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POVERTY, GROWTH, INEQUALITY AND PRO-POOR FACTORS: NEW EVIDENCE FROM MACRO DATA

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ABSTRACT

Poverty eradication will remain United Nations highest priority after the Millennium Development Goals-2015 deadline. Moreover, although impressive achievements in poverty cutting have been reached in the last decade, progress has been uneven, as inequality has been increasing. Hence, future poverty reduction strategies should be designed taking into account the nexus between economic development, inequality and the so-called "pro-poor factors", which represent the set of policies able to make economic growth beneficial for the poor. The aim of this paper is to provide a quantitative answer to the following questions: Does economic growth reduce poverty? If so, by how much? How economic inequality affects poverty? Does the responsiveness of poverty to growth and inequality depend on initial poverty and inequality? How do pro-poor policies influence the poverty-growth-inequality nexus? Although these questions have received a great deal of attention along the years, this paper makes use of the most complete and up-to-date comparable data on growth, poverty and inequality, as compiled by the World Bank PovcalNet. Moreover, it originally employs the System Generalised Method of Moments estimator. In particular, the present empirical exercise is built on an original unbalanced panel dataset, which comprises 109 developing countries observed between 1981 and 2008, in 8 different three-year growth spells. As for the econometric technique, System GMM has been proved to be the most efficient and best suited in the context of dynamic unbalanced panels. Our main results are in line with the existing literature. First, we find that the poverty elasticity to growth and inequality is, respectively, around -2% and 2%. Second, the poverty elasticity to growth is higher the more favorable the initial conditions (i.e. -0.89% and -2.5% for, respectively, high and low initial poverty and inequality). Third, the poverty elasticity to inequality is higher in relatively richer and more equal countries (i.e. 2.6%) than in poorer and more unequal countries (i.e. 0.39%). And, finally, we show that human capital, as measured as health and education, facilitates the effect of economic growth on poverty reduction (i.e. poverty elasticity of -0.89% and -2.5% for, respectively, high and low infant mortality). Our analysis suggests that, in designing policy reduction strategies, policy makers should carefully take into considerations initial poverty and the initial income distribution. Moreover, as for the fundamental importance of pro-poor policies, and human capital in particular, economic policies should go beyond the mere growth stimulus.
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Keywords: Poverty, Income Inequality, Poverty Elasticity, Pro-Poor Policies
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INTRODUCTION

During the Poverty Eradication Day, in October 2013, the Secretary-General of the United Nations, Mr Ban Ki-Moon, has declared that poverty eradication will remain the UN highest priority after the Millennium Development Goals-2015 deadline and that sustainable development will be at the core of any poverty reduction strategy. Mr Ban has also warned that, although in the last 13 years impressive achievements in poverty cutting have been reached, progress has been uneven, as inequality has been increasing and too many individuals still lack adequate access to health care and education[1]. Thus, future poverty reduction strategies should be designed taking into account the nexus between economic development, inequality and the set of policies that should make economic growth particularly beneficial for the poor. Such policies include education, health services, credit and property rights and they are known as "pro-poor factors" after Besley and Burgess (2003).[2]

The aim of this paper is to provide a quantitative answer to the following questions: Does economic growth reduce poverty? If so, by how much? How economic inequality affects poverty? Does the responsiveness of poverty to growth and inequality depend on initial poverty and inequality? How do pro-poor policies influence the poverty-growth-inequality nexus?

Although these questions have received a great deal of attention by eminent scholars along the years (Chen and Ravallion; Ravallion, 1997, 2001, 2012; Kalwij and Verschoor, 2007; Lopez and Serven, 2006; Bourguignon, 2003; Epaulard, 2003), we provide a novel contribution to the literature. In particular, the originality of our work relies in the data as well as in the econometric technique employed. More in details, on the one hand, we make use of the most complete and up-to-date comparable data on growth, poverty and inequality, as compiled by the World Bank PovcalNet project; and, on the other, for the first time in the field of poverty elasticity estimation, we adopt the System Generalised Method of Moments estimator (sys-GMM from here onwards) by Arellano and Bover (1995) and Blundell and Bond (1998). In line with existing empirical literature, our main findings are the following.

First, economic growth helps poverty reduction while inequality accelerations boost the number of the poor. In particular, we find that the poverty elasticities to growth and inequality are, respectively, around -2% and 2%. Second, poverty is more reactive to economic growth under favourable initial conditions in terms of poverty and inequality, with poverty elasticities equal respectively to -0.89% and -2.5% for high and low initial poverty and inequality. Third, the responsiveness of poverty to inequality crucially depends on the initial distribution of income. Consistently with Ravallion (2012), Lopez and Serven (2006) and Kalwij and Verschoor (2007), we show that the poverty elasticity to inequality is higher in relatively richer and more equal countries (i.e. 2.6%) than in poorer and more unequal countries (i.e. 0.39%).Finally, among the analysed pro-poor factors (i.e. human capital, credit availability and institutional development), we find that human capital, as measured by education and health, is what facilitates the most the

effect of economic growth on poverty reduction (e.g. poverty elasticity of -0.89% and -2.5% for, respectively, high and low infant mortality).

The implications of our study are highly policy relevant. In particular, our results show that the extent to which growth reduce poverty is very much dependent on the initial income distribution and, thus, on initial poverty and inequality. Hence, the classical perspective as according to which the poorest benefit from economic growth as much as everybody else (Dollar and Kraay, 2002) is not supported. On the contrary, our analysis clearly demonstrates that the income distribution plays a major role for the success of any poverty reduction strategy and, thus, it is crucial for policy makers to quantify the responsiveness of poverty to economic growth, given the relevant initial conditions in terms of poverty and inequality. Moreover, our findings enrich the spectrum of the literature aimed at estimating the effects of pro-poor factors on the poverty-growth relation. With this respect, we envisage that the most important contextual feature that affect the poverty elasticity to growth are the initial conditions in human capital, as measured by health and education. Thus, in line with Sen (1999), we show that the ability of the poor to benefit from economic growth crucially depends on the presence of some enabling conditions and, hence, economic growth and boosting consumption alone are unlikely to address poverty reduction.

The rest of the paper is organised as follows. Section 2 presents the five reduced forms estimated in the empirical exercise. Section 3 provides details on the data and the econometric technique employed. Section 4 discusses the results obtained. Section 5 presents a three-fold robustness check. Final comments and possible lines for future research conclude.

EMPIRICAL SPECIFICATIONS

Our exercise explores the interrelations between poverty, economic growth, inequality and pro-poor policies employing four different reduced forms. The first three estimable equations, exploring the poverty-growth-inequality nexus, are retrieved from the taxonomy of Bourguignon (2003), while the last one, which encompasses the effects of pro-poor policies on poverty reduction, has been inspired by De Janvry and Sadoulet (2000).

Following Bourguignon (2003), the first equation, also known in the literature as the Datt and Ravallion (1992) decomposition, is called the Standard Model. Formally:

$$\Delta \log P_{it} = \alpha + \beta_1 \Delta \log \mu_{it} + \gamma_1 \Delta \log G_{it} + \varepsilon_{it} \quad (1)$$

Where P_{it} stands for poverty in country i at time t; μ_{it} and G_{it} are, respectively, the country and time-specific mean income and Gini index and ε_{it} is the idiosyncratic error term. Thus, Equation (1) states that the percentage change in poverty depends on changes in mean income and changes in the distribution of income. In particular, the parameters β_1 and γ_1 represent, respectively, the poverty elasticity to growth and inequality. The second of our reduced forms is called the Standard Model Improved I and it is written as follows:

$$\Delta \log P_{it} = \alpha + (\beta_1 + \beta_2 \log G_{it-1} + \beta_3 \log P_{it-1})\Delta \log \mu_{it} + \gamma_1 \Delta \log G_{it} + \eta_1 \log G_{it-1} + \eta_2 \log P_{it-1} + \varepsilon_{it} \quad (2)$$

In this instance the role of initial conditions on poverty (i.e. P_{it-1}) and inequality (i.e.G_{it-1}) is considered. In particular, it is postulated that initial conditions affect poverty changes both directly, via the parameters η_1 and η_2, as well as indirectly, via their effect on the poverty elasticity to growth, through β_2 and β_3. Employing the values of the estimated parameters $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ at meaningful values of initial inequality and initial poverty, we are able to calculate the poverty elasticity to growth "corrected" for initial conditions as follows: $\delta(\Delta \log P_{it}) / \delta(\Delta \log \mu_{it}) = \hat{\beta}_1 + \hat{\beta}_2 \log G_{it-1} + \hat{\beta}_3 \log P_{it-1}$

The third model is named Standard Model Improved II and it permits to compute not only the poverty elasticity to growth corrected for initial inequality and initial poverty but also the poverty elasticity to inequality corrected for the same factors, that is: [3]

$$\Delta \log P_{it} = \alpha + (\beta_1 + \beta_2 \log G_{it-1} + \beta_3 \log P_{it-1})\Delta \log \mu_{it} + (\gamma_1 + \gamma_2 \log G_{it-1} + \gamma_3 \log P_{it-1})\Delta \log G_{it} + \eta_1 \log G_{it-1} + \eta_2 \log P_{it-1} + \varepsilon_{it} \quad (3)$$

Employing the estimated parameters $\hat{\gamma}_1$, $\hat{\gamma}_2$ and $\hat{\gamma}_3$ at meaningful values of initial inequality and initial poverty, we calculate the poverty elasticity to inequality "corrected" for initial conditions as follows: $\delta(\Delta \log P_{it}) / \delta(\Delta \log G_{it}) = \hat{\gamma}_1 + \hat{\gamma}_2 \log G_{it-1} + \hat{\gamma}_3 \log P_{it-1}$.

Finally, in the spirit of De Janvry and Sadoulet (2000), the last equation estimated considers the direct and indirect roles of some selected pro-poor factors for poverty reduction. Formally:

$$\Delta \log P_{it} = \alpha + \beta_1 \Delta \log \mu_{it} + \gamma_1 \Delta \log G_{it} + \eta_1 \log G_{it-1} + \eta_2 \log P_{it-1} + \varphi \log X_{t-1} + \xi(\log X_{it-1} * \Delta \log \mu_{it}) + \varepsilon_{it} \quad (4)$$

Where matrix X collects the selected pro-poor growth factors that are human capital, credit constraints and institutional proxies. Such variables are taken at the beginning of the spell because it is customary to assume that their effects show up with some lags as well as to minimise the risk of endogeneity. The parameter φ captures the direct effects of the growth-enabling conditions on poverty reduction, while the parameter ξ captures the indirect ones. As previously done, employing the estimates of such parameters evaluated at meaningful values of the variable of interest (e.g. human capital and

institutions) we compute the poverty elasticity to growth "corrected" for pro-poor policies as follows: $\delta(\Delta \log P_{it}) / \delta(\log \mu_{it-1}) = \hat{\beta}_1 + \hat{\xi}(\Delta \log X_{it})$

DATA AND ECONOMETRIC TECHNIQUE

We use World Bank-PovcalNet, which collects the most up-to-date and reliable information on poverty and inequality to build an original unbalanced panel dataset, which comprises 109 developing countries observed between 1981 and 2008, in 8 different three-year growth spells, for a total of 847 observations. Details on the sample, variables and some descriptive statistics can be found in the Appendix (Tables A1, A2 and A3).

More in details, World Bank-PovcalNet is an online tool which allows users to calculate aggregate internationally and inter-temporally comparable poverty figures for different poverty lines, using the World Bank Poverty Monitoring Data Base, developed by Ravallion and Chen (1997). Such a dataset collects national households' survey data and its latest release comprises 850 household surveys at three-year waves, from 1981 to 2008, in 127 developing countries. To the best of our knowledge, such a dataset has been used in the context of poverty elasticity estimation only by Lenagala and Ram (2010).

PovcalNet offers three main advantages.[4] First, the international and inter-temporal comparability of poverty figures, as ensured by the use of 2005- International Comparison Program (ICP) Purchasing Power Parity exchange rates. Second, the ready availability of a wide spectrum of poverty indicators and, third, the country coverage. It is worth noticing that PovcalNet collects comparable data for 80% of developing world (i.e. 127 countries over a total of 158, as according to WB definition) and that our sample covers 109 countries, which represents the 70% of developing economies.

We use PovcalNet to calculate the poverty headcount ratio, the poverty gap and its square at 38 2005-PPP Dollars ($38 from here onwards) per month and 60 2005-PPP Dollars ($60 from here onwards) per month. As for the 2005-ICP, the $38 per month, or $1.25 a day, poverty line replaces the old "dollar a day" and it is the current threshold for extreme poverty. The $60 per month, or $2 a day, threshold represents, instead, the median poverty line of all developing countries during the period under consideration.

For what concerns the poverty indicators employed in our econometric exercise, we focus principally on the headcount ratio. This is because such an indicator has, not only a straightforward interpretation, but it is also the most commonly cited poverty statistic (Collier and Dollar, 2001).[5]

PovcalNet household consumption-based income measures have been preferred to national accounts' ones, following previous studies on poverty, such as for example, Kalwij and Verschoor (2007).[6]

Turning now to the econometric technique, for the first time in the field of poverty elasticity estimation, we employ the sys-GMM estimator by Arellano and Bover (1995) and Blundell and Bond (1998). Such an identification strategy is motivated by two main considerations: (i) the endogeneity of poverty, growth, inequality, and pro-poor factors;

(ii) the superiority of sys-GMM with respect to the first-differenced GMM estimator by Arellano and Bond (1991). In the context of dynamic unbalanced panel data, having a large cross-sectional but a small times-series dimension, the sys-GMM outperforms the first-differenced GMM in terms of efficiency as well as the sys-GMM transformation minimises the gaps in unbalanced panels (Caselli et al, 1996; Bond et al, 2001; Blundell and Bond (1998) and Roodman, 2006).

Nevertheless, there are some caveats to keep in mind. In sys-GMM, the number of instruments tends to increase rapidly with the endogenous variables. This might weaken the Hansen test for over-identification restrictions as well as it might increases the finite-sample bias. To tackle these issues we adopt a specification that limits the number of instruments. Following Roodman (2006), we limit the number of lags employed and we "collapse" the instrument matrix. More technically, the estimates were performed using the "collapse" option that is available in Stata 12 which implies that one instrument is created for each variable and lag distance, instead of for each time period. Finally, as customary, we use the Arellano-Bond test for detecting the order of serial correlation and thus for assessing the appropriateness of the instruments.

RESULTS

The Poverty Elasticity to Growth and Inequality

In this section we discuss, with reference to the existing literature, our keys findings on the poverty elasticity to growth and inequality. Table 1 reports in chronological order the most relevant studies in the field and it summarises them. It is worth noticing that our estimates are comparable with the previous ones, as for both the empirical specifications as well as for the data employed, which have been mainly from the World Bank.

TABLE 1. EXISTING LITERATURE ESTIMATES

The Poverty Elasticity to Income

Authors, Year	Observations Period	Estimator	Poverty Measure	Equation estimated	Poverty Elasticity to Income
Ravallion and Chen (1996)	64 1981-1994	OLS	PH $1	Standard Model	3.1%
Ravallion (1997)	41 1981-1994	OZLS	PH $1.5	Standard Model + gini*income	3.3% (low gini)- 0.59% (high gini)
De Janvry and Sadoulet (2000)	12 1970-1994	OLS	PH $1	Standard Model + gini*income	.61%(low gini)).23% (high gini)
				Standard Model + poverty*income	1.98% (low poverty)).73% (high popoverty
Bourguigon (2003)	114 1980-1996	OLS	PH $1	Standard Model	2.012%
				Standard Model I	5%
			PG $1		1.8%
Epaulard (2003)	99	OLS	PH $2	Standard model + gini*income	3.6% (low gini) -1% (high gini)

Adams (2004)	126 1980-1996	OLS	PH $1.08 PG PG^2	Standard Model	2.7% 3.83% 2.28%
Ram (2006)	1990	n/a	PH	n/a	1.5%
Ram & Lengala (2010)	1999-2005	direct approach	$1.25		1.6%
Lopez and Serven (2006)	794	OLS	PH $1.25	Standard Model I	6.05% (low gini & high development) 0.39% (high gini & low development)
Kalwij and Verschoor (2007)	141 1980 1990 Mid-1990	Difference GMM	PH $2	Standard Model Standard Model II	2.32% 1.5% 1.43% 1.31%
Fosu (2010)	456 1980-2004	FE		Standard Model + gini*income	0.5% high gini 7.9% low gini
Lenagala and Ram (2010)	1980s 1990s 1999-2005	n/a direct approach	PH $1.25	n/a	3.44% 1.54% 1.42%
Chambers & Dhongde (2011)	94 1997-2007	Non parametric	PH $1.25	n/a	2.2% high Gini 3.8% low Gini

The Poverty Elasticity to Inequality

Authors, Year	Data/Period	Estimator	Poverty Measure	Equation estimated	Poverty Elasticity to Inequality
Bruno, Ravallion, Squire (1998)	1984-1992	OLS	PH $1	Standard Model	3.86%
Bourguigon (2003)	114	OLS	PH	Standard Model St.Model Impr.I	4.7% n/a
			PG	Standard Model St.Model Impr.I	7.2% n/a
Besley and Burgess (2003)		OLS	Headcount $1 a day		2.7%
Lopez and Serven (2006)	794	OLS	PH $1.25	Standard Model I	12.34% (low gini & high development) 0.35% (high gini & low development)
Kalwij and Verschoor (2007)	141 1980, 1990 Mid-1990	GMM	PH $2	Standard Model St.Mod.Impr.I St.Mod.Impr.II	0.5 0.63 0.8

Note: PH is the poverty headcount ratio, PG is the poverty gap. RE is random effect, FE is fixed effect. The poverty elasticity to income is in its absolute value. All the listed studies use the World Bank Poverty Data, except for Lopez and Serven (2006) which uses the Dollar and Kraay (2002) dataset.

TABLE 2. POVERTY, GROWTH AND INEQUALITY

	Rate of change of PH ($38 per month)			Rate of change of PH ($60 per month)		
VARIABLES	(1)	(2)	(3)	(1)	(2)	(3)
incchange	-1.72***	-2.586	0.455	-1.66***	-5.497**	-2.290
	(0.208)	(2.382)	(2.392)	(0.293)	(2.387)	(2.345)
ginichange	0.132**	2.130***	1.473**	0.168**	1.746***	1.797*
	(0.0565)	(0.599)	(0.740)	(0.0749)	(0.526)	(1.049)
L.Lhpl38		-0.28***	-0.19***			
		(0.0795)	(0.0623)			
L.Lhpl60					-0.26***	-0.17***
					(0.0592)	(0.0663)
L.Lgini		1.925***	0.901		1.218**	0.952*
		(0.596)	(0.572)		(0.547)	(0.573)
l.Lhpl38*incchange		0.311***	0.377***			
		(0.0692)	(0.0717)			
l.Lhpl60*incchange					0.158	0.256**
					(0.193)	(0.125)
l.Lgini*incchange		0.176	-0.731		1.065	0.0171
		(0.607)	(0.616)		(0.709)	(0.601)
l.Lhpl38*ginichange			-0.142			
			(0.210)			
l.Lhpl60*ginichange						-0.137
						(0.270)
l.Lgini*ginichange			0.163			0.125
			(0.113)			(0.138)
Constant	-0.31***	-6.36***	-2.947	-0.30***	-3.700**	-3.079
	(0.0869)	(2.023)	(1.955)	(0.0991)	(1.848)	(1.909)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	847	847	847	847	847	847
Number of ID	109	109	109	109	109	109
N. Instrument	20	32	38	20	32	38
AR(1)-p value	0.000827	0.000669	0.000467	0.00442	0.00430	0.000763
AR(2)-p value	0.984	0.340	0.325	0.608	0.923	0.396
Hansen- p value	0.0490	0.761	0.692	0.179	0.857	0.637

*Notes: Incchange is the rate of change of mean income from survey; gini change is the rate o change of gini coefficient; l.Lgini is lagged gini coefficient; l.Lhpl38 is the lag of poverty headcount at $38 per month; l.Lhpl60 is the lag of poverty headcount at $60 per month. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

For what concerns the Standard Model, the first column of Table 2 shows that the poverty elasticity to growth is around -1.7% for both poverty lines. Comparing our results with the ones of the established literature, the value of the poverty elasticity to growth is in line with the ones obtained using GMM while is unsurprisingly lower, in absolute value, than the ones found in studies that employ OLS. For instance, Kalwij and Verschoor (2007), which uses GMM and it employs the $2 a day poverty line, gets a poverty elasticity to growth that, despite its variation across world regions, it is around -

1.5% on average[7]. Bourguignon (2003) and Bruno, Ravallion and Squire (1998), employing OLS, obtain, instead, an higher elasticity in absolute value, equal respectively to -2.01% and -2.28%. The lower GMM estimates are motivated by the fact that the GMM estimators have a lower bias than OLS (Soto, 2010). Finally, it is worth noticing that our finding of a lower poverty elasticity to growth -in absolute value- at the $2 a day poverty line with respect to the one at $1.25 a day is in line with recent estimates that find a lower elasticity at higher poverty lines (Lenagala and Ram, 2010). Turning now to the poverty elasticity to inequality, Table 2 shows that, in all the estimated models, and for both poverty lines, an increase in inequality is associated with higher poverty rates.

Passing now to the discussion of the effect of initial conditions, as encompassed by Standard Model Improved I and II (i.e. Equation 2 and 3, respectively), it must be recalled that, as explained in Section 2, the poverty elasticity to growth and the poverty elasticity to inequality are obtained at meaningful levels of the initial levels of poverty and inequality. Table 3 reports the poverty elasticities to growth and inequality, based on Equation (2) estimated coefficients[8].

Table 3 shows that the initial levels of poverty and inequality can dramatically change the effectiveness of growth in reducing poverty. In particular, poverty is shown to be more reactive to economic growth under favourable initial conditions. As a matter of facts, when poverty it is measured at $1.25 per day, the absolute value of the poverty elasticity to growth is 1.2% if initial poverty and inequality take their median values (i.e. ginipovp50). At high level of initial poverty and inequality (i.e. ginipovp90), instead, the absolute value of the elasticity decreases to 0.89%, while at low levels of initial poverty and inequality (i.e. ginipovp10) it increases to 2.5%. The same conclusion can be reached when employing the $2 a day poverty line. In this case, the absolute value of the poverty elasticity to growth corrected for initial poverty and inequality ranges between 0.7% (at ginipovp90) and 1.9% (at ginipovp10). Our findings are very much in line with the ones of the existing literature, which are collected in Table 1. In particular, it seems to be a quite well established result that the more favourable the initial conditions in terms of poverty and inequality the greater the effect of economic growth on poverty reduction (see, for example, Ravallion, 1997; De Janvry and Sadoulet, 2000; Epaulard, 2003; and Fosu, 2010). Moreover, our results are very similar to the ones obtained by Kalwij and Verschoor (2007), when estimating the Standard Model Improved II using GMM at the $2 a day poverty line. At mean values of initial level of inequality and development (defined as the ratio of mean income to the poverty line), their corrected poverty elasticity to growth ranges between 1.3% and 1.5% in absolute value and ours is slightly more than 1%.

Concluding with the analysis of the poverty elasticity to inequality, the calculations included in Table 3 unveil an inverse relationship between the poverty elasticity to inequality and the initial conditions on poverty and inequality. To clarify, this means that a worsening in the initial conditions makes the poverty rate to increase faster, for a given acceleration in inequality, in relatively richer and more equal countries.

TABLE 3. POVERTY ELASTICITY CORRECTED FOR INITIAL CONDITIONS

	Poverty Elasticity to Mean income Growth			Poverty Elasticity to Inequality		
Poverty Headcount($38 per month)						
Value of initial Gini and Poverty	**Coef.**	**Std. Err.**	**P>|z|**	**Coef.**	**Std. Err.**	**P>|z|**
ginipovp50	-1.157	0.136	0.000	1.660	0.503	0.000
ginipovp10	-2.513	0.491	0.000	2.214	0.876	0.000
ginipovp90	-0.897	0.177	0.000	1.528	0.668	0.000
Poverty Headcount ($60 per month)						
ginipovp50	-1.013	0.170	0.000	0.824	0.393	0.036
ginipovp10	-1.875	0.484	0.000	2.612	0.609	0.000
ginipovp90	-0.699	0.171	0.000	0.394	0.478	0.410

Notes: ginipovp50 : gini and poverty at 50th percentile; ginipovp10: gini and poverty at 10th percentile; ginipovp90: gini and poverty at 90th percentile; ginip90povp50.

If we take for instance the $2 a day poverty line, the poverty elasticity to inequality ranges between 0.39 % (at high level of initial poverty and inequality) and 2.6% (at low level of initial poverty and inequality). This result must be interpreted in the light of the fact that the poverty elasticity to inequality crucially depends on the initial distribution of income. With the words of Ravallion (2012), high initial inequality matters to poverty reduction only in so far it entails a high initial incidence of poverty relative to the mean. Moreover, it is reassuring that our findings mimic the ones of the established literature. Lopez and Serven (2006) obtained the same inverse relationship between poverty elasticity to inequality and initial conditions, while demonstrating that the distribution of per capita income is well approximated by a lognormal density. Finally, Kalwij and Verschoor (2007) estimate the poverty elasticity to inequality at mean level of the interactions to be between 0.5% and 0.8% and our estimate for the median level is also 0.8%.

The Poverty Elasticity to Growth and Pro-Poor Factors

In this section we assess the role that pro-poor factors have for poverty reduction, as according to Equation (4). In particular, we consider human capital (i.e. health and education), credit constraints (i.e. credit to private sector and Foreign Aid) and institutions (i.e. prevalence of law and order and quality of bureaucracy). The pro-poor factors analysed are introduced one at a time in separate regressions so that we can clearly identify the direct and indirect effects of each variable. The details of our estimates are reported in Table 4. Again, all models include year and regional dummies. The Arellano-Bond test and the Hansen J statistic are also reported. These diagnostic tests mostly show acceptable results, indicating that our estimates are reliable. Overall our findings show that improvements in human capital, institutions and credit availability substantially increase the responsiveness of poverty to income growth. With the only exception of primary school enrolment, all these variables are highly significant.

TABLE 4. POVERTY ELASTICITY AND PRO-POOR FACTORS

	Rate of Change of PH ($38 per month)							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Income change	-4.3***	11.1***	5.86***	2.120**	-1.7***	-0.439*	-1.001	-0.48**
	(0.611)	(2.113)	(2.259)	(1.066)	(0.295)	(0.228)	(0.909)	(0.219)
Gini change	0.0286	-0.0606	1.415*	1.700**	1.186**	0.0326	-0.0442	-0.105
	(0.114)	(0.107)	(0.77)	(0.829)	(0.473)	(0.113)	(0.116)	(0.133)
L.Lhpl38	-0.08***	-0.05***	-0.05***	-0.07***	-0.08***	-0.07***	-0.05***	-0.06***
	(0.02	(0.015)	(0.02)	(0.022)	(0.03)	(0.028)	(0.017)	(0.024)
L.Lgini	-0.0377	-0.0921	-0.0272	0.143	0.0719	-0.0702	-0.155*	-0.157
	(0.077)	(0.069)	(0.084)	(0.091)	(0.111)	(0.101)	(0.087)	(0.1)
L.Lmortality	0.104***							
	(0.037)							
incchange*l.Lmortality	0.660***							
	(0.125)							
L.Llife		-0.27***						
		(0.097)						
incchange*l.Llife		-3.13***						
		(0.546)						
L.Lschenrol1			0.001					
			(0.037)					
incchange*Lschenrol1			-1.70***					
			(0.528)					
L.Lschenrol2				-0.06***				
				(0.023)				
incchange*l.Lschenrol2				-1.03***				
				(0.311)				
L.Lbeaurqual					-0.15**			
					(0.06)			
incchange*Lbeaurqual					-0.192			
					(0.481)			
L.Llaw						-0.0491		
						(0.0385)		
incchange*Llaw						-1.08***		
						(0.296)		
L.Lcredit							-0.0389*	
							(0.0225)	

Incchange*Lcredit							-0.214	
							(0.273)	
L.Lnetaid								
								0.00791
incchange*Lnetaid								(0.0101)
								0.334***
								(0.0784)
Constant	-0.271	1.39***	-0.0698	-0.36	0.099	0.473	0.570*	0.563
	(0.339)	(0.445)	(0.274)	(0.291)	(0.358)	(0.366)	(0.323)	(0.387)
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	841	847	642	592	425	499	687	705
Number of ID	109	109	105	106	81	85	108	108
N. instrument	26	26	26	26	39	39	30	30
AR(1)- pvalue	0.000574	0.000726	0.00544	0.00591	0.00223	0.00143	0.00227	0.000563
AR(2)-p value	0.791	0.812	0.446	0.943	0.52	0.435	0.969	0.841
Hansen- p value	0.0497	0.0129	0.305	0.0568	0.856	0.957	0.732	0.441

*Notes: Incchange is the rate of change of mean income from survey; gini change is the rate o change of gini coefficient; l.Lgini is lagged gini coefficient; l.Lhpl38 is the lag of poverty headcount at $38 per month; Lmortality is infant mortality; Llife is life expectancy; Lschenrol1/2 are primary and secondary school enrolment; Lbeaurqual is beaurocratic quality; Llaw is law and order; Lcredit is credit to private Sector as share of GDP; Lnetaid is Net official development assistance and official aid Collapse option used in stata 10. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

Columns 5 and 6 of Table 4 reports the effect of institutions. Our estimates show better institutions are associated with lower poverty rate (i.e. negative sign), however only the quality of bureaucracy is statistically significant. Finally the last two columns of Table 4 show the impact of credit constraints. While credit is negative and significant as expected, aid is not significant.

In order to unveil how the pro-poor factors analysed affect the responsiveness of poverty to economic growth, we focus our discussion on the interactive terms between these variables and income growth (i.e. coefficient ξ in Equation 4). Moreover, to analyse the effects of distinct policy manoeuvres in a comparative light, we calculate the corrected growth elasticity of poverty at three levels of the variable of interest: the median, the 10^{th} and the 90^{th} percentile. The results are summarized in Table 5, where each percentile of interest has been associated with a country pertaining to such a percentile.

Table 5 shows how different level of mortality, life expectancy and schooling affect the responsiveness of poverty to income growth. First we must point that the interactions between these variables and income growth are always highly significant. This is a particularly important result as it indicates that the level of human capital significantly affects the poverty elasticity to income. Although the role that human capital plays in economic development is well known (Hanushek and Wößmann, 2008), in the

empirical literature its effect on the poverty elasticity to growth seems ambiguous. While De Janvry and Sandoulet (2000) and Chibber and Nayyar (2007) find that health and schooling have a significant impact on the growth elasticity of poverty, Epaulard (2003), using a combined indicator of adult literacy, primary schooling and mortality, does not find any significant effects. Our calculations show that increasing health or schooling can dramatically change the poverty elasticity to growth. For example with high level of infant mortality, the equivalent of Chad in our sample, the poverty elasticity is -0.88%, however if mortality decreases to the level of Bulgaria, the elasticity turns out to be -2.5%. Similarly at high level of secondary schooling the poverty elasticity is -2.5% and at low level is -0.43%. The latter values are very close to those estimated by De Janvry and Sadoulet (2000). In fact they estimate the poverty elasticity to be -1.59% at high level of education and -0.58% at low level of education.

TABLE 5. POVERTY ELASTICITY TO MEAN INCOME AND PRO POOR FACTORS

Mortality				
Quantile	***Country***	***Coef.***	***Std. Err.***	***P>|z|***
50th	Algeria	-1.513052	.1370861	0.000
10th	Bulgaria	-2.434946	.270563	0.000
90th	Chad	-.8871882	.1283009	0.000
Life Expectancy				
50th	India	-1.839494	.1727207	0.000
10th	Mali	-.8481958	.0800453	0.000
90th	Estonia	-2.252692	.2391037	0.000
Primary School Enrollment				
50th	The Gambia	-1.963459	.26775	0.000
10th	Burkina Faso	-1.076315	.222712	0.000
90th	Croatia	-2.239927	.330947	0.000
Secondary School Enrollment				
50th	El Salvador	-2.052529	.2501049	0.000
10th	Angola	-.4325761	.3295997	0.000
90th	Estonia	-2.585981	.3879347	0.000
Beaurocratic Quality				
50th	Bulgaria	-1.909038	.2608368	0.000
10th	Nigeria	-1.776233	.2951705	0.000
90th	Slovenia	-1.986724	.4000749	0.000
Law and Order				
50th	Peru’	-1.630387	.1959061	0.000
10th	Congo, Dem. Rep.	-.878402	.1492826	0.000
90th	Croatia	-2.184574	.3228273	0.000
Credit				
50th	Sri Lanka	-1.74194	.1798729	0.000
10th	Rwanda	-1.50804	.2975655	0.000
90th	South Africa	-1.946124	.3601845	0.000

Aid				
50th	Swaziland	-1.477747	.1306238	0.000
10th	Gambia, The	-2.440077	.3014377	0.000
90th	Nigeria	-1.016055	.1332451	0.000

Notes: These calculation are based on the regression reported in Table 4

We now turn onto analyse the effect of institutions and credit availability on the poverty elasticity to growth. The analysis of the impact of institutions on the poverty-growth relationship is scarce. However recent studies find that reduction in regulations enhances the absolute value of the poverty elasticity to growth (Chibber and Nayyar, 2007) and that that low corruption promotes economic growth and minimises income distribution conflicts and this, in turn, foster poverty reduction (Tebaldi and Mohan, 2010).

Table 5 shows that better institutions and increased credit availability significantly increase the poverty elasticity to growth, taken in absolute value. Thus, our results support recent evidence that credit availability to private sector can improve the effectiveness of growth in reducing poverty (Chibber and Nayyar, 2007). Aid also significantly affects the poverty elasticity to growth, although, interestingly, our calculations show that higher level of aid is associated with a slower pace of poverty reduction. This result is in line with the skeptical view about the developmental impact of aid (see, for example, Alesina and Weder, 2002) and it possibly indicates that aid itself is not sufficient to enable the poor with the 'capabilities' necessary to participate in the process of economic growth.

ROBUSTNESS CHECKS

In order to assess the robustness of our results, we employ a three-fold check.

First, we re-estimate Equations 1 to 4 using the pooled OLS and Fixed Effects estimators. Table A4 collect such estimates for the poverty line at $38 a month.[9]. This is done for two main reasons. On the one hand, it is useful for checking whether the results obtained are robust to the econometric technique employed and, on the other, it serves to validate the use of the sys-GMM estimator. Table A4 shows that, qualitatively, the results hold despite the different estimators employed. In particular, it could be noticed that the interactive terms analysed remain significant and have the expected sign. With respect to the appropriateness of the sys-GMM estimator, it is well known that the GMM estimates for the lagged dependent variable should fall between the upwardly biased OLS estimate (Hoeffler, 2002) and the downwardly biased fixed effects one (Nickell, 1981). From Table A4, it is apparent that in most of the cases, the coefficients on the lagged dependent variable lie close to the expected range.

Second, following Bourguignon (2003) and Kalwij and Verschoor (2007), instead of controlling for the lagged dependent variable we include the initial level of development, defined as the ratio of the poverty line to mean income. At this point, it must be noticed that if, on the one hand, using initial level of poverty serves to fully exploit the properties of the sys-GMM estimator in dealing with endogeneity issues in the context of dynamic panel data (Bond et al., 2001), on the other, employing the initial

level of development (i.e. the ratio of the poverty line to mean income) ensures that the estimated model has the residual term at its minimum (Kalwij and Verschoor, 2007).[10] The results reported in Table A5 show that changing the definition of the lagged dependent variable does not alter our main results.

The accuracy of our main exercise is further confirmed by the checks reported in Table A6, where we calculate the poverty elasticity to growth corrected for the initial level of development (i.e. the ratio of the poverty line to mean income) and initial inequality. The values obtained in this instance mimic quantitatively and qualitatively the ones of the main exercise (see Table 3 for reference). In particular, improvements in the initial level of development have still a statistically significant negative impact on poverty growth while any acceleration in inequality leads to more poor. Moreover, the corrected poverty elasticity to income range between -2.9%, at the most favourable initial conditions (i.e. low inequality and high development), and -0.1%, at the least favourable initial conditions (i.e. high inequality and low development). The poverty elasticity to inequality still exhibits a negative relation with initial conditions, being equal to 2.1% at the most favourable initial conditions and to 1.2% at the worst ones.

The last checks we make are reported in Table A7, where we estimate Equations 1-4 using the poverty gap and the squared poverty gap. Once again our main qualitative results are supported.

CONCLUSIONS AND POLICY IMPLICATIONS

Given the importance of poverty reduction for domestic and international policy makers, governments and academics have long discussed what can improve the living conditions of the poor. At the prime of the "Washington Consensus" the main policy prescription from institutions such as the World Bank was that developing countries should focus on achieving economic growth. Such a view has been backed up by Dollar and Kraay (2002), who demonstrate that growth had a neutral impact on the distribution of income. Hence, the poorest should benefit from growth as much as everybody else. However, a decade of research on the poverty-growth nexus has much questioned such a statement. Recent studies have uncovered a large variation in the way that poverty responds to economic growth. A new consensus has emerged around the fact that the extent to which growth reduced poverty is very much dependent on the initial distribution of income, and hence on the level of inequality. Taking this into consideration, several empirical studies have analysed the intertwined relationship between poverty, growth and inequality. Another, although less developed, strand of the literature has analysed the effect of pro-poor factors on the poverty-growth relationship.

Employing the most up-to-date data on a very broad spectrum of developing countries (i.e. 72% as according the World Bank definition) as well as the System-GMM estimator, our work offers novel quantitative assessment of the intertwined relationship between poverty, economic growth, inequality and pro-poor factors.

Our empirical exercises shows three key results that are in line with the existing literature.

First, economic growth helps poverty reduction while inequality accelerations boost the number of the poor. In particular, we find that the poverty elasticities to growth and inequality are, respectively, around -2% and 2%. Second, poverty is more reactive to economic growth under favourable initial conditions in terms of poverty and inequality, with poverty elasticities equal respectively to -0.89% and -2.5% for high and low initial poverty and inequality. Third, the responsiveness of poverty to inequality crucially depends on the initial distribution of income. Consistently with Ravallion (2012), Lopez and Serven (2006) and Kalwij and Verschoor (2007), we show that the poverty elasticity to inequality is higher in relatively richer and more equal countries (i.e. 2.6%) than in poorer and more unequal countries (i.e. 0.39%).

Moreover, we find novel empirical evidence that the pro-poor factors can dramatically increase the responsiveness of poverty to economic growth. In particular, we find that human capital, as measured by education and health, is what facilitates the most the effect of economic growth on poverty reduction (e.g. poverty elasticity of -0.89% and -2.5% for, respectively, high and low infant mortality). Thus, as according to Sen (1999), we provide new empirical support that the ability of the poor to participate in economic growth depends on the presence of some enabling conditions and, then, economic growth and boosting consumption alone are unlikely to address poverty reduction.

The implications of our study are highly policy relevant. The understanding of the responsiveness of poverty to growth and inequality is crucial when designing policy reduction strategy. Moreover, our calculations help to quantify the aggregate impact of policies geared at improving human capital stock, financial and institutional development on the poor.

Our study opens further lines of research. The first one is related to enriching the spectrum of pro-poor factors, evaluating, for example, the effects of different labour market institutions and policies on the poverty elasticity to growth. Then, complementing the macro-based evidence here provided with micro-empirical work would be of extreme importance, in order to fully understand why some individuals can take advantage of the opportunities brought by economic growth while others cannot.

ENDNOTES

*Acknowledgement

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[1] See Poverty Eradication Day, 17 October 2013: http://www.un.org/apps/news/story.asp?NewsID=46275 &Cr=poverty&Cr1=#.UmfTq85wbIV

[2] See De Janvry and Sadoulet (2000) for an exhaustive review.

[3] For a formal derivation of the Standard Model Improved II see Kalwij and Verschoor (2007), which demonstrate that Equation (3) can be obtained taking a linear approximation of Equation (1).

[4] See for more details on this point PovcalNet-Methodology: http://iresearch.worldbank.org/ovcalNet/index.htm?0,2 [5] For an exhaustive discussions on the properties of other poverty indicators, such as the poverty gap and its square, see, respectively, Deaton (2003) and Lopez (2006).

[6] For a complete review of the debate on whether it is better to use consumption data from surveys or from national accounts see Deaton (2003).

[7] From -0.71% for Sub-Saharan Africa to -2.27% for the Middle East and North Africa and -1.31% for Eastern Europe, South and East Asia, and Latin America.
[8] These calculations are available on request. We also performed similar calculations using the estimated coefficients in Equation (3), obtaining similar results. Also these results are available upon request.
[9] To save some space we do not report the results obtained employing the $60 per month poverty line but they are available upon request.
[10] Kalwij and Verschoor (2007) demonstrates that in the Standard Model Improved II (i.e. Equation 4), which encompasses all the others reduced forms we estimate, the relation between left and right hand side variables is exact, in the sense that the residual term is minimised, when the ratio of the poverty line to the initial cross-country mean income is employed. This is because such a model is built upon the properties of Foster-Greer-Thorbecke (1984) poverty measures.

DATA APPENDIX

TABLE A1. NUMBER OF OBSERVARIONS FOR EACH COUNTRY INCLUDED IN THE SAMPLE *

Country	Freq.	Country	Freq.	Country	Freq.
Albania	9	Honduras	7	Swaziland	8
Algeria	8	Hungary	8	Tajikistan	8
Angola	8	Iran	8	Tanzania	8
Armenia	9	Jamaica	8	Thailand	9
Azerbaijan	5	Jordan	6	Timor-Leste	8
Bangladesh	8	Kazakhstan	9	Togo	8
Belarus	9	Kenya	8	Trinidad and Tobago	6
Benin	8	Republic	6	Tunisia	8
Bhutan	8	Lao PDR	9	Turkey	8
Bolivia	9	Latvia	4	Turkmenistan	8
Bosnia Her.	8	Lesotho	8	Uganda	8
Botswana	8	Liberia	8	Ukraine	9
Brazil	9	Lithuania	7	Uruguay	2
Bulgaria	7	Macedonia, FYR	3	Venezuela, RB	8
Burkina Faso	8	Madagascar	8	Vietnam	9
Burundi	8	Malawi	8	Yemen, Rep.	8
Cambodia	9	Malaysia	8	Zambia	8
Cameroon	8	Mali	8		
Cape Verde	8	Mauritania	9		
Central African Republic	9	Mexico	9		
Chad	8	Moldova, Rep.	9		
Chile	8	Morocco	8		
Colombia	5	Mozambique	8		
Comoros	8	Namibia	8		
Congo, Dem. Rep.	8	Nepal	6		
Congo, Rep.	8	Nicaragua	8		
Costa Rica	9	Niger	8		
Croatia	9	Nigeria	8		
Czech Republic	3	Pakistan	8		
Cote d'Ivoire	9	Panama	8		
Djibouti	8	Papua New Guinea	8		
Dominican Rep.	9	Paraguay	9		

Ecuador	9	Peru	9
Egypt	8	Philippines	8
El Salvador	9	Poland	9
Estonia	8	Romania	9
Ethiopia	8	Russia	8
Gabon	8	Rwanda	8
Gambia, The	8	Senegal	8
Georgia	5	Sierra Leone	2
Ghana	8	Slovakia	5
Guatemala	7	Slovenia	8
Guinea	8	South Africa	8
Guinea-Bissau	8	Sri Lanka	8
Guyana	8	St. Lucia	8
Haiti	8	Suriname	8

*Notes: *Based on sample of equations estimated in Table 2*

TABLE A2. DEFINITION AND SOURCES OF VARIABLES

Variable Name	**Variable Definition**	**Variable Source**
Povchange	Logarithmic change of poverty headcount at $38 per month	PovcalNet, WB
Pov2change	Logarithmic change of poverty headcount at $60 per month	PovcalNet, WB
Pov3change	Logarithmic change of poverty gap at $38 per month	PovcalNet, WB
Pov4change	Logarithmic change of poverty gap squared at $38 per month	PovcalNet, WB
Incchange	Logarithmic change of mean income	PovcalNet, WB
Ginichange	Logarithmic change of gini coefficient	PovcalNet, WB
Lhpl38	Logarithm poverty headcount ratio at $38 per month	PovcalNet, WB
Lhpl60	Logarithm poverty headcount ratio at $60 per month	PovcalNet, WB
Lpgl38	Logarithm poverty gap at $38 per month	PovcalNet, WB
Lpgsl38	Logarithm poverty gap squared at $38 per month	PovcalNet, WB
Lgini	Logarithm Gini coefficient	PovcalNet, WB
Ldev	Logarithm ($38/mean income)	PovcalNet, WB
Lmortality	Logarithm infant mortality	World Development Indicators(WDI)
Llife	Logarithm life expectancy	WDI, WB
Lschenrol1/2	Logarithm of primary (1)/secondary school enrolment (2)	WDI, WB
Lcredit	Logarithm credit to private Sector as share of GDP	WDI, WB
Lnetaid2gdp	Logarithm Net official development assistance and official aid received as share of GDP	WDI, WB
Llaw	Logarithm of Law and Order	International Country Risk Guide (ICRG)
Lbeaurqual	Logarithm of bureaucratic quality	International Country Risk Guide (ICRG)

TABLE A3. SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
povchange	847	-.0516591	.5512497	-2.744418	5.349486
pov2change	847	-.0276277	.4831353	-3.243336	5.09375
pov3change	845	-.0628386	.5759617	-2.833213	3.850148
pov4change	834	-.0587665	.6742211	-4.110874	4.481118
incchange	847	.027004	.1877822	-1.005309	.9834182

ginichange	847	.0114048	.1868399	-.7741492	4.987849
Lhpl38	847	2.312867	2.131981	-4.60517	4.586599
Lhpl60	847	3.068101	1.810536	-3.912023	4.598649
Lpgpl38	846	1.294063	2.141688	-4.60517	4.283862
Lpgspl38	838	.7261764	2.027268	-4.60517	4.027314
Lgini	847	3.723594	.2539687	2.823163	4.308515
Lmortality	845	3.809893	.8079767	1.223776	5.101694
Llife	847	4.103075	.1746149	3.2891	4.368767
Lschenrol1	706	4.500814	.3270149	3.121506	5.41812
Lschenrol2	602	3.709279	.8221604	1.096072	4.695886
Lbeaurqual	501	.5393313	.4435833	-.8754688	1.386294
Llaw	576	1.015422	.4742865	-.2876821	1.791759
Lcredit1	718	3.400804	.8459717	-1.686046	5.582986
Lnetaid2gdp	744	-3.493394	1.784503	-10.11668	.0799655

*Notes: *Based on sample of equations estimated in Table 2*

TABLE A4. ROBUSTNESS CHECK. OLS AND FIXED EFFECT

	OLS			FE		
VARIABLES	(1)	(3)	(4)	(5)	(7)	(8)
Rate of change of PH ($38 per month)						
Income change	-1.7***	-5.62***	-0.888	-1.7***	-4.271**	-0.684
	(0.182)	(1.891)	(2.151)	(0.221)	(2.044)	(2.481)
Gini Change	0.347	0.681***	1.550**	0.481	1.136***	1.760**
	(0.218)	(0.218)	(0.678)	(0.332)	(0.298)	(0.759)
L.Lhpl38		-0.05***	-0.04***		-0.20***	-0.17***
		(0.0140)	(0.0131)		(0.0468)	(0.0430)
L.Lgini		0.124*	0.0398		0.681**	0.366
		(0.0693)	(0.0655)		(0.260)	(0.235)
l.Lhpl38*incchange		0.306***	0.383***		0.301***	0.353***
		(0.0949)	(0.0874)		(0.101)	(0.0940)
l.Lgini*incchange		0.899*	-0.438		0.566	-0.446
		(0.515)	(0.590)		(0.552)	(0.671)
l.Lhpl38*ginichange			-0.345**			-0.335*
			(0.166)			(0.184)
l.Lgini*ginichange			0.141*			0.0988
			(0.0837)			(0.0961)
Constant	0.0270	-0.227	0.00665	-0.0045	-2.021**	-0.945
	(0.0269)	(0.254)	(0.244)	(0.0158)	(0.909)	(0.819)
Observations	847	847	847	847	847	847
R-squared	0.434	0.547	0.583	0.425	0.564	0.590
N. of Countries				109	109	109

*Notes: Incchange is the rate of change of mean income from survey; gini change is the rate of change of gini coefficient; l.Lgini is lagged gini coefficient; l.Lhpl38 is the lag of poverty headcount at $38 per month; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

TABLE A5. ROBUSTNESS CHECK, INITIAL LEVEL OF DEVELOPMENT AS LAGGED DEPENDENT VARIABLE

	(1)	(2)	(3)
VARIABLES	**Rate of change of PH ($38 per month)**		
incchange	-1.723***	-7.601***	-3.945
	(0.208)	(2.391)	(2.570)
ginichange	0.132**	2.141***	0.975**
	(0.0565)	(0.582)	(0.464)
L.Ldev		-0.379**	-0.523**
		(0.182)	(0.225)
L.Lgini		1.281**	0.399
		(0.530)	(0.445)
l.Ldev*incchange		0.759***	0.759***
		(0.155)	(0.148)
l.Lgini*incchange		1.853***	0.935
		(0.647)	(0.674)
l.Ldev*ginichange			-0.478
			(0.505)
l.Lgini*ginichange			0.0660
			(0.137)
Constant	-0.316***	-5.138***	-2.072
	(0.0869)	(1.989)	(1.743)
Observations	847	847	847
Number of ID	109	109	109
N. instrument	20	32	38
AR(1)- pvalue	0.000827	0.00159	0.00129
AR(2)-p value	0.984	0.419	0.289
Hansen- p value	0.0490	0.753	0.603

*Notes: Incchange is the rate of change of mean income from survey; ginichange is the rate of the gini coefficient; l.Lgini is lagged gini coefficient; l.Ldev is the lag of poverty line to mean income. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1*

TABLE A6. ROBUSTNESS CHECK, POVERTY ELASTICITY CORRECTED FOR INITIAL DEVELOPMENT

	Poverty Elasticity to Mean income Growth			**Poverty Elasticity to Inequality**		
Poverty Headcount($38 per month)						
Value of initial Gini and Development	**Coef.**	**Std. Err.**	**P>|z|**	**Coef.**	**Std. Err.**	**P>|z|**
ginidev50	-1.197	0.275	0.000	1.697	0.470	0.000
ginidev10	-2.369	0.574	0.000	2.186	0.731	0.003
ginicdv90	-.1169	0.116	0.685	1.216	0.730	0.096

Notes: ginidev50 : gini and development at 50th percentile; ginidev10: gini and development at 10th percentile; ginidev90: gini and development at 90th percentile;

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