External Debt Sustainability and Economic Growth Nexus in Nigeria: A Co-integration and Causality Analysis

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Abstract

High debt burdens can stifle investment and growth, while responsible debt management can support productive spending and development. This paper examined the impact of debt sustainability on economic growth in Nigeria from 1986 to 2024 using the co-integration and Pairwise Granger causality techniques. The variables of this paper are real GDP; debt-to-GDP ratio, debt-to-service ratio, monetary policy rate, and government expenditure on the theoretical frameworks of the exogenous growth theory and the debt overhang hypothesis. The data for the variables were sourced from the Central Bank of Nigeria Statistical Bulletin and the Debt Management Office (DMO). The results show that debt-to-GDP ratio had a negative (-0.000206) and insignificant (-0.688940) relationship with economic growth; debt-to-service ratio had a negative (-0.001716) and insignificant (-0.342420) relationship while MPR had a negative (-0.005717) and insignificant (-0.96354) relationship. Government expenditure had negative but significant relationship between debt sustainability and economic growth. The debt-to-GDP ratio (P-value, 0.0005< 0.05) Granger causes real GDP and Debt-to-GDP ratio causes economic growth (0.0071< 0.05). This paper concluded that debt-to-GDP ratio, debt-to service ratio and monetary policy rate has negative impact on economic growth within the reviewing period. Furthermore, the evidence as shown in the causality results show that the relationship between debt sustainability and economic growth is symbiotically mutual, reinforcing each other both in the immediate and in the long-term. This paper recommended as follows: i) sustain the current fiscal policy regime/reforms, economy-wide and sector specific so as to promote growth. This also implies regular update using the best scenarios for the Nigeria Debt Sustainability Analysis (DSA), ii If possible by the Government, a moratorium on debt accumulation at all levels of government should be implemented. This would reduce the excessive borrowing by the Federal government and subnational governments, iii) The Central Bank of Nigeria should reconsider the hike in the rate, a downward review in order to promote growth, v) Government spending should be to promote productive/growth drivers than consumption.

Keywords: Debt-to-GDP, debt-to-service, monetary policy rate, Nigeria, real GDP, time series analysis

JEL Codes: E52, H62, H63, O40

1. Introduction

Economic growth is primarily a quantitative concept, referring to an increase in the total output or gross domestic product (GDP) of an economy over a period of time. Economic growth is crucial because it leads to increased production, potentially more jobs, higher incomes, and improved living standards, ultimately contributing to a more prosperous and stable society. Economic growth is typically measured by tracking changes in Gross Domestic Product(GDP), which represents the total value of goods and services produced within a country's borders, and gross national product(GNP) which measures the total value of goods and services produced by a country's residents, both domestically and abroad.

External debt is the portion of a country's debt owed to foreign lenders, including governments, commercial/deposit money banks or international financial institutions. External debt sustainability refers to a country's ability to service its foreign debts without resorting to unsustainable measures including default or restructuring. A country's external debt is considered sustainable when it can meet its current and future payment obligations without facing debt-service difficulties or exceptional financing (IMF, 2013). To assess the sustainability of external debt, key measures include the debt-to- GDP ratio, debt-to-export ratio, debt-to- revenue ratio, and debt service to exports or revenues, which indicates a country's ability to repay its obligations without compromising its long-term goals.

According to the National Bureau of Statistics(NBS), gross domestic product expanded by 3.84% year-on-year in the fourth quarter of 2024, up from 3.46 in quarter three(Q3) 2024, as compared to 2.7 in 2023. The *growth drivers* in 2024 are the information and telecommunication (ICT), oil and gas sector, which expanded by 4.9 percent and 7.9 percent respectively. Major growth *stagnators* include agriculture, trade, manufacturing and real estate, with 21.8 percent, 16.0 percent, 9.2 percent and 5.2 percent shares of GDP respectively. The growth draggers include construction and transport, constrained by the impact of reforms on operating costs (NESG, 2024). The Debt Management Office(DMO) conducts debt sustainability analysis(DSA) using a World Bank/International Monetary Fund (IMF) tool to assess the sustainability of public debt. The challenges of debt sustainability in Nigeria include: inadequate revenue mobilization, inefficient public expenditure management characterized by inefficient spending and corruption which hinders fiscal discipline, rising public debt and debt service burden. Nigeria's total public debt surged to N142.3 trillion by the end of September 2024, a 5.97 percent increase (N8.02) trillion from N134.3 trillion in June 2024, driven by both rising domestic borrowing and the impact of the weak naira on external debt. Nigeria's external debt in dollar terms grew marginally by 0.29 percent in June to $43.03bn in September 2024. In Naira terms, external debt surged by 9.22 percent, rising from N63.07trillion to N68.89 trillion within the 4th quarter. This sharp increase was attributed to the depreciation of the Naira, with exchange rate weakening from N1,470.19/$1 in June to N1,601.03/$ 1 by the end of September, 2024. The analysis of Nigeria's external debt stock shows a largely stable external debt profile, with charges driven by minor adjustments in multilateral and bilateral obligations.

In line with the submissions of Sanusi *et al*.(2019), public debt could impact economic growth negatively through crowding out private investment, macroeconomic vulnerability, debt overhang, high interest rate and increased tax burden. It could impact positively on economic

growth through stimulation of aggregate demand and funding of public investment. However, the overall impact of public debt on economic growth depends on the size/level of debt relative to the size of the economy (debt-to-GDP ratio and the sustainability of the debt(Oyadeyi, Agboola, Okunade, & Osinubi, 2024). Objectively, this paper examined the impact of external debt sustainability on economic growth in Nigeria.

This paper is structured as follows: Following the introduction is some stylized facts in section 2, section 3 presents review of empirical literature while section 4 is on data and methodology, and section 5 is on the empirical results and section 6 is on policy implications

2 Some Stylized Facts on External Debt Sustainability and Economic Growth in Nigeria

Table 1 presents gross domestic product trajectory for Nigeria based on periodic averages after 2023.

Table 1: GDP Trajectory, 2023- 2035

GDP	Economic Outcomes	2023	2027	2031	2035
	GDP(Nominal US$Bn)	414	1,000	2,500	4,000
	GDP(Nominal N'Trn)	240	800	2000	3,200
	Nominal US$GDP Growth%	-	24.82	25.96	12.48
	Real GDP Growth (%)*	3.1	8.6	14.1	13.5
	Per Capita Income(US$)	1,863.2	4,105.4	9, 453.2	14,041.5

Source: NESG Estimates/ * represents outcomes based on periodic averages after 2023, which are as follows: 2024-2027, 2028-2031 and 2032-2035

From the Nigerian Economic Summit Group(NESG) report as contained in Charting Nigeria's Path to a US$4 Trillion Economy by 2035: A Pathway Analysis for Sustainable Economic Transformation and Inclusion-NES#29 Perspective- it was concluded that achieving a US$4 trillion economy by 2035 will come with fundamental changes in the structure and characteristics of the economy. From that report, by 2035, Nigeria will become Africa's industrial and manufacturing hub, producing and exporting diverse mineral and agricultural products, high- end products and knowledge product for the large AfCFTA market and the globe. Hence, Nigeria will become an industrialized nation with an industrial output of over 33 percent of GDP and a mechanized and commercialized agricultural sector offering high-end services to the industrial and agricultural sector. Table 2 presents selected Macroeconomic Indicators 2022-2027

Table 2: Selected Macroeconomic Indicators 2022-2027

Indicators	2022	2023	2024	2025	2026	2027
Real GDP Growth (%)	3.55	3.75	3.30	3.46	3.45	3.66

Real GDP Growth(N'Trn)	74.96	77.77	80.34	83.11	85.98	89.13
Nominal GDP(N'Trn)	198.93	225.51	252.18	280.80	314.32	353.94
Inflation (%)	13.00	17.16	16.21	17.21	14.36	14.19
Revenue(N'Trn)	9.97	10.49	10.87	12.11	16.40	19.70
Deficit/GDP (%)	3.81	4.24	3.55	4.13	2.54	2.22
Exchange Rate(USD/N)	410.15	435.57	435. 92	437.57	445	445
New Borrowing(N'Trn)	6.92	8.80	8.84	10.62	7.98	7.68
Domestic Borrowing(N'Bn)	4.35	7.04	7.07	8.50	6.38	6.14
External Borrowing(N'Bn)	2.57	1.76	1.77	2.12	1.60	1.54

Source: Federal Ministry of Finance, Budget and National Planning (Budget 2022 & MTEF,

2023-2027and DSA Team Projection (2026-2027)

The Baseline macroeconomic assumption as presented in Table 2 were those in the 2023-2025 Medium Term Expenditure Framework and Fiscal Strategy Paper (FSP). These assumptions incorporated the relevant pillars and priorities of the National Development Plan (NDP) 2021-2025 taking into cognizance the current realities and changes in the economy in terms of output and inflation. Table 3 presents the summary of total public debt sustainability assessment.

Table 3: Summary of Total Public Debt Sustainability Assessment

Details	Threshold	2022	2023	2024	2025	2026	2027
Total Public Debt – t0-GDP (%)	40*						
Baseline		23.4	37.1	37.2	37.0	36.6	35.3
Alternatives(Shocks)		25.7	45.4	47.5	49.0	50.6	51.6
Gross Financing Needs-to-GDP (%)	15**						
Baseline		5.3	7.2	6.0	6.1	5.6	5.0
Alternatives		5.3	8.8	8.0	8.7	9.0	9.1
FGN Debt Service –to-Revenue (%)	50***						
Baseline		36.5	73.5	95.6	105.4	83.5	86.3
Alternatives		36.5	142.3	162.9	166.0	152.04	148.61

Source: DMO (2022)
* Nigeria's self-imposed Limit, ** MAC-DSA Threshold, *** Nigeria's Recommended Threshold

Table 3 shows that in spite of the increase in the debt stock, the Total Public Debt-to-GDP ratio at 37.1 percent in 2023, and thereafter to 2027 remained below the Nigerian self-imposed limit of 40 percent, following the growth in GDP. The Gross Financing Needs-to- GDP ratio remained below its threshold of 15 percent throughout the projection period. Table 4 presents Nigeria's debt burden benchmark.

Table 4: Debt Burden Benchmark

S/N	Indicators	MAC-DSA	DMO's Self – Imposed
1	Total Public Debt-to- GDP ratio (%)	70	40
2	Gross Financing Needs-to-GDP (%)	15	-
3	FGN Debt- Service-to- Revenue	-	50

Source: DMO (2022)

MAC-DSA (Market Access Country-Debt Sustainability Analysis)

3 Empirical Literature Review

They few reviewed empirical literature on the relationship between external debt sustainability and economic growth are presented in this section. For example, Ojo and Ayodele (2023) examined the causal relationship between external debt and economic growth in Nigeria using the Granger Causality test. The study employed time-series data from 1990 to 2021 and found bidirectional causality between external debt and economic growth. The authors concluded that while external debt contributes to economic growth, its high servicing costs could limit the growth benefits unless the funds are invested in productive sectors. The study underscored the need for effective debt utilization to achieve sustainable growth.

Aliyu and Usman (2023) investigated how external debt affects economic growth in Nigeria using the co-integration and error correction model (ECM) approach. The analysis, based on annual data from 1985 to 2021, showed that external debt has a significant long-term negative impact on Nigeria's economic growth. This was attributed to the large proportion of government revenue being directed toward debt servicing rather than development expenditure. The study suggested that Nigeria should explore alternative sources of financing, such as foreign direct investment, to reduce dependency on debt.

Suleiman and Mustapha (2023) explored the impact of external debt on economic growth in Nigeria using a multivariate econometric model. The analysis was based on data from 2000 to 2022, using the ordinary least squares (OLS) regression approach. The study showed a positive impact of external debt on economic growth within the reviewing period when the debt was profiled towards infrastructure projects but noted that Nigeria's growing debt burden posed a risk to future growth. The study concluded that the effectiveness of external debt in driving growth is contingent on how well the borrowed funds are utilized.

Ogunleye and Olajide (2024) examined the impact of external debt in stimulating economic growth in Africa, evidence from Nigeria. Using panel data from 2000 to 2022 and employing the fixed effects model, the results show that external debt positively impacted economic growth in the short term but led to diminishing returns in the long run. The study highlighted that the negative effect of external debt became evident when the debt-to-GDP ratio exceeded 40%. The study emphasized the importance of debt management strategies that focused on reducing debt servicing costs.

Akinlo and Lawal (2024) explored the link between external debt and economic growth in Nigeria using a time-series analysis from 1995 to 2022. The authors applied the autoregressive distributed lag approach(ARDL) bounds testing approach and showed that external debt had a statistically significant positive impact on Nigeria's economic growth in the short run, but its long-term impact were negative due to the high cost of servicing external debt. The study argued that external debt should only be used for projects that generate high returns to mitigate the long-term negative impact of debt servicing.

Ibrahim and Mohammed (2025) examined the impact of external debt on economic growth in the context of Nigeria's oil-dependent economy. Using quarterly data from 2005 to 2023 and applying the error correction model (ECM) approach, the study showed that external debt negatively impacted economic growth, particularly during periods of low oil prices. The authors suggested that Nigeria should diversify its sources of revenue and focus on improving domestic savings to reduce reliance on external debt for financing.

Abdullahi and Bello (2025) investigated the dynamics between external debt and economic growth in Nigeria, focusing on the role of external debt in economic stabilization. The study used a vector autoregressive (VAR) model and data spanning from 1999 to 2023. The finding showed that external debt contributed positively to economic growth in the short run, but the long-term impact was negative due to the rising burden of debt servicing. The authors recommended that Nigeria should adopt a more sustainable debt strategy, emphasizing the need for greater accountability in the management of borrowed funds.

3.1 Knowledge Gap

With the exception of Ogunleye and Olajide(2024) that was focused on Africa, using panel data approach, the most current reviewed studies(Ojo & Ayodele, 2023; Aliyu & Usman, 2023; Suleiman & Mustapha, 2023, Akinlo & Lawal, 2024, Ibrahim & Mohammed, 2025) focused on the Nigerian economy. This study is also focused on Nigeria. Unlike the previous reviewed empirical studies, this study presents some stylized facts on the real external debt sustainability using the most current macroeconomic debt sustainability analysis of the Debt Management Office (DMO) thereby giving facts behind external debt sustainability analysis in Nigeria.

While majority of the reviewed studies used Granger causality test approach, co integration and error correction model approach, vector autoregressive approach and panel fixed effect approach, this study used the co-integration approach, the most feasible approach for measuring sustainability, this is the long –run relationship. In terms of variable utilization, while this study used the most related proxy, real gross domestic product, debt-to-service ratio, debt-to-GDP ratio and government expenditure as a percentage of GDP, the reviewed studies used macroeconomics variables that may not capture debt sustainability. The variables of this study served the knowledge gap purposes.

This study used the debt overhang and exogenous growth theories, unlike previous studies that relied only on the economic growth theories only, thereby subjecting the theoretical relevance of the topic on debt sustainability and economic growth one-side- affair. This serves the purposes of bridging the knowledge gap. The most recent of reviewed studies, majority of the

reviewed works were done earlier in the year 2025 than now. Overall this study on the impact of external debt sustainability and economic growth has contributed to the body of economic knowledge theoretically, empirically and pragmatically since there are economic policy suggestions to improve on external debt sustainability and economic growth.

4 Theoretical Framework, Model Specification and Methodology

This paper is anchored on the exogenous growth and the debt overhang theories. Exogenous growth theory, often represented by the Solow-Swan model. Public expenditure and debt sustainability, while seemingly exogenous, can significantly impact economic growth, with debt sustainability being crucial for long-term stability and public expenditure influencing growth through investment and consumption. The model this paper intends to estimate is as follows:

4.1 Model Specification

The model of this paper is specified as thus:

$RGDPt = f(DBTGDP_t, DSERV_t, MPR_t, GOVT_t)$ (4.1)

Where RGDP is the real gross domestic product, proxy for economic growth; DBTGDP is debt-to-GDP, measure for debt sustainability; DSERV is debt-to-service ratio, proxy for debt sustainability in line with the theoretical measures of debt sustainability. MPR is the Central Bank of Nigeria Monetary policy rate as a control variable and government expenditure. Government expenditure and debt sustainability are intertwined with economic growth, where responsible fiscal policies The explicit panel econometric and debt management are crucial for long-term prosperity, while increased government spending can stimulate short-term growth, excessive debt can lead to crowding out private investment and hinder long-term economic expansion: Equation 4.1 can be re-specified to take in estimable econometric format as represented in equation 4.2

$$RGDP_t = \beta_{0t} + \beta_1 DBTGDP_t + \beta_2 DSERV_t + \beta_3 MPR_t + \beta_4 GOVT_t + \mu_{it} \text{ (4.2)}$$

Where β's are structural parameters and μ = stochastic error term. The empirical relationship between debt sustainability and debt-to-GDP ratio is both positive, negative and inconclusive. Soyres, Kawal and Wang (2022) and Heimberger (2021) showed a negative relationship between the subject matter, and Spilloti (2015) reported a positive relationship between debt sustainability and debt-to-GDP ratio while Dave(2024) showed inconclusive relationship between debt sustainability and debt-to-GDP ratio. Following the empirical evidence, ambiguous relationship between debt sustainability and debt-to-GDP ratio is expected for the Nigerian economy, hence, $\beta_1 </>0$. A high debt-to-service ratio (DSR), where debt payments consume a large portion of a country's income, can negatively impact real GDP growth by reducing investment and consumption, potentially leading to economic stability. Amoo(2024) and Salisu, Alabbas and Haladu(2024) showed a negative relationship between debt sustainability and real GDP. Therefore, $\beta<0$. The Monetary Policy Rate (MPR) is the anchor rate. While some researchers argue that the high interest rate hurts the economy and high borrowing discourages investments, others argue that the moderating effect of high interest rate on inflation leads to a positive real growth in the economy. So, β_3, MPR, is expected to be

negatively related to real GDP. Some theories, like Keynesianism, suggest that government spending stimulate the economy by increasing aggregate demand, while others highlight potential negative effect like crowding out the private sector. Government expenditure, particularly when focused on productive sectors, can positively influence real GDP growth. Okunlola, Sani, Ayetigbo and Oyadeji (2024) showed a positive relationship between government expenditure and debt sustainability.

4.2 Estimation Techniques and Procedure

The estimation techniques for this paper is the Johansen co integration and the Granger causality approaches. A co-integration test is used to establish if there is a correlation between several time series in the long-run. It identifies scenarios where two or more non-stationary time series are integrated together in a way that they cannot deviate from equilibrium in the long-term. The Granger causality test is a statistical method used to determine if one-time series can help predict another, meaning one variable Granger cause another if its past values improves the prediction of the other variables beyond what can be achieved using only the past values of the predicted variable

This was used to test whether a variable's mean value and variance varies over time. It is necessary in time series variables to avoid the problem of spurious regression. The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test was used for the analysis. Augmented Dickey-Fuller (ADF) test is used to test existence of unit root when there is autocorrelation in the series and lagged terms of the dependent variable are included in the equation. The following three models represent pure random walk, random walk with drift and random walk with drift and trend used in Augmented Dickey-Fuller tests:

$$\Delta \psi_t = \Omega \psi_{t-1} + \sum_{i=1}^{p} \beta_i \Delta \psi_{t-1} + \varepsilon_t \qquad 4.1$$

$$\Delta \psi_t = \alpha_0 + \Omega \psi_{t-1} + \sum_{i=1}^{p} \beta_i \Delta \psi_{t-i} + \varepsilon_t \qquad 4.2$$

Decision Rule: If ADF test statistic (t-statistic of lagged dependent variable) is greater than the critical value, we reject the null hypothesis and conclude that the series is stationary (there is no unit root) but if otherwise, we accept the null hypothesis and conclude that the series is not stationary (there is unit root). The Phillips-Perron (PP) test on the other hand uses nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. The asymptotic distribution of the PP test is the same as the ADF test statistic.

Co-integration test

This test examines if there exists a long-run relationship between the variables under investigation. The Johansen or Engel-Granger methodology will be used. The long-run equilibrium relationship is estimated with the following equation:

$$X_t = \alpha_0 + \alpha_1 Z_t + \varepsilon_t$$

If there is cointegration, α_0 and α_1 estimates reveal "super-consistent" estimators in the OLS regression. In this estimation fitted values of ε_t series is tested for stationarity. In this analysis

DF or ADF may be used. However, in hypothesis testing, critical values constructed by McKinnon (1991) is used. If this series is stationary, we can conclude that there is co-integration between X_t and Z_t. The fitted values of ε_t may be used as error correction term of the model.

Decision Rule: If the ADF statistics of residual series is absolutely greater than the critical values at 5% level of significance, then there exists a long-run relationship between the variables and if otherwise, there exists no long-run relationship among the variables.

The Granger causality representations of our model is as follows:

$$GDPr = \beta + \sum_{i}^{n} \eta_i\, GDPr_{t-i} + \sum_{i=1}^{n} \gamma_i\, DBTGDP_{t-i} + \sum_{i=1}^{n} \gamma_i\, DSERV_{t-i} + \sum_{i=1}^{n} \gamma_i\, MPRt - 1$$
$$+ \sum_{i=1}^{n} \gamma_i\, GOVT_{t-i} + \Omega.$$

$$DBTGDP = \phi + \sum_{i}^{n} \theta_i\, DBTGDP_{t-i} + \sum_{i}^{n} \vartheta_i\, GDP_{t-i} + \sum_{i=1}^{n} \gamma_i\, DSERV_{t-i} + \sum_{i}^{n} \eta_i\, MPR_{-i}$$
$$+ \sum_{i=1}^{n} \gamma_i\, GOVT_{t-i} + \psi$$

$$DSERV = \beta + \sum_{i=1}^{n} \gamma_i\, DSERV_{t-i} + \sum_{i}^{n} \theta_i\, GDP_{t-i} + \sum_{i}^{n} \vartheta_i\, DBTGDP_{t-i} + \sum_{i}^{n} \eta_i\, MPR$$
$$+ \sum_{i}^{n} \eta_i\, GOVT_{t-i} + \mu$$

$$MPR = \beta + \sum_{i=1}^{n} \gamma_i\, MPR_{t-i} + \sum_{i}^{n} \theta_i\, DSERV_{t-i} + \sum_{i}^{n} \vartheta_i\, GDP_{t-i} + \sum_{i=1}^{n} \gamma_i\, DBTGDP_{t-i}$$
$$+ \sum_{i=1}^{n} \gamma_i\, GOVT_{t-i} + \mu$$

$$GOVT = \beta + \sum_{i=1}^{n} \gamma_i\, GOVT_{t-i} + \sum_{i}^{n} \theta_i\, DSERV_{t-i} + \sum_{i}^{n} \vartheta_i\, GDP_{t-i} + \sum_{i=1}^{n} \gamma_i\, DBTGDP_{t-i}$$
$$+ \sum_{i=1}^{n} \gamma_i\, MPR + \mu$$

Decision Rule: If the probability value of an estimated Granger causality is less than 0.05, we reject the null hypothesis and conclude that a Granger causality exists while if the probability value is greater than 0.05, we accept the null hypothesis and conclude that there exists no causality relationship among the variables.

Table 4.1 presents the sources of data

Variables	Proxy	Measure	Source
Real GDP	Economic growth	Total value of goods and services	CBN Bulletin,
DBTGDP	Debt-to-GDP	Ratio	Debt Management Office(DMO)
DSERV	Debt-to- service	Ratio	DMO
MPR	Monetary Policy Rate	Rate	CBN Bulletin
GOVT	Government Expenditure	Percentage of GDP	CBN Bulletin

5. Empirical Results and Analysis

5.1. Unit-Root Test Result

Table 5.1: Unit Root Test Result

Variable	**ADF STAT.**	**Critical value.**	**Order of Integration**
RGDP	-5.304880	-3.533083	I(1)
DBTGDP	-4.649705	-1.949609	I(1)
DSERV	-5.742142	-1.949609	I(1)s
MPR	-4.095670	-1.951332	I(1)
GOVT	-3.206057	-1.949856	I(1)

Source: Authors computation using EView 12

5.1. Cointegration Analysis (Johansen Methodology)

Table 5.2: Cointegration Test Result
Series: GDPR DBTGDP DSERV MPR GOVT
Lags interval (in first differences): 1 to 1
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.524093	79.10069	69.81889	0.0117
At most 1 *	0.459742	52.34193	67.85613	0.0470
At most 2	0.291001	24.12928	29.79707	0.1950
At most 3	0.169749	10.71716	15.49471	0.2295
At most 4	0.084946	3.462106	3.841466	0.0628

Trace test indicates 2 co-integrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

Source: Authors computation using EView 12.

The Johansen method of co-integration was used for the study because all the variables are stationary at first difference. The Johansen result as displayed in table 5.1 clearly shows evidence of co-integration as trace statistics test indicates 2 co-integrating equations as the trace statistic value is greater than that of 5% critical value (79.10069 > 69.81889) & (52.14193 > 67.85613). This entails that there exists a long-run relationship between the variable under analysis.

5.2 Error Correction Model Regression Results
Table 5.2: ECM Results
Dependent Variable: D(GDPR)
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.074009	0.025936	2.853551	0.0073
D(DBTGDP)	-0.000206	0.000299	-0.688940	0.4955
D(DSERV)	-0.001716	0.005010	-0.342420	0.7341
D(MPR)	-0.005717	0.005933	-0.963507	0.3421
D(GOVT)	-0.000307	8.400905	-3.648195	0.0009
ECM(-1)	-0.046398	0.085309	-0.543880	0.5901
R-squared	0.554538	Mean dependent var		-0.010296
Adjusted R-squared	0.489029	S.D. dependent var		0.194478
S.E. of regression	0.139017	Akaike info criterion		-0.970958
Sum squared resid	0.657076	Schwarz criterion		-0.717626
Log likelihood	25.41916	Hannan-Quinn criter.		-0.879361
F-statistic	8.465043	Durbin-Watson stat		2.133643
Prob(F-statistic)	0.000028			

Source: Authors computation using EView 12

It can be clearly seen from table 5.2 that external debt sustainability measured with the ratio of external debt to GDP (DBT/GDP) yielded a regression numerical coefficient of -0.000206 with a corresponding probability value of 0.4955 > 0.05. This entails that external debt sustainability contributes negatively and insignificantly to economic growth in Nigeria for the period analyzed. This further entails that the external debt in Nigeria is not sustainable. The numerical coefficient of the regression output also shows that debt service ratio yielded a negative numerical value at the magnitude of -0.001716 with a corresponding probability value of 0.7341 > 0.05. This entails that debt service ratio has a negative relationship with economic

growth in Nigeria. Hence, a one percent increase in debt to service ratio reduced economic growth by 0.001716 percent. This conforms to economic a priori expectation because there is an inverse relationship between debt service ratio and Gross Domestic Product.

The regression output also shows that inflation has an inverse relationship with economic growth in Nigeria. This entails that a 1% increase in inflation yielded a reduction in economic growth by -0.005717% and vice versa. This conforms to economic theory. Government expenditures yielded a negative numerical coefficient of -0.000307 with a corresponding p-value of 0.0009 < 0.05. This entails that government expenditures contributes negatively and significantly to economic growth in Nigeria for the period reviewed. This does not also conform to economic a priori expectation. This is because it is expected that government expenditures should have a positive relationship with economic growth in Nigeria for the period analyzed. The F-statistics which is employed to test for the statistical significance of the entire regression plane yielded 8.465043 with a corresponding probability value of 0.000028 < 0.05. This entails that the test is statistically significant at the entire regression plane. The coefficient of determination (R^2) which measures the explanatory power of the independent variables yielded 0.554538. This implies that approximately 55% of the variations in economic growth are explained by changes in external debt sustainability and other control variables used in this study. This is, however, relatively high and significant. The error correction mechanism (ECM) which measures the speed of the adjustment of the variables at which equilibrium is restored yielded -0.046398. This is correctly signed (negative) at the 5 percent level, and therefore confirms our earlier proposition that the variables are co-integrated. The speed suggests that economic growth in Nigeria adjusts relatively slowly to the long-run equilibrium changes in the explanatory variables and it gives the proportion of the disequilibrium error accumulated in the previous period that is corrected in the current period. The speed of adjustment is specifically at 4.6% annually.

5.3 Model Diagnostic Test
Table 5.3: Serial Correlation Test Result
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.382240	Prob. F(2,32)	0.2656
Obs*R-squared	3.180809	Prob. Chi-Square(2)	0.2038

Source: Authors' Computation using EView 12

The Breusch-Godfrey Serial Correlation LM Test was used to carry out the test of autocorrelation. It is clearly seen that the Obs*R-squared which follows the computed Chi-Square distribution yielded 3.180809 and it is clearly greater than the Chi-Square probability which yielded 0.2038. This compels us to accept the null hypothesis that there is no serial correlation of any order. Hence, there is no presence of autocorrelation problem in the model.

5.4 Granger Causality Test Result
Table 5.4: Causality Test Result
Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.

DBTGDP does not Granger Cause RGDP	39	21.7636	0.0005
RGDP does not Granger Cause DBTGDP		6.63529	0.0071

Source: Authors' computation using EView 12

The Granger causality test was carried out to identify the causality relationship between economic growth and external debt sustainability in Nigeria. The Granger causality output in table 5.4 showed that DBTGDP causes economic growth (p-value = 0.0005 < 0.05) and economic growth (GDPR) also granger causes DBTGDP (p-value = 0.0071 < 0.05). Hence, there is a bi-directional causality relationship between the two variables.

5.2 Discussion of Results

The first objective of this paper is to examine the impact of debt sustainability on economic growth in Nigeria from 1986-2024. The co-integration and the associated error correction model approaches were utilized. From the co-integration result, it showed that the trace test indicated 2 co-integrating at the 0.05 level of significance and again from the error correction model results, it show that the constant term is positive at 0.074009 with t-statistics (prob.value of 2.853551/0.0073), which implies that the policy regimes on debt management has some positive impact on economic growth. It could also imply that the debt portfolio has been managed sustainably. However, from the result, debt-to-GDP ratio negatively and insignificantly impacted on economic growth within the reviewing period; debt-to-service ratio equally impacted negatively and insignificantly on economic growth while monetary policy rate impacted negatively and insignificantly on growth. Government expenditure negatively although significantly impacted on economic growth. Further from the ECM results, the summary statistics (F-stat, 8.46; Prob, 0.00028, Dw stat, 2.133643) are within the acceptance criteria. In Nigeria, the Monetary Policy Rate (MPR) influences economic growth by impacting borrowing costs, investment and overall economic activity, with high MPRs potentially leading to slower growth due to borrowing costs. Consumption and investment, inflation and exchange rate are the other channelings through which higher MPR impact negatively on economic growth. An MPR of 27.50% as at the 18-19th February Monetary Policy Committee meeting on asymmetric corridor around the MPR at + 500/-100 basis point unarguably crowds out investment due to high associated interest rate with untoward consequence on economic activity. This results lay credence to economic theory and empirical validation ((see Fagbola & Sokunbi, 2021; Sulaiman, 2017, Ayadi & Ayadi, 2015)

The second objective of this paper is to evaluate the causality between debt sustainability and economic growth. The Pairwise Granger causality test was adopted. From the as presented in Table 5.4, it showed that debt-to-GDP ratio causes economic growth at (P-value 0.0005< 0.05) and economic growth causes debt-to-GDP ratio at (P-value 0.0071< 0.05) at the 5% level of significance. This implies bidirectional causality between debt-to-GDP ratio and economic growth for the Nigerian economy as against the uni-directional causality established by previous studies (Choong, Lau, Liew & Puah, 2018; Karogl, 2017). This shows the plausibility of debt sustainability and economic growth

6. Conclusion and Policy Implication

Conclusion

From the objectives of the paper, it can be concluded that the fiscal policy regimes has positive impact on the growth potentials. Furthermore, debt-to-GDP ratio, debt-to service ratio and monetary policy rate has negative impact on economic growth within the reviewing period. In other word, monetary policy and fiscal policy has not been coordinated well in Nigeria to achieve sustainable growth. Meanwhile, if these policies are mixed effectively, there would a long-run equilibrium relationship between fiscal policy on one hand and monetary policy on the other hand.

First hand evidence as shown in the causality results show that the relationship between debt sustainability and economic growth is symbiotically mutual, reinforcing each other both in the immediate and in the long-term. This paper has contributed to the existing body of knowledge on fiscal policy (debt sustainability and economic growth). The challenge of this paper is the omission of more relevant economic growth drivers including openness of the economy and external competitiveness, demographic characteristics and investment indicator variables. It is expected that future research on the relationship between debt sustainability and economic growth should consider the inclusion of these omitted variables to enhance robustness of economic analysis.

Policy Implications

From the empirical results, the following can be considered for implementation:

Sustain the current fiscal policy regime/reforms, economy-wide and sector specific so as to promote growth. This also implies regular update using the best scenarios for the Nigeria Debt Sustainability Analysis (DSA).

If possible by the Government, a moratorium on debt accumulation at all levels of government should be implemented. This would reduce the excessive borrowing by the Federal government and subnational governments.

The Central Bank of Nigeria should reconsider the hike in the rate, a downward review in order to promote growth.

Government spending should be to promote productive/growth drivers than consumption.

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