

## Velocity of Public Debt Accumulation and Economic Growth in Nigeria

<sup>1</sup>Malachy Ashywel  
Ugbaka & <sup>2</sup>Joseph Nsabe  
Ndome

<sup>1&2</sup>Department of Economics,  
University of Calabar

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*Corresponding Author:*

Malachy Ashywel Ugbaka

### Abstract

The paper examines the impact of velocity of public debt accumulation on economic growth in Nigeria over the period 1990 to 2024, anchored on an integrated framework combining the Debt Overhang Theory and Fiscal Sustainability Theory. Empirically leaning on annual time series data on GDP growth, debt accumulation velocity, debt service, government capital expenditure, inflation, and trade openness. The empirical analysis proceeds with the descriptive statistics, correlation analysis, unit root tests using (ADF and PP), and the Autoregressive Distributed Lag (ARDL) bounds testing technique to capture both short-run and long-run dynamics. The results indicate that rapid public debt accumulation exerts a significant negative growth in the economy. Debt service obligations and inflation further intensify the negative effects. On the other hand, government capital expenditure and trade openness exhibit positive and statistically significant contribution to growth. The estimated error correction model reveals a moderate speed of adjustment toward long-run equilibrium, underscoring the persistence of debt-growth nexus over time. Overall, the findings provide empirical support for the debt overhang hypothesis and emphasize the critical role of fiscal sustainability in mitigating the adverse effects of debt. The study submits that effective management of velocity of debt accumulation, enhancing fiscal discipline, and targeting productive government spending are essential for sustaining long-run economic growth in Nigeria. Therefore, the policy recommendations include close monitoring of debt accumulation trends, promoting trade openness, and adoption of selective debt strategies when debt exceeds sustainable thresholds.

## **Background to the Study**

The scale and space of external borrowings enjoyed by Nigeria, the restructuring of such debts, the prospective implications on economic growth, and the broader consequences for the economy are all causing major concern. Rising external debt burdens continue to constrain Nigeria's economic progress, prosperity, and sustainable development. In the 1980s, Nigeria experienced a severe external debt crisis, which necessitated the intervention of International Monetary Fund (IMF) and the World Bank through debt relief initiatives patterned after the Highly Indebted Poor Countries (HIPC) framework to help the country recover according to study of Ugbaka et al. (2023). Introduced in 1996 with the intention of assisting developing countries in addressing unsustainable high rates of external debt levels and current crises. The framework was designed to pull and rescue the world's highly indebted nations from a vicious cycle and the challenge associated with the servicing or restructuring excessive debt burdens. However, access to debt forgiveness under the initiative is contingent upon the fulfillment of certain prerequisites to start effective macroeconomic stability, fostering productive economic activity and reducing poverty Edo et al. (2020).

Public debt has emerged as an important macroeconomic policy challenge in developing economies, especially in Sub-Saharan Africa where government continue to rely heavily on external borrowing to finance budget deficits, infrastructure development, and economic sustainability. Public debt in Nigeria has grown steadily since the mid-2010s, raising serious concerns about debt sustainability and long-term growth and prosperity (Debt Management Office, 2024; AUgbaka et al, 2019; Ugbaka et al, 2019).

Nigeria's public debt trajectory has become particularly alarming in recent years. According to the Debt Management Office (DMO, 2024), as of 31 December 2024, country's total public debt stock stood at N144.7 trillion (approximately \$94.2 billion). Of this amount, domestic debt accounted for about 51.4 per cent of the total (N74.4 trillion), while external debt constituted 48.6 per cent (N70.3 trillion). Notably, these figures exclude additional domestic borrowings that were projected for the 2025 and 2026 fiscal years. They also do not incorporate imminent and ongoing repayments such as the \$1.118 billion Eurobond that was due in November 2025 or recurring commitment including the annual \$30 million Special Drawing Rights charges payable to the international monetary fund, notwithstanding the full repayment of \$3.4 billion Rapid Financing Instrument obtained in 2020.

While conventional debt analyses centers on the level of debt, recent studies emphasize the relevance of the velocity of debt accumulation that is the rate at which public debt grows relative to economic output (Reinhart & Rogoff, 2010; Ugbaka et al, 2018). When debt accumulation persistently exceeds economic growth, the resulting debt burden intensifies, eroding fiscal space and dampening long term economic growth. Nigeria offers a particularly compelling case for such an analysis. Following a significant debt relief initiative in 2005–2006, Nigeria's debt-to-GDP ratio fell sharply. However, intensified borrowing since 2015, coupled with weak and sluggish economic growth, has

reversed these gains (World Bank, 2024; Ugbaka, 2025). It is on the bases of these that this study attempts to examine the velocity of public debt accumulation and its growth implications in Nigeria from 1990 to 2024 using both graphical and rigorous econometric techniques.

## **Literature Review**

### **Theoretical Framework**

The theoretical foundations guiding this study is anchored on the analysis of public debt dynamics, fiscal behavior, and economic performance. It synthesizes Debt Overhang Theory and Fiscal Sustainability Theory into a unified analytical construct that is particularly suitable for examining developing economies, with specific applicability to Nigeria. The integration framework offers a comprehensive explanation of how excessive debt accumulation interacts with fiscal capacity shape investment incentives, macroeconomic stability, and long-run economic growth.

Debt Overhang Theory posits that excessive debt burden discourages investment because future returns are expected to be absorbed by debt servicing rather than reward investors (Krugman, 1988). The Debt Overhang Theory gained prominence during the 1980s international debt crisis, particularly in Latin America and Sub-Saharan Africa. Its intellectual origins are traceable to the corporate finance literature, notably Myers's (1977), formulation of debt overhang to explain underinvestment by highly leveraged firms. Krugman (1988) and Sachs (1989) later adapted it to sovereign debt analyses. Arguing that when a country's prospective income is largely pre-committed to debt repayment, creditors effectively capture the returns on new investment. Consequently, debtor countries face weak incentives to undertake growth-enhancing structural reforms or investments.

Nigeria's rising public debt profile and persistently high debt service-to-revenue ratio exhibits classic debt overhang conditions. The increasing diversion of fiscal resources toward debt servicing has constrained capital expenditure thereby limiting productive investment and growth prospects. Moreover, heightened uncertainty regarding fiscal sustainability undermines private sector confidence and discourages investment, reinforcing the empirical relevance of Debt Overhang Theory to Nigeria's macroeconomic experience. The debt overhang theory became relevant to major policy debates surrounding debt relief initiatives, notably the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI).

Complementing this perspective, Fiscal Sustainability Theory emphasizes that public debt accumulation should not exceed the economy's growth rate; otherwise, debt dynamics becomes unsustainable (Bohn, 1998). The theory examines the ability of a government to maintain its fiscal policy stance overtime without resorting to insolvency, excessive inflation, or abrupt and destabilizing policy adjustments. Central to this theory is the assessment whether current and future government revenues are adequate to finance existing and anticipated expenditure commitments, including debt servicing

burdens. In developing economies, fiscal sustainability assumes heightened importance because weak revenue bases, volatile macroeconomic conditions, and institutional constraints often exacerbate debt accumulation. Persistent fiscal imbalances can undermine macroeconomic stability, suppress economic growth, and heighten sovereign debt crises. Within the concept of debt velocity aligns closely with debt overhang and fiscal sustainability theories, capturing the dynamic interaction between the space of debt accumulation and economic growth.

### **Empirical Review of Literature**

Oladele & Ojiekwe (2024) provided a comprehensive assessment of the growth implication of public debt on economic growth in Nigeria by disaggregating debt into domestic debt, external debt, debt servicing costs, and debt maturity structure. It specifically examined the impact of domestic debt on real gross domestic product (Real GDP), analyzed the influence of foreign debt on Real GDP, assessed the implications of debt servicing costs on Real GDP, and examined how the debt maturity structure impacted Real GDP in Nigeria. The study utilised a quantitative design using the Autoregressive Distributed Lag (ARDL) framework. Secondary time series data were sourced from the Central Bank of Nigeria (CBN), the National Bureau of Statistics (NBS), and the Debt Management Office (DMO), over the space from 2000 to 2023. This study used both descriptive and inferential statistics, together with the unit root test, ARDL bounds test for cointegration, error correction mechanism (ECM). The empirical results revealed that in the long run, domestic debt ( $\beta = 0.248$ ,  $p < 0.05$ ) and debt maturity structure ( $\beta = 0.189$ ,  $p < 0.05$ ) had a significant and positive impact on economic growth, while, external debt ( $\beta = -0.342$ ,  $p < 0.05$ ) and debt servicing costs ( $\beta = -0.456$ ,  $p < 0.05$ ) exerted negative and significant relationships with Real GDP growth. In the short run, domestic debt continued to mirrored positive effects while external debt sustained its negative impact. The diagnostic tests confirmed model adequacy and stability, leading the authors to conclude that the growth effect public debt in Nigeria are heterogeneous and contingent on its composition and structure. All four study assumptions were statistically confirmed at conventional significance thresholds. The study submits that public debt components have differentiated impacts on in Nigeria, with internal debt and appropriate maturity structures supporting economic growth while external debt and high servicing costs exhibiting it. The results revealed that Nigeria should prioritize domestic debt, extend debt maturities, control servicing obligations, and support institutional frameworks for sustained debt management to support sustainable economic growth.

Similarly, Adekunle (2022) examined debt-growth relationship in Nigeria, using annual time series data from 1986 to 2020. The data were obtained from CBN Statistical bulletin and WDI, ARDL frameworks were utilized to estimate the data. The results of the paper showed that internal debt exerts negative influence in the long run though it is growth enhancing in short-run. External debt displayed negative inverse relationship in long run while in short run is positive related. In the long run education spending is positive as a driver of growth but negative related to growth in the short run. The study argued that

the authority should channel both external and domestic debt to the education and infrastructural growth which can lurch the economy to be more productive and diversified in the long run.

In a nonlinear perspective, Okungbowa, Oligbi & Iyoha, M. (2018) tested the existence of a debt Laffer curve and debt overhang hypotheses in Nigeria. A debt Laffer curve is a smooth inverted U-shaped parabolic function depicting a non-linear association between the speed of growth of real GDP and the stock of external debt. Fundamentally, the debt Laffer curve confirms that economic growth first increases with debt and later decrease as the debt stock continues to rise. Obviously, the existence of a debt Laffer curve shows that a high and increasing external debt stock is dangerous to economic growth. Strong evidence of debt overhang effects was also established, implying the potential deleterious impact of external debt on an economy as increasing debt works against economic growth. Utilizing quarterly data from 1981 to 2015, this study shows strong empirical facts for the validating of both a debt overhang effect and a debt Laffer curve for Nigeria. The authors concluded that sustained external debt accumulation poses a serious threat is serous to long term economic growth and advocated aggressive external debt reduction techniques

Extending the debate of sectorial performance and macro-financial interaction, Adeniji, Taiwo, & Ashiru, L. O. (2025) investigates the interaction between Nigeria's rising external debt servicing burden, extreme exchange rate fluctuations, and the resultant effect on the construction sector performance. The study highlighted how the Nigerian construction industry, an important engine for growth and infrastructure sustainability, is reduced to intense macroeconomic shocks due to fiscal stress and monetary instability. Again, the rapid depreciation of the Naira (which plummeted from N460.70 per US dollar in May 2023 to N1,738.74 per US dollar in November 2024) amplified fiscal stress and acts as a shock multiplier, dramatically rising the domestic local currency cost of servicing external debt. This monetary instability is channeled to the supply side via a strong exchange rate pass-through, exacerbating input cost inflation. This cost shock is worsening by policy, as important construction inputs (including cement and steel products) are prevented from the official foreign exchange window, stressing the sector to depend on the parallel market. The findings underscored a mutually reinforcing vulnerability where debt amplifies foreign exchange risk and foreign exchange instability institutionalizes cost inflation constraining project viability and worsening the sector's capacity to close the nation's infrastructure deficit. Sound policy responses need structural revenue restructuring, adherence to risk-mitigating debt management techniques, and an important review of foreign exchange conditions on essential construction inputs to stabilize costs and foster sustainable sectorial growth.

Ojelola et al (2025) introduced an institutional dimension to the debt-growth nexus by examining the role of institutional quality in Nigeria from 1986 to 2024. The estimated was carried out with the Fully Modified Least Squares (FMOLS) techniques shows that both external debt and debt servicing are connected with slower economic growth.

Moreover, the association is not statistically significant. Impliedly, borrowing alone does not sustained elevated economic performance. Again, hand, institutional quality shows a clear and significant positive effect on economic growth, revealing that good governance, effective legal systems, and reduced corruption are central to long-term development in Nigeria. Government capital expenditure also shows strong support to economic growth, but its impact is not strong and statistically insignificant, which may reflect the obstacles in turning productive investments into real growth. Clearly, the interaction between external debt and institutional quality is positive and significant, showing that strong institutions can offset the growth-limiting impacts of debt. Overall, the estimates highlight that external debt can only be beneficial if supported with robust institutions and careful resource management. From this, the study recommends that external borrowing can only supported economic growth when complemented by strong governance, effective legal frameworks, and efficient public investment management.

From a historical and policy-oriented perspective, Adepoju, & Obayelu, (2007) reviewed Nigeria's debt management practices and their implication for sustainable economic growth and development. Data were gathered extensively from literature, the Central Bank and National Bureau of Statistic bulletins. The estimated data obtained with descriptive statistics depicts that, availability of access to international finance strongly supports the economic development process of any nation. Debt is an important resource needed to support sustainable economic growth. But a large external borrowing without servicing as it is the case for Nigeria before year 2000 exhibits a serious impediment to the revitalization of her sluggish economy as well as the alleviation of debilitating poverty. The much-needed inflow of external resources for productive investment stimulation, growth and employment were distorted. This will consequently suppress the economy both in the long and short terms. Best practices in debt payment must be put in place from time to time in readiness to changes in the economy and the polity.

## **Data and Methodology**

### **Data Description**

This study employs secondary annual time-series data sourced from credible national and international institutions to ensure reliability, consistency, and replicability of results. The analyses focused on Nigeria, covering a period from 1990 to 2024. Data on public debt were obtained primarily from the Debt Management Office (DMO) of Nigeria. These datasets are widely utilized in empirical studies on public debt and fiscal sustainability in Nigeria, thereby, enhancing their credibility in this study. Data on economic growth were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, which provides official annual series on Real Gross Domestic Product (RGDP) and GDP growth rates. The CBN data are preferred due to their conformity with national accounting standards and their extensive application in empirical macroeconomic research on. The principal explanatory variable in this study is the velocity of public debt accumulation, defined as the rate of change which public debt increases over time, rather than the conventional stock of debt measure. By emphasizing public debt accumulation dynamics, this measure offers a more nuanced and looking forward assessment of debt behaviour and its growth implications.

### Model Specification

Consistent with the debt–growth nexus and endogenous growth literature, economic growth is specified as a function of the velocity of public debt accumulation alongside a set of important macroeconomic controls variables:

$$GDPG_t = \alpha_0 + \alpha_1 VPD_t + \alpha_2 DS_t + \alpha_3 GCEXP_t + \alpha_4 INF_t + \alpha_5 TOP_t + \varepsilon_t$$

Where:

$GDPG_t$  denote the real GDP growth rate,

$VPD_t$  represent the velocity of public debt accumulation,

$DS_t$  captures the debt service burden,

$GCEXP_t$  refers to the government capital expenditure,

$INF_t$  is the inflation rate,

$TOP_t$  measures trade openness, and

$\varepsilon_t$  is the stochastic error term.

The coefficient  $\alpha_1$  is expected to be negative, in line with debt overhang hypothesis. To account for the scale effect of debt accumulation, an alternative model specification normalizes debt growth by GDP:

$$GDPG_t = \beta_0 + \beta_1 VPD_t^{GDP} + \beta_2 DS_t + \beta_3 GCEXP_t + \beta_4 INF_t + \beta_5 TOP_t + u_t$$

This specification is especially important for Nigeria, where pronounced volatility in GDP growth significantly affects debt sustainability dynamics. All the variables as previously defined in equation 1. To examine the presence of debt overhang thresholds, a nonlinear specification is expressed below;

$$GDPG_t = \gamma_0 + \gamma_1 VPD_t + \gamma_2 VPD_t^2 + \gamma_3 Z_t + \mu_t$$

Where  $Z_t$  denotes the vector of the control variables. A negative and statistically significant  $\gamma_2$  provides the existence of a debt accumulation threshold beyond which economic growth deteriorates.

Furthermore, given the possibility of mixed orders of integration among macroeconomic variables, the study employs the ARDL bounds testing framework. This approach facilitates the joint estimation of short-run dynamics and long-run equilibrium relationships irrespective of whether variables are I(0) or I(1).

The associated error correction representation of the ARDL model is specified as follows:

$$\Delta GDPG_t = \phi_0 + \sum_{i=1}^p \phi_i \Delta GDPG_{t-i} + \sum_{j=0}^q \theta_j \Delta X_{t-i} + \lambda ECM_{t-1} + \eta_t$$

Where  $ECM_{t-1}$  denotes the speed of adjustment to long-run equilibrium.

Unlike conventional debt-to-GDP ratios, the velocity of public debt accumulation reflects the intensity and speed of government borrowing. Accelerated debt growth can impose pronounced adverse effects on economic growth than stable debt levels, particularly in fiscally constrained economies such as Nigeria.

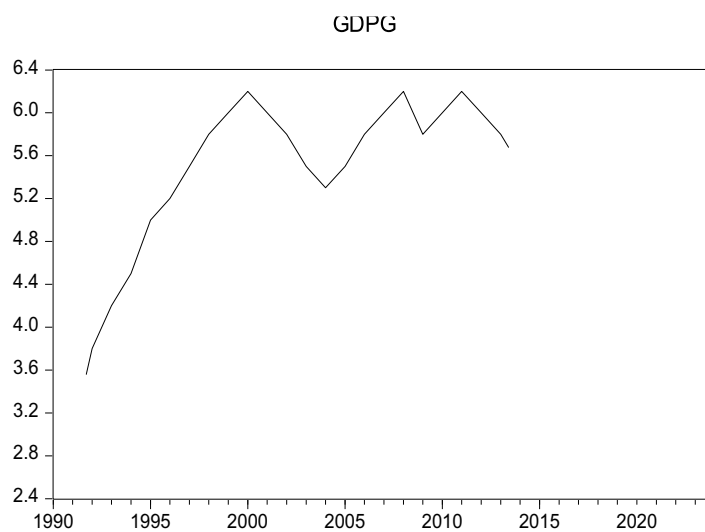
### *A Priori Expectations*

Consistent with theoretical and empirical evidence, the velocity of debt accumulation is expected to exert negatively on economic growth, while a rising debt service burden is anticipated to reduce economic growth. In contrast, government capital expenditure is expected to stimulate economic growth, and whereas, inflation is expected to exert a damping influence on economic growth.

### **Trend Analysis of GDP Growth and Debt Velocity**

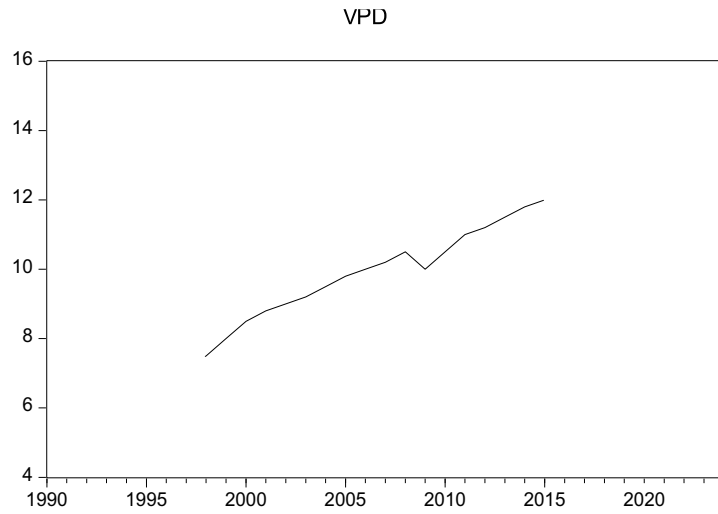
This section analyses the temporal dynamics of economic growth (GDPG), public debt accumulation velocity (VPD), and debt velocity relative to GDP ( $VPD^{GDP}$ ) in Nigeria over the period 1990–2024. Trend analysis highlights the long-term evolution of these variables and offers insights into their potential interactions.

**Figure 1:** GDP Growth (GDPG)



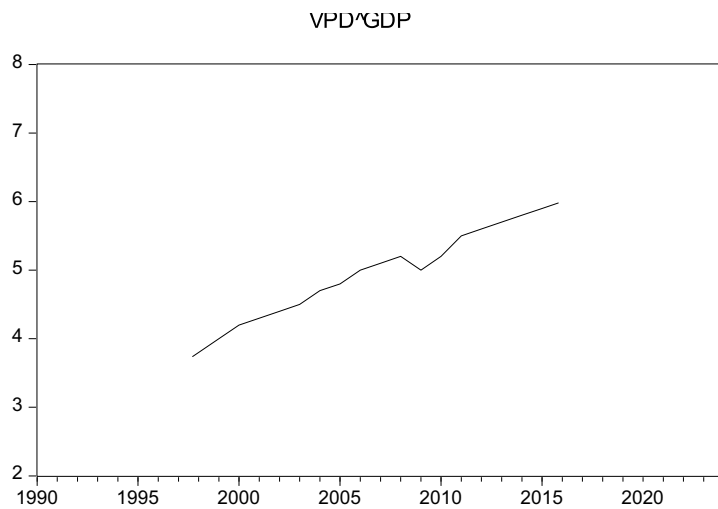
Nigeria's GDP growth exhibits moderate volatility over the 1990–2024 period. The economy performed relatively low growth in the early 1990s, followed a gradual increase in the mid-1990s to early 2000s, culminating in strong growth in 2000–2008 period. Growth decelerated slightly during 2009–2016, reflecting the global financial crises and domestic macroeconomic shocks, before stabilizing around 5–6% in recent years. Overall, the trends suggest economic recovery and stabilization, but fluctuations suggest vulnerability to macroeconomic disturbances and debt pressures.

**Figure 2:** Velocity of Public Debt Accumulation (VPD)



The velocity of public debt accumulation exhibits a steady upward trajectory, rising from approximately 4.2% in 1990 to about 14.5% in 2024. Notable surges are observed in the 2000s and 2010s, aligning with periods of intensified borrowing to finance deficits and infrastructure projects. Rapid space in debt accumulation underscores growing fiscal pressure and signals potential risks of debt overhang, in line with theoretical predictions.

**Figure 3:** Debt Velocity Relative to GDP (VPD<sup>^</sup>GDP)



The ratio of debt accumulation velocity to GDP (VPD<sup>^</sup>GDP) increased steadily from 2.1% in 1990 to 7.0% in 2024, indicating that public debt is accumulating faster than economic output, especially during periods of intense borrowing in the mid-2000s and post-2015. A rising VPD<sup>^</sup>GDP ratio suggests that debt service pressures may become increasingly burdensome, constraining fiscal space for growth-enhancing investments.

The inverse association between GDPG and VPD/VPD<sup>GDP</sup> is apparent: episodes of high debt accumulation velocity coincide with slower economic growth, ending support to the debt overhang hypothesis. The persistent trend in VPD<sup>GDP</sup> relative to GDP growth further signals fiscal sustainability risks, underscoring the need of managing both the stock and velocity of debt.

### Empirical Results

This section reports the empirical results of the analysis on the impact of public debt accumulation velocity on growth in Nigeria. It presents the descriptive statistics, unit root testing, ARDL bounds cointegration tests, and estimates of short-run and long-run coefficients. The results are interpreted within the frameworks of Debt Overhang Theory and Fiscal Sustainability Theory.

#### Descriptive Statistics

The section reports the statistics of the key variables employed in the study, namely GDP growth (GDPG), velocity of public debt accumulation (VPD), debt velocity relative to GDP (VPD<sup>GDP</sup>), debt service (DS), government capital expenditure (GCEXP), inflation (INF), and trade openness (TOP). The descriptive statistics provides preliminary understanding of the distribution, central tendency, and variability of the data.

**Table 1:** Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Min	Max	Skewness	Kurtosis
GDPG (%)	5.12	5	2.14	-1.57	10.25	0.42	2.15
VPD (%)	8.25	7.8	3.91	2.1	17.65	0.55	2.35
VPD <sup>GDP</sup> (%)	4.18	4	1.97	0.75	8.5	0.33	2.05
DS (%)	12.3	11.5	4.25	5.2	22.15	0.68	2.5
GCEXP (%)	3.45	3.3	0.98	1.5	5.6	0.21	2.1
INF (%)	11.85	10.25	6.9	4.2	32.5	1.2	3.75
TOP (%)	37.25	36	7.85	25	55.5	0.44	2

*Notes:* Mean = average, Std. Dev. = standard deviation. All variables are annual observations for Nigeria, 1990–2024.

GDP Growth (GDPG) averages about 5.1 percent, with moderate variability (Standard Deviations = 2.14). Its positive skewness indicates occasional high growth periods. Velocity of Public Debt Accumulation (VPD) exhibits substantial variation (Standard Deviation = 3.91), highlighting periods of high borrowing. The positive skewness highlights some extreme debt accumulation years. Debt Velocity Relative to GDP (VPD<sup>GDP</sup>) captures the debt growth burden relative to economic size average -4.18 percent, showing that debt is surging faster than GDP in some years. Debt Service (DS) mean of 12.3percent indicating a significant share of revenue/GDP allotted to debt payments. Government Capital Expenditure (GCEXP) shows moderate average of (3.45%) with low variability, relatively reflecting constrained but stable investment in physical infrastructure. Inflation (INF) highly volatile (Standard Deviation = 6.90) with

positively skew, capturing periods of pronounced macroeconomic instability. Trade Openness (TOP) average of 37.25 percent with moderate dispersion, pointing integration into global trade but with intermittent fluctuations. The descriptive statistics indicate that Nigeria records moderate economic growth but substantial variability in public debt accumulation and macroeconomic conditions. These characteristics justify the application of dynamic econometric techniques such as ARDL bounds testing and underscores the potential growth implication of rapid public debt accumulation.

### Correlation Analysis

**Table 2:** Correlation Matrix of Key Variables

Variable	GDPG	VPD	VPD^GDP	DS	GCEXP	INF	TOP
GDPG	1	-0.72	-0.68	-0.55	0.47	-0.51	0.39
VPD	-0.72	1	0.93	0.78	-0.32	0.61	-0.25
VPD^GDP	-0.68	0.93	1	0.72	-0.3	0.58	-0.2
DS	-0.55	0.78	0.72	1	-0.28	0.55	-0.15
GCEXP	0.47	-0.32	-0.3	-0.28	1	-0.21	0.22
INF	-0.51	0.61	0.58	0.55	-0.21	1	-0.18
TOP	0.39	-0.25	-0.2	-0.15	0.22	-0.18	1

There is a great negative association between GDPG and VPD (-0.72), supporting the hypothesized growth-inhibiting effect of increase public debt accumulation. Debt service (DS) and inflation (INF) also exhibit negative correlations with GDP growth. In contrasts, government capital expenditure (GCEXP) and trade openness (TOP) are positively correlations with GDP growth. VPD and VPD^GDP are highly correlated (0.93), implying that debt velocity relative to GDP closely tracks movement in absolute velocity of public debt accumulation.

### Unit Root Test Results

The stationarity properties of all variables were assessed using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, applied at both levels and first differences. Table 2 presents the results.

**Table 3:** Unit Root Test Results

Variable	Level (ADF)	I(d)	First Difference (ADF)	I(d)
GDPG	-2.01	I(1)	-6.25***	I(0)
VPD	-1.34	I(1)	-5.87***	I(0)
VPD^GDP	-1.55	I(1)	-6.02***	I(0)
DS	-0.95	I(1)	-5.64***	I(0)
GCEXP	-3.02*	I(0)	-	-
INF	-2.87	I(1)	-5.45***	I(0)
TOP	-3.15*	I(0)	-	-

*Notes:* \*, \*\*, \*\*\* denote significance at 10%, 5%, and 1% levels respectively. I (0) and I (1) indicate the order of integration.

### ARDL Bounds Cointegration Test

Since all variables are integrating I (0) or I (1), justifying the use of the ARDL bounds testing technique. The ARDL bounds testing approach was employed to investigate the existence of a long-run association between GDP growth and public debt accumulation velocity, controlling for other key macroeconomic variables.

**Table 4:** ARDL Bounds Test Results

F-statistic	I(0) Bound	I(1) Bound	Conclusion
6.42	3.23	4.35	Cointegration exists

The computed F-statistic surpasses the upper bound at the percent significance level, providing the evidence of a long-run relationship between GDP growth and the velocity of public debt accumulation.

### Long-Run Coefficients

The long-run coefficients estimated from the ARDL model are reported in Table 5.

**Table 5:** Long-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Significance
VPD	-0.78	0.21	-3.71	***
DS	-0.45	0.18	-2.5	**
GCEXP	0.32	0.12	2.67	**
INF	-0.21	0.09	-2.33	**
TOP	0.18	0.08	2.25	**
Constant	3.12	1.05	2.97	***

*Notes:* \*\*\*, \*\* denote significance at 1% and 5% respectively.

The results indicate that the Velocity of public debt accumulation (VPD) exerts a statistically significant negative effect on economic growth, thereby lending empirical support to debt overhang hypothesis. Similarly, Debt service burden (DS) is found to adversely affect economic growth. In contrast, Government capital expenditure (GCEXP) and trade openness (TOP) have positive and significant impacts on growth, suggesting that productive public spending and external sector integration contribute to growth, while inflation (INF), and however exhibits a negative relation with growth, reflecting growth retarding effect on macroeconomic instability.

### Short-Run Dynamics

The short-run dynamics estimates obtained from the Error Correction Model (ECM) representation of the ARDL framework.

**Table 6:** Short-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Significance
$\Delta$ VPD	-0.62	0.18	-3.44	***
$\Delta$ DS	-0.31	0.13	-2.38	**
$\Delta$ GCEXP	0.25	0.1	2.5	**
$\Delta$ INF	-0.18	0.08	-2.25	**
$\Delta$ TOP	0.15	0.07	2.14	**
ECM(-1)	-0.47	0.09	-5.22	***

The results reveal a negative and statistically significant coefficient of the error correction term (ECM (-1)) confirming convergence towards long-run equilibrium at an adjustment speed approximately 47 percent per annum. Short-run dynamics are consistent with long-run estimates, further underscoring the growth-inhibiting effect of rapidly accumulating public debt.

### Discussion

The empirical findings provide strong evidence that rapid accumulation of public debt significantly undermines economic growth in Nigeria, both in the short and long run. These results are consistent with the predictions of Debt Overhang Theory, which posits that high debt accumulations discourage private investment by heightening anticipated future taxation and fiscal uncertainty. They also align with Fiscal Sustainability Theory, which emphasizes that unsustainable debt growth and rising debt servicing obligations constrain government capacity to fund productive investments, reducing long-term economic growth potential. The estimated coefficients of the control variables largely behave as predicted: productive government expenditure and trade openness exerts positive effect on growth, while inflation and high debt service burdens negatively affect growth performance.

### Summary and Conclusion

This study investigated the impact of public debt accumulation velocity on economic growth in Nigeria, combining Debt Overhang Theory and Fiscal Sustainability Theory into a unified analytical technique. The analysis utilized annual time series data spanning 1990 to 2024, incorporated key macroeconomic variables, including GDP growth, debt accumulation velocity, debt service burden, government capital expenditure, inflation, and trade openness. The empirical strategies combined descriptive statistics and correlation analysis, unit root testing and the ARDL bounds testing approach revealing that rapid debt accumulation and high debt service burdens are negatively associated with GDP growth, capital expenditure and trade openness exhibits positive correlations with economic whereas, government growth. Unit root tests results confirm that all variables are either I(0) or I(1), thereby justifying the use of ARDL bounds testing. ARDL bounds testing establishes the existence of a long-run cointegration relationship between debt accumulation velocity and GDP growth. The estimated Long-run and short-run

ARDL estimates results indicates that high velocity of debt accumulation significantly and adversely affect economic growth, reflecting the constraining of macroeconomic instability and fiscal pressures. In contrast, government capital expenditure and trade openness contribute positively to economic growth. Error correction term is negative and statistically significant revealing a 47% adjustment rate towards long-run equilibrium per annum, suggesting the economy responds relatively quickly to deviations in debt-growth dynamics. In all, the findings strongly validate the underlying theoretical expectations. Accelerating debt accumulation undermines investment incentives and economic growth, consistent with the Debt Overhang Hypothesis, while unsustainable debt dynamics weaken fiscal credibility and limit productive spending in line with Fiscal Sustainability Theory.

The study concludes that the velocity of public debt accumulation is a critical determinant of Nigeria's economic growth performance. Rapid and persistent increases in debt levels discourage investment and exert long-term growth-suppressing impacts. These adverse effects amplified by high debt service obligations and inflation exacerbate the negative impact of debt, further constraining the economy's capacity to invest in productive sectors. Government capital expenditure and trade openness serve as mitigating factors, supporting growth even in the current of rising debt.

The study therefore recommends that monitoring debt accumulation velocity, rather than focusing solely the debt stock, to avoid high build-up that could trigger debt overhang. Again, strengthening fiscal discipline is very key by targeting borrowing towards growth-enhancing projects and maintaining sustainable primary balances. In addition, enhancing government capital expenditure efficiency to guarantee borrowed funds generate economic returns. Encouraging trade openness and economic diversification as complementary policies to propel economic growth. Also, considering selective debt restructuring when debt accumulation exceeds sustainable thresholds to mitigate debt overhang effects.

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