External debt, institutional quality and economic growth in Nigeria

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ABSTRACT

The study examined the effect of external debt on economic growth; evaluate the role of institutional quality; determine the direction of causality; and establish the threshold of external debt relative to GDP for the Nigerian economy. Secondary annual time series data with key variables like economic growth (proxied by GDP), external debt (proxied by external debt outstanding), and institutional quality (proxied by six World Governance Indicators, including Voice & Accountability and Control of Corruption), financial development, human capital, and trade openness were included. The data were sourced from the CBN, World Bank, and World Governance Indicators, and were analyzed using advanced econometric techniques, specifically the Vector Error Correction Model (VECM) and a Nonlinear Threshold model. The analysis revealed that external debt has a positive and significant effect on economic growth in both the short and long run in Nigeria. Additionally, institutional quality also has positively impacts on economic growth. Causal analysis showed unidirectional causality running from economic growth to external debt, from institutional quality to external debt, and from economic growth to institutional quality. Crucially, a critical external debt-to-GDP ratio of 5.4822% was established as the threshold for the Nigerian economy. From the results, external debt can stimulate growth in Nigeria, particularly when combined with improved institutional quality (e.g., better rule of law and corruption control). However, to achieve rapid and sustainable economic development while avoiding debt servicing burdens that constrain future investment, the Nigerian government should explore alternative infrastructure financing mechanisms. It is recommended to shift reliance from huge external debt to Public-Private Partnership (PPP) models such as Build-Operate-Transfer (BOT) and similar arrangements.

Keywords: *Economic growth, External debt, Financial development, Institutional quality, Non-linear threshold model, Vector error correction model.*

Highlights of this paper
- This study employed the VECM and Nonlinear Threshold models on data spanning 1981–2021 to analyze the complex effects of external debt and institutional quality on economic growth in Nigeria.
- The key finding established that both external debt and strong institutional quality positively impact economic growth, while identifying a crucial external debt-to-GDP threshold of 5.4822%.
- The study, therefore, recommends that the Nigerian government enhance the rule of law and strengthen measures to control corruption, while prioritizing Public-Private Partnership (PPP) models over large external debts to ensure sustainable development.

1. INTRODUCTION

External debt is a common source of financing for developing countries, especially in Sub-Saharan Africa (SSA). However, external debt can also pose serious challenges for economic growth, especially when it is unsustainable or volatile. The impact of external debt on economic growth depends on various factors, such as the terms and conditions of the debt, the use and management of the borrowed funds, and the macroeconomic and institutional environment of the borrowing country. Institutional quality refers to the quality of governance, rule of law, political stability, and corruption control in a country. Institutional quality can affect economic growth by influencing the efficiency and productivity of resource allocation, the protection of property rights and contracts, the attraction of foreign investment, and the credibility of fiscal and monetary policies.

The primary objective of economic policies in developing nations, such as Nigeria, is to achieve sustainable economic growth, infrastructural development, and poverty reduction (Akinlo, 2020). However, when the government faces constraints in meeting these growth objectives, it becomes imperative to seek financial assistance from external sources, primarily in the form of debt. Nigeria has relied on external debt to bridge the saving-investment gap and address fiscal deficits since gaining independence (Ogbaro, Young, & Bank-Ola, 2022). External debt has played a significant role in the economic growth and development of developing countries like Nigeria, where access to necessary finances for driving economic growth is limited (Makun, 2021). Nevertheless, Nigeria continually grapples with a low revenue base and high government operating expenditures, leading to an increasing reliance on foreign capital sources, including remittances, financial aid, and external debt. However, it's important to note that the inflow of external debt alone may not suffice; a sound macroeconomic environment, effective policies, and strong institutions are also essential to prioritize and effectively utilize these finances for stimulating economic growth (Montiel, Badenhorst, Lee, & Valenzuela, 2022).

The notion that external debt can contribute to infrastructure development and stimulate growth in developing nations is rooted in the Keynesian theory of debt, as articulated by Rotheim (1981). According to Keynes, in an economy facing depression, substantial public investments in infrastructure play a crucial role in kick-starting growth. Consequently, when external borrowing is effectively employed to fund income-generating domestic investments and infrastructure projects, with the aim of stimulating private sector involvement, it can lead to sustained economic growth over the long term. This growth, in turn, augments the country's revenue base, enhancing its capacity to service external debt obligations without impeding domestic private investments (Willis, Jayaraman, Lambourne, Chu, & Pu, 2021).

Also, equally important in the growth process is the quality of governance and institutions. In this light, Raheem (2021) argued that the biggest determinants of growth in a country are its leadership, policies and institutions. Institutional quality measures the level of governance effectiveness in terms of economic management, prevalence of corruption and the predictability of policymaking. Institutional quality are the rules of the game in a society or better yet humanly devised constraints that shape human interaction and determine the effectiveness of

the anti-corruption framework of the government machinery in making decisions in the best interests of citizens (Tarek & Ahmed, 2017). A well-defined institution decreases macroeconomic volatility, reduces uncertainty, lowers transaction costs, stimulates specialization and invariably fosters investments and innovation (Smith & Brownstone, 2020). Forson, Ofosu-Dwamena, Opoku, and Adjavon (2021) attributed the low GDP per capita growth of developing countries like Nigeria to poor governance and weak institutions. According to Dey and Tareque (2020) economic growth is driven by certain economic activities which among other things, include policies and directives instituted by the government; as the government policies and institutions that make up the infrastructure of an economy determine investment and productivity, and therefore also determine the wealth of nations. In fact, problem in governance hinders every effort to improve infrastructure, attract investment, and raise educational standards (Daud, 2020).

2. EMPIRICAL LITERATURE

The empirical evidence on the link between debt and growth has been extensively assessed in various countries, nevertheless the existing literature has addressed the issue with diverse approach which generates mixed findings. By investigating the symmetric and asymmetric link between external debt and growth for Fiji Island for the period of 1980 and 2018, Makun (2021) employed by ARDL and Nonlinear ARDL approach. For linear analysis, the finding of the study revealed that external debt impede growth in the long run but insignificantly augment growth in the short run. For the asymmetric link, the study established that both positive and negative change in debt hamper growth in the long run while only positive change to debt enhance growth in the short run. By disaggregating 123 countries into low-income, lower-middle- and upper-income countries, Qureshi and Liaqat (2020) evaluate the link between debt and growth for the period of 1990 and 2015. The study applied panel vector autoregression approach and discovered that external debt hampers growth in all the 123 countries but augment growth in the lower- and upper-middle income countries. Furthermore, the study established that external debt stimulate growth via saving and investment. Based on panel data analysis considering 24 emerging markets from 1996 to 2018, De Mendonça and Brito (2021) explore the link between public debt and investment (proxied by aggregate, private investment and public investment) using Difference and System Generalized Method of Moments. The result of the study revealed that public debt and inflation hampers aggregate investment, private investment and public investment while trade openness accelerate investment (aggregate, private investment and public investment) for the emerging countries. Focusing on the link between institution (proxied by law and order, bureaucratic quality, democratic accountability, ethnic tension, protection from religious tension, non-militarized politics, no corruption, external conflicts, internal conflicts, investment profiles, socioeconomic conditions and government stability) and growth for 15 ECOWAS countries spanning the period of 2005 and 2017. The study employed Driscoll and Kraay nonparametric covariance matrix estimator, and the spatial error model which account for cross-section dependency and cross-country heterogeneity. The empirical outcome of the study disclosed that better-quality political and economic institutions can have positive effects on economic growth. Also, the study found that capital formation, inflation and trade openness retard growth of ECOWAS countries. Further, the study established a threshold of 6.6087. Beyond this threshold level, political and economic institutions propel growth and beneath the threshold, political institutions, economic institutions exert insignificant effects on economic growth which suggests that low quality of political institutions feed the greed and rent-seeking activities of political actors, which damages developmental prospects. Achua, Yusuf, and Wakdok (2022) analyzed the asymmetric link between public debt and resource rent (proxied by oil revenue) in Nigeria over the period of 1970 and 2020 using Nonlinear Autoregressive Distributed Lag (NARDL) cointegration and dynamic multiplier

estimators. The result of the NARDL indicates that there exists a long run relationship between public debt and resources rent. In addition, the study established that negative shocks of resource rent impact more on public debt than positive shocks. Bardaka, Bournakis, and Kaplanoglou (2021) estimated a panel vector autoregressive to assess the influence of fiscal consolidation on total factor productivity (TFP) among 26 OECD countries from 1980 to 2016. The results found fiscal consolidation to be more harmful on TFP of low debt countries in the short run. The study recommended that spending-driven fiscal consolidation is unnecessary as such consolidation would undermine the capacity due to the importance of government spending in shaping productive capital.

Focusing on 6 South African Development Community (SADC) economies (South Africa, Botswana, Namibia, Zambia, Malawi and Zimbabwe), Makhoba, Kaseeram, and Greyling (2022) employed smooth transition regression (STAR) estimator to analyze the asymmetric debt-growth nexus for the period of 2000 and 2018. The outcome of the study revealed that an increase in public debt increases by 1% in the low debt regime, economic performance decline by 0.58%, 1.5%, 0.3% and 0.27% for Botswana, Namibia, Zambia and Zimbabwe respectively. In the high debt regime, the growth rate for Botswana and Namibia is a staggering 128% and 129%, respectively. This may indicate that the governments of these economies are highly efficient with the potential to appropriately allocate and manage infrastructural funds to stimulate high growth rates for their economies, given their endowments at the offshores. Alternatively, there is an impressive 37% and 28% for Zambia and Zimbabwe, respectively. This performance is better than that of Malawi at 22%, under a high-debt regime. However, relative to the results of Botswana and Namibia, the governments of these economies appear to be less efficient in appropriately allocating infrastructural funds, given their endowments. In a panel study of a panel of 44 sub-Saharan African Economies over the period between 1996–2014, Kemoe and Lartey (2022) analyze the role of institution (proxied by corruption and government effectiveness) in debt-growth nexus. The result of the GMM estimator indicates that debt and government effectiveness hampers growth in SSA region which suggests that government inefficiencies related to this aspect of governance are deeply rooted in sub-Saharan Africa, and actions to address them are usually met with resistance at lower levels of government effectiveness, leading to disruptions and hence, potentially negative consequences on growth. However, the square of government effectiveness exerts a positive and significant impact on growth which indicates that non-linearity in the response of growth to improvement in the quality of public service, suggesting that establishing measures to enhance government effectiveness leads to a positive effect on growth when government effectiveness is high. By investigating the link between public debt, economic growth and public sector management (proxied by property rights and rule-based governance, quality of budgetary and financial management, efficiency of revenue mobilization, quality of public administration, and transparency, accountability, and corruption in the public sector).

3. MATERIALS AND METHODS

The study adopts a descriptive and econometric approach to investigate the relationships between external debt, institutional quality, and economic growth in Nigeria from 1981 to 2021. The study uses secondary time series data on seven variables: economic growth (GDP), external debt (ED), institutional quality (IQ), financial development (FD), capital stock (CS), human capital (HC), and trade openness (OP). Data on economic growth, external debt, financial development, degree of openness, and capital stock are sourced from the Central Bank of Nigeria (CBN) statistical bulletin, while data on human capital and institutional quality are sourced from the World Bank Development Indicator and World Bank Governance Indicator, respectively. The study follows the standard debt-growth literature and specifies the relationship between external debt, institutional quality, and growth in Nigeria using a non-linear threshold model in consonance with the studies of Daud (2020) and Ogbaro et al. (2022).

According to the duo, the link amongst external debt, institutional quality and growth in Nigeria is specified as follows.

$$EG_t = f(EXD_t, INS_t) \tag{1}$$

Adding the variables of interest to reflect the novelty of this work, Equation 1 becomes.

$$EG_t = f(EXD_t, INS_t, FD_t, OP_t, CAP_t, HUM_t) \tag{2}$$

Expressing Equation 2 in log-linear econometric form becomes.

$$lEG_t = \lambda_0 + \alpha lEXD_t + \beta lINS_t + \delta lFD_t + \gamma lOP_t + \varphi lCAP_t + \theta lHUM_t + \mu_t \tag{3}$$

The essence of the log-linear Equation 3 is mainly to adjust the variables seasonally and examine the magnitude change of the variables. With the non-linear threshold model, there is consistency in the estimating procedure such that the type 1 error rates of the Monte Carlos approach are very apt in their applicability to indicative finite samples (Fong, Holden, & Trzcinka, 2017). The methodology involves using an indicator function, location parameter, and threshold variable to divide the sample into different regimes based on the external debt level. The dependent variable is economic growth, while the independent variables include external debt and institutional quality, proxied by various indicators such as voice and accountability, political stability, government effectiveness, regulatory quality, control of corruption, and rule of law. It also allows coefficients to be interpreted in elasticity terms.

Variables in Equation 3 are defined as EG is economic growth, EXD is external debt and INS is institutional quality, degree openness is denoted by (OP), financial development (FD), investment in physical infrastructure by the government (CAP) and human capital (HUM) at time t while μ_t is the error term which captures other variables that might influence economic growth not expressed in Equation 3. In addition, the coefficient of external debt, institutional quality, financial development, degree of openness, infrastructural stock and human capital are denoted by $\alpha, \beta, \delta, \gamma, \varphi, \theta$ while λ_0 is the intercept.

Institutional Quality is measured by rule of law (ROL), regulatory quality (REQ), government effectiveness (GEF), political stability and absence of violence/terrorism (PSA), voice and accountability (VAC) and control of corruption (COP). The scores for all these indicators of institutional quality range from −2.5 to 2.5. The higher the value, the better the institutional quality and vice-versa. In order to circumvent the problem of multicollinearity and overparameterization of model, this study utilized the average of all the six indicators of institutional quality such that the higher the value, the better the institutional quality.

The study first performs some descriptive statistics on the data, such as mean, standard deviation, minimum, and maximum values of the variables. It also tests for the stationarity of the variables using unit root tests and determines their order of integration. The study then applies a vector error correction model (VECM) to examine the short-run and long-run effects of external debt and institutional quality on economic growth. The VECM is a multivariate time series model that captures the dynamic interactions among the cointegrated variables and their adjustment to the long-run equilibrium. The VECM can be expressed as.

$$\begin{bmatrix} \Delta InEG_t \\ \Delta InEXD_t \\ \Delta InFD_t \\ \Delta InOP_t \\ \Delta InCAP_t \\ \Delta InHUM_t \end{bmatrix} = \begin{bmatrix} \vartheta_1 \\ \vartheta_2 \\ \vartheta_3 \\ \vartheta_4 \\ \vartheta_5 \\ \vartheta_6 \end{bmatrix} + \sum_q^p \begin{bmatrix} \alpha_{1j} & \beta_{1j} & \delta_{1j} & \phi_{1j} & \sigma_{1j} & \varphi_{1j} \\ \alpha_{2j} & \beta_{2j} & \delta_{2j} & \phi_{2j} & \sigma_{2j} & \varphi_{2j} \\ \alpha_{3j} & \beta_{3j} & \delta_{3j} & \phi_{3j} & \sigma_{3j} & \varphi_{3j} \\ \alpha_{4j} & \beta_{4j} & \delta_{4j} & \phi_{4j} & \sigma_{4j} & \varphi_{4j} \\ \alpha_{5j} & \beta_{5j} & \delta_{5j} & \phi_{5j} & \sigma_{5j} & \varphi_{5j} \\ \alpha_{6j} & \beta_{6j} & \delta_{6j} & \phi_{6j} & \sigma_{6j} & \varphi_{6j} \end{bmatrix} \begin{bmatrix} \Delta InEG_{t-j} \\ \Delta InEXD_{t-j} \\ \Delta InFD_{t-j} \\ \Delta InOP_{t-j} \\ \Delta InCAP_{t-j} \\ \Delta InHUM_{t-j} \end{bmatrix} + \begin{bmatrix} \lambda_1 \\ \lambda_2 \\ \lambda_3 \\ \lambda_4 \\ \lambda_5 \\ \lambda_6 \end{bmatrix} ECT_{t-1} + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \\ \mu_{3t} \\ \mu_{4t} \\ \mu_{5t} \\ \mu_{6t} \end{bmatrix} \tag{4}$$

Where $\Delta lnEG_t$; $\Delta lnEXD_t$; $\Delta lnFD_t$; $\Delta lnOP_t$; $\Delta lnCAP_t$; $\Delta lnHUM_t$; are vector of endogenous variables, ϑ is a vector of intercepts, α is a matrix of error correction coefficients, λ are matrices of short-run coefficients, p is the optimal lag length, and u_t is a vector of error terms. The study uses the Akaike information criterion (AIC) and the Schwarz information criterion (SIC) to select the optimal lag length for the VECM; and as well tests for the stability and causality of the VECM using the eigenvalue stability condition and the Granger causality test, respectively. The study also performs some diagnostic tests on the VECM, such as serial correlation test, heteroskedasticity test, and normality test. These tests check whether the VECM satisfies some basic assumptions and whether there are any problems with the error terms.

The study also performs some inferential tests on the VECM, such as impulse response functions (IRFs) and variance decomposition (VDC). These tests measure how a shock to one variable affects other variables over time and how much of the forecast error variance of one variable is explained by other variables, respectively.

Finally, the study applies a nonlinear threshold model to determine the threshold level of external debt that maximizes economic growth in Nigeria. The nonlinear threshold model allows for different effects of external debt on economic growth depending on whether external debt is above or below a certain threshold value. The nonlinear threshold model can be expressed as:

$$y_t = \alpha + \beta_0' X_t + \beta_1' X_t h(q_t; \theta) + \mu_t \qquad (5)$$

Where y_t is the dependent variable (economic growth), β_0' and β_1' represent $Kx1$ vectors (external debt, institutional quality, financial development, degree of openness, capital stock and human capital), θ is the vector of parameters

Table 1. Descriptive statistics.

	GDP	EXD	INS	FD	CAP	HUM	DOP
Mean	37550.91	2311.984	-0.6228	11.4731	35.6305	52.7528	31.6743
Median	8234.490	648.8100	-1.0258	8.0900	33.1073	52.7219	33.7197
Maximum	176075.5	15855.23	0.0000	22.7500	89.3861	53.7323	53.2779
Minimum	139.3100	2.3300	-1.2651	5.8100	14.1687	51.7946	9.1358
Std. Dev.	50434.86	3497.686	0.5605	5.5295	18.9694	0.5458	12.42937
Skewness	1.2843	2.3427	0.2164	0.6876	1.0874	-0.1727	-0.260245
Kurtosis	3.4592	8.3588	1.0864	1.7184	3.9245	2.0300	2.128483
Jarque-Bera	11.6318	86.5632	6.5754	6.0370	9.5414	1.8112	1.760356
Probability	0.0029	0.0000	0.0373	0.0488	0.0084	0.4042	0.414709
Observations	41	41	41	41	41	41	41

Note: GDP, EXD, INS, FD, CAP, HUM and DOP denote economic growth (proxied by gross domestic product), external debt, institutional quality (proxied by control of corruption, voice and accountability, rule of law, regulatory quality, absence of violence/terrorism, government effectiveness), financial development (proxied by domestic credit to private sector as a share of GDP), capital stock (proxied by gross fixed capital formation as a share of GDP), human capital and degree of openness (proxied by trade as a share of GDP)

4. RESULTS AND DISCUSSION

Table 1 shows the descriptive statistics of the variables, such as mean, standard deviation, minimum, maximum, skewness, kurtosis, and Jaque-Bera (JB) test. The mean values of the variables are within the range of their minimum and maximum values, indicating a high degree of consistency. The skewness values measure the symmetry of the distributions. All the variables except human capital and degree of openness have positive skewness, meaning that they have longer right tails than left tails. The kurtosis values measure the peakedness of the distributions relative to the normal distribution, whose kurtosis value is 3. Five of the variables, gross domestic product, external debt, institutional quality, financial development and capital stock have kurtosis values above 3, meaning that they have more peaked distributions than the normal distribution (leptokurtic). The other two variables, human capital and degree of openness have kurtosis values below 3, meaning that they have less peaked

distributions than the normal distribution (platykurtic). The JB test evaluates the null hypothesis that the variables are normally distributed. The null hypothesis can be accepted if the p-value of the JB test is greater than or equal to the significance level (0.05 in this case). Based on this criterion, only human capital and degree of openness can be considered as normally distributed.
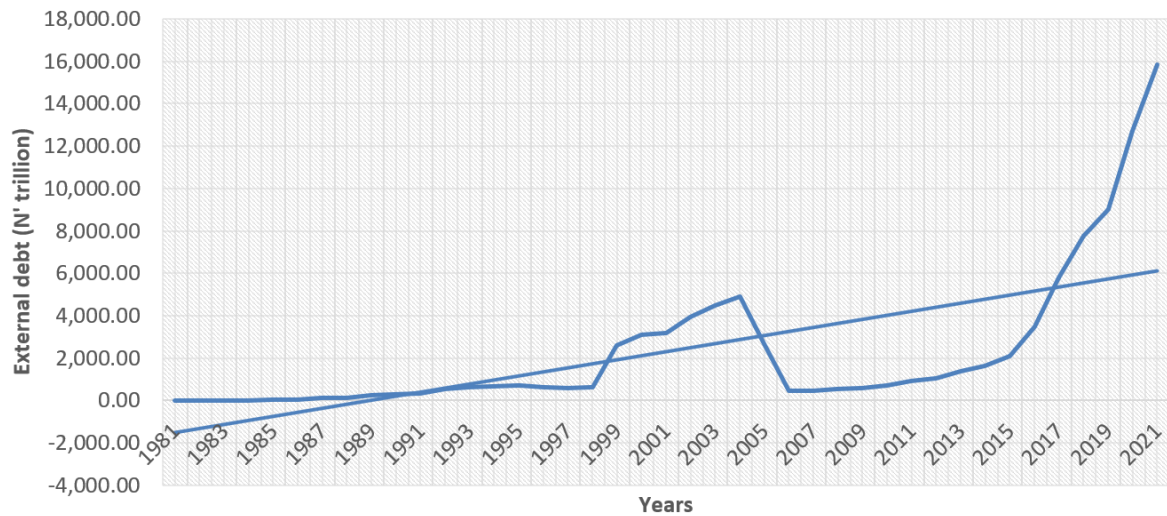

Figure 1. Trend of external debt in Nigeria (1981-2021).

4.1. Trend of External Debt in Nigeria

Figure 1 shows the evolution of external debt in Nigeria from 1981 to 2021. In 1981, Nigeria's external debt stock was N2.23 billion and rose to N41.45 billion in 1986, when Nigeria adopted the Structural Adjustment Programme to pursue sustainable growth. The programme required the government to borrow externally to finance its development goals. External debt increased sharply from N41.45 billion to N289.61 billion in 1990, reaching 59.76 per cent of GDP, which exceeded the international threshold of 30 per cent. In 1992, Nigeria's external debt stock was N544.26 billion and climbed to N716.87 billion in 1995 and N2.57 trillion in 1999. In 2000, Nigeria's external debt was N3.09 trillion and grew to N4.89 trillion in 2004. However, Nigeria's external debt declined drastically from N4.89 trillion in 2004 to N451.46 billion in 2006, thanks to the external debt relief from the Paris Club in 2005, which cancelled about 60 per cent of the US$30.85 billion that Nigeria owed. The debt relief negotiation aimed to free up resources for investment and faster economic growth in Nigeria. Between 2008 and 2012, external debt in Nigeria increased from N523.25 billion to N1.026 trillion and further rose to N2.111 trillion in 2015. Between 2016 and 2021, external debt accumulated rapidly. It increased from N3.478 trillion in 2016 to N7.75 trillion in 2018 and further grew to N12.70 trillion in 2020 and N15.85 trillion in 2021.

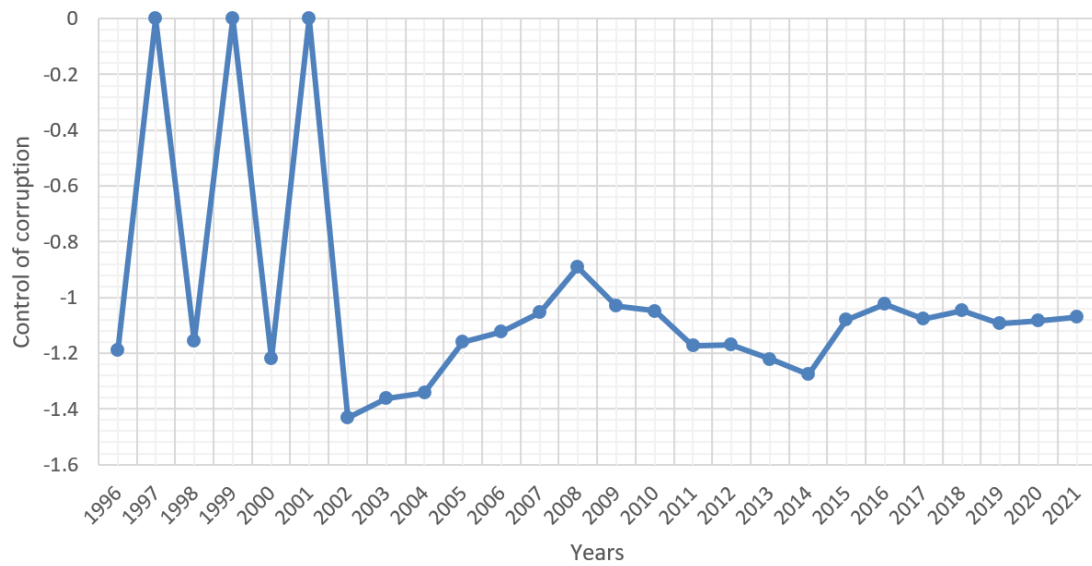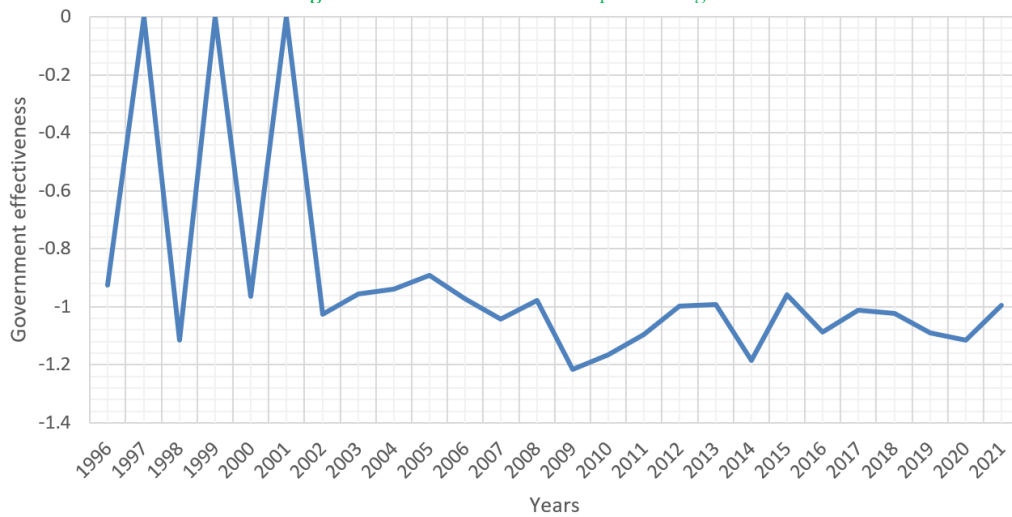**Figure 2.** Trend of control of corruption in Nigeria.

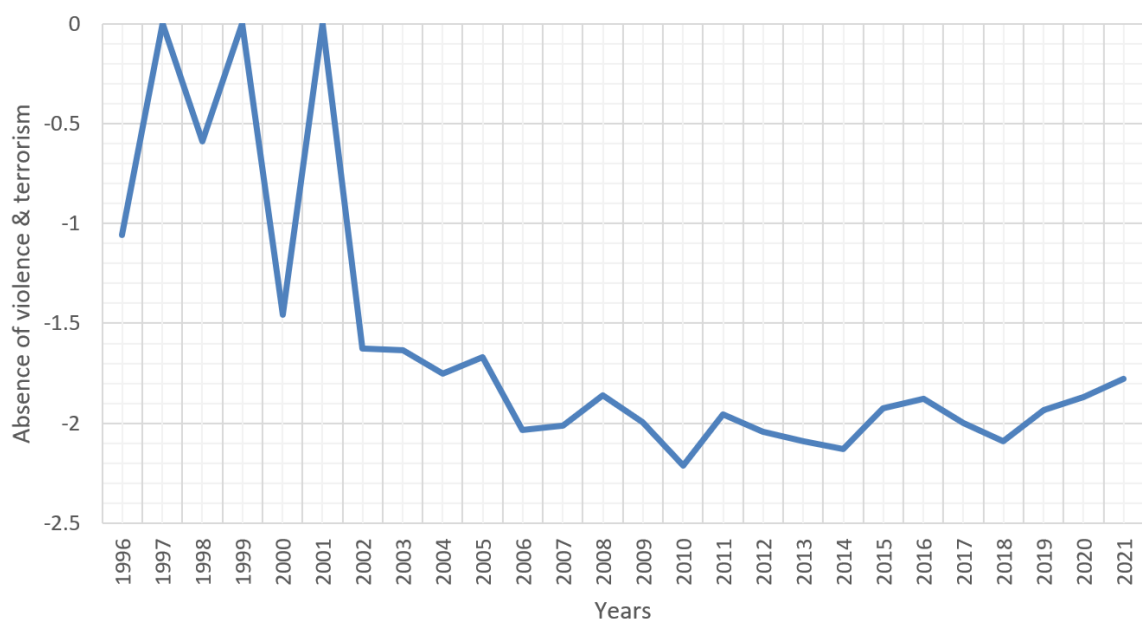**Figure 3.** Trend of government effectiveness in Nigeria.

Figure 4. Trend of absence of violence and terrorism in Nigeria.
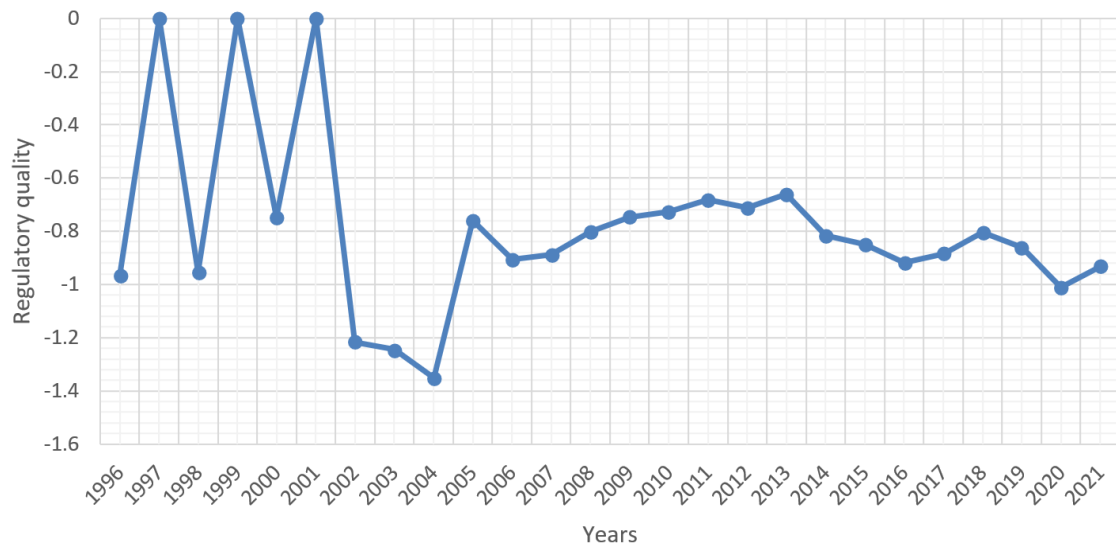
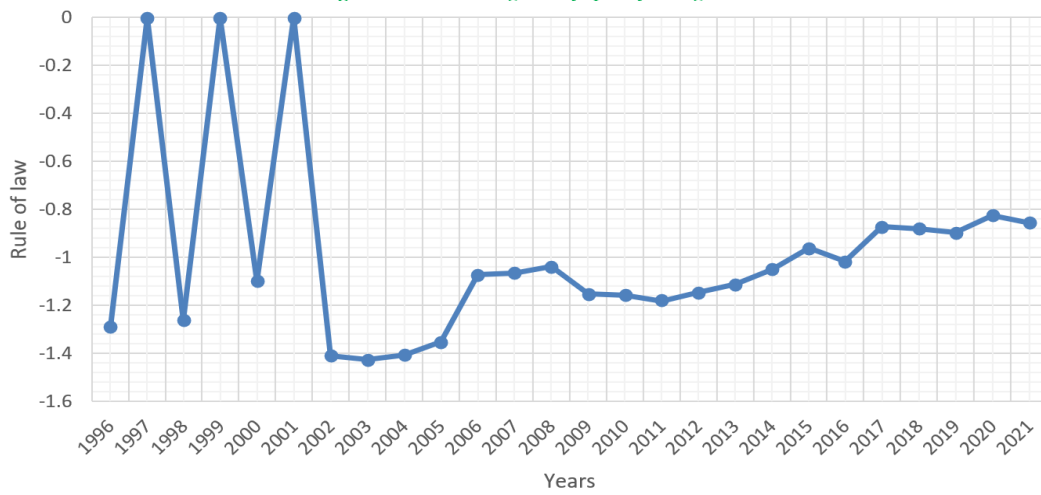**Figure 5.** Trend of regulatory quality in nigeria.

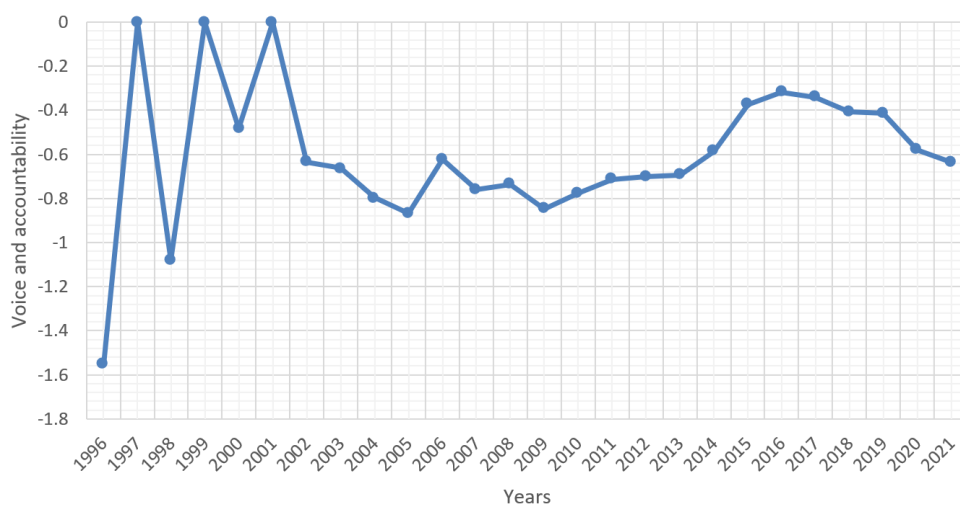**Figure 6.** Trend of rule of law in Nigeria.

Figure 7. Trend of voice and accountability in Nigeria.

4.2. Trend Analysis of Institutional Quality in Nigeria

Figure 2 illustrates the progression of corruption control in Nigeria from 1996 to 2021. Corruption control gauges the perceived extent to which public power is curbed from being exploited for personal gains. This encompasses a wide range of actions involving the misuse of public power by government officials for personal benefit. The depicted values in Figure 1 portray Nigeria's unfavorable performance in terms of corruption control, with all values in the negative range. These values fluctuated between -1.18 in 1996 and -1.07 in 2021. This indicates that Nigerian government officials employed public power for personal advantage by diverting funds designated for development projects and infrastructure into personal use.

Figure 3 outlines the trajectory of government effectiveness in Nigeria between 1996 and 2021. Government effectiveness reflects perceptions regarding the quality of public services and the civil service, along with its independence from political pressures. It also encompasses the quality of policy formulation and implementation, as well as the credibility of the government's commitment to these policies. Enhanced government effectiveness suggests better public services, sound public finance, controlled fiscal deficits, and potential reduction in external debt. The values for government effectiveness in Nigeria ranged from -0.92 in 1996 to -1.00 in 2021. This implies that political pressures influence public and civil services, resulting in subpar policy formulation and implementation.

Figure 4 portrays the trend of absence of violence and terrorism in Nigeria spanning from 1996 to 2021. This metric gauges perceptions about the likelihood of political instability and politically motivated violence, including terrorism. It reflects the extent to which societal members conform to behavioral norms within the confines of political role expectations. It measures perceptions of the potential destabilization or removal of the governing authority through unconstitutional or violent means. The absence of violence and terrorism in Nigeria also exhibits negative values across all periods, varying from -1.05 in 1996 to -1.78 in 2021. This signifies occurrences of violence and terrorism in Nigeria between 1996 and 2021, such as Boko Haram in the north-east, banditry in the north-west, kidnapping in the south-south and south-east, as well as the EndSARS protests.

Figure 5 demonstrates the trajectory of regulatory quality in Nigeria from 1996 to 2021. This index reflects perceptions of the government's capacity to formulate and implement effective policies and regulations that facilitate private sector growth and attract both domestic and international investments. Regulatory quality assesses whether policies are market-friendly or overly restrictive, impacting trade, business, and development. In this context, the values remain negative, ranging from -0.96 in 1996 to -0.93 in 2021.

Figure 6 showcases the evolution of the rule of law in Nigeria over the period of 1996 to 2021. The rule of law encompasses perceptions of the degree to which individuals and entities adhere to societal rules, including contract enforcement, property rights, law enforcement, courts, and the likelihood of crime and violence. It signifies the supremacy of the law over government actions and individual behavior, where both are bound by and comply with the law. The values for the rule of law measured -1.28 in 1996 and -0.86 in 2021.

Lastly, Figure 7 illustrates the trend of voice and accountability in Nigeria from 1996 to 2021. This index reflects perceptions of citizens' ability to autonomously participate in selecting their governments, as well as freedom of expression, association, and a free media that enable citizens to monitor government conduct. It signifies the power to engage in reason-based justifications for behavior and the capacity to impose penalties for poor performance. Throughout the review period, average values for voice and accountability in Nigeria remained negative, ranging from -0.76 in 1996 to -0.31 in 2021.

Since non-stationary time series data pose some challenges in regression analysis, it is thus, important to check the time series properties of data before analyzing the relationship that exist among the variables. It has been well established in the literature that regression result produces spurious estimate while using data that is not stationary

(have unit root). To avoid a spurious regression result, unit root test was performed on all the variables used in this study. In an attempt to test for the stationarity of the variables, this study employed both the Augmented Dickey-Fuller (ADF) unit root test and the Phillip-Peron (PP) unit root test.

Table 2. Unit root test result.

	ADF Test			PP Test		
Variables	**Level**	**First Diff**	**Status**	**Level**	**First Diff**	**Status**
LGDP	0.1793	-3.6740	I(1)	-0.6149	-3.5972	I(1)
	[0.9970]	[0.0363]**		[0.9725]	[0.0431]**	
LEXD	-1.9670	-4.7724	I(1)	-2.5748	-4.7724	I(1)
	[0.6006]	[0.0023]***		[0.2932]	[0.0023]***	
INS	-1.7058	-19.5619	I(1)	-2.2731	-23.4986	I(1)
	[0.7296]	[0.0009]***		[0.9420]	[0.0000]***	
LFD	-2.8710	-5.4113	I(1)	-2.2075	-8.7125	I(1)
	[0.4310]	[0.0004]***		[0.4727]	[0.0000]***	
LCAP	0.4150	-5.2605	I(1)	0.2174	-5.2914	I(1)
	[0.9986]	[0.0006]***		[0.9974]	[0.0006]***	
LHUM	-2.7259	-4.1586	I(1)	-1.8958	-5.7026	I(1)
	[0.2330]	[0.0126]**		[0.6516]	[0.0011]***	
LDOP	-1.9520	-7.8981	I(1)	-1.8227	-10.1550	I(1)
	[0.6089]	[0.0000]**		[0.0801]	[0.0000]***	

Note: GDP, EXD, INS, FD, CAP, HUM and DOP denote economic growth (proxied by gross domestic product), external debt, institutional quality (proxied by control of corruption, voice and accountability, rule of law, regulatory quality, absence of violence/terrorism, government effectiveness), financial development (proxied by domestic credit to private sector as a share of GDP), capital stock (proxied by gross fixed capital formation as a share of GDP), human capital and degree of openness (proxied by trade as a share of GDP) Note 2: The values in the square bracket [ ] are the probability values; (*) indicates significant at 10% level, (**) indicates significant at 5% and (***) indicates significant at 1%.

4.3. Determination of the Effect of External Debt on Economic Growth in Nigeria

The results of the ADF and the PP tests are as shown in Table 2. The decision rule for rejecting the null hypothesis that the variable under investigation has a unit root is that the probability value of the test statistic (in parenthesis) be less than the chosen significance level. In that case, the variable under consideration is stationary. Otherwise, it is non-stationary and the test has to be repeated at first difference. The ADF and PP test result contained in Table 2 indicates that economic growth *(GDP)*, external debt *(EXD)*, institutional quality *(INS)*, financial development *(FD)*, capital stock *(CAP)*, human capital *(HUM)* and degree of openness *(DOP)* are not stationary at level form but become stationary at first differenced, and thus, integrated of order 1.

It is appropriate to determine the optimal lag length to be used. To further prevent the misspecification and loss of degrees of freedom, there is the need to determine the optimal lag length before estimation. The selection of lag length rests on the outcomes of the various information criteria of which the Schwarz criterion is adjudged the most reliable. Table 3 depicts the result of the lag length selection criteria.

Table 3. VAR lag order selection criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-136.5823	NA	8.96e-05	7.707153	7.968383	7.799249
1	76.18092	345.0215*	6.53e-09	-1.847617	-0.019008*	-1.202947
2	110.9999	45.17052	8.16e-09	-1.783776	1.612213	-0.586531
3	158.2712	45.99374	7.03e-09	-2.393038	2.570330	-0.643219
4	229.8091	46.40294	3.09e-09*	-4.314004*	2.216744	-2.011610*

Note: * indicates lag order selected by the criterion; LR, FPE, AIC, SIC and HQ indicate sequential modified LR test statistic, Final Prediction Error, Akaike Information Criterion, Schwarzt Information Criterion and Hannan-Quinn respectively.

As shown in Table 3, Schwarzt Information Criterion (SC) and LR test statistic (LR) depicts an optimal lag length of 1 while Final Prediction Error (FPE), Akaike Information Criterion (AIC) and Hannan-Quinn (HQ) depicts an optimal lag length of 4. In this study, the AR root test is used to settle for the most stable lag length criterion recommended. From the AR root test (Figure 8), lag 1 is stable inside the AR root circle. Hence, lag length one (1) criteria is more amenable for the model and therefore used in this study.
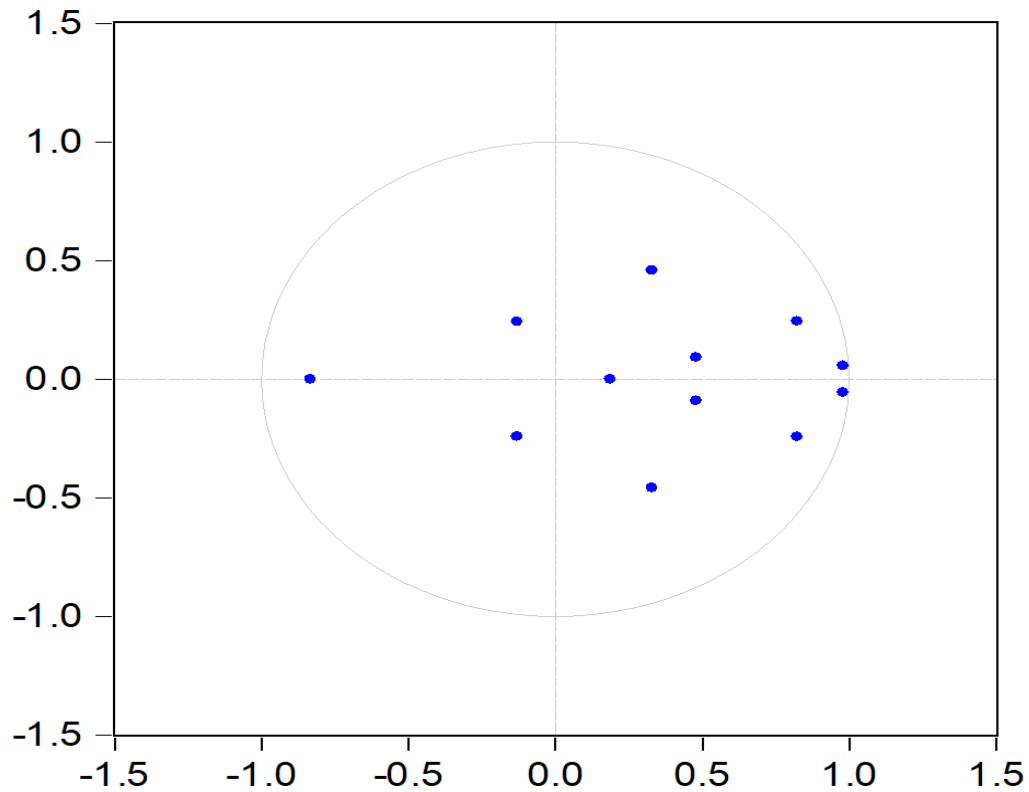
Figure 8. Inverse Roots of AR characteristic Polynomial.

4.4. Co-Integration Test Result

After confirming that the time-series data consists of integrated order one variables (I(1)), the next step is to explore co-integration presence. Given the time series characteristics, the suitable approach is the Johansen and Juselius (1994) method for multivariate co-integration, aligning with the study's reliance on the VAR methodology. The determination of cointegrating relationships employs two test statistics: the Trace and Maximum Eigen statistics (Table 4). The outcomes of the Johansen and Juselius (1994) approach are presented in Table 4. Rejection of the null hypothesis occurs when the associated probability value of the Trace or Max-Eigen statistic is below the designated significance level. The findings indicate rejection of the null hypothesis, revealing three co-integrating relationships via both the trace statistic and Max-Eigen test. In conclusion, a lasting relationship exists among the model's variables.

Table 4. Johansen cointegration test.

H₀	H₁	Max E. Stat.	Prob.	Trace Stat.	Prob.
r = 0	r = 1	90.1523	0.0000***	222.2003	0.0000***
r ≤ 1	r = 2	57.5625	0.0001***	132.0480	0.0000***
r ≤ 2	r = 3	40.1732	0.0042***	74.4854	0.0050***
r ≤ 3	r = 4	15.7799	0.5643	34.3122	0.2744
r ≤ 4	r = 5	12.3845	0.3802	18.5322	0.3093
r ≤ 5	r = 6	6.14774	0.4418	6.1477	0.4418

Note: ***, **, * indicate cointegration at 1%, 5% and 10% respectively.

4.5. Effect of External Debt on Economic Growth in Nigeria

Table 5 presents the outcomes of the Vector Error Correction (VEC) analysis examining the impact of external debt on economic growth in Nigeria. The investigation hinges on the cointegrating aspect of the estimated VECM models, focusing on the enduring relationships between variables. Within this context, economic growth (LGDP) serves as the dependent variable. Notably, the analysis reveals that external debt (LEXD) yields a positive and statistically significant influence on Nigeria's economic growth in the long term. The coefficient of 33.22681 indicates that a one percent rise in external debt corresponds to a 33.22681 percent boost in economic growth over the long run. This positive relationship aligns with the Keynesian debt theory, which posits that external debt can foster economic growth by facilitating infrastructure investment. Consequently, external debt becomes a valuable instrument for funding income-generating domestic projects and infrastructure, stimulating private sector engagement, and fostering sustained economic growth (Makun, 2021). This perspective finds support in the studies of Kim (2017); Nguyen et al. (2018) and Qureshi and Liaqat (2020) which demonstrate the growth-enhancing effect of public debt in transparent nations.

Furthermore, the VECM results suggest that financial development (measured by domestic credit to the private sector as a percentage of GDP) exerts a positive, albeit statistically insignificant, impact on Nigeria's long-term economic growth. With a coefficient of 90.82998, the findings imply that an increase in domestic credit from financial institutions to the private sector can potentially elevate long-term economic growth by 90.82998 percent. The observed positive link between financial development and economic growth underscores the significance of a well-structured and efficient financial system that channels resources from surplus to deficit economic units for productive investment. This supports the supply-leading hypothesis, which posits that the availability of financial services prompts enterprises to demand them, thereby driving economic growth. Consequently, policies aimed at enhancing financial systems can contribute to industrial productivity and economic growth, as demonstrated by the study of Kebede and Takyii (2017) which emphasizes the role of financial development in boosting economic performance.

Table 5. Vector error correction model (VECM) result.

Cointegrating Eq:	CointEq1					
LGDP(-1)	1.000000					
LEXD(-1)	33.22681					
	(15.2170)					
	[2.18354]**					
LFD(-1)	90.82998					
	(52.1317)					
	[1.74232]					
LDOP(-1)	-133.8807					
	(32.3152)					
	[-4.14297]***					
LCAP(-1)	-12.68582					
	(57.2806)					
	[-0.22147]					
LHUM(-1)	-14157.43					
	(1851.73)					
	[-7.64550]***					
C	56194.23					
Short run estimate						
ECM:	**D(LGDP)**	**D(LEXD)**	**D(LFD)**	**D(LDOP)**	**D(LCAP)**	**D(LHUM)**
	-3.88E-05	0.000532	-0.000221	0.000500	0.000155	3.71E-06
	(0.00012)	(0.00050)	(0.00022)	(0.00035)	(0.00015)	(2.9E-07)
	[-3.31629]	[1.06086]	[-1.00066]	[1.43008]	[1.03118]	[12.8910]
D(LGDP(-1))	0.591599	-1.810213	-0.086781	0.331529	-0.043826	-0.000295
	(0.19403)	(0.79345)	(0.34937)	(0.55278)	(0.23759)	(0.00046)
	[3.04900]	[-2.28144]	[-0.24839]	[0.59975]	[-0.18446]	[-0.64886]
D(LEXD(-1))	0.020118	0.123269	-0.050126	0.031804	-0.001575	-0.000250
	(0.03775)	(0.15438)	(0.06798)	(0.10756)	(0.04623)	(8.9E-05)
	[0.53287]	[0.79845]	[-0.73738]	[0.29569]	[-0.03407]	[-2.82642]
D(LFD(-1))	-0.068018	-0.164997	0.097312	-0.398736	0.036813	0.000126
	(0.10318)	(0.42192)	(0.18578)	(0.29394)	(0.12634)	(0.00024)
	[-0.65925]	[-0.39106]	[0.52380]	[-1.35652]	[0.29138]	[0.52066]
D(LDOP(-1))	-0.049747	0.085491	0.072789	-0.316075	-0.014215	0.000249
	(0.05967)	(0.24401)	(0.10744)	(0.17000)	(0.07307)	(0.00014)
	[-0.83370]	[0.35036]	[0.67746]	[-1.85930]	[-0.19454]	[1.77695]
D(LCAP(-1))	-0.036432	-0.650798	-0.102491	-0.354760	0.021240	0.000400
	(0.16269)	(0.66528)	(0.29294)	(0.46349)	(0.19922)	(0.00038)
	[-0.22393]	[-0.97822]	[-0.34987]	[-0.76541]	[0.10662]	[1.04956]
D(LHUM(-1))	7.254915	62.27781	-8.808817	10.11153	25.61756	0.987609
	(8.58753)	(35.1171)	(15.4628)	(24.4654)	(10.5156)	(0.02014)
	[0.84482]	[1.77343]	[-0.56968]	[0.41330]	[2.43614]	[49.0363]
C	0.064293	0.448368	0.049254	-0.058689	-0.027689	0.000335
	(0.03940)	(0.16114)	(0.07095)	(0.11226)	(0.04825)	(9.2E-05)
	[1.63163]	[2.78255]	[0.69419]	[-0.52279]	[-0.57384]	[3.62617]
R-squared	0.335229	0.296407	0.115841	0.231315	0.235038	0.991638

Adj. R-squared	0.185120	0.137532	-0.083807	0.057741	0.062305	0.989750
F-statistic	2.233233	1.865654	0.580226	1.332658	1.360699	525.1719

Note: GDP, EXD, FD, CAP, HUM and DOP denote economic growth (proxied by gross domestic product), external debt, financial development (proxied by domestic credit to private sector as a share of GDP), capital stock (proxied by gross fixed capital formation as a share of GDP), human capital and degree of openness (proxied by trade as a share of GDP).
The values in the square bracket [ ] are the probability values; (*) indicates significant at 10% level, (**) indicates significant at 5% and (***) indicates significant at 1%.

The VECM analysis yields insights into the long-term dynamics of various factors on economic growth in Nigeria. Remarkably, the outcomes reveal a counterintuitive pattern where capital stock (Represented by gross fixed capital formation), degree of openness, and human capital development exert a negative influence on Nigeria's economic growth over the long run. Specifically, the coefficient of -12.68582 signifies that a one percent increment in public investment in essential infrastructure like schools, roads, rails, airports, and seaports corresponds to a decrease of -12.68582 percent in the nation's economic performance over the long term. This outcome contradicts conventional economic reasoning, which anticipates that heightened public investment boosts the quality and quantity of public services, complements private capital, enhances market integration, stimulates aggregate demand, and consequently accelerates growth. The adverse impact of capital stock on economic growth could stem from administrative inefficiencies, lack of accountability, and the mismanagement of public funds due to corrupt practices. This departs from the findings of De Mendonça and Brito (2021) which uncovered capital formation's weakening effect on growth in ECOWAS countries. Additionally, the vector error correction term for economic growth (LGDP) registers at -0.000388, implying an annual correction rate of about 0.038% for the previous period's disequilibrium in economic growth.

In the short term, focusing on economic growth (LGDP) as the dependent variable, the VECM outcomes reveal that external debt exhibits a positive yet statistically insignificant impact on Nigeria's economic growth. This suggests that, presently, external debt contributes to Nigeria's economic performance. A one percent augmentation in external debt corresponds to a modest 0.020118 percent increase in economic growth. These findings resonate with Edo, Osadolor, and Dading (2020) study, which showcased public debt's marginal growth-accelerating effect in the short run across 8 SSA countries. However, they contrast with the conclusions of A. E. Akinlo (2020); Ohiomu (2020), and Guei (2019) who identified a detrimental impact of debt on growth in both expansive and restrictive economic conditions. Conversely, the VECM analysis suggests that financial development adversely affects Nigeria's short-term economic growth, with a coefficient of -0.068018 indicating that elevated domestic credit to the private sector inhibits growth by 0.1262. The negative relationship between financial development and economic growth might be attributed to high lending interest rates, deterring private sector engagement with financial institutions for investment financing. Moreover, the study highlights that trade openness and capital stock similarly exert a negative and insignificant influence on Nigeria's short-term economic growth. A one percent rise in the degree of openness and capital stock results in declines of -0.049747 percent and -0.036432 percent, respectively, in Nigeria's economic performance over the short term. This deviates from the findings of Ehikioya, Omankhanlen, Osagie Osuma, and Iwiyisi Inua (2020) but aligns with the conclusions drawn by Mhlaba and Phiri (2019) illustrating how trade openness can dampen economic performance.

4.6. VEC Diagnostic Tests

Diagnostic test results to establish the appropriateness of the model is germane. This is to account for more credence in the estimate and forecasts from model specification. The serial correlation LM test in Table 6 indicated that the hypothesis of no residual serial correlation over the periods were not statistically significant, hence cannot be rejected but accepted. This shows that there is no serial correlation. In Table 7, the heteroscedasticity test shows that there is homoscedasticity among the variance in the model.

Table 6. VEC residual serial correlation LM tests.

Null hypothesis: No serial correlation		
Lags	LM-Stat	Prob
1	42.94858	0.1980
2	46.40345	0.1148
3	45.34886	0.1366
4	24.34422	0.9302
5	34.34802	0.5473
6	34.68084	0.5313
7	28.08538	0.8241
8	47.47110	0.0956
9	26.91053	0.8637
10	35.58344	0.4882
Probs from chi-square with 36 df.		

Table 7: VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares).

Joint test:		
Chi-square	Degree of freedom	Prob.
320.1253	294	0.1413

4.7. The Role of Institutional Quality on Economic Growth in Nigeria

4.7.1. Co-Integration Test Result

It is essential to validate the existence of long-run association between institutional quality and economic growth in Nigeria. The Trace and Maximum Eigen statistics were reported in Table 8. From the results, the study safely rejects the null hypothesis of no co-integration among the variables. As such, both the trace statistic and Max-Eigen test indicate two (2) co-integrating relationships. This implies that there exists long run relationship among the variables in the model.

Table 8. Johansen cointegration test.

H_o	H_1	Max E. Stat.	Prob.	Trace Stat.	Prob.
$r = 0$	$r = 1$	76.3655	0.0000***	133.6597	0.0000***
$r \leq 1$	$r = 2$	30.3305	0.0216**	57.2940	0.0216**
$r \leq 2$	$r = 3$	19.5275	0.0826	26.9635	0.0826
$r \leq 3$	$r = 4$	5.4766	0.6808	7.4360	0.6808
$r \leq 4$	$r = 5$	1.9593	0.1616	1.9593	0.1616

Note: ***, **, * indicate cointegration at 1%, 5% and 10% respectively.

Table 9. VEC on the role of institutional quality on economic growth in Nigeria.

Cointegrating Eq:	CointEq1				
LGDP(-1)	1.000000				
INS(-1)	7.571844				
	(1.29989)				
	[5.82501]				
LFD(-1)	-3.469935				
	(0.91079)				
	[-3.80979]				
LCAP(-1)	-2.685470				
	(1.31806)				
	[-2.03744]				
LHUM(-1)	269.1557				
	(29.1337)				
	[9.23863]				
C	-1054.039				
Error Correction:	**D(LGDP)**	**D(INS)**	**D(LFD)**	**D(LCAP)**	**D(LHUM)**
CointEq1	-0.000542	-0.037594	0.009868	-0.006375	-0.000205
	(0.00664)	(0.01536)	(0.01243)	(0.00846)	(1.9E-05)
	[-0.08156]	[-2.44751]	[0.79362]	[-0.75343]	[-10.5387]
D(LGDP(-1))	0.556802	-0.833143	0.012259	-0.096832	0.000166
	(0.17401)	(0.40236)	(0.32571)	(0.22163)	(0.00051)
	[3.19990]	[-2.07063]	[0.03764]	[-0.43690]	[0.32481]
D(INS(-1))	0.068503	-0.776562	-0.119113	-0.000845	0.000737
	(0.04231)	(0.09783)	(0.07919)	(0.05389)	(0.00012)
	[1.61922]	[-7.93811]	[-1.50412]	[-0.01569]	[5.93832]
D(LFD(-1))	0.037166	0.194958	0.154092	0.033424	-0.000274
	(0.09834)	(0.22738)	(0.18407)	(0.12525)	(0.00029)
	[0.37795]	[0.85739]	[0.83714]	[0.26685]	[-0.94872]
D(LCAP(-1))	-0.053156	-0.102122	-0.027701	-0.015563	-0.000123
	(0.15326)	(0.35439)	(0.28688)	(0.19521)	(0.00045)
	[-0.34683]	[-0.28816]	[-0.09656]	[-0.07972]	[-0.27331]
D(LHUM(-1))	7.682744	33.06140	-15.74863	29.70345	1.086799
	(8.93054)	(20.6505)	(16.7166)	(11.3750)	(0.02621)
	[0.86028]	[1.60100]	[-0.94210]	[2.61129]	[41.4711]
C	0.077202	0.078458	0.020567	-0.021293	0.000169
	(0.03438)	(0.07950)	(0.06436)	(0.04379)	(0.00010)
	[2.24541]	[0.98685]	[0.31956]	[-0.48621]	[1.67895]
R-squared	0.378329	0.802450	0.106449	0.226000	0.987758
Adj. R-squared	0.261765	0.765409	-0.061092	0.080875	0.985462
F-statistic	3.245693	21.66400	0.635359	1.557277	430.3182

Note: GDP, INS, CAP and HUM denote economic growth (proxied by gross domestic product), institutional quality (proxied by control of corruption, voice and accountability, rule of law, regulatory quality, absence of violence/terrorism, government effectiveness), capital stock (proxied by gross fixed capital formation as a share of GDP) and human capital respectively.
Standard errors in ( ) & t-statistics in [ ]

Table 9 presents the VEC analysis results concerning the influence of institutional quality on economic growth in Nigeria. Notably, the VEC findings in Table 8 indicate that institutional quality exerts a positive and substantial impact on economic growth over the long term. The coefficient of 7.571844 underscores that an enhancement in institutions encompassing aspects like the rule of law, control of corruption, regulatory quality, peaceful political and economic environments, and efficient governance can amplify Nigeria's economic growth by 7.571844 percent in the long run. This outcome aligns with the institutional quality hypothesis, which posits that strong institutions establish the framework for economic actors, fostering discipline, minimizing opportunistic behavior, reducing transaction costs, ensuring equitable resource distribution, and thereby cultivating an environment conducive to growth-promoting activities like investment and innovation (Hashim Osman, Alexiou, & Tsaliki, 2011). This result contradicts Hashim Osman et al. (2011); Kilishi, Mobolaji, Yaru, and Yakubu (2013); T. Akinlo (2016), Ben Ali and Ben Abdul Aziz Al Yahya (2019); Vinayagathasan and Ramesh (2019) and Kemoe and Lartey (2022) who identified corruption, ethnic tensions, and macroeconomic instability as impediments to growth.

Furthermore, the VECM analysis divulges that both capital stock (represented by gross fixed capital formation) and financial development (captured by domestic credit to the private sector as a share of GDP) exert a negative and significant influence on Nigeria's long-term economic growth. With a coefficient of -2.685470, a one percent increment in public investment in vital infrastructure such as schools, roads, rails, airports, and seaports correspond to a 2.685470 percent decline in Nigeria's economic performance over the long term. This counterintuitive negative effect challenges the conventional wisdom that increased public investment in infrastructure enhances public goods and services, complements private capital, spurs market integration, raises aggregate demand, and subsequently accelerates growth. This negative impact of capital stock on economic growth could be attributed to incompetence, lack of accountability, and mismanagement of public funds due to corrupt practices.

Concerning the relationship between human capital and economic growth, the VEC model in Table 9 demonstrates that human capital (LHUM) has a positive and significant influence on Nigeria's long-term economic growth. With a magnitude of 269.1557, the results imply that improved human capital development enhances Nigeria's economic growth by 269.1557 percent over the long term. This affirmative correlation aligns with human capital theory, which argues that substantial investments in education and healthcare create a more productive workforce with higher wages, subsequently stimulating national economic growth. These findings echo the conclusions of Abubakar and Mamman (2021) who found that human capital development spurs growth across 37 OECD countries from 1980 to 2018.

The vector error correction term for economic growth (LGDP) is -0.000542, suggesting an annual correction rate of around 0.0542 percent for the previous period's economic growth disequilibrium. In the short term, the VEC model shows that institutional quality has a positive yet insignificant impact on economic growth. With a coefficient of 0.068503, an enhancement in institutions encompassing rule of law, control of corruption, regulatory quality, peaceful political and economic environments, and efficient governance could enhance Nigeria's economic growth by 0.068503 percent in the short term. These findings concur with Kilishi et al. (2013); Asghar, Qureshi, and Nadeem (2020); Kebede and Takyi (2017); Nguyen et al. (2018) and Daud (2020), which highlight the positive contribution of strong institutions to economic performance.

Moreover, the VEC results in Table 9 reveal that both financial development (FD) and human capital development (HUM) have a positive yet insignificant impact on Nigeria's short-term economic growth. With coefficients of 0.037166 and 7.682744, an increase in domestic credit from financial institutions to the private sector and substantial investment in human capital, respectively, can potentially enhance Nigeria's economic growth by

0.0371 and 7.6827 percent. This positive impact of human capital development aligns with (Abubakar & Mamman, 2021) findings regarding OECD countries' growth stimulation.

In contrast, the VEC model indicates that capital stock has a negative and insignificant effect on Nigeria's short-term economic growth. With a coefficient of -0.053156, heightened investments in physical infrastructure like roads, rail systems, telecommunications, air and sea ports, and dams correspond to a diminishment of 0.0531 percent in Nigeria's economic performance. This observation could be attributed to pervasive corruption and the diversion of public funds away from productive investments towards consumption. This finding contrasts with Law et al. (2021) study, which identified capital stock investment's positive effect on economic growth.

4.7.2. VEC Diagnostic Tests

Diagnostic test results to establish the appropriateness of the model is important. The serial correlation LM test in Table 10 indicated that the hypothesis of no residual serial correlation over the periods were not statistically significant, hence cannot be rejected but accepted. This shows that there is no serial correlation is that the error terms are random in the model. In Table 11, the heteroscedasticity test shows that there is homoscedasticity among the variance in the model.

Table 10. VEC residual serial correlation LM tests.

Null Hypothesis: no serial correlation at lag order h		
Lags	LM-Stat	Prob
1	24.31047	0.5015
2	23.12744	0.5701
3	28.69104	0.2770
4	22.02345	0.6344
5	23.85586	0.5277
6	31.03036	0.1880
7	35.83555	0.0741
8	32.29351	0.1497
9	16.78641	0.8894
10	22.08031	0.6311
Probs from chi-square with 25 df.		

Table 11. VEC residual heteroskedasticity tests.

Joint test:		
Chi-square	Degree of freedom	Prob.
199.5398	180	0.1516

Causality among external debt, institutional quality and economic growth in Nigeria.

Table 12. Multivariate VECM causality.

Dependent	Short run			Long-run
Variables	Δ LGDP	Δ LEXD	Δ INS	ECT(-1)
LGDP	--------	0.0964	0.4787	0.5185
		[0.7580]	[0.4937]	[0.4764]
LEXD	16.5947	-------	16.9754	13.3894
	[0.0003]***		[0.0002]***	[0.0008]***
INS	7.3186	0.1599	---------	1.1921
	[0.0106]**	[0.6917]		[0.2826]

Note: GDP, EXD and denote economic growth (proxied by gross domestic product), external debt and institutional quality (proxied by control of corruption, voice and accountability, rule of law, regulatory quality, absence of violence/terrorism, government effectiveness) respectively.
***, ** and * indicates significant at 1%, 5% and 10% respectively.

The Vector Error Correction Model (VECM) causality test results, as presented in Table 12, reveal several significant directional relationships. In the short term, a unidirectional causality is observed from economic growth to external debt. This suggests that developing nations, such as Nigeria, aiming for swift economic advancement, rely on external borrowing and foreign capital inflows to sustain and leverage growth due to limited internal revenue generation. This finding aligns with Sanso-Navarro and Puente-Ajovín (2015); De Vita, Trachanas, and Luo (2018) and Alkhawaldeh, Mahmood, and Jakada (2020), who identified a similar causality pattern from growth to public debt, indicating that sluggish economic performance prompts increased public debt accumulation in selected OECD countries. Furthermore, in the short term, a unidirectional causality is detected from institutional quality to external debt. This suggests that a country's external debt level is significantly influenced by its internal institutional dynamics. Strong institutional quality fosters an environment conducive to financial stability, investment, and economic advancement, attracting both domestic and foreign investors with a sense of security and confidence. Consequently, robust institutional foundations can stimulate economic growth, enhance productivity, and potentially reduce reliance on external borrowing.

Moreover, the VECM outcomes reveal a short-term unidirectional causality from economic growth to institutional quality. This indicates that improvements in economic performance drive enhancements in institutional quality. In essence, sustained economic growth tends to lead to the development and reinforcement of institutions. This finding contradicts (Asghar et al., 2020) conclusion of causality running from institutional quality to economic growth, while aligning with Kebede and Takyi (2017) discovery of a unidirectional causality from economic growth to institutional quality in the SSA region. In the long term, a reciprocal causality relationship emerges, where economic growth and institutional quality granger cause external debt accumulation in Nigeria. This implies that a pursuit of sustainable growth and improved institutions could result in the accumulation of higher levels of external debt in the country, as these factors collectively contribute to the economic landscape

Determining the threshold of external debt that spur economic growth in Nigeria.

The Nonlinear Threshold Model analysis, summarized in Table 13 reveals that the threshold for the external debt-to-GDP ratio in relation to economic growth in Nigeria is found to be 5.4822%. Below this threshold, external debt has a positive and significant impact on economic growth, with a substantial coefficient of 7.0717, indicating that a one percent increase in external debt correlates with a 7.07 percent growth in Nigeria's economy. However, beyond the threshold of 5.4822%, the influence of external debt becomes negative and significant, implying that exceeding this threshold will lead to a significant dampening effect on economic performance, with an estimated decrease of -271.0030%.

Moreover, the Nonlinear Threshold Model outcomes highlight that institutional quality (INS) has a positive and significant effect on economic growth. The coefficient of 20.1930 suggests that improvements in institutions, encompassing factors like the rule of law, control of corruption, regulatory quality, political and economic stability, and efficient governance, can enhance Nigeria's economic growth by 20.19 percent. Conversely, financial development (represented by domestic credit to the private sector), capital stock, human capital development, and degree of openness exhibit negative impacts on economic growth in Nigeria. These findings contrast with the conclusions of Gómez-Puig and Sosvilla-Rivero (2017) whose study identified trade openness, human and physical capital, and population growth as fostering economic growth in 11 EMU countries.

Table 13. Threshold result of external debt on economic growth in Nigeria.

Dep. Variable: LGDP	Coefficient	T-statistics	Prob.
Variable			
Threshold $(\hat{\gamma})$		5.4822	
External Debt			
$\hat{\beta}_L (LEXD \leq \gamma)$	7.0717	7.9908	0.0000***
$(LEXD \geq \gamma)$	-271.0030	-7.9289	0.0000**
Non-threshold variable			
INS	20.9130	4.1678	0.0027***
LFD	-0.1024	-0.7126	0.9437
LCAP	-1.2694	-0.7440	0.4631
LHUM	-0.4632	-0.4976	0.6626
LDOP	-0.3656	-1.5429	0.1321
R^2	0.9788		
F-stat.	262.1782	0.0000***	

Note: GDP, EXD, INS, FD, CAP, HUM and DOP denote economic growth (proxied by gross domestic product), external debt, institutional quality (proxied by control of corruption, voice and accountability, rule of law, regulatory quality, absence of violence/terrorism, government effectiveness), financial development (proxied by domestic credit to private sector as a share of GDP), capital stock (proxied by gross fixed capital formation as a share of GDP), human capital and degree of openness (proxied by trade as a share of GDP) respectively.
***, **, * indicate statistical significance at 1%, 5% and 10% respectively.

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

This study explores the impact of external debt on economic growth, assesses the role of institutional quality, investigates causality directions, and determines the debt threshold. It finds that in the short run, external debt positively influences Nigeria's economic growth. Additionally, institutional quality positively affects growth in both the short and long run, indicating that improvements in factors like rule of law and control of corruption accelerate economic expansion in Nigeria.

5.2. Recommendations

There are policy prescriptions emanating from the findings and conclusions of this study. The recommendations are here highlighted.

Enhanced External Debt Management: The study suggests that Nigeria should leverage external debt strategically to promote economic growth. Emphasizing prudent borrowing practices and effective utilization of borrowed funds can help harness the positive impact of external debt on short-term economic performance.

Institutional Quality Enhancement: To foster sustained economic growth, the study highlights the importance of improving institutional quality. Strengthening the rule of law, curbing corruption, enhancing regulatory frameworks, and creating a stable political and economic environment can contribute to long-term economic growth in Nigeria.

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