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Determinants of Debt Sustainability in Nigeria: The Consequence of Crude Oil Price Fluctuation, Fiscal and Institutional Indicators

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Abstract: Fiscal and debt sustainability have become significant challenges for developing countries, including Nigeria, since the country has experienced rising debt and expanding fiscal deficits in recent decades, threatening its fiscal policies and long-term economic stability. Using data from 2000 to 2023, this study used a Vector Error Correction Model (VECM) to examine the long-term determinants of debt sustainability. The major variables studied are the government expenditure-to-GDP ratio, revenue-to-GDP ratio, debt servicing, real GDP, and institutional quality. The findings showed that, while government spending and debt servicing have a large impact on the debt-to-GDP ratio, revenue has a less direct effect. Higher government spending, when distributed correctly, can reduce the debt burden, whereas good debt servicing leads to debt reduction over time. The findings also revealed that economic growth and institutional quality have a weaker short-term impact on the debt-to-GDP ratio. The study emphasizes the gradual nature of debt adjustment, emphasizing the significance of fiscal consolidation, discipline, and strategic government expenditure. Policy recommendations include increasing spending efficiency, improving debt management measures, encouraging economic growth, building institutional frameworks, and increasing financial literacy.

Keywords: Debt-to-GDP Ratio, Fiscal Policy, Debt Servicing, Institutional Quality

JEL classification: H63, E62, H11, O11, 043.

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Introduction

The administration of public finances has grown more challenging in Nigeria, a nation abundant in natural resources but marked by high rates of unemployment, poverty, and reliance on oil earnings. Nigeria's government finances have fluctuated for a large portion of its post-independence history, frequently due to outside influences, most notably shifts in the price of oil globally (Adeleke *et al*., 2021). The Nigerian government faces tremendous difficulties in maintaining fiscal balance due to its reliance on a limited income base, a growing population, ineffective tax collection methods, and an increasing public debt load (Kontagora, 2011; Ademola & Oluwole, 2020).

In recent years, Nigeria's debt burden has grown dramatically. Nigeria's entire public debt as of 2023 was at ₦87 trillion ($188 billion), which is more than 30% of its GDP (World Bank, 2023). Rising domestic borrowing and foreign loans intended to close the nation's infrastructure gap and solve budgetary deficits have been primarily blamed for this development. However, the nation's capacity to manage its public finances sustainably and preserve economic stability has come under scrutiny due to the rising debt payment expenses, which take up a significant amount of government revenue (Organization for Economic Cooperation and Development [OECD], 2023).

In 2023, Nigeria's debt-to-GDP ratio was 35%, and almost 60% of its total revenue was used to pay off its debt (Central Bank of Nigeria [CBN], 2024). Serious ramifications for the nation's long-term economic stability result from this situation. High debt service commitments limit the amount of money available for investments in vital public goods like healthcare, education, and infrastructure, which impedes efforts to reduce poverty and promote inclusive growth (Adeleke *et al*., 2021). Also, exchange rate being a fundamental macroeconomic indicator in Nigeria (Sani & Oladele, 2018), Nigeria's external debt obligations also expose the government to exchange rate risks, especially in light of the naira's depreciation and changes in interest rates around the world (International Monetary Fund [IMF], 2023).

The situation is exacerbated by a lack of economic diversification, with the oil sector still accounting for the majority of government revenue, despite continued efforts to diversify. As oil prices remain fluctuating, this overdependence causes budgetary instability and hampers efforts to build a more sustainable economic structure (Sani, 2014; Ogunleye & Ajayi 2020). Given the precarious fiscal and debt situation, the Nigerian government faces a crucial issue in controlling debt while ensuring that public finances are not jeopardized. Apparently, the underlying

economic problems of Nigeria, such as rising inflation, a declining currency, and an underdeveloped non-oil industry, make it even more difficult to maintain fiscal and debt sustainability. Over 70% of Nigeria's government revenue comes from oil exports, which the country still depends heavily on despite recent attempts to diversify its economy (IMF, 2023).

Furthermore, Institutional quality is a crucial factor in determining a country's debt sustainability. Strong institutions, which are distinguished by transparent governance, effective public administration, and the rule of law, can strengthen fiscal discipline, boost economic stability, and increase investor confidence (Onyele *et al*., 2024). These criteria enable governments to better manage debt, ensuring that it can be serviced and repaid without putting undue strain on the economy. In contrast, inadequate institutions can lead to bad fiscal management, corruption, and inefficient resource allocation, raising the risk of unsustainable debt. Borrowing may be mismanaged in such situations, and repayment may become problematic as a result of slow economic growth or unstable financial systems. As a result, countries with strong institutions are better positioned to ensure debt sustainability in the long run.

Hence, this study aims to address these concerns by looking into the fundamental elements that influence Nigeria's debt sustainability with particular focus on fiscal and institutional indicators thereby offering policy solutions. This study consists of five sections: introduction, literature review, methodology, results and discussion, conclusion and policy recommendations.

Literature Review

Empirical Literature

Regarding the mechanisms of Nigeria's expanding public debt and the consequences for fiscal and debt sustainability, Ogunleye *et al*. (2023) provide a comprehensive analysis of Nigeria's public debt situation, with a focus on the structural and external factors that influence debt accumulation. They contend that Nigeria's mounting debt burden is caused by continuous fiscal deficits, oil price swings, and the need to fund infrastructure projects. They also say that external debt is increasingly being denominated in foreign currencies, exposing the country to exchange rate risk and putting further strain on the fiscal balance. According to their findings, Nigeria's debt sustainability can only be realized by economic diversification and a more sustainable debt management plan.

Ademola and Oluwole (2023) conduct another key analysis to assess the long-term impact of Nigeria's external debt on its fiscal sustainability. Using a Vector Autoregressive (VAR) model, they concluded that external debt has a long-term detrimental influence on Nigeria's economic development and fiscal health. Their findings indicate that the rising cost of foreign debt servicing has limited government expenditure on critical infrastructure, restricting the country's economic potential. Arguably, Ogunleye *et al*. (2023) and Ademola and Oluwole (2023) correctly identified Nigeria's income base and budget deficits as major factors influencing debt sustainability. However, the empirical literature frequently ignores or understates the importance of structural variables, such as institutional weakness, in generating Nigeria's fiscal fragility.

As identified by Kontagora (2017) that tax can be used to distribute wealth and manage the economy, nonetheless, the literature emphasizes Nigeria's low tax revenue-to-GDP ratio, which has long hampered fiscal sustainability. Adeyemi and Omotayo (2023) investigated the relationship between Nigeria's tax income and fiscal sustainability, concluding that inadequate revenue production, particularly from non-oil sources, has resulted in persistent fiscal deficits and heavy borrowing. They discover that, despite efforts to improve the tax system, such as the Finance Act of 2020, revenue collection remains unsatisfactory, owing to the informal sector, tax evasion, and a limited tax base. According to their findings, tax reforms and improved revenue collection procedures are critical to strengthening Nigeria's budgetary sustainability.

Similarly, Alaba and Arimoro (2022) investigate the impact of Nigeria's tax policies on fiscal sustainability. They discover that, despite policy efforts, the revenue-to-GDP ratio remains below the World Bank standard of 15%, limiting the government's capacity to fund programs without incurring more debt. Their analysis emphasizes the importance of tax policy reforms aimed at expanding the revenue base, particularly through digitization and stronger enforcement tools. Arguably, both Adeyemi and Omotayo (2023) and Alaba and Arimoro (2022) analyses focused mainly on the immediate concerns of low revenue generation and debt servicing challenges, while overlooking important concerns about long-term sustainability.

According to Uthman and Kontagora (2021), Nigeria's tax system faces several difficulties, such as a small revenue base, low compliance, and inadequate administrative frameworks. Although debt sustainability is not specifically covered in their paper, their examination of tax revenue generation offers helpful insights into how it contributes to fiscal stability. To improve Nigeria's revenue performance, they support comprehensive changes that increase the effectiveness of tax collection, broaden the tax base, and fortify institutional frameworks. It is clear from expanding their arguments that increased tax revenue production can help maintain debt sustainability. A government's reliance on borrowing to pay for infrastructure and ongoing expenses is lessened when it can raise enough domestic revenue. This reduces the amount of debt owed and improves the government's ability to pay down debt without cutting back on necessary public spending. Therefore, even if their main focus is not debt sustainability, Uthman and Kontagora's (2021) findings imply that increasing tax income is essential for promoting long-term debt management and economic resilience in addition to bridging fiscal deficits.

With respect to debt servicing and fiscal sustainability, Adeleke *et al*. (2021) examine the relationship between debt service payments and fiscal deficits in Nigeria during the last two decades. They discover that debt servicing costs in Nigeria have become a huge drain on national resources, accounting for more than 60% of government revenue in recent years, notably after 2014, when oil prices fell. Their research demonstrates that hefty debt service payments restrict the government's fiscal space, making it impossible to fund vital public investment initiatives. Although Adeleke *et al*. (2021) acknowledge the link between weak fiscal policy and growth, they do not investigate institutional quality, which is an important predictor of fiscal outcomes.

In a more extensive analysis of debt servicing trends, Olaniyi and Durojaiye (2022) find that the debt service-to-revenue ratio has reached unsustainable levels, especially given the continuous decline in oil revenues. They underline that mounting debt payment commitments have resulted in budget cuts for social

spending and infrastructure investment. As the government spends more on debt payment, meeting fiscal targets and achieving long-term development becomes increasingly problematic.

Ogunleye and Ajayi (2023) use regression analysis to investigate the relationship between Nigeria's debt-to-GDP ratio and economic development from 2000 to 2022. They discover a negative association between high levels of governmental debt and economic growth, with the debt burden suffocating private investment and increasing macroeconomic volatility. They argue that debt management policies should prioritize growth-enhancing investments rather than depending on borrowing for consumption.

Ouedraogo (2022) used the Arellano and Bond estimator to investigate the impact of public debt on economic sustainability between 1990 and 2017 for eighty low-income countries. The study discovered that, while debt accumulation can fund capital expenditure, debt servicing can put additional strain on natural resources that are critical to a sustainable economy, upsetting all mechanisms of adjusted net saving, both of which assess economic sustainability. It also discovered that debt growth in low-income nations after 2010 has been connected with progress toward sustainability. However, while debt sustainability looked to be linked to economic sustainability, the public debt coefficient was negative when inclusive wealth growth was used to quantify progress.

Moreover, Kongo (2023) conducted a moderator analysis to evaluate the impact of institutional quality on Kenyan state debt sustainability. According to the findings, Institutional Quality has a considerable beneficial impact on public debt sustainability, although Current Account Balance appears to have no statistically significant effect. However, the interplay of Current Account Balance and Institutional Quality has a statistically significant negative impact on the long-term sustainability of public debt.

While there is a growing number of literature on fiscal and debt sustainability in Nigeria, numerous significant gaps remain in our understanding of the complex factors that influence the country's fiscal health and ability to manage debt sustainably. These shortcomings are mostly due to limitations in analytical techniques, insufficient examination of broader socioeconomic aspects (such as institutional quality), a lack of investigation into policy initiatives, and a failure to address long-term sustainability objectives. Addressing these gaps is critical for Nigeria's fiscal policies to become more successful and sustainable.

Theoretical Framework

The Intertemporal Government Budget Constraint (IGBC) theory serves as the foundation for this research. The IGBC theory, formalized by Robert Barro in 1974, emphasizes the importance of a government's long-term fiscal policy balance. Barro's work on this notion argues that a government's current debt must be offset by future surpluses to maintain fiscal sustainability (Barro, 1974). Barro's theoretical development is also linked to the broader Ricardian Equivalence hypothesis, which asserts that government debt has no actual effect on the economy if households understand that future taxes would rise to cover the debt. This framework is based on the idea that fiscal sustainability is contingent on future generations' ability to bear the burden of repaying government debt through higher taxes or lower public spending (Calvo, 2021).

Data and Methodology

Data Sources and Variable Description

Data for the study were collected from 2000 to 2023 so as to have a comprehensive dataset on all the variables of the study.

Table 1: Data Sources and Variable Description

S/N	Variables	Measurement	Source
1	Debt to GDP ratio (DGR)	Total Government Debt divided by GDP	CBN
2	Government expenditure to GDP ratio (GGR)	Total Government Expenditure divided by GDP	CBN
3	Revenue to GDP ratio (RGR)	Total Government Revenue divided by GDP	CBN
4	Debt servicing (DSS)	Total repayment of interest and principal on borrowed funds per year	CBN
5	Real Gross Domestic Product (GDP)	The monetary worth of a nation's commodities and services after accounting for inflation	CBN
6	Institutional Quality Index (INQ)	Average of the six indicators of institutional quality as outlined by the World Bank	WGI

Notes: CBN− Central Bank of Nigeria, WGI− World Governance Indicators as complied by the World Bank.

Source: Author's compilation, 2024

Estimation Techniques

Vector Error Correction Model (VECM) is a tool for analyzing long-term correlations between cointegrated variables for multivariate time series modeling method (Chib *et al*., 2021). The VECM distinguishes itself from conventional models by accounting for the long-term equilibrium relationships between variables in addition to capturing their short-term dynamics. To better understand the short- and long-term relationships between important variables like GDP ratios, researchers employ VECM, which is especially helpful in economic and financial studies (Bekaert *et al*., 2022).

Cointegration is a crucial principle behind the VECM. When two or more time series are cointegrated, they have a shared long-term trend despite short-term volatility. In such instances, the linear combination of the individual series can be stationary (Fry & Pagan, 2023, Abdullahi & Sani, 2021). The VECM is specifically designed to capture long-term equilibrium relationships, while the error correction term assists the system in adjusting to short-term deviations from equilibrium. This error correcting method causes

the system to return to equilibrium over time, giving for a more thorough understanding of both short- and long-term dynamics (Lu *et al*., 2023, Sani, 2014).

Furthermore, VECM is a significant tool for comprehending the complicated dynamics of economic and financial systems. Its capacity to model both short-term fluctuations and long-term correlations between cointegrated variables makes it an important tool in time series econometrics. Recent developments in dealing with nonlinearity, time-varying coefficients, and high-dimensional data have further strengthened its applicability and resilience, ensuring that it continues to play a prominent position in econometric modeling (Brock, 2023).

Model Specification

Multiple linear regression was used to investigate the relationship between Nigeria's fiscal and debt sustainability. The study's goal was achieved by the use of VECM regression. VECM is an effective statistical tool for investigating the relationships between multiple time series variables that exhibit cointegration. Cointegration occurs when non-stationary time series variables that display trends on their own form a stationary linear combination, implying a long-term equilibrium relationship despite the potential of oscillations in the separate series (Suresh & Kumar, 2023). The VECM specification is as follows:

$$D(DGR)_t = \beta_1 D(DGR)_{t-1} + \beta_2 D(GGR)_{t-1} + \beta_3 D(RGR)_{t-1} + \beta_4 D(DDS)_{t-1} + \beta_5 D(GDP)_{t-1} + \beta_6 D(INQ)_{t-1} + v_1 \quad \ldots\ldots\ldots\ldots\ldots 1$$

$$D(GGR)_t = \Omega_1 D(DGR)_{t-1} + \Omega_2 D(GGR)_{t-1} + \Omega_3 D(RGR)_{t-1} + \Omega_4 D(DDS)_{t-1} + \Omega_5 D(GDP)_{t-1} + \Omega_6 D(INQ)_{t-1} + v_2 \quad \ldots\ldots\ldots\ldots\ldots 2$$

$$D(RGR)_t = \Psi_1 D(DGR)_{t-1} + \Psi_2 D(GGR)_{t-1} + \Psi_3 D(RGR)_{t-1} + \Psi_4 D(DDS)_{t-1} + \Psi_5 D(GDP)_{t-1} + \Psi_6 D(INQ)_{t-1} + v_3 \quad \ldots\ldots\ldots\ldots\ldots 3$$

$$D(DDS)_t = \phi_1 D(DGR)_{t-1} + \phi_2 D(GGR)_{t-1} + \phi_3 D(RGR)_{t-1} + \phi_4 D(DDS)_{t-1} + \phi_5 D(GDP)_{t-1} + \phi_6 D(INQ)_{t-1} + v_4 \quad \ldots\ldots\ldots\ldots\ldots 4$$

$$D(GDP)_t = \alpha_1 D(DGR)_{t-1} + \alpha_2 D(GGR)_{t-1} \alpha_3 D(RGR)_{t-1} + \alpha_4 D(DDS)_{t-1} + \alpha_5 D(GDP)_{t-1} + \alpha_6 D(INQ)_{t-1} + v_5 \quad \ldots\ldots\ldots\ldots\ldots 5$$

$$D(INQ)_t = \partial_1 D(DGR)_{t-1} + \partial_2 D(GGR)_{t-1} + \partial_3 D(RGR)_{t-1} + \partial_4 D(DDS)_{t-1} + \partial_5 D(GDP)_{t-1} + \partial_6 D(INQ)_{t-1} + v_6 \quad \ldots\ldots\ldots\ldots\ldots 6$$

$\beta_1 - \beta_6$, $\Omega_1 - \Omega_6$, $\Psi_1 - \Psi_6$, $\phi_1 - \phi_6$, $\alpha_1 - \alpha_6$, and $\partial_1 - \partial_6$ are the estimated parameters, $v_1 - v_6$ are the stochastic terms.

Results and Discussion

Trend Analysis

The trend analysis of the fiscal and debt sustainability proxies on Figures 1, 2 and 4 (debt-to-GDP ratio, Government expenditure-to GDP ratio, and Debt Servicing) and the economic performance indicator (Figure 5) revealed predominantly increasing trend over time except for the erratic trend observed in Revenue-to-GDP ratio which can be linked to the fluctuation of the price of crude oil in the international market which is a key determinant of revenue generation in Nigeria. Similarly, the institutional quality index revealed an unfavourable trend (Figure 6). This is a consequence of the poor ratings of the institutional quality indicators in Nigeria which are rated below the specified threshold by the World Bank.

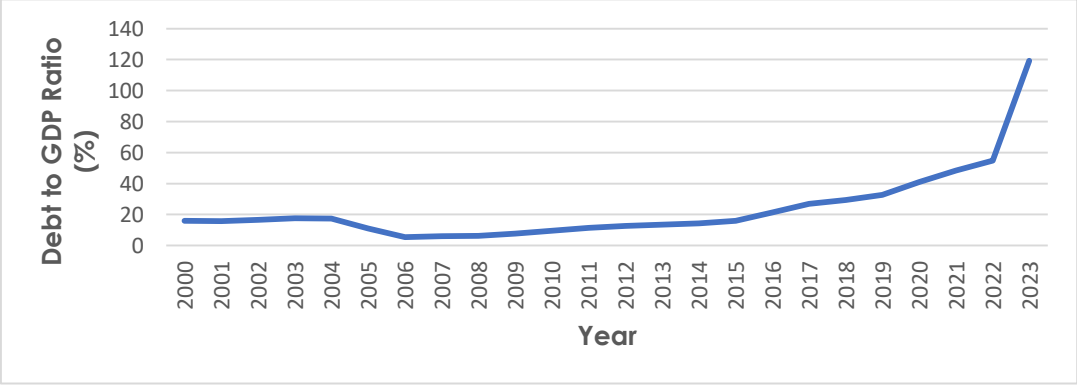


Figure 1: Trend of Debt-to-GDP Ratio in Nigeria, 2000-2023.

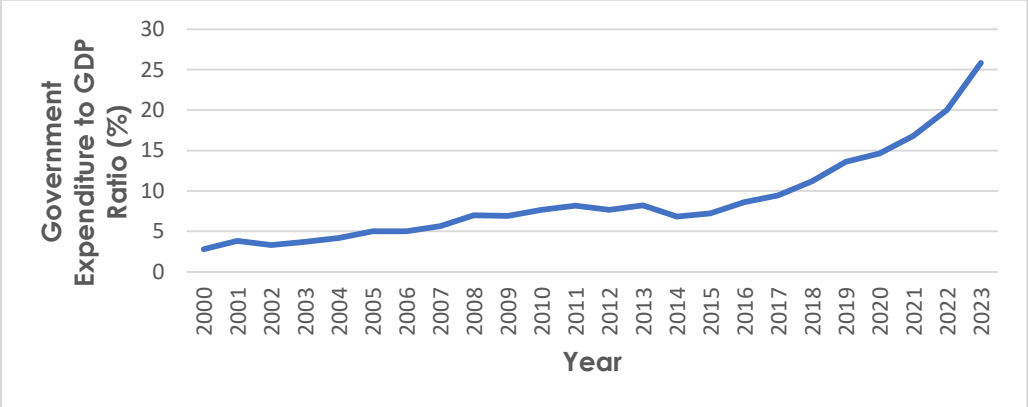


Figure 2: Trend of Government Expenditure-to-GDP Ratio in Nigeria, 2000-2023.

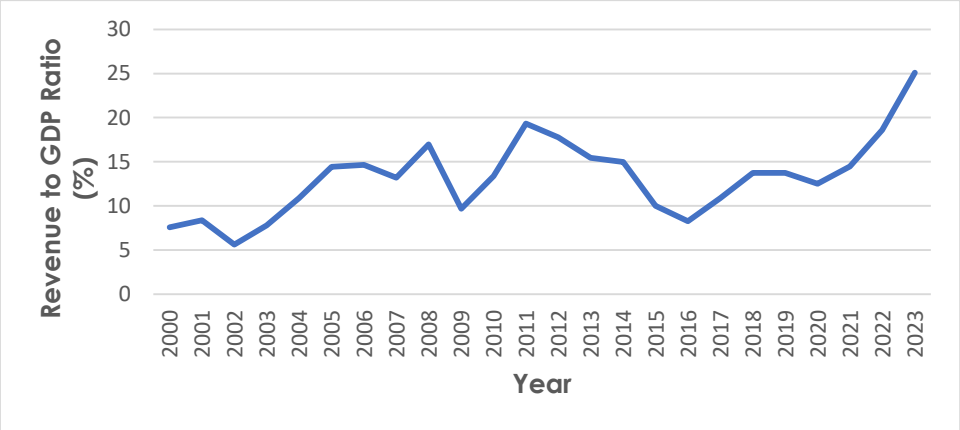


Figure 3: Trend of Revenue-to-GDP Ratio in Nigeria, 2000-2023.

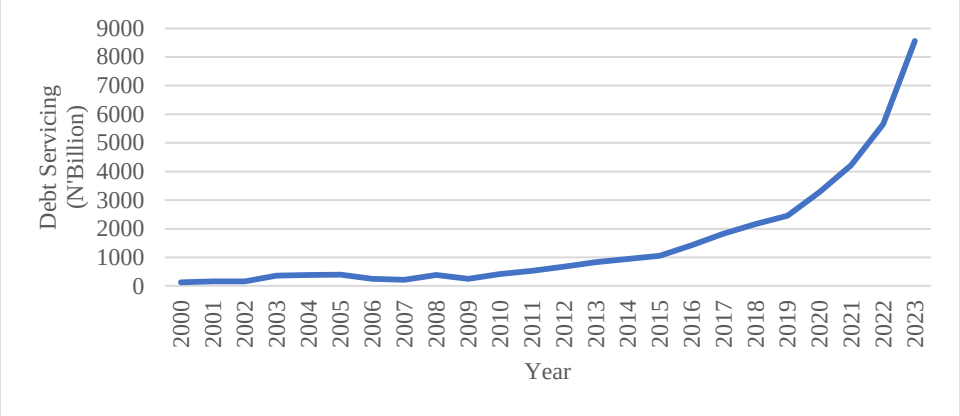
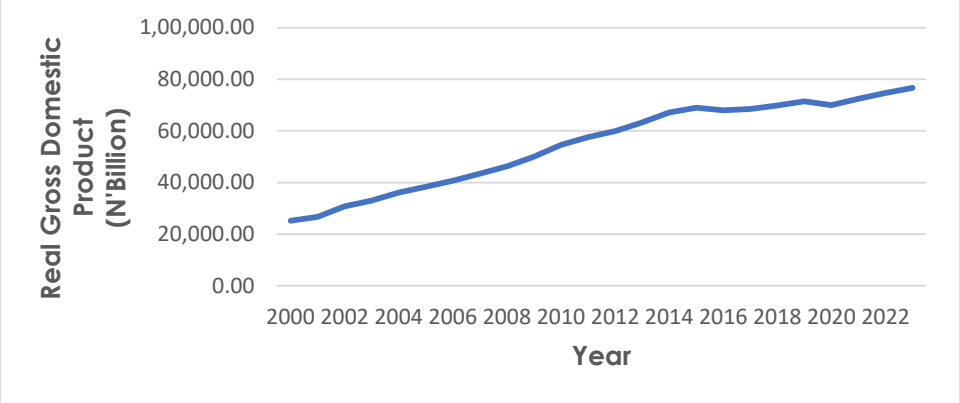


Figure 4: Trend of Debt Servicing in Nigeria, 2000-2023.



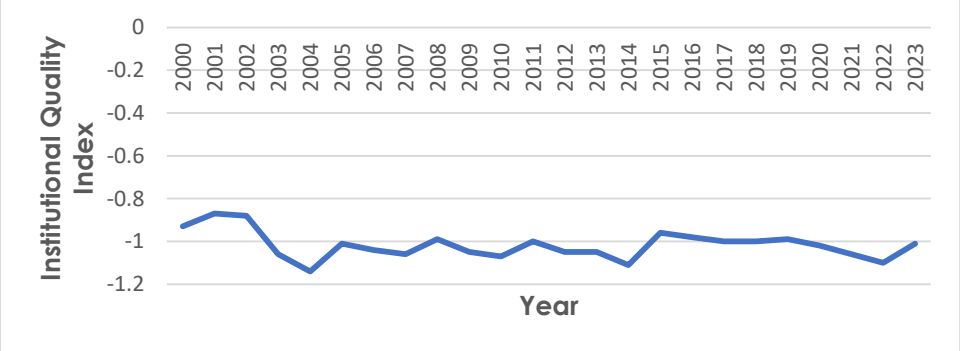


Figure 6: Trend of Institutional Quality Index in Nigeria, 2000-2023

By implication, rising trends in the Debt-to-GDP ratio, Government Expenditure-to-GDP ratio, and Debt Servicing all point to increased fiscal pressure on a government, indicating a change in how the country manages its finances. When the debt-to-GDP ratio rises, it indicates that the government is borrowing more in proportion to the size of the economy. While borrowing may be necessary in times of crisis or to pay critical initiatives, a steady rise in this ratio indicates that the government is growing

increasingly reliant on debt to support its operations. If this trend continues unabated, it may suggest possible dangers, such as increasing default risk, increased sensitivity to external economic shocks, and the prospect of unsustainable debt levels if economic growth does not keep pace with borrowing.

4.2 Correlation Analysis

Table 2: Correlation Matrix

	DGR	GGR	RGR	DSS	GDP	INQ
DGR	1.000000					
GGR	0.897214	1.000000				
RGR	0.533201	0.674061	1.000000			
DSS	0.966083	0.970226	0.605119	1.000000		
GDP	0.536336	0.782320	0.536934	0.673370	1.000000	
INQ	-0.046310	-0.212886	-0.391201	-0.157159	-0.307150	1.000000

Source: Author's computation, 2024

The Debt-to-GDP ratio, government expenditure-to-GDP ratio, and debt servicing are all significantly positively connected, implying that increasing spending leads to higher debt and servicing expenses. GDP has moderate positive associations with DGR, GGR, and DSS, indicating that economic growth is connected with increased debt, expenditure, and servicing. Revenue-to-GDP ratio is marginally linked with DGR and DSS, indicating that increased revenue does not always result in lower debt levels or service costs. However, Institutional Quality has weak negative correlations with most variables, implying that more debt, spending, and income are associated with worse institutional quality, while the links are not substantial.

Unit Root Test

Phillips-Perron test was adopted to analyze the stationarity of the variables of the VECM.

Table 3: Phillips-Perron (PP) Unit Root Test

	LEVEL		1st DIFFERENCE		
VARIABLE	**Test statistics**	**Critical values@5%**	**Test statistics**	**Critical values@5%**	**Conclusion**
DGR	4.6722	-2.9981	--	--	I (0)
GGR	5.0362	-2.9981	--	--	I (0)
RGR	-1.2164	-2.9981	-3.9843	-3.0049	I (1)
DSS	11.7166	-2.9981	--	--	I (0)
GDP	-2.0272	-2.9981	-3.0194	-3.0049	I (1)
INQ	-3.4648	-2.9981	--	--	I (0)

Source: Author's Computation, 2024

The PP test revealed that while Debt-to-GDP ratio, Government expenditure-to-GDP ratio, Debt servicing, and Institutional Quality Index are stationary at level, Revenue-to-GDP ratio and Real Gross Domestic Product as proxy for economic performance are stationary at first difference. This is calculated by comparing the PP test statistic to its corresponding critical value at the 5% level of significance. It is stationary when the test statistic exceeds the critical value, irrespective of the sign of its coefficient.

Cointegration Test

Johansen cointegration test was adopted to analyze the cointegration of the variables of the VECM.

Table 4: Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Trace Statistic	Eigenvalue	0.05 Critical Value	Prob.**	Hypothesized No. of CE(s)
178.2525	0.952091	117.7082	0.0000	None *
111.4065	0.878663	88.80380	0.0005	At most 1 *
65.00434	0.683930	63.87610	0.0401	At most 2 *
39.66490	0.574868	42.91525	0.1019	At most 3
20.84708	0.484933	25.87211	0.1860	At most 4
6.251018	0.247337	12.51798	0.4291	At most 5
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

Max-Eigen Statistic	Eigenvalue	0.05 Critical Value	Prob.**	Hypothesized No. of CE(s)
66.84600	0.952091	44.49720	0.0000	None *
46.40213	0.878663	38.33101	0.0048	At most 1 *
25.33945	0.683930	32.11832	0.2670	At most 2
18.81781	0.574868	25.82321	0.3177	At most 3
14.59607	0.484933	19.38704	0.2165	At most 4
6.251018	0.247337	12.51798	0.4291	At most 5

Source: Author's Computation, 2024

When the trace and maximum eigenvalue statistics above the 5% critical value at the level of significance, it was established that the study's variables were co-integrated in the model using the unrestricted co-integration test. The highest trace statistics at the 5% level yields three cointegrating equations, whereas the unconstrained eigenvalue statistics yield two cointegrating equations. The hypothesis that there is no co-integration between the variables is disproven by the test statistics. The findings indicate that the variables studied have a long-term link within the model. The test results suggest long-term interactions between the model's variables. Thus, in order to achieve the purpose of this study, the VECM was estimated.

The VECM Estimation

The estimated VECM is displayed on Table 5.

Table 5: VECM Result

Error Correction:	D(DGR)	D(GGR)	D(RGR)	D(LOG(DSS))	D(LOG(GDP))	D(INQ)
CointEq1	1.547 [1.267] {0.2256}	0.0292 [0.119] {0.8062}	-0.531 [0.308] {0.0874}	0.029 [0.0174] {0.1056}	0.005 [0.003] {0.0695}	-0.003 [0.008] {0.7407}
D(DGR(-1))	-1.357 [1.802] {0.4536}	0.0765 [0.169] {0.6520}	**1.005** **[0.436]** **{0.0239}**	**0.059** **[0.025]** **{0.0196}**	-0.0009 [0.004] {0.8087}	-0.0007 [0.012] {0.9518}
D(GGR(-1))	**9.352** **[3.943]** **{0.0202}**	0.653 [0.370] {0.0814}	0.7471 [0.955] {0.4354}	0.034 [0.054] {0.5313}	0.012 [0.008] {0.1372}	-0.020 [0.027] {0.4551}
D(RGR(-1))	-0.794 [1.211] {0.5140}	0.049 [0.114] {0.6683}	0.278 [0.293] {0.3469}	**-0.032** **[0.0167]** **{0.0583}**	-0.001 [0.002] {0.5754}	**0.0113** **[0.008]** **{0.1743}**
D(LOG(DSS(-1)))	11.075 [16.366] {0.5006}	-1.392 [1.535] {0.3672}	**-8.839** **[3.963]** **{0.0286}**	-0.148 [0.225] {0.5127}	0.025 [0.032] {0.4376}	-0.107 [0.111] {0.3388}
D(LOG(GDP(-1)))	90.871 [118.731] {0.4464}	8.128 [11.133] {0.4676}	44.180 [28.750] {0.1284}	**3.681** **[1.635]** **{0.0272}**	-0.215 [0.233] {0.3593}	-0.068 [0.807] {0.9326}
D(INQ(-1))	-48.980 [45.342] {0.2834}	-5.298 [4.252] {0.2164}	-10.074 [10.979] {0.3617}	-0.316 [0.625] {0.6147}	-0.135 [0.089] {0.1333}	-0.240 [0.308] {0.4379}
R-squared	0.557736	0.664710	0.594875	0.801444	0.753510	0.268912

Note: Standard errors are in parentheses [-] and P-values are in curly braces {-}
Source: Author's Computation, 2024

From the estimated model, the debt-to-GDP ratio (DGR) is significantly impacted over the long term by government spending (GGR) and debt servicing (DSS). In particular, a fall in the debt-to-GDP ratio is linked to an increase in government spending as a percentage of GDP, indicating a negative correlation between GGR and DGR. This suggests that increased government expenditure in relation to GDP may lessen the total amount of debt, most likely as a result of fiscal expansion or economic stimulus that promotes growth and lowers the debt ratio. Conversely, there is a comparable negative link between DGR and Debt Servicing (DSS), indicating that a lower debt-to-GDP ratio results with higher debt servicing (as a percentage of GDP). Although it may seem counterintuitive, this shows that servicing debt lowers the total amount of debt, which in turn helps to lower the ratio. From another perspective, this bolsters Adeleke *et al*. (2021) that discovered that debt servicing costs in Nigeria have become a huge drain on national resources

Since the revenue-to-GDP ratio (RGR) and DGR are positively interrelated, the debt-to-GDP ratio tends to climb when government revenue rises in relation to GDP. This might be the result of increased money being utilized to fund unsustainable expenditure or investments, which would raise the debt load. However, over time, the effects of real GDP (GDP) and the Institutional Quality Index (INQ) on DGR are less pronounced and less substantial. A greater debt-to-GDP ratio may result from improved institutional quality, as evidenced by the positive relationship between INQ and GDP, although GDP and INQ exhibit a weak, statistically insignificant link. Nevertheless, this effect is too small to be statistically significant, suggesting that stronger institutions are required to have a major impact on debt levels.

Although the magnitude of these effects varies, the results show that different factors modify the debt-to-GDP ratio in the short run in reaction to changes in the other variables. Government spending (GGR), for instance, has a significant positive short-term impact on DGR; that is, rises in GGR typically result in an immediate increase in the debt-to-GDP ratio. This aligns with Ademola and Oluwole (2023) that concluded the rising cost of debt servicing has limited government expenditure on critical infrastructure, restricting the country's economic potential. While not statistically significant, the revenue-to-GDP ratio (RGR) has a negative impact on DGR and a weaker short-term impact.

Additionally, there is a modest short-term relationship between debt servicing (DSS) and DGR. Even though there is a short-term beneficial benefit, it is not strong enough to have a major impact on the debt-to-GDP ratio, indicating that the effects of debt servicing may take longer to manifest. On the other hand, the short-term impact of Real GDP on the debt-to-GDP ratio is statistically negligible. Although Institutional Quality (INQ) has a short-term negative impact on DGR, there isn't a substantial or statistically significant association between both.

Furthermore, the model incorporates an error correction term (CointEq1) that determines how quickly the system returns to long-term equilibrium following a shock. The error correction term for DGR is positive, implying that any short-term deviations from the long-run equilibrium in the debt-to-GDP ratio will gradually adjust over time. This adjustment, however, does not occur immediately because the coefficient is modest, indicating a prolonged return to equilibrium.

Conclusion and Policy Recommendations

Conclusion

Finally, the Vector Error Correction Model (VECM) results provide some significant insights into the factors influencing a country's fiscal and debt sustainability in Nigeria. The findings highlight the importance of government expenditure and debt servicing in defining the long-term debt trajectory, with both higher expenditure and effective debt servicing leading to a reduction in the debt load. In contrast, the revenue-to-GDP ratio is positively associated to debt-to-GDP, indicating that just raising revenue without careful management of fiscal policy may not lower debt. While the short-term dynamics show some immediate effects of government spending and debt servicing on the debt ratio, the findings also show that real GDP and institutional quality have a modest impact in the short run. These variables have weaker or statistically negligible effects on debt dynamics in the short run, indicating that structural factors like effective governance and economic growth take time to have a major impact on the debt ratio.

Policy Recommendations

First, it is necessary to improve the efficiency of government expenditure. While more government expenditure might occasionally result in higher debt in the short term, the long-term impact is determined by how efficiently these resources are utilized. Policymakers should target public resources toward productive expenditures like infrastructure, education, and healthcare, which have the potential to boost economic development and productivity over time. To accomplish this, performance-based budgeting and frequent audits of public expenditure should be introduced, which will aid in identifying waste and optimizing resource use.

Second, debt servicing must be managed effectively. From the findings, high debt servicing can help reduce the debt-to-GDP ratio over time, but it must be balanced with other areas of spending. Therefore, debt restructuring should be considered, including refinancing high-interest debt to lower servicing expenses. Spreading debt payments more evenly over time and diversifying debt financing sources are two ways that could assist reduce budget pressures while maintaining fiscal stability.

Improving revenue management is another important policy priority. While improving the revenue-to-GDP ratio is crucial, the findings indicate that simply increasing income may not result in a lower debt-to-GDP ratio if funds are not used efficiently. To minimize budget deficits and manage debt, critical strategies include strengthening tax collection mechanisms, widening the tax base, and implementing tax reforms to address loopholes.

Although the influence of institutional quality and governance is not immediate, it remains an important long-term strategy. Improving the strength of public institutions can result in more efficient tax collection, better fiscal management, and increased responsibility for government expenditure. To maintain solid fiscal policies and efficient public-sector management, organizations responsible for fiscal monitoring should be strengthened, transparency increased, and corruption combated.

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