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The Non-Linear Relationship Between External Debt and Economic Growth in African Economies: The Role of Financial Stability, Investment, and Governance Quality

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Abstract

This paper estimates a nonlinear asymmetric dynamics model in the threshold panel data framework to study the extent to which the quality of governance, investment, and financial stability affect the impact of external debt on economic growth in 47 African countries from 2002 to 2022. As a general approach, we use the first-differenced GMM estimator, which allows both threshold variables and regressors to be endogenous. The results confirm that external debt becomes a drag on growth beyond a threshold of 53.49% relative to GDP. Furthermore, the results show that external debt appears to stimulate economic growth mainly by orienting it towards productive investment. In addition, the results show that better governance quality and financial stability accentuate the positive impact of external debt on economic growth. Based on the findings, this study proposes several policy recommendations.

Keywords: external debt; economic growth; financial stability; dynamic panel threshold models; governance; Africa



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1. Introduction

External debt of all kinds, public and private, is an important source of financing that has accompanied international trade since ancient times. African countries need capital to finance their domestic investments, sustain their growth, and implement their economic development plans. If domestic savings are unable to perform their function as the main source of financing, African countries generally resort to external borrowing, and the debts are then repaid in installments with interest as agreed between the parties concerned. If external borrowing fails to finance productive, income-generating ventures, the nation's capacity to fulfill its debt obligations may be significantly weakened.

The global economy is facing a profound challenge as public and private debt levels rise to unprecedented levels. As of 2023, global debt levels exceeded USD 300 trillion (World Bank, 2023), a figure that raises concerns about financial stability, long-term growth, and fiscal sustainability. Public and external debts have often been leveraged to drive developmental progress, enabling governments, businesses, and households to invest in infrastructure, capital projects, and innovation. However, the accumulation of debt beyond sustainable levels can lead to severe economic distortions, including financial instability, reduced investment, and slower economic growth. In recent decades, debt accumulation has accelerated globally, driven by loose monetary policies, economic crises, and the growing fiscal needs of governments. Both the 2008 financial crisis and the COVID-19 pandemic amplified this tendency, prompting governments to undertake exceptional

levels of borrowing in efforts to sustain their economies. As the world emerges from the COVID-19 pandemic and faces new challenges, such as inflationary pressures and geopolitical risks, the issue of global debt has gained renewed urgency.

In developing countries, and African nations in particular, high levels of external debt can be traced to a range of intertwined economic and structural factors, including expansionary monetary policy, fiscal stimulus measures, and structural economic weaknesses. Understanding these factors is critical to designing effective policy responses. Fiscal policy choices in many African nations have significantly contributed to the rise in external debt levels. In the wake of the global financial crisis and subsequently the COVID-19 pandemic, many governments introduced expansive fiscal stimulus measures to avert economic downturns. These packages often included direct financial assistance to households, subsidies to businesses, and investment in infrastructure, all of which required significant government borrowing. While these measures were necessary to mitigate the immediate impact of the crises, they led to dramatically increased levels of external debt. A rapid build-up of external debt can undermine global economic stability and trigger broader financial vulnerabilities. These include financial instability, shrinking fiscal space, and long-term growth constraints. A country's financial stability is important because it is closely linked to the country's economic and social health. When a country is financially stable, it can stimulate economic growth, attract foreign investment, and improve the standard of living of its citizens. On the other hand, financial instability can have negative repercussions on the economy, such as a fall in the value of the currency, an increase in unemployment, a reduction in investment and income, a decline in confidence towards financial institutions, coupled with a rise in both economic and social disparities.

The public external debt of Africa as a whole has increased considerably over the last 10 years. This increase has been accompanied by a slowdown in the pace of economic growth in the continent's countries. Budget and public investment programs implemented by countries to respond to development needs, fiscal slippages, and successive shocks, including the COVID-19 pandemic, climatic events, and natural disasters, as well as the rise in global food, fuel, and fertilizer prices following Russia's invasion of Ukraine, have led to an increase in debt. Africa's total external debt reached the threshold of USD 1120 billion in 2022 and then registered an amount of USD 1152 billion at the end of 2023, with an external debt growth rate of 2.86%. With interest rates reaching the highest levels recorded on the continent for four decades, several countries are at risk of defaulting on their external debt in 2024 ([World Bank, 2023](#)).

Numerous empirical studies highlight external public debt as a key determinant of economic growth, emphasizing the bidirectional nature of their relationship. However, if external debt exceeds a reasonable limit and is oriented towards non-productive activities in countries with poor governance quality, it will constitute an obstacle to sustainable economic growth (see [Bouchrara et al., 2020](#); [Law et al., 2021](#); [Duodu & Baidoo, 2020](#)). Within this framework, this paper aims to identify the optimal external debt threshold beyond which economic growth in African countries is hindered, while also examining how governance quality, financial stability, and domestic investment levels affect the debt-growth nexus. Unlike previous studies, we use the dynamic panel threshold model proposed by [Seo and Shin \(2016\)](#) and developed by [Seo et al. \(2019\)](#). This study contributes to the empirical literature on debt and economic growth by specifically focusing on African countries and identifying their unique threshold levels, while considering the roles of governance, investment, and financial stability. The conclusions reveal, among other things, that although external debt tends to improve growth, its interaction with poor governance and its orientation towards non-productive activities can limit its expected effects on economic growth.

The remainder of this paper is organized as follows: Section 2 assesses the theories of public debt. Section 3 presents the data and the model specification. Section 4 shows the results and discussion, and Section 5 concludes.

2. Public Debt: Theoretical Foundations and Empirical Evidence

Economists from various schools of thought have offered differing perspectives on the economic implications of external debt, which can be summarized as follows.

Classical theory: After examining the opinions of the classics on the idea of state borrowing, we find that they opposed the idea from its foundation due to its harmful economic effects and heavy burdens on the national economy, and they considered that loans are an exceptional source that could only be used in extreme cases (Mankiw, 2000). They believed that the ideal policy was to limit borrowing and expedite the repayment of what was borrowed (Barro, 1989). The ideas of the classicals stemmed from their strong belief that the state should not intervene in economic life except in extreme cases because they believed that the invisible hand is sufficient to achieve economic balance, and therefore state intervention through borrowing disrupts this balance (Say, 1824). Traditionalists base their argument against public borrowing on two assumptions: the stability of the quantity of money supplied and the unproductiveness of public spending, and the hypothesis of full employment (Modigliani, 1961). As for borrowing, it was rejected as a means of financing expenditures, except in exceptional cases such as wars and crises (Otieno & Dániel, 2025; Elkhalfi et al., 2024).

Keynesian's theory: To overcome the crisis, Keynes proposed that “the state must intervene to achieve equilibrium through the application of fiscal and monetary policies.” Keynes argues that loans, like the other components of the two parts of the budget, are a means used by the state to direct the national economy to areas that fulfil society's goals. Keynesians believe that loans have less impact on income and consumption than taxes. As noted by Buchanan (1964), the use of loans to expand public expenditure positively influences aggregate demand, thereby enhancing employment levels and national income. The state must intervene and increase the volume of spending through the taxes it collects, thus creating a deficit in the state budget, financed by the banking system. Keynes is therefore considered to be the first to have introduced a policy of deficit financing in the event of full employment. Since he requires the state to intervene to compensate for any shortfall in effective demand, he justifies its borrowing to accomplish this mission.

Monetarism theory: The theory of monetarism was founded by the economist Milton Friedman, who believes in limiting the role of the state in economic activity. He believes that the main reason for the public budget deficit is the state's intervention in economic activity, which caused a recessionary crisis and a decline in economic growth, accompanied by inflation, and therefore opposes the state's intervention in economic activity through loans. Friedman's monetary school completely opposed Keynesian assumptions about the role and efficiency of fiscal policy. To support this critique, two key concepts were introduced: the ‘Crowding Out’ effect, which challenges the effectiveness of funding government spending through borrowing, and the ‘Permanent Income Hypothesis,’ which questions the efficiency of financing public expenditure via taxation (von Thadden, 2004).

Modern Monetary Theory: Modern Monetary Theory emerged in the 1990s from the work of a number of post-Keynesian economists, including Warren Mosler, L. Randall Wray, Stephanie Kelton, Bill Mitchell, and Pavlina R. Tcherneva (De Broeck et al., 2015). Modern Monetary Theory is a theory of the functioning of the state. Its only innovation lies in its way of understanding state financing and the link between fiscal and monetary policies. Supporters of this theory see money as a product of the state. The state can therefore finance itself by creating money; it cannot go bankrupt because it will never run out of money to create.

Existing empirical studies on external debt and economic growth are wide-ranging, and their results are also very controversial. The questions of whether external debt is an obstacle to economic growth, at what level external debt will have a negative impact on growth, and through which mechanisms this impact is likely to be generated have been examined by studies such as [Mejia \(2024\)](#), [Ayoub et al. \(2024\)](#), [Daba Ayana et al. \(2023\)](#), [Morlin \(2022\)](#), [Turan and Yanikkaya \(2021\)](#), [Baidoo et al. \(2021\)](#), [Hassan and Meyer \(2021\)](#), and [Eberhardt \(2019\)](#). Nevertheless, the debate over whether external debt promotes or hinders economic growth remains uncertain. The relationship may be negative ([Penzin & Akanegbu, 2024](#); [Agyeman et al., 2022](#); [Sandow et al., 2022](#); [Triatmanto et al., 2023](#); [Babu et al., 2014](#)), positive ([Mijiyawa, 2024](#); [Roy, 2023](#); [Ndikumana & Boyce, 2018](#)), inconclusive, or there may be no relationship. [Krugman \(1988\)](#), [Sachs \(1989\)](#), and [Cohen \(1992\)](#) developed the debt overhang theory. According to this theory, once external debt surpasses a certain threshold, it begins to suppress both consumption and investment, thereby hindering economic growth.

[Agyapong and Bedjabeng \(2020\)](#) explored the impact of external debt and foreign direct investment (FDI) on financial development across African countries. Their findings indicate a significant positive relationship between both external debt and FDI and the progress of financial systems within the continent. In contrast, other studies, such as [Stiglitz \(2000\)](#), have highlighted the adverse effects of external debt on economic growth, particularly in light of financial crises. Focusing on Ghana, [Takyi and Obeng \(2013\)](#) analyzed the factors influencing financial development and identified a unique cointegration between public borrowing and short-term financial development. However, their results showed no significant relationship between public borrowing and either short- or long-term financial development. Similarly, [Hauner \(2009\)](#) argued that elevated public debt levels may contribute to the limited development of financial institutions and markets. This occurs when financial institutions focus heavily on lending to government entities, reducing their incentive to innovate or expand their services.

[Reinhart and Rogoff \(2010\)](#) conducted a comprehensive study spanning 200 years and 44 countries to examine the effects of government and external debt on economic growth and inflation. They concluded that the negative impact of public debt on real GDP growth is relatively weak when the debt-to-GDP ratio remains below the 90% threshold. Interestingly, this threshold appears to be consistent across both advanced and emerging economies. However, they noted that emerging markets tend to face lower debt thresholds—particularly for external debt, which is often denominated in foreign currencies. Additionally, their findings suggest no clear contemporaneous relationship between inflation and public debt levels in advanced economies as a whole, although specific cases, such as the United States, have experienced higher inflation during periods of elevated debt ratios. In a critical reassessment, [Herndon et al. \(2013\)](#) replicated Reinhart and Rogoff's analysis and discovered several methodological flaws and calculation errors that misrepresented the relationship between public debt and GDP growth in 20 advanced economies. Contrary to Reinhart and Rogoff's more generalized conclusions, their results showed that both average and median GDP growth rates for countries with debt levels above 90% of GDP were not significantly different from those with lower debt ratios. This indicates that the relationship between public debt and economic growth is far more nuanced and varies significantly depending on the country and time period considered.

The dynamics of public debt and its macroeconomic effects differ notably in emerging markets, where rising debt levels are often accompanied by sharp increases in inflation. [Chudik et al. \(2017\)](#) analyzed the long-term impact of public debt accumulation on economic growth across a sample of 40 advanced and developing countries between 1965 and 2010. Their study specifically investigated whether the relationship between debt and

growth is influenced by the level of indebtedness. After accounting for global factors and their spillover effects, the authors found no consistent evidence of a universal threshold beyond which debt becomes harmful to growth. Nevertheless, regardless of the specific threshold level, their results revealed significant long-run negative effects of rising public debt on output growth.

The empirical studies presented in the literature review used standard econometric methods, but these are adequate to meet the research objectives. They used relatively large sample sizes and presented solid arguments to support their findings. The robustness of their findings was validated through a series of rigorous checks, lending strong credibility to their conclusions. Overall, these studies contribute valuable insights into the complex relationship between public debt and economic growth. However, a notable limitation of much of the existing literature is the insufficient consideration of socio-economic and environmental factors such as governance quality and financial stability. To address this gap, the present study aims to explore the non-linear relationship between external debt and economic growth while investigating the moderating roles of governance quality, investment, and financial stability. Unlike previous studies, we use the first-differenced generalized method of moments estimation (FD-GMM Estimator) of the dynamic panel threshold model.

3. Methodology

3.1. Data and Variables

This section provides a description of the variables and summarizes their statistical properties. The empirical analysis utilizes annual data comprising 987 observations from 47 African countries over the period 2002–2022. The 47 African countries used in the sample include Chad, the Central African Republic, Botswana, Comoros, Burkina Faso, the Republic of the Congo, Djibouti, Egypt, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Algeria, the Republic of Guinea, Guinea-Bissau, Côte d'Ivoire, Kenya, Lesotho, Cabo Verde, Liberia, Madagascar, Malawi, Mali, Mauritania, Burundi, Mauritius, Morocco, Cameroon, Mozambique, Benin, Niger, the Democratic Republic of the Congo, Nigeria, Rwanda, São Tomé and Príncipe, Senegal, Zambia, Sierra Leone, South Africa, Sudan, Tanzania, Angola, Tunisia, Uganda, and Togo.

This research utilizes three threshold variables, namely external debt, the quality of governance, and domestic investment. This study employs economic growth as the endogenous (dependent) variable. The explanatory variables are foreign direct investment, trade openness, human capital, and financial development. All variables conform to internationally accepted standard definitions. The selection of our variables was suggested by previous studies such as those by [Ochi et al. \(2024, 2025\)](#), [Edo and Oigiangbe \(2024\)](#), [Chowdhury et al. \(2024\)](#), [Chen et al. \(2024\)](#), [Oyadeyi et al. \(2024\)](#), [Jalles and Medas \(2024\)](#), [Triatmanto et al. \(2023\)](#), [Roy \(2023\)](#), [Wang et al. \(2021\)](#), and [Makun \(2021\)](#). The database constructed for this study integrates data from several reputable sources, including the World Bank database, the Worldwide Governance Indicators, the Penn World Table version 10.0, and the International Monetary Fund.

Financial stability is crucial to long-term economic growth and prosperity, as financial instability can have serious repercussions on the real economy, notably by leading to a credit crunch, higher interest rates, a fall in output and employment, and a drop in consumer and investor confidence. Financial stability can be measured using a number of economic indicators, such as the inflation rate, the GDP growth rate, the unemployment rate, the exchange rate, external debt levels, and the solvency of banks and other financial institutions, among others. In low-income developing countries such as most African countries, the macroeconomic indicator 'external public debt' can give an indication of the state of the economy and therefore of financial stability. The variable 'external debt' is

therefore considered in this study as a measure of financial stability. The measures of these variables and their symbols are presented in Table 1.

Table 1. Variables description.

Variables	Symbol	Measure
Economic Growth	GDP	This study represents economic growth through the annual percentage change in GDP per capita, reflecting the year-on-year growth rate.
Governance Quality	GQ	The quality of governance is captured by the Global Governance Index, which is calculated as the mean value of six governance indicators provided by the World Bank (Kaufmann et al., 2009) (−2.5 = bad governance to 2.5 = good governance).
Domestic Investment	DI	Domestic investment is assessed through gross capital formation expressed as a percentage of the gross domestic product (GDP).
External Debt	ED	External debt is measured by the ratio of external debt stocks to gross national income.
Foreign Direct Investment	FDI	We used the net foreign direct investment inflow as a share of gross domestic product.
Human Capital	HC	Human Capital is measured by human capital index per person, based on years of schooling and returns to education.
Trade Openness	TO	Trade openness is evaluated by calculating the total value of a country's exports and imports relative to its gross domestic product (GDP).
Financial Development	FD	Financial Development is a composite index of a country's relative rank of its "financial market and institutions" on their "depth, access, and efficiency." (on a scale of 0–1); (<0.5: less developed financial sector; ≥0.5: more developed financial sector).

Table 2 presents detailed descriptive statistics for the data used in this study over the research period, along with the correlation coefficients among the explanatory variables. Additionally, the Variance Inflation Factor (VIF) test results are included to assess multicollinearity.

Table 2. Summary statistics and Variance Inflation Factor (VIF) multicollinearity test.

Variable	Obs	Mean	Std. Dev	Min	Max	Variable	VIF	1/VIF
GDP	987	1.591	4.167	−36.777	27.831	ED	1.08	0.508
ED	987	53.796	58.947	2.551	610.451	GGI	1.58	0.633
GQ	987	−0.622	0.563	−2.1	0.879	GCF	1.21	0.825
DI	987	22.234	9.055	1.096	79.461	FDI	1.15	0.872
FDI	987	4.232	7.706	−8.703	103.337	TOE	1.14	0.875
TO	987	75.629	54.731	2.187	454.732	HCI	1.68	0.595
HC	987	1.708	0.414	1.061	2.911	FD	1.97	0.508
FD	987	0.136	0.100	0.026	0.642	Mean VIF	1.40	

The mean of ED over the study period is 53.796%, with a minimum of 2.551% for Algeria in 2013 and a maximum of 610.451% for Liberia in 2003. The GDP ranges from −36.777% in the Central African Republic (in 2013) to 27.831% in Chad (in 2004), with an average value of 1.591%, while governance quality ranges from −2.1 in the Democratic Republic of the Congo (in 2002) to 59.1% in Botswana (in 2007). In addition, DI has a minimum value of 1.096% in Sierra Leone (in 2002), while it has a maximum value of 79.461% in the Republic of the Congo (in 2018). The FDI, TO, HC, and FD registered on average a value of 4.232%, 75.62%, 1.708%, and 0.136%, respectively. The values of Variance Inflation Factor for our sample range from 1.08 to 1.97, with a mean of 1.40. The observed low correlation levels among the variables indicate the absence of multicollinearity.

3.2. Dynamic Panel Threshold Model

This study is based on the premise that external debt affects economic growth in a nonlinear manner, influenced by optimal levels of external debt, governance quality,

and investment. To capture this potential non-linear relationship, we utilize the First-Differenced Generalized Method of Moments Estimation (FD-GMM Estimator) of the dynamic panel threshold model introduced by [Seo and Shin \(2016\)](#) and further enhanced by [Seo et al. \(2019\)](#), who expanded Hansen's PTR model ([Hansen, 1999](#)). The dynamic panel threshold regression model is defined as follows ([Ochi et al., 2025](#)):

$$x_{it} = (1, z'_{it})\beta_1 I\{q_{it} \leq \lambda\} + (1, z'_{it})\beta_2 I\{q_{it} > \lambda\} + \varepsilon_{it} \quad (1)$$

where i denotes the country index and t represents the time. x_{it} is a scalar stochastic variable of growth, z_{it} the $k_1 \times 1$ vector of time-varying regressors, which may include the lagged dependent variable, the error term ε_{it} is composed of two components, $\varepsilon_{it} = \mu_i + \theta_{it}$, where μ_i captures the unobserved individual fixed effect, and θ_{it} is an idiosyncratic random disturbance with zero mean. In particular, θ_{it} is assumed to be a martingale difference sequence, $E(\theta_{it}|F_{t-1}) = 0$, where F_t is a natural filtration at time t ([Seo & Shin, 2016](#); [Seo et al., 2019](#)).

We consider the following augmented dynamic growth model:

$$GDP_{it} = \beta_1 GDP_{it-1} + \alpha_1 ED_{it} + \alpha_2 GQ_{it} + \alpha_3 DI_{it} + \alpha_4 FDI_{it} + \alpha_5 TO_{it} + \alpha_6 HC_{it} + \alpha_7 FD_{it} + \varepsilon_{it} \quad (2)$$

We subsequently extend Equation (2) to a dynamic panel data framework incorporating threshold effects ([Ochi et al., 2024](#)).

$$GDP_{it} = (\beta_1 GDP_{it-1} + \alpha_{11} ED + \alpha_{21} GQ_{it} + \alpha_{31} DI_{it} + \alpha_{41} FDI_{it} + \alpha_{51} TO_{it} + \alpha_{61} HC_{it} + \alpha_{71} FD_{it})I(q_{it} \leq \lambda) + (\beta_2 GDP_{it-1} + \alpha_{12} ED_{it} + \alpha_{22} GQ_{it} + \alpha_{32} DI_{it} + \alpha_{42} FDI_{it} + \alpha_{52} TO_{it} + \alpha_{62} HC_{it} + \alpha_{72} FD_{it})I(q_{it} > \lambda) + \mu_i + \theta_{it} \quad (3)$$

where $I\{\cdot\}$ denotes the indicator function that identifies the regime based on the threshold variable q_{it} and the threshold parameter λ , which partitions Equation (1) into distinct regimes characterized by coefficients α_1 and α_2 . Equation (3) is estimated using the proposed FD-GMM approach, which accommodates endogeneity in both contemporaneous regressors and the transition variable. Alternatively, previous studies (e.g., [Hansen, 1999](#); [González et al., 2005](#)) address the potential endogeneity of regressors and threshold variables by using their lagged values as instruments ([Ochi et al., 2025](#)).

3.3. Testing for Threshold Effects

To test for linearity or the presence of threshold effects, we consider the null hypothesis of no threshold effect, $H_0 = \delta_0$ for any $\gamma \in \Gamma$, where Γ denotes the parameter space for γ , against the alternative hypothesis $H_1 \neq \delta_0$ some $\gamma \in \Gamma$ ([Seo & Shin, 2016](#)).

A standard method is to apply a supremum-type statistic to take care of the loss of identification under the null; that is, $\sup W = \sup_{\gamma \in \Gamma} W_n(\gamma)$, where $W_n(\gamma)$ is the standard Wald statistic for each fixed γ , that is, $W_n(\gamma) = n\hat{\gamma}(\gamma)' + \Sigma_\delta(\gamma)^{-1}\hat{\delta}(\gamma)$, where $\hat{\delta}(\gamma)$ is the FD-GMM estimate of δ , given γ , and $\Sigma_\delta(\gamma)$ is the consistent asymptotic variance estimator for $\hat{\delta}(\gamma)$, given by $\hat{\Sigma}_\delta(\gamma) = R(\hat{V}_\delta(\gamma)\hat{V}_\delta(\gamma))^{-1}R'$ is a consistent asymptotic variance estimator, where $R = 0_{(k_1+1)*k_1}, I_{k_1+1}$ ([Seo et al., 2019](#); [Ochi et al., 2025](#)).

4. Results and Discussion

4.1. Panel Unit Root Test

Asymptotic theories related to threshold panel models are typically developed under the assumption of stationary regressors. Therefore, in dynamic panel settings, threshold estimation procedures assume that all variables included in Equation (3) are stationary in level ([Saidi, 2024](#); [Ochi, 2023](#)). The panel unit root tests reported in Table 3 reject the null hypothesis of non-stationarity for all variables, thereby confirming their stationarity in level.

Table 3. Panel-data unit-root tests.

Variables	First-Generation Tests				Second-Generation Test	
	Levin et al. (2002)		Im et al. (2003)		Pesaran (2007)	
	LLC Test Statistic	Prob	IPS Test Statistic	Prob	CIPS Test Statistic	Prob
GDP _{−1}	−9.632	0.000 +	−12.738	0.000 +	−6.162	0.000 +
ED	−8.929	0.000 +	−1.989	0.004 +	1.303	0.090 *
GQ	−5.124	0.000 +	−1.701	0.067 *	−1.055	0.047 **
DI	−5.415	0.000 +	−1.806	0.013 **	−8.347	0.000 +
FDI	−5.800	0.000 +	−2.948	0.000 +	−1.883	0.000 +
TO	−2.107	0.017 **	−1.539	0.041 **	−5.302	0.000 +
HC	−6.236	0.000 +	−1.462	0.000 +	−8.015	0.091 *
FD	−3.066	0.001 +	−1.854	0.000 +	−1.121	0.031 **

p-value: + *p* < 0.01; ** *p* < 0.05 and * *p* < 0.1.

4.2. Dynamic Panel Threshold Estimation

Table 4 presents the estimation results for the dynamic threshold model of growth (3), with ED, GQ, and DI used as the transition variables. The results obtained via the FD-GMM are reported separately for the low and high regimes. The low regime corresponds to values of the independent variables below the threshold parameter, while the high regime corresponds to values above the threshold parameter.

Table 4. A dynamic threshold panel data model of growth.

Variables	External Debt		Governance Quality		Investment	
	Coefficient	t-Statistic	Coefficient	t-Statistic	Coefficient	t-Statistic
Lower regime α_1						
GDP _{−1}	0.166	2.40 **	−0.314	−2.86 +	−0.366	−5.15 +
ED	0.104	3.91 +	−0.017	−0.72	−0.014	−0.86
GQ	−0.405	−1.73 *	0.009	0.45	0.091	0.62
DI	0.277	3.42 +	0.031	0.38	0.007	1.17
FDI	0.029	1.66 *	0.038	0.21	0.063	1.41
TO	0.017	2.32 **	0.019	1.10	0.081	1.36
+HC	0.328	3.66 **	−0.089	−1.45	−0.401	−0.88
FD	0.558	2.34 **	−0.392	−0.46	0.319	1.54
Upper regime α_2						
GDP _{−1}	−0.415	−4.83 +	0.431	2.49 **	0.441	2.23 *
ED	−0.059	−1.92 *	0.056	8.25 +	0.093	6.14 +
GQ	−0.482	−2.12 **	0.664	3.35 +	0.157	1.98 *
DI	0.186	1.37	0.347	2.85 **	0.597	2.83 +
FDI	0.015	0.36	0.109	1.88 *	0.198	2.59 +
TO	0.009	0.86	0.076	1.91 *	0.107	5.24 +
HC	−0.567	−2.02 *	0.585	6.57 +	0.543	2.44 **
FD	0.417	1.64	0.562	2.26 **	0.473	2.15 **
Difference δ						
GDP _{−1}	−0.581	−2.23 **	0.745	2.23 **	0.807	1.68 *
ED	−0.163	−2.01 +	0.039	1.88 *	0.107	1.06
GQ	−0.077	−1.71 *	0.655	1.68 *	0.066	0.62
DI	−0.091	−1.73 *	0.316	1.08	0.590	1.72 *
FDI	−0.014	−1.69 *	0.071	0.45	0.135	1.74 *
TO	−0.008	−1.41	0.057	1.54	0.026	1.66 *
HC	−0.895	−1.60	0.674	1.04	0.944	1.60
FD	−0.141	−1.15	0.954	1.22	0.154	1.64
Threshold	53.496	(3.01) +	−0.263	(−3.96) **	28.374	(10.63) +
Upper regime	82.04%		25.07%		21.08%	
Linearity (<i>p</i> -value)	(0.000) +		(0.000) +		(0.000) +	
J-test	76		82		79	
(<i>p</i> -value)	(0.000) +		(0.001) +		(0.000) +	
Observations	987		987		987	

+, ** and * indicates significance at 1%, 5%, and 10% with critical values of 2.576, 1.96, and 1.645, respectively.

When ED is considered as the transition variable, the results for (3) indicate that the threshold estimate is 53.50%, such that about 82% of observations fall into the upper external debt regime and 12% fall into the lower regime. The coefficient on ED shows an expected result that, below the threshold of 53.50%, there is a significant positive effect of ED on GDP in African countries. The negative and significant impact of ED on GDP per capita growth would begin to manifest once ED exceeded the threshold level of 53.50%. When the value of ED surpasses the 53.50% threshold, a 1% increase in ED reduces GDP by 5.9%. The link between GDP and ED is twofold. Debt appears to have an inverted U-shaped relationship with growth. When a country opens up to foreign capital, in the short term, an increase in debt supports domestic demand and growth. As ED ratios rise above the threshold of 53.50%, any new borrowing slows growth, even if the overall stock of debt continues to exert a positive effect on growth. The 53.50% threshold can therefore be considered as the level of debt that maximizes growth. However, when debt exceeds this threshold, its contribution becomes negative overall, and the situation of the country is less good than if it had not taken on debt. Findings are in line with the results presented by [Makun \(2021\)](#), [Law et al. \(2021\)](#), [Zaghoudi \(2020\)](#), [Pattillo et al. \(2002, 2004\)](#), [Krugman \(1988\)](#), [Sachs \(1989\)](#), and [Cohen \(1992\)](#), who found that when the ratio of ED to GDP is above a certain threshold, the average effect of ED on GDP is negative, whereas it is positive at lower levels. The findings also do not corroborate the results of [Dogan and Bilgili \(2014\)](#), who found that public and/or private external borrowing has a negative impact on GDP in both regimes.

Our findings indicate that external debt can play a vital role in supporting economic development; however, when debt levels become unsustainable, they tend to hinder and undermine economic growth. High debt levels increase the risk of financial instability, especially if borrowing is used to finance unproductive spending or speculative investments. A sudden tightening of global financial conditions, such as an increase in interest rates, could trigger a wave of defaults, especially in heavily indebted countries and companies. This risk is particularly acute in developing markets, where debt is often denominated in foreign currencies, leaving these economies vulnerable to capital flight and currency depreciation. High public debt reduces the fiscal space available to governments for countercyclical policy measures during economic downturns. Countries with high debt levels are often forced to engage in fiscal austerity (spending cuts or tax increases) to stabilize debt-to-GDP ratios. This can exacerbate economic downturns by reducing demand and stifling growth. Moreover, high levels of debt servicing—interest payments on existing debt—distribute resources away from productive investment in areas such as infrastructure, human capital, and social services.

The most widely accepted explanation aligns with the “debt overhang” theory, which posits that when a country’s debt exceeds a certain threshold, the expected future debt burden discourages investment and hampers growth. In line with this theory, our results indicate that while external debt can play a crucial role in fostering development, unsustainable debt levels tend to weaken and undermine economic growth. When the external debt becomes excessive and future debt will exceed the repayment capacities of debtor countries, investors who anticipate a gradual increase in taxes to repay the debt reduce their investments, which slows down the accumulation of capital and reduces economic growth. Over-indebtedness hampers growth by increasing investor uncertainty about the means available to the government to meet its onerous obligations. When the volume of debt increases, investors may fear that the government will finance its debt servicing obligations through distortionary measures (fiscal austerity). High levels of public external debt can have several adverse effects, including crowding out private investment, intensifying fiscal pressure, constraining social spending, and limiting the government’s capacity to implement structural reforms. In addition, the external debt overhang can encourage the government to increase the tax on profits, which

increases the size of the informal sector at the expense of a more efficient formal sector. In this way, external debt reduces the economy's productive capacity (Buchanan, 1964; Otieno & Dániel, 2025; Elkhalfi et al., 2024).

Next, the coefficient of lagged GDP is significant, but it is negative for the lower regime and positive for the upper regime. The results indicate that there is no significant relationship between the following variables: FD, TO, FDI, DI, and GDP in the lower external debt regime. However, the impact will be positive and significant in the upper regime. Finally, the GQ has a negative and statistically significant impact on GDP in the upper and lower external debt regimes. But the impact of HC is positive only in the lower regime.

When using the GQ as the transition variable, the threshold is estimated at -0.263 , with 75% of observations falling into the lower governance quality regime. The results show that below the threshold of -0.263 , there is no significant impact of ED on GDP per capita growth in African countries. The positive and significant effect of ED on GDP would begin to manifest once GQ reaches a threshold level of -0.263 . Countries with good governance can benefit favorably from external debt expansion, even when their foreign borrowing costs are high. Better institutions tend to minimize the negative impact of ED on GDP. ED can be a tool and a pillar for achieving growth, provided that it is well managed, well governed, transparent, and used as part of a credible growth policy. This result is similar to those obtained by Ramzan et al. (2023) and Law et al. (2021), who confirm that the quality of governance and policies has a substantial influence on the debt-growth link. There are two negative effects of poor governance of external debt on the economy's productive efficiency. Firstly, a direct effect resulting from the misallocation of foreign debt between public spending and private investment. This effect is relevant in economies where the government, controlling access to external debt, constrains private sector debt in favor of public debt overhangs. This suboptimal allocation of external debt reduces the economy's growth potential. Secondly, an indirect effect, such as the accumulation of a stock of unproductive public external debt, encourages the government to increase the tax on profits, thereby increasing the size of the informal sector of the economy at the expense of a more efficient formal sector. The results show that the positive and significant impact of all the explanatory variables on GDP becomes apparent once GQ reaches a threshold level of -0.263 .

When DI is used as the transition variable, the threshold parameter is estimated at 28.37%, with more than 79% of observations falling into the lower domestic investment regime. It should be noted, according to the results of our estimates, that there is no significant impact of ED and DI on GDP in the lower domestic investment regime. Whereas, for the upper domestic investment regime, ED and DI are positively and significantly correlated with GDP. The high level of ED could be beneficial to the economy if it is oriented directly towards investment and wealth creation, and also towards structural investments with a strong impact on improving the country's attractiveness in relation to tourism and foreign direct investment. Otherwise, external debts will be a painful and exhausting burden on the economy and risk becoming a spiral of weakness and vulnerability for the economy as they mobilize a significant proportion of the state's resources to pay the principal and interest due on these debts. The rest of the variables have positive and significant effects only in the upper domestic investment regime.

It should be noted here that the International Monetary Fund offers a range of programs and tools to help countries manage their external debt, particularly in the event of crises or repayment difficulties. These programs aim to restore macroeconomic stability, support sustainable growth, and reduce poverty in member countries. The four main mechanisms used by the IMF to achieve this objective are: financial assistance through loans, facilities, and debt relief; advice and capacity building through structural reforms, support for domestic resource mobilization and debt management; the debt sustainability

framework through debt assessment and support; and coordination with other creditors through debt restructuring. Coordination with other creditors through debt restructuring. In summary, the International Monetary Fund plays a key role in managing countries' external debts by providing them with financial support, advice, and technical assistance to strengthen their capacity to meet their financial obligations and ensure sustainable growth.

To assess the robustness of the model specifications employed above, we refer to the diagnostic test results reported in Table 4. Specifically, we examine the tests for the presence of threshold effects and the validity of the overidentifying moment conditions. First, the bootstrap p -values of the supW test are all close to zero, providing strong statistical evidence in favor of the existence of threshold effects. Second, the results of the Hansen J-test suggest that the null hypothesis of instrument validity is not rejected when external debt, governance quality, and domestic investment are used as the transition variables. Considering that the number of instruments tends to increase quadratically with the time dimension (T), these results are relatively satisfactory and support the reliability of the estimation (Seo & Shin, 2016; Roodman, 2009).

4.3. Robustness Checks with Generalized Method of Moments

In order to check the robustness of our estimation, we use the Generalized Method of Moments (GMM) with orthogonal forward deviations (Asongu et al., 2017; Asongu & Acha-Anyi, 2019; Tchamyou et al., 2019). The estimated results from system-GMM estimates are reported in Table 5. There are four principal justifications for the choice of GMM as a robustness checking technique for our estimation: First, the number of countries ($N = 47$) is higher than the number of years in each cross-section ($T = 21$). Second, the outcome variable is persistent because the correlation between economic growth and its first lag is 0.911, which is higher than the rule-of-thumb threshold of 0.800 required for establishing persistence. Third, this empirical technique has the advantage of treating endogeneity by monitoring time-invariant omitted variables and simultaneity. Finally, the GMM approach does not eliminate cross-country variations (Saidi et al., 2023).

Table 5. Estimation results of System-GMM.

Variables	Coefficient	Prob.
GDP ₋₁	−0.911	0.000 +
ED	−0.027	0.000 +
GQ	−0.911	0.001 +
DI	0.003	0.801
FDI	0.023	0.202
TO	0.003	0.122
HC	−0.413	0.000 +
FD	0.069	0.682
AR (1)	0.688	
AR (2)	0.764	
HansenOIR	0.826	
Sargan OIR	0.072	
DHT for instrument (a) Instruments in levels		
H excluding group	0.882	
Dif (null, H = exogenous)	0.773	
(b) IV (years, eq (diff))		
H excluding group	0.886	
Dif (null, H = exogenous)	0.582	
Fisher	554,614 +	
Instruments	40	
Countries	47	
Observations	987	

p -value: + $p < 0.01$. DHT: Difference in Hansen Test for Exogeneity of Instruments' Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. (1) The significance of estimated coefficients and the Wald statistics. (2) The failure to reject the null hypotheses of: (a) no autocorrelation in the AR (1) & AR (2) tests, and (b) the validity of the instruments in the Sargan and Hansen OIR tests. Sargan p -value must not be less <5% and >10%. H0: over-identifying restrictions are valid. For Sargan's test, p -value = 8%, we accept the H0; that is, all instruments are valid.

As reported in Table 5, the signs of all estimated coefficients are consistent with those obtained from the dynamic threshold regression model, confirming the robustness of the results. Furthermore, the absence of autocorrelation in the System-GMM estimates indicates that the model is well specified and the results are unbiased.

5. Conclusions, Limitations, and Extension

This study explores the link between external debt and economic growth across 47 African nations over the period from 2002 to 2022. The empirical findings reveal a non-linear relationship involving economic growth, external debt, governance quality, financial stability, and public investment. They show that external debt has significant effects on economic growth and indicate a threshold of 53.49% of the debt ratio, beyond which any accumulation of external debt constitutes an obstacle to economic growth. Our results support the idea of the conditional positive impact of external debt on economic growth and that its impact depends on its rate relative to GDP, the quality of governance in African countries, and the share of domestic investment in GDP.

Several strategies can help reduce the trade-offs faced by African countries. Primarily, governments need to focus their public expenditures on initiatives that foster economic growth. This involves investing in critical areas such as education, healthcare, infrastructure, and other high-quality projects that encourage development. Reviving economic growth is expected to increase public revenues, thereby improving the capacity to repay debt. Additionally, it entails directing greater funds towards implementing first-generation reforms. Structural reforms are necessary to overcome key barriers to growth. For instance, long-term governance reforms remain crucial in many African countries, which typically perform worse than other regions in governance indicators such as the rule of law, anti-corruption efforts, and government accountability. Additionally, improving revenue collection is vital. Although economic growth expands the overall economy and generates more income, limited domestic revenue collection hampers governments' ability to service debt and fund critical social and developmental sectors. Several African nations, including South Africa, Nigeria, Ghana, Zambia, Kenya, and Ethiopia, have taken steps to enhance revenue generation. These efforts encompass introducing new taxes, increasing existing tax rates, registering more businesses for tax compliance, broadening the tax base, strengthening tax administration, and implementing other measures to boost government revenues. Finally, it would be preferable to set precise debt targets that take into account the trade-offs between debt sustainability and development objectives rather than focusing on short-term budget deficits. This study proposes a threshold of 53.49% of debt over the medium term, which would allow debt servicing costs to be kept at a manageable level. Just over half of African countries had a debt level above this threshold at the end of 2023.

Addressing the external debt crisis requires a multi-pronged approach that balances the need for fiscal sustainability with the objective of promoting long-term economic growth. The external debt crisis is a major challenge for African economies, with unsustainable debt levels threatening fiscal stability and long-term growth prospects. The causes of external debt accumulation (expansionary monetary policies, crisis-induced fiscal spending, and structural economic weaknesses) need to be addressed through a combination of national and international efforts.

Policy solutions require a balanced approach, combining fiscal consolidation with targeted investments in growth-enhancing sectors such as education, infrastructure, and technology. Debt management strategies, including proactive debt restructuring and innovative financial instruments, can help minimize the risks associated with high debt levels. In addition, international coordination is essential to strengthen financial regulation, enhance debt transparency, and provide debt relief when necessary. Ultimately, addressing

the external debt crisis requires a combination of immediate fiscal measures and long-term structural reforms. By implementing these evidence-based policy solutions, African economies can mitigate the risks associated with high external debt and pave the way for more sustainable and resilient economic growth in the future.

A key limitation of this study is the lack of consideration for the diversity among African countries. Therefore, a potential direction for future research would be to divide the full sample into subsamples based on the different economic communities within the continent. Another possible extension of this study is to present, as an example, the use of other omitted variables, such as “The ratio of revenues devoted to debt service, sovereign credit rating, and bond yields”.

Finally, there is ample evidence that many authoritarian regimes- including those in Africa- are dishonest about their levels of GDP and GDP growth (Martinez, 2022; Andries et al., 2022). As a suggestion for future research, a growing number of economists and other social scientists are identifying outcomes other than GDP growth as important (Marangos, 2008; Sen et al., 2010; Zhang, 1997; Andolfatto & Gervais, 2006).

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