A Revisit of the "Growth-Inequality-Poverty" Relationship: the Role of Institutional Quality

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Abstract

This paper is motivated by empirical observations on the interaction between income inequality and growth in reducing poverty taking into account the role that may play the quality institution. In order to investigate this question, a simultaneous equation model has been developed in a way that endogenizes economic growth and allows institutional quality to affect poverty. Using data on a sample of 70 countries over the period 1990-2010, the findings provide evidence of a positive association between income inequality and economic growth in one hand, and a positive association between income inequality and poverty on the other. We fin also that improvement in institutional quality is the key channel for poverty reduction.

Keywords: Economic growth, Inequality, Institution, Poverty.

Introduction

The fight against poverty is part of our day as one of the main policy objectives and development strategies. It is a central concern of managers and policy makers, especially as the international community is committed to the Millennium Summit of the United Nations in New York in 2000 to halve the rate of extreme poverty in the 2015. This situation of poverty deserves to be treated so that adequate measures are taken. Therefore, the fight against this scourge which has affected all countries of the world, priority should be given to policies that promote growth, because it has been recognized that poverty was considered a long time as a temporary problem that would disappear with the growth acceleration. However, according to the economic literature, even if it is assumed that if the growth rate increases, there is no assurance that any such additional growth benefits the poor. Because it is possible that, in some cases, the beneficial effects of growth is offset by rising inequality that can accompany growth. In this context, [1] and [2] argue that changes in absolute poverty are direct causes of the growth and changes in the income distribution. We think that the real challenge to establishing a development strategy for reducing poverty lies in the interactions between inequality and growth, and not in the relation connecting poverty and growth on one hand and inequality

and poverty on the other, which are essentially arithmetic. There is little controversy among economists that economic growth is crucial for poverty reduction under the assumption that the distribution of income remains constant (see [3], [4] and [5]). Likewise, some current believe that a worsening of the distribution tends to increase poverty. We think that the policy objectives and development strategies for reducing poverty should be considered simultaneously interaction between growth and inequality.

Our primary goal in this paper is to revisit the inter-relationship connecting the growth-inequality-poverty. In doing so, we will augment our empirical «growth-inequality-poverty» triangle model by adding an indicator of institutional quality to help formulate policies of poverty reduction. The remainder of this article is structured as follows. In section 2 we start by providing an overview of the literature on the relation connecting growth, inequality and poverty. We explore in the same section the role of the quality of institution in determining the links between growth and distribution. Section 3 shows empirical model specification and describe data, while section 4 presents the results and discuss the findings. Section 5 concludes.

I-2-The Relationship between Inequality, Economic Growth and Poverty

The question that links economic growth to poverty reduction has generated an intense debate for several decades. Thereby, reducing poverty appears as a dependent function on both growth and distribution. In addition, it seems that the effect of growth on poverty reduction is highly dependent on its size distribution. Moreover, it is possible that the effects of growth on poverty can be mitigated by the negative effects of inequality. As such, the model of [6] provides a theoretical basis for understanding the function of reducing poverty. According to the same other, the level of inequality can affect poverty in a direct or indirect way. First, when the initial inequalities are very high, the effect of economic growth on income poverty is reduced. In some cases, when inequality is extremely high, the rate of poverty can be inelastic to economic growth. Thus, the rate of poverty is directly proportional to the growth rate corrected by the distribution. Then, high initial inequality has direct negative effects on economic growth, which consequently inhibits the potential of reducing poverty.

The relationship between economic growth, poverty and income distribution is a fundamental issue that is central to the study of the dynamics of economic development. Some researchers have argued that economic growth was necessary and sufficient for poverty reduction. [7] found that average income of the fifth poorest of society rise proportionately with average income and they concluded that growth generally does benefit the poor. However, other studies [8] [9] and [10] tend to prove the contrary. They argue that, some of the gains from growth for the poor could be lost due to a rise in inequality and hence the impact of growth in many of the developing countries – in the sense of income growth – on poverty would be lower than it would otherwise be.

Currents traditional thinking about the dynamics of development considers that any economic growth can be a cause of increased income (poverty reduction) and an effect of income distribution (increase or decrease inequalities). In the capitalist countries, economic growth is seen as a necessary and sufficient condition for poverty reduction [11] [12] and [7]. For others, growth alone cannot achieve poverty reduction. This implies that, by contrary to the predictions of [4], the growth is not necessarily good for the poor, but there are also other political and institutional factors that may be involved. Even to what we introduce the distributive dimension matrix in analyzing the evolution of poverty. Thereby

reducing poverty appears as a dependent function on both growth and distribution. In this context, two schools that compete in this thesis: a mainstream, with a bit optimistic vision, argues that "growth is good for the poor" [7] according to these authors the elasticity of poverty to growth in average is one. It is estimated that current economic growth has no effect on the income distribution (trickle-down thesis). [13] assumed that growth will be sufficient to reduce poverty. In practice, this is consistent with the recommendation to emphasize economic growth even in spite of the trickle-down theory.

A second current of literature supports the view that "growth is not enough to reduce poverty [5]. According to this current, high inequality can be a vector of political and social instability leading to a weakening of incentives to invest, which eventually reduced the long-term growth [14]. This argument runs counter to the theoretical literature that marked the 50's and 60's that economic growth is a sufficient measure of the evaluation of social welfare. This literature has ignored the phenomena of distribution whose implications are very different for the poor. According to [6], the level of inequality can affect poverty in a direct or indirect way. First, when the initial inequalities are very high, the effect of economic growth on income poverty is reduced. In some cases, when inequality is extremely high rate of poverty reduction can be inelastic to economic growth. Thus, the rate of reduction of poverty is directly proportional to the growth rate corrected by the distribution. Then, high initial inequalities have direct negative effects on economic growth, which consequently inhibits the potential of reducing poverty.

Moreover, according to the theoretical literature [15] and [6] any scenario of growth may produce different results in terms of poverty reduction. To a level of growth given, the extent of poverty reduction depends on the corresponding initial distribution of income, how inequalities change and how the poor participate in the realization of this growth, [15]. Theoretically, a growth subject to an increase in income inequality may penalize poorer households, the rich become richer while the poor get poorer. In this context, a large body of the development literature show that the relationship between growth and inequality is of the form U-reversed that the distribution of income tends to worsen in early stages of growth, but improves in later stages.

Finally, what we can learn from the theoretical literature is that rapid economic growth is not necessarily synonymous with poverty reduction,

however, sometimes it may worsen through increased inequality, which is still lacking in the implementation of programs to fight against poverty, especially in developing countries. We believe that the introduction of the institutional aspect of the dynamics of the understanding of the relationship between growth and inequality can give this debate all its dimensions.

The Role of the Quality Institutions

Recent economic literature states that the quality of institutions can promote poverty reduction via the channel of economic growth, by affecting the incentives for investment in physical and human capital, and technological progress and innovations. Another way, in which institutional quality can affect economic growth, is related to the role played by institutions in determining transaction costs and the implication of this to the market size, specialization, and technological progress.

Institutions play this essential role because they, as defined by [16], it determines the security for property rights in a society and guides the economic behavior of agents. Property rights are the rights of a firm or individual to assets, to the incomes gained from the use of these assets, and to any other contractual obligations due to the firm or individual. By determining the security and the certainty over property rights, institutions also determine the incentives for investment and innovation [17] and as such, the low security of property rights over physical capital, profits, and patents, reduces incentives and opportunity to invest, innovate, and obtain foreign technology [18].

On the other hand, proficient and established institutions provide an appropriate environment for growth-enhancing activities like investment, innovation, and entrepreneurship. In fact, more secure property rights will increase the incentive to entrepreneurs to adopt new and efficient technologies that maximize long term performance. It seems that there is not much dispute that the quality of institutions, and particularly the security of property rights, is a significant determinant of economic growth and consequently of reducing poverty.

Moreover, poor institutions allow and encourage unproductive activities which can slow down economic growth as resources are driven away from the most productive activities. Thus, in a low-quality institutional environment, entrepreneurs will be forced to use technology that employs low levels of capital, and to adopt short-term prospects for their businesses, and

keep them small in scale, all of which leads to slow economic growth [16].

Among the pioneering empirical studies that explored the relationship between institutional quality and economic growth, is that of [19] and [20]. The main finding is that institutions affect growth directly through influencing total factor productivity, and indirectly through influencing investment. [21] find strong support for the notion that institutions and property rights in particular, are crucial to economic growth and poverty. [22] find that institutions have a substantial impact on labour productivity and growth. [23] document that institutional quality has a strong impact on income level and identifies property rights institutions as one of the main determinants of economic growth.

Finally, if economic literature does not provide much insight into how to attain well-functioning institutions [24], available empirical evidence on the determinants of institutional quality and property rights link institutions to historical, cultural, and geographical variables [25].

Empirical Model Specification and Technical Estimation

Empirical Model Specification

To empirically investigate the relation connecting the "growth-inequality-poverty" triangle, one needs to specify a model that allows us to capture the interrelationships that may exist taking into account the role of the quality institution. Therefore, we specify a basic econometric model that consists of a series of two equations describing the behavior of poverty and economic growth. In particular, the model consists of a poverty equation and growth equation.

The first endogenous variable in the model is poverty, which is measured as the consumer expenditure per capita over the period 1990-2010. We introduce in the equation of poverty a set of control variables that are commonly used as factoring explaining poverty: overalls income inequality to capture the kind of distribution of income, GDP per capita growth to capture the economic development, the number of telephone mainlines per 1000 people as indicator to measure the quality of infrastructure and population growth.

The second endogenous variable in the model is economic growth, which is measured as the average of growth rate of real Gross Domestic Product (GDP) per capita over the same period. The growth equation specification follows the commonly accepted form in the cross-country

growth literature [26], and includes a group of economic variables that have been identified by empirical growth literature as robust determinants of economic growth, [27]. In addition to inequality and institutions, the growth equation includes other variables. The first variable is the average years of secondary schooling in the total population, it is expected to have a positive impact on economic growth. The equation also include rate of inflation (it is introduced into the model to capture the impact of macroeconomic stabilization on poverty), trade openness to capture the degree of international openness and financial development to test the impact of financial system on economic growth. As regards institutions are expected to have a positive impact on economic growth (as they have positive externalities that increase the productivity of economic resources) and inequality measured by the theil index.

$$POV_{it} = \delta_0 + \delta_1 GDPG_{it} + \delta_2 INQ_{it} + \delta_3 INST_{it} + \delta_4 POP_{it} + \delta_5 TEL_{it} + \xi_{1it}$$

$$GDPG_{it} = \gamma_0 + \gamma_1 INQ_{it} + \gamma_2 INST_{it} + \gamma_3 INF_{it} + \gamma_4 TRADE_{it} + \gamma_5 SCH_{it} + \gamma_6 FD_{it} + \xi_{2it}$$

Where:

POV*:* an index measuring the rate of poverty. It is measured by the expenditure of consumption per capita.

GDPG*:* the average of GDP per capita.

INQ: it represents a proxy of income inequality measured by Theil index which is provided by the University of Texas Inequality Project.

INST: is the indicator of institution quality. It is constructed from the six governance indicators (voice and accountability, political stability no violence, control of corruption, rule of law, government effectiveness and regulatory quality) using the Principal Component Factor method (PCF).

SCH: the average years of secondary schooling in the total population. It is expected that investment in human capital enhances the productivity of individuals and their welfare.

TEL*:* is an indicator of infrastructure which is measured by the average of the number of telephone mainlines per 1000 people. It represents the degree of development in the field of information technology and communication, which is a sector that could have a positive influence on economic development.

INF: The rate of inflation, it is introduced into the model to capture the impact of macroeconomic stabilization on poverty. Inflation is a factor worsening poverty because it has a negative impact on the real value of assets and the purchasing power of household incomes. It is measured by inflation consumer prices available in World Bank.

TRADE: defined as the sum of exports and imports as a share of GDP. It is introduced into the model to capture the degree of international openness.

POP: represent the growth population. It is expected to have a negative effect on poverty reduction.

Estimation Method

In a simultaneous equation model, like the one developed in the previous section, a dependent variable in one equation can be an explanatory variable in other equations in the model. For example, in equation (1), GDPG is an explanatory variable, but at the same time this explanatory variable in simultaneous equation models is endogenous (equation 2). As a consequence, using Ordinary Least Square, OLS, to estimate the structural equations will result in inconsistent estimates for the model parameters.

Estimation methods that can be used in the context of simultaneous equation models are functions of identification criteria for estimating the model and the endogeneity problem. In our case, the model presented is over-identified. On the other hand, our model is characterized by the presence of an endogeneity problem of order one, by definition, why the estimate by the method of least squares would be double registered. This estimation method is based on the principle of application of the method of least squares in two stages. A technique for solving endogeneity problems is to introduce the variables at the root of these problems as instrumental variables. However, treatment with the STATA 11 allows a resolution using the method Two-Stage Least Square "2 SLS". In order do so, a series of econometric tests will be conducted on the usual set of equations and variables in the model estimated. This is, first, the stationarity tests and bivariate collinearity.

Results and Interpretations

How does Inequality and Institution Affects Poverty Reduction?

Equation (1) shows that a change in inequality by one unit causes poverty to change by an amount equal to δ_2. Furthermore, Equation (1) shows that a change in institutional quality index by one unit causes poverty to change by an amount equal to δ_3. However, equation (2) shows that a change in inequality by one unit can also induce a change in

the GDPG index by an amount equal to γ_1 which means that the effect of change in inequality by one unit is not limited to its direct influence on poverty, but also includes the indirect impact via economic growth channel. Thus, the total impact of inequality on poverty equals the sum of direct impact and indirect impact.

The total effect of inequality on poverty can be determined by finding the derivative of poverty with respect to inequality, which is equal to:

$$\frac{\partial Poverty}{\partial Inequality} = \delta_2 + \delta_1 \frac{\partial Growth}{\partial Inequality} = \delta_2 + \delta_1 * \gamma_1$$

By the same, the total effect of quality institution on poverty can be calculated by finding the derivative of poverty with respect to institution, which is equal to:

$$\frac{\partial Poverty}{\partial Institution} = \delta_3 + \delta_2 \frac{\partial Growth}{\partial Institution} = \delta_3 + \delta_1 * \gamma_2$$

Estimating the above complete system of equations and finding γ_1, γ_2, δ_1, δ_2 and δ_3 allows us to test whether and how inequality and institution affects poverty reduction.

Correlation Matrix of the Variables of Interest

Table below shows the simple correlations between the variables of interest in the model, which helps in exploring the nature of the relationships between them. This Table documents a positive and significant correlation between poverty (measured by expenditure consumer per capita) and economic growth on the one hand, and a negative and significant correlation between inequality and poverty on the other. The data also indicates a positive association between institutions and the rate of poverty, with a positive and significant correlation coefficient. As regards the relationship between economic growth and institutions show a significant positive correlation between the two variables.

These correlations represent a first approximate test for the hypothesis that inequality and institutions may exert indirect positive impact on poverty by positively influencing economic growth. Second, the Table shows that there is a positive correlation between poverty and institutions, which means that countries that have well-functioning institutions tend to have a lower rate of poverty.

Table 1:Correlation matrix of variables of interest

	POV	*GDPG*	*INQ*	*INST*
POV	1			
GDPG	0.56**	1		
INQ	-0.49**	0.54***	1	
INST	0.363*	0.38**	-0.14*	1

Note: **Significant at 10%; ** Significant at 5%; *** Significant at 1%.*

Estimation results

Table 2 report the estimation results of the simultaneous equation model using the Two-Least Squares method for the period 1990-2010. The first column presents the estimation results of the poverty equation and the second presents the estimation results of growth equation.

Table 2: Robustness analysis results of the regression model on the effects of growth, inequality and institution on poverty

Variables	Poverty	Growth
GDPG	1.125	--
	(2.43)***	
INQ	-0.221	0.289
	(-3.69)***	(4.04)**
INST	0.156	0.073
	(4.4)***	(1.92)**
POP	-1.38	--
	(-1.54)	

TEL	0.261	--
	(3.58)**	
INF	--	-0.006
		(-2.59)***
SCH	--	0.010
		(1.78)*
TRADE	--	0.037
		(4.72)***
Constant	0.075	0.042
	(5.67)***	(2.22)**
Observations	1470	1470
R²	0,08	0,08

*Notes: * significant at 10% ** Significant at 5%; *** Significant at 1%. GDPG design the growth rate of GDP/t; Theil represent the index of income inequality; FD is the indicator of financial development, it is measured by domestic credit to the private sector to GDP, TEL is an indicator of infrastructure as measured by the number of subscriber telephone lines per 1000 people, INF is the inflation rate; SCH is human capital, is measured by the average years of secondary schooling in the total population; TRADE is an indicator of trade openness measured by the sum of imports and exports of goods and services to GDP; INST is an indicator of institutional quality, it is constructed by applying the PCF method on the six governance indicators presented above.*

The parameters of interest in Table 2 are: the coefficients that describe respectively the direct effect of economic growth, inequality and institution on poverty, δ_1, δ_2 and δ_3; the coefficients that describes respectively the indirect effects of inequality and institutions on poverty through the channel of growth, γ_1 and γ_2.

In poverty equation, all the explanatory variables have the expected sign and are statistically significant, expect growth population. In particular, the results shows that there is a positive and highly significant relationship between the growth rate of GDP per capita and the level of household consumption expenditure per capita. In fact, an increased growth rate of one percentage point results in an increased level of household consumption of δ_1=1.125 points. This positive relationship that associate economic growth to poverty rates is commonly identified in studies of [7]. Then, a higher level of inequality attainment is directly associated with a lower rate of poverty. Thus, increases of the Theil index by one percentage point decrease in household consumption expenditure by δ_2= - 0.221 point, thereby disadvantaging poverty.

Concerning the indirect impact of inequality on poverty it can be computed by the product of the coefficient ($\delta_1 * \gamma_1$) = 1.125*0.289= 0.325. Then, the total effect of income inequality on poverty can be calculated as the sum of the direct and the indirect impact on poverty. According to the table 2, the total impact is equal to: $\delta_2 + (\delta_1 * \gamma_1)$ = - 0.221+0.325= 0.104 which indicates that an increase in the income inequality index by one point leads to an increase in the level of household consumption expenditure and thereby to a decrease in poverty rate by 0.104 points. This

finding is consistent with some theatrical studies which imply that an increase in inequality may be good for growth through a number of channels, whether economic, political or social. For example, an increase in income inequality may have a positive impact on a country's aggregate savings rate if richer people save a higher proportion of their income than poorer people. This in turn means a higher investment rate, a higher growth and thereby a low rate of poverty.

In conclusion, findings shaw that the positive indirect effect of inequality through the income inequality outweighs the negative direct effects of inequality on poverty. This unexpected result can be interpreted by the fact that, an increase in the Theil index of one percentage point increases the growth rate of GDP per capita of 0.289 point. This result is quite consistent with some theoretical predictions and is consistent with studies based on the assumption of [28] that the marginal propensity to save is higher among the rich than among the poor and low income. Because of the positive relationship between savings rates and growth rates, unequal economies would experience growth rates higher (centralization of capital stimulates investment) which favorite consequently reducing poverty. Is in keeping with the early economic theories which state that inequality is essential to the genesis of savings needed to finance investment and growth. In this context, [29], using a sample of developed countries found a positive relationship between growth and income inequality. At [30], longitudinal analysis seems to update an opposite relationship, that is to say, inequality favorable to growth. These results do not support the predictions of the theory of social conflict which states that inequality within a society can be a

vector of high political and social instability leading to the weakening of incentives for investment [31], rigidity shocks [32] and a blocking process of economic development. As the sum we can conclude that an increase in income inequality can be considered as a vector of reducing poverty, at least for the considered sample.

Table 3: The impact of inequality on poverty

	the direct impact of inequality on poverty	the indirect impact of inequality on poverty	The total impact on poverty
The coefficient	δ_2	$(\delta_1 * \gamma_1)$	$\delta_2 + (\delta_1 * \gamma_1)$
The estimated coefficient	-0.221	1.125*0.289= 0.325	0.104

As regards the impact of institutions, the results shows that the variable has positive and statistically significant directly impact on poverty reduction. In fact, an increased institution rate of one percentage point results in an increased level of household consumption of δ_3=0.156 points which consequently reduces the poverty rate.

On the indirect impact of quality institutions on poverty it can be computed by the product of the coefficient $(\delta_1 * \gamma_2)$ = 0.156*0.073 = 0.078. This indicates that an improvement in the quality of institution by one percent leads to a decrease in headcount ratio by 0.078 point. Then, the total effect of institution on poverty can be calculated as the sum of the direct and the indirect impact on poverty. According to the table 3, the total impact is equal to: $\delta_3 + (\delta_1 * \gamma_2)$ = 0.234, indicates that an increase in the institutional quality index by one point leads to a decrease in poverty rate by 0.234 point.

Table 4: The impact of inequality on poverty

	the direct impact of institution on poverty	the indirect impact of institution on poverty	The total impact on poverty
The coefficient	δ_3	$(\delta_1 * \gamma_2)$	$\delta_3 + (\delta_1 * \gamma_2)$
The estimated coefficient	0.156	1.125*0.073=0.078	0.234

These findings suggest some important implications: first, they enhance our understanding of the contribution of both growth and inequality to poverty, and show also that the impact of institution on poverty is not limited to its direct effect but also to its role via the channel of economic growth, by affecting the incentives for investment in physical and human capital, and technological progress and innovations.

Conclusion

Our contribution to the literature is to offer an empirical examination of the «poverty-growth-inequality » triangle hypothesis using panel data from a sample of 70 countries. In order to investigate this question, a simultaneous equation model has been developed. Applying the Two-Stage Least Square method to this model shows that:

First, a positive relationship that associate economic growth to poverty rates. Second, while the direct effect of inequality on poverty is negative, the indirect effect on poverty, through the channel of economic growth is positive. Moreover, the estimated indirect effect of inequality is greater than the direct one. Furthermore, the results indicate that the indirect impact of inequality through economic growth on poverty is far greater than, or more than the direct impact of inequality on poverty. Thus the total effect of inequality on poverty is positive. That's to say that a reduction in absolute poverty is made possible by an increase in income distribution. All being equal, an increasing in income distribution by one point leads to a fall of the headcount ratio by 0.104 point.

Third, our finding indicates also that institutions have a significant impact on poverty beyond its direct and indirect impact, an impact that works via improving economic growth. The results also show that this impact is of considerable volume. In addition, enhancements in political rights and

civil liberties would be needed to enable agents to actively and effectively participate in economic development and thereby reducing poverty. Finally, the most significant contribution of this paper is that it corrects the recently emerging claim that income inequality has a negative impact on poverty reduction. In particular, the empirical results presented in this contribution made it clear that inequality can contribute positively to poverty reduction if countries achieve a minimum threshold of institutional quality.

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