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Growth-inequality-poverty triangle in developing countries: the role of political stability

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Abstract

This paper investigates the moderating role of political stability within the growth-inequality-poverty triangle using a panel of 23 Sub-Saharan African countries over the period 2003-2020. Employing both dynamic System GMM and Hansen's (1999) non-linear threshold modeling, we provide empirical evidence that institutional governance acts as a critical catalyst in this relationship. Linear estimates demonstrate that political stability significantly amplifies the poverty-reducing effects of economic growth and inequality reduction. Furthermore, our non-linear analysis identifies specific institutional thresholds; above these critical levels of political stability and absence of violence, the benefits of growth and redistributive policies on extreme poverty alleviation are substantially magnified. These findings highlight that macroeconomic strategies aimed at poverty reduction in fragile contexts must be coupled with robust institutional consolidation to be fully effective.

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1. Introduction

Analysis of the *growth-inequality-poverty* triangle encompasses three main groups of works: those that analyze causality in the *growth-inequality-poverty* direction, works that focus on the *inequality-growth-poverty* causality direction, and analyses that integrate the role of governance. In the first group of studies, economic growth appears to be an effective remedy for reducing inequality and poverty for some authors (Déolalikar, 2002; Dollar and Kraay, 2002), while it is a necessary but insufficient remedy for others (Rangel et al. 2006; Stiglitz-Fitoussi-Sen, 2009). There is also a lack of consensus in the second group of studies. Indeed, the results show that inequalities can be a factor in increasing poverty-reducing economic growth (Partridge, 2005; Rangel et al. 2006), but also an obstacle to achieving this type of economic growth (Tabellini, 1994; Panizza, 2002). As for the role of governance, work focuses on its impact on economic growth (Acemoglu and Verdier, 2000; Aidt, 2009; Johnson & al. 2014; Nur-tegin and Jakee, 2020) and on inequality and poverty (Clements, de Mooij, Gupta and Keen, 2015; Caren et al. 2017; Cyrek, 2019; Turnovsky and Erasuskin, 2021).

Our study stands out from the existing literature by moving beyond sequential analyses that separately address the relationships between growth, inequality, and poverty. While most previous works (Dollar & Kraay, 2002; Bourguignon, 2004; Stiglitz-Fitoussi-Sen, 2009) focus on a unidirectional link (either from growth to poverty or from inequality to growth and poverty), we propose an integrated approach that examines the joint effect of the growth-inequality interaction on poverty, thereby allowing for the simultaneous consideration of the bidirectional causality highlighted in the literature. This approach offers a dynamic and two-way reading of the growth-inequality-poverty triangle, which remains rarely explored in the African context. Furthermore, unlike studies that consider governance merely as a direct determinant of growth or inequality (Acemoglu & Verdier, 2000; Méon & Sekkat, 2005; Benhabib & Spiegel, 2021), our research highlights its moderating role within this triangle. Governance is measured here by the World Bank's Political Stability and Absence of Violence indicator, which reflects the likelihood of internal or external unrest that could weaken the economy. Using GMM system model (Blundell and Bond, 1998), we empirically test whether this dimension of governance can mitigate or amplify the effect of the growth-inequality interaction on poverty, through the creation of governance-inequality and governance-economic growth interaction variables. Finally, the use of Hansen's (1999) threshold model constitutes a major methodological contribution, demonstrating that the impact of these interactions on poverty varies according to the level of political stability achieved by each country. The empirical application to developing African countries characterized by low political stability (average index -0.445), high inequality (average Gini index 56), and persistent poverty (17% of the population living below the extreme poverty line) thus provides a contextualized and innovative reading of the role of governance within the growth-inequality-poverty triangle.

The results show that growth that reduces income inequality is pro-poor. Tackling income inequality also makes growth pro-poor in the countries in the sample. What's more, the beneficial effect of economic growth and the fight against inequality on poverty reduction is all the greater, the greater is the country's political stability. This result, obtained by means of linear dynamic modelling (Blundell and Bond, 1998), is confirmed by threshold-effect modelling *à la Hansen (1999)*, which highlights the non-linear effect of political stability in the *growth-inequality-poverty* triangle, with the benefits in terms of poverty reduction being greater than

the thresholds found. The results highlight the importance of governance in the countries in the sample for achieving pro-poor growth that reduces inequality.

In the remainder of the paper, the second section presents a literature review analyzing the evolution of work from reverse causality between economic growth, inequality and poverty to the role of governance. The third section is an empirical model, while the fourth concludes.

2. From the inverse causality between economic growth, inequality and poverty to the role of governance

2.1. Inverse causality between economic growth, inequality and poverty

2.1.1. Causality in the sense *growth-inequality-poverty*

In studies of causality in the *growth-inequality-poverty* direction, some analyses show that economic growth is an effective remedy for poverty reduction (Déolalikar, 2002; Dollar and Kraay, 2002), while others maintain that it is a necessary but not sufficient remedy for effectively combating poverty (Rangel et al. 2006; Stiglitz-Fitoussi-Sen, 2009).

Indeed, liberal analysis shows that while growth may initially create inequalities, it eventually benefits the poor. This is the thesis defended by the *trickle-down* theory, which is based on the idea that the benefits of growth initially go to the rich. Then, as they spend their gains, they pass them on to the poor *via* the Kaldorian process. Growth is therefore good for the poor (Dollar and Kraay, 2002). Kuznets (1955) summarized that economic growth reduces inequality after increasing it at the start of the process. Thomas Piketty (2014) uses industrialization to clarify this result, showing that income inequality increases in the early phases of industrialization, and then decreases as a larger fraction of the population participates in the fruits of economic growth. In a comparative study of sub-Saharan Africa and Latin America, Adeleye et al. (2020) show that economic growth contributes to poverty reduction, although the interaction between growth and inequality can attenuate its impact on poverty.

However, the liberal approach symbolized by the “*Washington Consensus*”, whereby economic growth was all that was needed to combat poverty, was strongly criticized by the Stiglitz-Fitoussi-Sen (2009) commission. According to these authors, growth alone does not provide a clear picture of the evolution of poverty. This is why they insist on the need to observe a decline in inequalities for growth to effectively reduce poverty. Lechhed et al (2019) show that economic growth is not enough to eradicate poverty. Although it is a necessary condition, it must be combined with the implementation of targeted actions and policies to reduce present and future inequalities. Bourguignon (2004), for his part, shows that poverty is a function of economic growth, inequality and, finally, their coexistence. For him, the only condition for growth to reduce poverty is for inequality to be stable or diminishing. An empirical analysis of Nigeria obtained results along the same lines, demonstrating that economic growth can exacerbate inequalities, with a negative effect on poverty reduction. Indeed, it would mainly benefit middle- and high-income groups, exacerbating economic disparities (Tanimu and Ibrahim, 2014).

2.1.2. Causality in the sense *inequality-growth-poverty*

In work looking at causality in the inequality-growth-poverty direction, results show that inequality can be a factor in increasing poverty-reducing economic growth (Partridge, 2006; Rangel et al. 2006), but also a brake on achieving pro-poor growth (Tabellini, 1994; Panizza, 2000).

For Voitchovsky (2005), income inequality can have positive effects on economic growth by encouraging innovation and entrepreneurship, although these effects may vary according to the institutional and economic context. According to Okun (1975), inequalities can increase growth by providing incentives for effort, innovation and entrepreneurship. For this author, the market is both unequal and efficient. Consequently, reducing inequalities in relation to market equilibrium has a cost in terms of efficiency.

However, according to Aghion et al (1999), the poor find it harder to access credit. Recent studies confirm that limited access to credit for the poorest hampers their ability to invest, which in turn hampers economic growth. Aghion et al. (2019) show that the financial constraints of low-income households reduce their ability to invest in productive activities, thereby exacerbating inequality and limiting their participation in economic growth. Similarly, the study by Beck, Demirguc-Kunt and Levine (2007) highlights that financial inclusion plays a key role in reducing inequality and stimulating growth in developing countries. As a result, they are less able to invest in education, economic activity and even health. Alesina and Perroti (1996) include social conflict in their analysis and show that initially high inequalities can lead to social unrest, which in turn lowers investment levels and negatively impacts economic growth. Aisen and Veiga (2013) demonstrate that political instability, often fueled by initial inequalities, reduces growth by increasing uncertainty and weakening property rights, which in turn reduces investment. Similarly, Cerra et al. (2021) show that social conflict amplified by inequality hampers economic development and accentuates poverty. Barro (2000) also highlights the loss of productive resources when underprivileged sections of the population take refuge in illicit or even criminal practices, or rebel against the political order for lack of alternatives. Fajnzylber et al. (1998), for their part, assert that inequalities of income and wealth have an upward effect on the crime rate, and consequently a negative effect on economic growth. Sugiharti et al. (2023), in a study of Indonesia, find that higher levels of inequality are associated with higher crime rates, which undermine economic growth by redirecting resources to crime-fighting rather than productive activities.

2.2. The role of governance

The literature highlighting the role of governance in the growth-inequality-poverty triangle focuses on its impact on economic growth, on the one hand, and on income inequality, on the other.

Regarding the effect of governance on economic growth, the “sand the wheels” theory maintains that corruption would have a negative effect on economic growth by altering government objectives and diverting resources from public to private goals (Méon and Sekkat, 2005, Aidt, 2009; Nur-tegin and Jakee, 2020). The “*grease the wheels*” theory, meanwhile, argues that corruption would promote economic growth by acting as a “*lubricant that facilitates business creation and produces more efficient economies*” in the presence of bureaucracy (Acemoglu and Verdier, 2000; Heckelman & Powell, 2010 and Johnson & al. 2014). Political instability, meanwhile, is said to have a negative effect on growth by weakening countries’ ability to accumulate human capital and attract foreign direct investment (Bassil et al. 2018; Benhabib & Spiegel, 2021). As for government efficiency, it would have a positive and significant impact on economic growth thanks to a better allocation of public spending between

investment in quality human and physical capital (Castellucci and Coromaldi, 2021). Concerning the voice variable and responsibility, work shows that it would have a beneficial effect on growth (Azimi, 2022; Mahran, 2022). Debate persists as to the effect of regulatory quality on economic growth, with some studies suggesting a negative effect (Lee and Kang, 2023), while others find a positive effect (Abdelaziz and Mohamed, 2022; Wang et al. 2022).

Regarding the effect of governance on inequality and poverty, Caren et al. (2017) demonstrate that instability often comes in response to economic crises and growing inequality, which could lead to policy reforms aimed at reducing inequality. The study conducted by the Chr. Michelsen Institute (2012) shows, however, that these movements could lead to public policies that, although motivated by egalitarian ideals, could prove ineffective in reducing inequality. Dincer & Gunalp (2008) show that corruption increases income inequality and poverty in the USA. It could, however, reduce income inequality in developing countries (Keneck-Massil, Nomo-Beyala & Owoundi, 2021). Most work shows that the relationship between corruption and income inequality varies according to factors such as governance, the distribution of political power and regional context (Pedauga, Pedauga and Delgado-Márquez 2017). For Sonora (2019), improvements in the judicial system would have reduced inequality and poverty in Latin American countries, which would not have been the case in other developing regions. Government efficiency, for its part, would have a significant effect on inequality *via* better decision rules governing public employment policy and capital allocation (Clements, de Mooij, Gupta and Keen, 2015; Patmasiriwat, 2015; Cyrek, 2019; Turnovsky and Erauskin, 2021).

3. Empirical modeling

Our empirical analysis uses panel data covering 23 Sub-Saharan African countries over the period 2003 to 2020, representing 414 observations. Most of these data come from the World Bank database, including political stability, which is derived from the Worldwide Governance Indicators (WGI), and the Gini index, which is obtained from several sources such as the Quality of Government (QoG) database, the World Inequality Database, and national reports. Our models include a dependent variable, poverty, measured by the percentage of the population suffering from undernourishment, and several explanatory variables, notably economic growth measured by the GDP per capita growth rate, income inequality measured by the Gini index, and governance measured by political stability and absence of violence. We also include interaction terms between growth and inequality, growth and governance, and inequality and governance. The control variables are trade openness, inflation, and foreign direct investment (FDI).

Table I: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
poverty	414	17.159	11.05	3.1	47.4
GINI	414	55.77	7.327	35.541	74.244
growth	414	1.687	3.767	-20.08	15.688
FDI	414	3.916	5.879	-18.918	39.811
openess	414	9.441e+11	2.037e+12	8.050e+09	1.166e+13
ginigdp	414	94.415	210.994	-1132.723	845.788
stability	414	-.437	.808	-2.523	1.117
gdpstab	414	-.682	3.84	-17.553	12.624
ginistab	414	-22.622	41.227	-129.875	64.648
inflation	414	5.74	5.534	-3.233	44.357

Source: authors

Descriptive statistics (Table I) show strong heterogeneity: the poverty rate ranges from 3.1% to 47.4%, the Gini index from 35.5 to 74.2, and the political stability index from -2.52 to +1.11.

Our empirical contribution is threefold. Firstly, to the *causality-in-the-growth-inequality-poverty* direction (Déolalikar, 2002; Dollar and Kraay, 2002; Rangel et al. 2006) *versus causality-in-the-inequality-growth-poverty* direction (Tabellini, 1994; Panizza, 2000; Partridge, 2006; Rangel et al. 2006) observed in the literature, we add the approach of *the growth-inequality* interaction and the effect of this new variable on poverty, thus encompassing both directions of causality in a single variable. Secondly, in contrast to literature which generally focuses on the direct effect of governance on economic growth, inequality and poverty, we opt for an integrative approach which allows us to analyze the indirect effect of inequality and economic growth on poverty *via* governance by creating interaction between variables *governance-inequality* and *governance-economic-growth*. The aim is to verify whether improved governance can modify the effect of inequalities on poverty, while ensuring that economic growth can go hand in hand with poverty reduction. The third contribution consists of using non-linear econometrics with threshold effects (Hansen, 1999) to show that below and above a given level of governance, the preceding interaction variables can have different effects on poverty reduction.

3.1. Linear dynamic modeling (Blundell and Bond, 1998)

Our empirical strategy relies on the System GMM estimator (Blundell and Bond, 1998) for four main reasons. First, the dynamic nature of poverty requires the inclusion of the lagged dependent variable as a regressor, creating endogeneity that traditional methods (OLS, fixed effects) cannot address. Second, our analysis faces multiple endogeneity issues: reverse causality among growth, inequality, and poverty; omitted variables correlated with the regressors; and measurement errors inherent in developing countries' data. Third, the structure of our panel (23 countries over 19 years) corresponds to a short panel in which the Within estimator suffers from the Nickell bias. The System GMM, by combining equations in differences and in levels instrumented by lagged values, efficiently exploits the moment conditions while controlling for unobserved heterogeneity. Fourth, this method is particularly well suited for persistent variables such as poverty, for which the standard Difference GMM (Arellano and Bond, 1991) would be less efficient.

Based on the GMM estimator of Blundell and Bond (1998), we proceed with the empirical estimation of the three systems of equations below:

$$\begin{cases} \Delta \text{Extreme poverty}_{i,t} = \beta \Delta \text{Extreme poverty}_{i,t-1} + \alpha \Delta \text{GINIGDP}_{i,t} + \delta \Delta \mathbf{X}_{i,t} + \Delta \mathbf{v}_t + \Delta \epsilon_{i,t} \\ \text{Extreme poverty}_{i,t} = \beta \text{Extreme poverty}_{i,t-1} + \alpha \text{GINIGDP}_{i,t} + \delta \mathbf{X}_{i,t} + \mathbf{v}_t + \epsilon_{i,t} \end{cases} \quad (1)$$

$$\begin{cases} \Delta \text{Extreme poverty}_{i,t} = \beta \Delta \text{Extreme poverty}_{i,t-1} + \alpha \Delta \text{STABGINI}_{i,t} + \delta \Delta \mathbf{X}_{i,t} + \Delta \mathbf{v}_t + \Delta \epsilon_{i,t} \\ \text{Extreme poverty}_{i,t} = \beta \text{Extreme poverty}_{i,t-1} + \alpha \text{STABGINI}_{i,t} + \delta \mathbf{X}_{i,t} + \mathbf{v}_t + \epsilon_{i,t} \end{cases} \quad (2)$$

$$\begin{cases} \Delta \text{Extreme poverty}_{i,t} = \beta \Delta \text{Extreme poverty}_{i,t-1} + \alpha \Delta \text{STABGDP}_{i,t} + \delta \Delta \mathbf{X}_{i,t} + \Delta \mathbf{v}_t + \Delta \epsilon_{i,t} \\ \text{Extreme poverty}_{i,t} = \beta \text{Extreme poverty}_{i,t-1} + \alpha \text{STABGDP}_{i,t} + \delta \mathbf{X}_{i,t} + \mathbf{v}_t + \epsilon_{i,t} \end{cases} \quad (3)$$

Extreme poverty is the endogenous variable that is explained by its one-period lagged value, the interaction variables *inequalities-economic growth* (GINIGDP) (see equation 1), *political stability-inequalities* (STABGINI) (see equation 2), *political stability-economic growth* (STABGDP) (see equation 3), and a matrix $\mathbf{X}$ of control variables containing the following

variables: inflation, foreign direct investment (FDI) and trade openness (OPENNESS)). v_t is the time-specific effect and $\varepsilon_{i,t}$ measurement error.

Table II: Estimated results of GMM (Blundell and Bond, 1998)

Variables	Model1	Model2	Model3
Extreme poverty L.1	0.286*** (0.084)	0.124** (0.065)	0.176*** (0.059)
GINIGDP	-0.002*** (0.000)	----- -----	----- -----
STABGINI	----- -----	-0.021*** (0.006)	----- -----
STABGDP	----- -----	----- -----	-0.071*** (0.016)
INFLATION	0.077*** (0.008)	0.054*** (0.011)	0.12*** (0.007)
FDI	-0.186*** (0.017)	-0.238*** (0.035)	-0.202*** (0.051)
OPENNESS	-0.851*** (0.000)	-1.11*** (1.33)	-1.43*** (1.88)
Constant	1.784*** (1.041)	1.815*** (1.175)	1.783*** (0.767)
AR (1)	0.061	0.047	0.03
AR (2)	0.34	0.147	0.74
Sargan	0.993	0.985	0.991
Number of observations	414	414	414

Standard errors in parentheses

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

The AR (1) effect is accepted, while the AR (2) effect is rejected in all three models. Consequently, the results do not suffer from a residual autocorrelation problem. The Sargan test also shows that the instruments are valid in all three models. The first-order lag of extreme poverty has a positive and significant effect on its current value in all three models. Thus, the poorer the population, the poorer there will be in the years to come, and vice versa. This result underlines the importance of implementing effective anti-poverty policies to bring about a lasting reduction in the poverty rate.

The interaction between variable *growth-inequality* has a negative and significant effect on the poverty rate. This means that growth accompanied by a reduction in inequalities in income distribution reduces extreme poverty. It may also mean that policies that reduce income inequality have a positive impact on economic growth, while having a positive impact on reducing the poverty rate.

The interaction between variable *governance-inequalities* has a negative and significant effect on the poverty rate. This result shows that political stability and the absence of violence is a fundamental element for the GINI index to have a negative influence on poverty rate dynamics. Indeed, numerous studies have shown that the fight against inequality promotes political

stability in many developing countries (Nel, 2003; Dutt & Mitra, 2008), but also that political stability can have a positive impact on the fight against inequality (Shehzadi et al. 2019; Khan et al. 2023). Our result complements and reinforces this empirical literature.

The interaction between variable *governance-economic growth* has a negative and significant effect on the dynamics of extreme poverty. Thus, an increase in economic growth in a country where political stability and the absence of violence prevail is accompanied by a reduction in poverty. Numerous empirical studies have demonstrated that economic growth can foster political stability (Paldam, 1998; Cebula, 2011) and vice versa (Feng, 1997; Aisen & Veiga 2013; Uddin et al. 2017). Our results show that this positive reverse causality results in the reduction in extreme poverty.

Our results also show that higher inflation increases poverty, but that foreign direct investment and trade openness also have significant negative effects on poverty rate dynamics.

Inflation increases poverty mainly by reducing the purchasing power of poor households and limiting their access to savings and credit, while weakening the effectiveness of social policies (Easterly & Fischer, 2001; Datt & Ravallion, 2002; De Hoyos & Medvedev, 2011). These effects are particularly pronounced in countries with weak governance and high institutional vulnerability (Loayza & Raddatz, 2010; Ivanic & Martin, 2014). Trade openness and foreign direct investment (FDI) help reduce poverty in developing Sub-Saharan African countries by stimulating economic growth and promoting job creation, while improving access to international markets and technologies (Dollar & Kraay, 2004; Winters et al. 2004; Alfaro et al. 2004). These effects are especially significant in contexts where institutions and political stability enable better absorption of foreign inflows and a more equitable distribution of the benefits of growth (Borensztein et al. 1998; Carkovic & Levine, 2005).

Table III: Robustness test

<i>Variables</i>	<i>Model1'</i>	<i>Model2'</i>	<i>Model3'</i>	<i>Model4'</i>	<i>Model5'</i>	<i>Model6'</i>
<i>Extreme poverty</i>	0.391*** (0.066)	0.444** (0.065)	0.141*** (0.025)	0.075*** (0.046)	0.423*** (0.064)	0.331*** (0.075)
<i>L1</i>						
<i>GINIGDP</i>	-0.002*** (0.000)	-0.002*** (0.000)	----- -----	----- -----	----- -----	----- -----
<i>STABGINI</i>	----- -----	----- -----	----- -----	----- -----	-0.008*** (0.003)	-0.053*** (0.009)
<i>STABGDP</i>	----- -----	----- -----	-0.077*** (0.019)	-0.068*** (0.018)	----- -----	----- -----
<i>GDP</i>	-0.018*** (0.005)	----- -----	-0.026*** (0.008)	----- -----	----- -----	----- -----
<i>GINI</i>	----- -----	0.203*** (0.024)	----- -----	----- -----	0.281*** (0.046)	----- -----
<i>POLITICAL STABILITY</i>	----- -----	----- -----	----- -----	-1.634*** (0.516)	----- -----	-0.269*** (0.113)
<i>INFLATION</i>	0.022*** (0.004)	0.023*** (0.004)	0.116*** (0.011)	0.103*** (0.006)	0.079*** (0.013)	0.032*** (0.006)
<i>FDI</i>	-0.017*** (0.007)	-0.014*** (0.007)	-0.211*** (0.053)	-0.175*** (0.047)	-0.009*** (0.004)	-0.008*** (0.003)

<i>OPENNESS</i>	- 0.125*** (0.03)	- 0.176*** (0.555)	-0.127*** (0.246)	-0.158*** (0.277)	-0.188*** (0.921)	-0.854*** (0.118)
<i>Constant</i>	0.089*** (0.074)	0.153*** (0.067)	0.176*** (0.132)	0.171*** (0.142)	0.158*** (0.284)	0.949*** (0.409)
<i>AR (1)</i>	0.047	0.015	0.023	0.005	0.001	0.011
<i>AR (2)</i>	0.73	0.6	0.91	0.114	0.302	0.303
<i>Sargan</i>	0.995	0.991	0.99	0.989	0.993	0.986
<i>Number of observations</i>	414	414	414	414	414	414

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The robustness of the results obtained from the GMM estimation in the system is tested by performing a second estimation with the addition of direct effects. Thus, models 1' and 2' are replicas of model 1 in Table II, adding the direct effect of growth on poverty in model 1' and the direct effect of the GINI index on poverty in model 2'. Models 3' and 4' are replicas of model 2 in Table II, adding the direct effect of economic growth on poverty in model 3' and the direct effect of political stability on poverty in model 4'. Finally, models 5' and 6' are replicas of model 3 in Table II, adding the direct effect of the GINI index on economic growth in model 5' and the direct effect of political stability on poverty in model 6'.

All AR (1) effects are validated, and AR (2) effects are rejected. The various models estimated therefore do not suffer from the problem of autocorrelation of residuals. In addition, all Sargan tests are greater than 0.05, confirming the validity of the instruments used. The first-order lag of poverty has a positive and significant effect on its current value in all models, confirming the result of self-perpetuating inequalities found in Table II. The three interaction variables, namely economic growth multiplied by the GINI index (GINIGDP), economic growth multiplied by political stability (STABDGP), and political stability multiplied by the GINI index (STABGINI), all have negative and significant effects on poverty. We also find that economic growth and political stability have negative and significant effects on poverty, while an increase in the GINI index has a positive and significant effect on poverty. Thus, strengthening governance and economic growth helps to curb the effect of inequality on poverty. Political stability also reinforces the negative effect of growth on poverty. These results are consistent with those in Table II, confirming their robustness. We also find that the results of the control variables are consistent with those in Table II. Inflation exacerbates poverty in all models, while FDI and trade openness reduce it.

3.2. Modeling non-linear threshold effect à la Hansen (1999)

After demonstrating that political stability is an important factor within the growth–inequality–poverty triangle, this subsection aims to examine whether there are threshold values of the Political Stability and Absence of Violence index beyond which the effect of the interaction variables in poverty reduction becomes stronger. To this end, we estimate the three previous equations using the nonlinear panel threshold model developed by Hansen (1999). Hansen's (1999) method is based on a threshold regression model within a panel data framework. It allows for the endogenous detection of one or more breakpoints in the relationship between a dependent variable and its determinants, using a transition variable (in this case, political

stability). Specifically, the threshold value is estimated by minimizing the sum of squared residuals, and its significance is tested through a bootstrap procedure based on the likelihood ratio statistic. This approach has the advantage of capturing the nonlinearity of economic effects without imposing any prior functional form and of distinguishing country behaviors according to their level of governance. Thus, it enables us to identify “low-stability” and “high-stability” political regimes and to analyze how the interactions among governance, growth, and inequality differently influence poverty across these regimes.

$$\text{Extreme poverty} = \theta + \beta_0 \text{GINIGDP}_{i,t} + X_{i,t}(\text{STABILITY} < -0.104)\beta_1 + X_{i,t}(\text{STABILITY} \geq -0.104)\beta_2 + v_t + \varepsilon_{i,t} \quad (4)$$

$$\text{Extreme poverty} = \theta + \beta_0 \text{STABGINI}_{i,t} + X_{i,t}(\text{STABILITY} < -0.195)\beta_1 + X_{i,t}(\text{STABILITY} \geq -0.195)\beta_2 + v_t + \varepsilon_{i,t} \quad (5)$$

$$\text{Extreme poverty} = \theta + \beta_0 \text{STABGDP}_{i,t} + X_{i,t}(\text{STABILITY} < -0.134)\beta_1 + X_{i,t}(\text{STABILITY} \geq -0.134)\beta_2 + v_t + \varepsilon_{i,t} \quad (6)$$

Table IV: Estimated results for Hansen (1999)

VARIABLES	<i>Model 1</i> <i>Threshold</i> <i>-0.104</i>	<i>Model 2</i> <i>Threshold</i> <i>-0.195</i>	<i>Model 3</i> <i>Threshold</i> <i>-0.134</i>
GINIGDP_0	-0.003 *** (0.001)	-----	-----
GINIGDP_1	-0.02 * (0.000)	-----	-----
STABGINI_0	-----	-0.003 (0.007)	-----
STABGINI_1	-----	-0.012** (0.006)	-----
STABGDP_0	-----	-----	0.088*** (0.041)
STABGDP_1	-----	-----	-0.061*** (0.023)
INFLATION_0	0.055*** (0.026)	0.108*** (0.043)	0.046* (0.029)
INFLATION_1	0.006 (0.014)	0.009 (0.013)	0.017 (0.014)
FDI_0	-0.118*** (0.033)	-0.093*** (0.044)	-0.103*** (0.034)
FDI_1	-0.006 (0.017)	-0.013 (0.016)	-0.002 (0.017)
OPENNESS_0	1.13 (0.337)	-7.82 (0.857)	-5.58 (0.35)
OPENNESS_1	-1.44 (0.212)	-1 (1.84)	-2.02 (2.08)
Constant	-0.083 (0.073)	-0.055 (0.082)	-0.062 (0.073)

Number of observations 437 437 437

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

The results of Model 1 show that the political stability threshold is -0.104, estimated using Hansen's (1999) non-linear approach and confirmed as significant by the Fisher test, validating the existence of two distinct regimes. The GINIGDP interaction (growth $\times$ inequality) has a negative effect on poverty below the threshold and becomes stronger above it, with the coefficient rising from -0.003 to -0.02. This indicates that when political stability is low, growth concentrated in the hands of the wealthy has little or no effect on poverty reduction. It is therefore recommended to strengthen political stability so that it positively moderates the impact of growth and inequality, and to implement redistributive policies, investments in employment for vulnerable households, and the development of social services to ensure sustainable poverty reduction.

In Model 2, the political stability threshold is -0.195, also significant according to the Fisher test, confirming the relevance of dividing the sample into two regimes. The STABGINI interaction (governance $\times$ inequality) is not significant below the threshold but becomes negative and significant above it, showing that political stability is necessary for governance to moderate the effect of inequality on poverty. These results highlight the importance of consolidating institutions and governance, intensifying pro-poor social and fiscal programs, and promoting social cohesion and national dialogue to create an environment conducive to sustainable poverty reduction, even in the presence of persistent inequalities.

Model 3 complements this analysis by examining the STABGDP interaction (stability $\times$ growth), with a threshold of -0.134, also significant according to the Fisher test. Below this threshold, economic growth primarily benefits the elites and exacerbates poverty, whereas above it, growth significantly reduces the poverty rate. This confirms that political stability plays a key moderating role: in a stable environment, growth becomes an effective lever for poverty reduction. It is therefore recommended to consolidate institutions, ensure transparency and predictability in policies, and strengthen social cohesion. Combined with redistributive policies and targeted investments for vulnerable households, these measures maximize the positive effect of growth on sustainable poverty reduction.

Regarding foreign direct investment (FDI), the associated coefficients (FDI₀ and FDI₁) are negative in both regimes and significant in the first, indicating that FDI contributes to poverty reduction regardless of the level of political stability, with a stronger effect under stable governance. This result confirms that FDI promotes inclusive growth by stimulating employment, facilitating technology transfer, and enhancing integration into global value chains (Borensztein et al. 1998; Alfaro et al. 2004; Dollar & Kraay, 2004). However, in contexts of political instability, its positive effects remain more limited due to an uncertain economic environment and weak institutional frameworks.

Table V: Robustness test

	<i>Model1</i>	<i>Model2</i>	<i>Model3</i>	<i>Model4</i>
VARIABLES	<i>Threshold</i>	<i>Threshold</i>	<i>Threshold</i>	<i>Threshold</i>
	-0.109	-0.104	-0.073	-0.195
GINIGDP_0	-0.003***	-0.003***	-----	-----

	(0.001)	(0.001)	-----	-----
GINIGDP_1	- 0.005*	-0.006*	-----	-----
	(0.000)	(0.000)	-----	-----
STABGINI_0	-----	-----	-----	-0.001
				(0.013)
STABGINI_1	-----	-----	-----	-0.012*
				(0.006)
STABGDP_0	-----	-----	0.059*	-----
			(0.037)	-----
STABGDP_1	-----	-----	-0.074***	-----
			(0.024)	-----
GDP_0	0.003	-----	-0.059**	-----
	(0.046)	-----	(0.034)	-----
GDP_1	-0.085***	-----	-0.069***	-----
	(0.032)	-----	(0.024)	-----
GINI_0	-----	-0.021	-----	-0.018
		(0.03)	-----	(0.032)
GINI_1	-----	-0.028	-----	-0.014
		(0.031)	-----	(0.032)
INFLATION_0	0.059***	0.049***	0.054**	0.104***
	(0.027)	(0.026)	(0.026)	(0.043)
INFLATION_1	0.006	0.006	0.011	0.01
	(0.014)	(0.014)	(0.014)	(0.013)
FDI_0	- 0.118***	-0.127***	-0.093***	-0.093***
	(0.033)	(0.033)	(0.032)	(0.044)
FDI_1	-0.003	-0.005	-0.002	-0.013
	(0.017)	(0.017)	(0.017)	(0.016)
OPENNESS_0	0.386	- 0.514	0.296	-0.733
	(0.332)	(0.338)	(0.282)	(0.891)
OPENNESS_1	- 0.432	-0.115	-0.767	-0.897
	(0.211)	(0.209)	(0.229)	(0.181)
Constant	-0.033	0.139	0.047	0.783
	(0.091)	(0.173)	(0.08)	(0.178)
Comments	437	437	437	437

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We analyze the robustness of the results of Table IV, which contain only the indirect effects of the variables of interest. To do so, we incorporate both direct and indirect effects into the same estimate in Table V. The first observation is that the nonlinear relationship according to governance thresholds is maintained. As in Table III, the interactions between economic growth and the GINI index (GINIGDP), economic growth and political stability (STABGDP), and political stability and the GINI index (STABGINI) reduce poverty. The effects are greater with the strengthening of governance beyond the thresholds found. The direct effect of growth on poverty is also greater above the governance thresholds. Overall, as in Table III, poverty reduction results are better when above the governance thresholds. This is therefore evidence of the robustness of the results. Ultimately, political stability appears to be a factor that strengthens the fight against poverty in the countries in the sample by enabling growth to reduce both inequality and poverty.

1. Conclusion

This study contributes to the ongoing debate on the growth-inequality-poverty triangle by providing robust empirical evidence on the crucial moderating role of institutional governance. Focusing on a panel of 23 fragile Sub-Saharan African countries from 2003 to 2020, our analysis moves beyond traditional unidirectional frameworks to examine how political stability shapes this tripartite relationship.

Using dynamic System GMM estimations, we demonstrate that the interactions between economic growth, inequality reduction, and governance significantly alleviate extreme poverty. To capture the complex dynamics of this relationship, we applied Hansen's (1999) threshold modeling, which yielded our most striking finding: the poverty-reducing impacts of growth and redistributive policies are not uniform. They are substantially amplified only when a country surpasses specific thresholds of political stability and absence of violence. Below these critical institutional levels, the benefits of economic growth remain marginalized and fail to reach the most vulnerable populations.

These findings carry profound policy implications for developing economies. They suggest that isolated economic interventions, whether pro-growth strategies or redistributive fiscal policies, are insufficient to eradicate extreme poverty if implemented in an unstable institutional vacuum. Consequently, policymakers and international development agencies must prioritize the consolidation of institutions, the enforcement of the rule of law, and conflict prevention as absolute prerequisites. Ultimately, securing a stable political environment is not merely a supplementary developmental goal, but the fundamental catalyst required to transform economic growth and inequality reduction into genuine, sustainable poverty eradication.

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