

## Public Debt and Economic Growth in Nigeria

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### Abstract

*This paper used public debt to investigate the impact of public debt on economic growth in Nigeria from 1992 to 2024. In particular, the paper explored the impacts of external debt ratio (EDTR), domestic debt ratio (DDTR), debt servicing ratio (DTSR) and exchange rate (EXR) on real gross domestic product (RGDP) and the compound effect. The research design was ex-post facto while the secondary time-series data were obtained annually from the Central Bank of Nigeria, Debt Management Office, National Bureau of Statistics, and the public-debt series of the underlying study. The descriptive statistics, correlation analysis, variance inflation factor diagnostics, Augmented Dickey-Fuller unit-root testing, Engle-Granger cointegration testing, ordinary least squares regression, Jarque-Bera normality testing, Breusch-Pagan and White heteroscedasticity tests, heteroscedasticity-consistent estimation, ARDL bounds testing, dynamic OLS, and an error-correction specification was used to analyse the data. The results of separate OLS showed that EDTR had a negative and significant relationship (Coeff. = -557.420;  $p = 0.0001$ ), DDTR had a positive and significant relationship (Coeff. = 557.420;  $p = 0.0001$ ), DTSR had a negative and significant relationship (Coeff. = -0.870;  $p < 0.0001$ ), EXR had a positive and significant relationship (Coeff. = 125.156;  $p < 0.0001$ ). The identified joint model kept EDTR, DTSR and EXR and was jointly significant ( $F = 53.727$ ;  $p < 0.0001$ ) and accounted for 84.75% of the variation in RGDP with an adjusted R-squared of 0.8317. The three regressors were significant in the presence of heteroscedasticity-consistent standard errors. No cointegration was found in the Engle-Granger test in the logged specification, while the parsimonious ARDL bounds statistic was greater than the 5% upper bound, suggesting mixed long-run evidence. The paper found that the composition and servicing burden of public debt was an important factor in Nigeria's growth performance, and suggested more robust management of the debt composition, efficient utilization of borrowed funds, better planning of debt repayments and exchange-rate policies that would reduce foreign-currency debt-service pressures.*

**Keywords:** Public Debt, External Debt Ratio, Domestic Debt Ratio, Debt Servicing Ratio, Exchange Rate, Economic Growth.

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## 1.0 Introduction

A significant way the government finances expenditure is by increasing public debt. Borrowing is used to spread the burden of the costs of major long-term investments in public facilities (such as roads, bridges, and other infrastructure) across several years, especially when the available resources of tax revenue and savings are not adequate to meet the costs of such facilities in a single year. The economic case for public borrowing is the belief that loans for spending by government will increase the productive capacity of the economy, which will then produce more output, jobs, and government revenues to repay the loans and interest. Aiyedun & Ogunleye (2021) noted that public debt management should remain a continuous fiscal concern whose impacts rely much on how the borrowed resources are structured and managed, while Eke & Akujuobi (2021) found that Debt can be used to boost economic activities when the borrowed resources are used for productive investments. The effect of public borrowing on growth is not predetermined, as the shape it takes on growth is dependent on the type of debt, its interest rate, its maturity, the currency in which it is repaid, and the return on the expenditure financed by the debt. The timing and quality of borrowing are especially significant in developing economies where fiscal revenue is likely to be highly variable and the infrastructure gap is substantial. Financing expenditure with borrowing can help to smooth the expenditure if revenue is likely to be lower for a short period, but when the borrowing is repeated to cover recurrent expenditure gaps, it can turn a temporary financing device into a long-term structural obligation. An intergenerational nature of public debt also implies that current policy choices have implications for future taxpayers as future budgets must be consistent with the ability to pay back and refinance debt. Therefore, taking into account public debt can be important not only with regard to the need for new borrowing to increase current government resources, but also whether the investments that are being funded generate productive capacity in the future that can repay the interest payments. Nigeria's public debt profile has grown significantly over the years and the nature of debts also has shifted in both fiscal and exchange-rate regimes. According to the underlying study, external debt grew from average of N3.097 trillion in 2000 to about N63.07 trillion in 2024, domestic debt grew from average of N898 billion in 2000 to N71.22 trillion in 2024 while total public debt reached about N144.67 trillion in 2024. This growth has led to growing fears of the fiscal room for manoeuvre for infrastructure, education, health and other growth-enhancing expenditures, since the repayment of debt is a direct demand on public funds. The public-debt landscape has also undergone change, as documented by Central Bank of Nigeria (2024), while Debt Management Office (2024) pointed to the significance of the composition of the portfolio and the capacity for debt-service in evaluating the debt position of Nigeria. The question is not, then, whether the government borrows but what sort of borrowing and what kind of servicing burden it bears remain compatible with a growth process. The dramatic increases in domestic and external liabilities have been coupled with poor revenue collection, high infrastructure requirements, and persistent fiscal deficits, creating a challenge of debt sustainability and sustainability of macro-economic policies. While debt-output ratio may be acceptable, a narrow revenue base can make servicing difficult because debts must ultimately be paid from government revenues and expenditures, and not from GDP itself. In Nigeria, after a depreciation in the exchange rate and/or a change in market interest rates, debt-service commitments can increase rapidly. The fiscal impact of public debt can, therefore, be best assessed with both the level of the stock of public debts and the annual resources needed to meet their obligations. There are multiple avenues by which debt composition affects economic growth. External debt can be a source of long-term foreign capital, but can also result in exchange-rate risk for the government, and increase the cost of interest and principal payments on foreign-currency obligations if domestic currency depreciates. Domestic debt is not directly exposed to foreign currency and could enrich the

domestic financial markets, but it is possible to over-borrow domestically, thereby increasing interest rates and pushing private borrowers out of the credit market. Debt servicing is the actual expression of the fiscal cost of past borrowing and can lower the resources for current productive spending. These channels interact with the movements in exchange rates, since a depreciation increases the value of foreign liabilities in local currency, but can also affect output via import prices and international competitiveness and the tradable sector. As reported by Nymphas et al. (2023), growth impacts differed for domestic debt, external debt and debt-service payments, and it is essential not to use aggregate stock of public debt but to break it down into its components. Debt composition influences the flexibility of refinancing. In local financial markets, domestic financial instruments may be easily rolled over, but repeated refinancing can increase the yield that the government has to pay locally and reduce the maturity structure. There may be concessional external loans, but commercial foreign borrowing may lead to rollover and currency risks which can occur during international tightening. The differences suggest that the growth implications of total debt can vary considerably across countries, depending on the composition of the debt (domestic and external) and the maturity distribution of debt, as well as the share of revenue used to service the debt. The use of EDTR, DDTR and DTSR in this paper are therefore more useful for providing an information-rich picture of debt pressure than a single aggregate debt figure.

Economic growth in this paper is measured by real gross domestic product (GDP) that reflects the inflation-adjusted value of final goods and services produced in Nigeria. A better macroeconomic picture for assessing whether borrowed resources have been linked to an increase in productive activity sufficient to sustain their eventual repayment is provided by growth. There may also be a nonlinear relationship between the debt level and the growth of the economy, since debt financed by moderate investment may be detrimental in the event that the debt service requirements of the households, the uncertainty and the fiscal adjustment requirements of the government stifle new investment. Nzeh (2020) concluded that public debt would be growth-enhancing up to a point of debt overhang but growth reducing thereafter; while Joy & Panda (2020) insisted that the debt-overhang issue is a concern in highly indebted economies. Such results call for an understanding of the financing advantages of debt and the disadvantages of the over accumulation and servicing of debt. The financing-growth relationship also holds true if the increase in debt financing increases the economy's supply capacity. Borrowing those results in multiplier effects and crowd in private investment can create durable output gains and leave the economy with little debt service pressure, while borrowing that does not result in durable output gains may leave the economy with outstanding debt with little added repayment capacity. The same percentage increase in debt can thus be very different, depending on the quality of spending. The real output aggregation of the financing and burden effects is what becomes apparent in this study, hence the utility of RGDP. Although there is much literature on public debt and economic growth in Nigeria, there has been no definite empirical conclusion during the periods and measures and estimation procedures. Other studies have yielded mixed short- and long-run results, while some researchers like Ajayi & Edewusi (2020) have reported that external debt negatively affected growth but domestic debt aided in growth. An important measurement feature of the underlying project is that external debt and domestic debt are each a percentage of total debt and therefore the two ratios add up to 100 in each year. These are precisely the same types of relationship that would make them perfect complements and would result in the two ratios having different coefficients if one of them is included in a common regression with an intercept. Meanwhile, the static regressions in the original project have low DW statistics, which require a wider array of time-series diagnostics and dynamic robustness checks. This paper, therefore, restructured the entire project in line with the journal pattern of the sustainability-index guide and looked

at the impact of public debt on Nigerian economic growth between 1992 and 2024, using the same macro-level analytical approach but explicitly tackling the complementary debt ratio identification issue. The other source of disagreement in previous studies is the measure of debt used. Some researchers use the absolute level of domestic or external debt stocks, some use the ratio of debt to GDP, and some others use threshold measures or debt service. These decisions are also not mutually exclusive an increase in a debt stock doesn't necessarily mean an increase in the share of debts in the stock, and the stabilisation of a debt stock can lead to an increase in the cost of servicing if the exchange rate declines or interest rates increase. The present specification thus provides an improvement by explicitly and explicitly defining the meaning of EDTR and DDTR to be portfolio shares, and in considering the resulting complementarity to be an econometric identification problem rather than the same, it is ignored.

## **2.0 Review of Related Literature**

### **Conceptual Review**

#### **Public Debt**

Public debt, in the sense of the results of government borrowing, is the total amount of financial obligations that a government incurs on the net toward domestic and foreign creditors. The government borrows money to fund a budget deficit, infrastructure, counter-cyclical programs and other government spending that is not covered by current revenue. Public debt can thus be seen as an intertemporal fiscal instrument, in which current expenditure is financed with future revenue. For the growth effect of public debt, Ayadi & Araoye (2023) pointed out that the amount of efficiency in the utilization of borrowed funds is very important; and Gani & Oyinlola (2021) linked to the Nigerian high debt burden broader questions of fiscal governance. The policy significance of public debt is its two faces: a first one, that it can ease financing constraints and help to finance capital formation; a second, that it can lead to high interest costs, high refinancing risk, and a loss of fiscal space if it is too large. The overall measure of government exposure is thus provided by the total debt and the composition of the portfolio and the service requirements of the debt indicates how government's exposure can affect macroeconomic performance. Debt sustainability is thus not just a question of whether the government can pay next week, it is a question of whether the government can sustain the debt. It's about whether this debt journey can be sustained without continual debts, emergency restructuring and severe tax hikes or significant reductions in vital spending. A debt stock can be serviceable if output, revenue and exports increase significantly, but it can become a problem when these structures are reduced. This wider lens is important when trying to understand the debt experience in Nigeria as the effect of borrowing is contingent on the relationship between backlogs of debts and the ability of the economy to service them.

#### **External Debt Ratio**

In this paper, the ratio of external debt to total public debt is called external debt ratio, calculated as  $\text{external debt} / \text{total public debt} \times 100$ . The ratio is not a measure of the foreign portion of the debt portfolio, but of the foreign portion of the total portfolio. A high share of external debt can also offer financing opportunities that might be longer-term and less expensive than borrowing domestically but expose borrowers to foreign interest rates, exchange-rate fluctuations and refinancing conditions. Alemu et al. (2023) correlated institutional quality with external debt, while Akinola & Abieyuwa (2024) analysed the relationship between economic growth and external debt in Nigeria. A significant consequence of the depreciation of the naira is the effect on the foreign currency cost of the obligations in terms of the domestic currency, and this is especially significant in Nigeria, where the burden of the foreign-currency obligations is increased. Hence, external debt ratio should be viewed

as a debt composition ratio that affects the growth proportionately to the productivity of borrowed funds and the ability of the economy to earn foreign exchange. The indicator is also sensitive to valuation changes. A depreciation of the exchange rate can also affect external liabilities' naira value even if new foreign borrowing does not occur, which in turn can affect the external share of the debt portfolio. This implies that the movements in EDTR can be due to both the borrowing and the currency valuation effect. The environment of exchange rates should also be taken into account when interpreting the results, especially in the later years of the sample when the naira was subject to big exchange-rate adjustments and foreign obligations were revaluated in local currency were experiencing sharp changes.

### **Domestic Debt Ratio**

Domestic debt ratio is the percentage of total public debt that is held by domestic creditors, and is defined as domestic debt/total debt x 100. Domestic borrowing is typically issued in the host country currency and can be a means for the government to obtain financing without a direct foreign currency repayment risk. It can also help to facilitate the formation of local securities markets through the provision of benchmark instruments and investment opportunities for banks, pension funds and other institutional investors. Bello & Ibrahim (2023) conceptualized domestic borrowing as a fiscal financing tool and its policy implications, whereas Nkemjika et al (2024) related domestic debt to price stability and growth. However, overreliance on the money market might still drive-up interest rates and crowd out private investment from available resources. In the dataset that is currently available, DDTR is identical with 100 - EDTR; that is, it represents debt composition information that is opposite the same information in EDTR and may not be used at the same time with EDTR and an intercept in an identified multiple regression. The increase in domestic share can mitigate direct currency mismatch in the public balance sheet in terms of repayment in local currency; however, it can relegate fiscal pressure to the domestic financial system. The heavy issuance by the government can deplete the liquidity of banks, affect the shape of the yield curve and push up benchmark interest rates for private borrowers. Therefore, the positive relationship between DDTR and RGDP in this sample should be interpreted as a portfolio-composition association rather than as a lack of costs of domestic borrowing. The impact on the economy would depend on whether local borrowing would have an impact on the ability of private credit to be used for productive investment, or would have an impact on preventing it from being used.

### **Debt Servicing Ratio**

Debt servicing is the payment of interest and principal on the remaining government debt. This study calculates debt servicing ratio as debt-service payments divided by total debt, and then by 100, as in the provided project data. The measure reflects the current fiscal burden of past borrowing because it measures the repayment burden in terms of the stock of the debt. Chukwu (2021) and Joshua & Onuora (2024) explored the impact of public debt and debt servicing on Nigerian growth and the macroeconomic significance of public debt-service obligations respectively. A high servicing burden may limit the funds available to service infrastructure and social needs, limit the fiscal flexibility of governments and increase their indebtedness in order to pay their debt obligations. An essential pathway by which a non-lethal stock of borrowed capital, otherwise able to increase productive capacity, can end up as a growth-curbing burden if payments on debt grow at a faster rate than the government's revenues and the productive returns. A refinancing cycle can also develop when new borrowing is employed to pay off the debt incurred from older loans. If this situation continues, gross financing needs can be increasing even when there is no pace of similar new investment in productive activities by the government. Debt-service indicators are thus useful refinements for separating out

borrowed resources from the fiscal expense of servicing the debt portfolio. The importance of this distinction in a growth analysis is crucial as debt may be very affordable in stock terms but require a high proportion of public resources for servicing each year.

### **Exchange Rate**

Exchange rate is the value of the domestic currency in terms of a foreign currency and in the underlying data, the exchange rate is the nominal naira exchange rate. The variable is important to public-debt analysis because foreign obligations have to be paid for in foreign currency, and naira depreciation makes them more expensive in domestic currency. Other impacts of exchange-rate changes on economic growth include import prices, export competitiveness, production costs, inflation and capital flows. Debt Management Office (2024) identified an important source of fiscal exposure as the foreign-currency composition of the debt portfolio, and Akomolafe (2024) revealed an interaction between external-debt outcomes and institutional and resource conditions in the African economies. This can increase debt service costs for Nigeria, due to the currency devaluation, but could also enhance competitiveness of some tradable activities. The coefficient on exchange rate thus may represent various counteracting channels and should be read as an association in the context of empirical model under consideration and should not be interpreted as a mechanical causal effect. The exchange-rate effects can also be non-symmetric. Some producers will be given better export incentives for a gradual depreciation, whereas a steep depreciation will raise the cost of imported inputs, inflation and the domestic cost of foreign debt at a much faster rate than production can respond. The fiscal impact could be immediate for an external obligations government, since the debt-service payments have to be converted at the prevailing rate. Thus, EXR is a macroeconomic growth variable, and an important conditioning variable for the external-debt channel.

### **Economic Growth**

Economic growth is the term used to describe an economy's increase in real output over time and is typically reflected in an increase in real gross domestic product. Instead of nominal output, RGDP is preferred because it is adjusted for changes in the general price level and more of a measure of changes in productive activity over time. When public funds are used to finance investments in infrastructure, human capital, and other investments that increased the productivity of private and public investments, public debt may be used to stimulate growth. On the other hand, debt can have a negative impact on the growth of an economy if servicing obligations create a squeeze on productive spending, if borrowing leads to an increase in risk premia, or if future taxation expectations are lowered, which would otherwise increase investment. Ejinkonye et al. (2025) indicated different impacts on Nigerian GDP between domestic and external debt, whereas Oyadeyi et al. (2024) demonstrated that debt sustainability varied between the components of debt and over time. The component-specific findings support the use of RGDP as the dependent variable in the present paper compared to the debt-composition and servicing indicators. Growth also helps to shape the convenience of debt to be carried forward in the future. As real output grows steadily, a given level of debt can be more easily sustained by either increases in the tax base or by the increased foreign exchange earning power. Conversely, when growth slows down, the same nominal commitments may grow harder to cover and fiscal compression may be needed. In this sense then, there are also potentially two-way relations between debt and growth, and that is another reason why the results of this paper are treated as econometric associations, with robustness checks, and not as mechanically one-way causal effects.

## **Theoretical Framework**

### **Debt Overhang Theory by Paul Krugman (1988)**

The Debt Overhang Theory by Paul Krugman (1988) describes the situation where a large enough debt load will lessen the incentives to invest and expand the economy because the potential gains from new productive activity are captured by existing creditors via debt-service payments in the future. If investors and policy makers believe that a significant portion of future output or tax revenue will be dedicated to debt service, the returns to new investments are effectively taxed by the inherited debt load. This may result in a delay of productive investment by the government, less long-term investment by the private sector and increased risk compensation by creditors. The theory suggests that, as applied to Nigeria, borrowing can help to support growth at an appropriate level, but that as external debt share rises and servicing costs increase, the net costs of borrowing (in terms of fiscal and foreign exchange costs) may exceed the benefits for financing growth. In turn, the framework implies that high debt-service demands and over-exposure to foreign currencies may lead to negative consequences on real output. The theory has been dismissed due to the fact that debt may not be the ultimate factor preventing growth. Some of the most important determinants of the capacity to sustain a high debt are the quality of institutions and the credibility of fiscal policies and productive public investment. Likewise, low growth can be caused by low level of governance, commodity price fluctuations, structural constraints, inflation or currency volatility, not by debt. Elechi et al. (2020) emphasized the institutional dimension affecting the effect of debt management, and Gbandi et al. (2023) underlined the governance aspect of public-debt management in Nigeria. These criticisms imply that debt overhang is not necessarily a rule, and that it is applicable to debt of a given size, particular composition, cost and use, and to the overall macroeconomic and institutional context. This paper is thus based on Debt Overhang Theory since it gives a direct explanation for the expected negative relationship between a high debt-servicing burden and economic growth and the possible risk arising from a larger share of external debt. It also assists in the understanding of the difference between external and domestic composition, the external debt provides pressure, forcing the government to pay in foreign currency while the domestic debt changes the financing of the economy within the country and may have a different crowding-out effect. The Nigerian evidence presented in this study consistently confirmed the theory of this study which posited that debt effects vary in sign and magnitude depending on the type of debt; and borrowing is not necessarily a bad thing as long as people are not burdened by the debt repayment. Empirical model then accounts for the composition of the debt stock, as well as the servicing burden, and introduces the exchange rate to reflect one of the key ways in which external obligations can increase their costs.

### **Empirical Review**

In Nigeria, Ajayi & Edewusi (2020) investigated the impact of government debt on economic growth from 1982 to 2018. They used an *ex-post facto* design and examined the data using descriptive and inferential methods in EViews. The study classified the borrowing into domestic and external debt to see the effect of the growth of domestic and external debt separately. From their work, they found out that external borrowing had a negative impact on economic growth in both the short- and long-term periods, while internal borrowing had a positive impact. The authors thus highlighted the necessity of more effective management of the structure of debt. The findings from this study are highly relevant to the present paper because they specifically concern the relationship between the growth of the different shares of debt, and they do provide an empirical basis for expecting different relationships based on the two shares of debt.

Nzeh (2020) explored the public debt and economic growth in Nigeria, stressing on optimum public debt ceiling. The ARDL bounds approach was used to analyze the annual observations from 1981–2018. The results indicated that the public sector debt experienced a growth threshold of around 40.2% and beyond and that any further increase in public debt led to a decrease in economic growth. Trade openness had positive effect on output; exchange rate and fiscal deficit had negative effects as reported. The study found that the debt-to-GDP ratio alone is not a suitable indicator of debt sustainability. Its value for the purposes of the present paper is that it provides an illustration that as the fiscal burden increases, the relationship between borrowing and growth can turn around. It is consistent with Debt Overhang Theory.

In Nigeria, Chukwu (2021) used an *ex-post facto* design and ordinary least squares estimation to analyze the effect of public debt and debt servicing on economic growth. The study did not only use the stock of outstanding debt as an explanatory variable, but also included debt service. The results reported showed that in the estimated model, public debt service was not statistically significant, and the sign of the relation was negative. This evidence is relevant because debt-service payments are the cash-flow constraint through which indebtedness can limit fiscal expenditure. The current paper takes this path further and examines the debt service in relation to total debt, as well as conducting further diagnostic and dynamic robustness tests on the time series. Having identified long-run relationship between the variables, Ekperiware et al. (2022) used a Vector Error Correction Model to investigate the effect of public debt on the economic growth of Nigeria. They found the growth impacts of domestic debt and external debt were not the same, and debt-service commitments were significant for the role of dynamic adjustment of output. The study confirmed the view that debt analysis on a total-basis may mask crucial variations in the mechanism(s) through which borrowing impacts the economy. In addition, its dynamic framework is also applicable to the contemporary journal, as the low Durbin-Watson statistics of the original static models suggest that time dependence needs to be taken into account when interpreting the results of the conventional OLS models.

In this paper, Nymphas et al. (2023) examined the relationship between public debt and economic growth in Nigeria from 1981 to 2020. The researchers used the unit-root tests and ARDL framework to separate the short-run from long-run relationships. Their results showed domestic debt and external debt were positively and significantly related with growth, and external debt-service payments had a negative and significant long run effect. The study thus concluded that even if debt stocks seemed to be conducive to output, debt servicing was a big constraint. This is especially significant for the current paper, as the Debt Servicing Ratio is anticipated to reflect the fiscal squeeze that transforms the rollover of debt into a resource expense. Kolawole et al. (2024) used ARDL approach to analyze the relationship between public debt, debt servicing and economic growth in Nigeria. The study evaluated the relationship between debt and growth over time, not just a contemporaneous correlation. The evidence reported indicated that there was a significant relationship between the measures of public debt and economic growth and the sign of that relationship was negative for the long run in the case of domestic debt. The outcome is different from the studies which have established the growth-enhancing nature of domestic borrowing, and reflects the ongoing confusion in the literature for Nigeria. This dispute is partly the reason why the present study has been re-estimated using a more precisely specified domestic-debt share, as well as robustness checks that distinguish between static association from dynamic evidence.

Using quarterly time-series data from 1981 to 2021, and a two-regime threshold ARDL model, Oyadeyi et al. (2024) examined the relationship between debt growth and debt sustainability in Nigeria. Their analysis indicated that in the short run domestic debt was sustainable while external debt and total debt exhibited different short-term and long-term sustainability characteristics. The results indicated that the economic impacts of borrowing are dependent on

the type of debt and regime as opposed to a single measure of debt. The study reinforces the focus of the present paper on composition, as a change in the external share must result in a change in the domestic share and can give rise to a change in risk structure of the portfolio even if the overall level of debt remains the same. Ejinkonye et al (2025) investigated how public debt affects Nigeria's economic growth from 1981 to 2023, with data analyzed using descriptive statistics and multiple regression models. They concluded that domestic debt positively influenced GDP and external debt negatively influenced GDP, both of which are statistically significant. When combined, the public-debt variables accounted for a significant share of the variance of output. The study is very similar to the current analysis as they report opposite signs of the two components of debt and highlight the importance of separating the source of debt. It additionally offers recent evidence from Nigeria which can be discussed in relation to the EDTR and DDTR findings of this journal. Time series data and a cointegration-based approach were used to examine the relationship between public debt and economic growth in Nigeria by Eke & Akujuobi (2021). The study noted that there is a significant relationship between public borrowing and economic activity and highlighted that there is a need to keep a check on the use of borrowings, especially external debt. The authors maintained that debt can aid growth if the money is used to invest in productive activity that will increase future income, but harms growth if the money must be paid back with higher future costs. This interpretation is consistent with the debt-overhang interpretation and the debt servicing and debt structure focus of this paper. Combined with the other studies reviewed, the results do not give a consistent answer to the question of whether public-debt effects are positive or negative, highlighting the need to measure and specify the model correctly in order to interpret the results of empirical analysis.

### 3.0 Methodology

The research design used was ex-post facto, since the observations in the study were macroeconomic in nature, that is, it was not possible to manipulate the observations by the researcher. The secondary data was also time series data, which were obtained for 33 years (1992-2024), providing 33 observations for each variable. This dataset was sourced from the full public-debt project provided for this journal conversion and was drawn from the Central Bank of Nigeria, Debt Management Office, National Bureau of Statistics and other macroeconomic sources. The explanatory variables were EDTR, DDTR, DTSR, and EXR, and the variables representing the economic growth were RGDP. This time frame was selected to enable the analysis to capture key changes in Nigeria's fiscal, exchange-rate and debt-management landscape such as the transition to democracy, the debt relief, debt rebounding, commodity-price shocks, recession, COVID-19 and the recent fast depreciation of the naira.

**Table 3.1: Operationalization of Variables**

| Concept         | Proxy                        | Measurement                                             | Apriori Expectations |
|-----------------|------------------------------|---------------------------------------------------------|----------------------|
| Economic Growth | Real Domestic Product (RGDP) | Gross Inflation-adjusted real gross domestic product    | —                    |
| Public Debt     | External Debt Ratio (EDTR)   | $(\text{External Debt} / \text{Total Debt}) \times 100$ | +                    |
| Public Debt     | Domestic Debt Ratio (DDTR)   | $(\text{Domestic Debt} / \text{Total Debt}) \times 100$ | +                    |
| Public Debt     | Debt Servicing Ratio (DTSR)  | $(\text{Debt Service} / \text{Total Debt}) \times 100$  | -                    |

| Concept                 | Proxy          | Measurement                                             | Apriori Expectations |
|-------------------------|----------------|---------------------------------------------------------|----------------------|
| Macroeconomic condition | Exchange (EXR) | Rate Nominal exchange rate used in the supplied dataset | +                    |

**Source:** Author's Compilation, 2026

The debt ratios were calculated in the same manner as outlined in the project. External debt was calculated as total debt minus domestic debt, EDTR, external debt/total debt  $\times 100$ , and DDTR, domestic debt/total debt  $\times 100$ . For each observation, therefore, the sum of EDTR + DDTR is 100. This identity is important not only substantively (as both variables are describing the same debt-composition allocation from two different angles), but also in the sense that when both variables are included in a multiple regression with a constant, they are exactly multicollinear. Thus, DDTR was retained based on its own hypothesis and descriptive interpretation, whereas the identified joint regression was based on EDTR, DTSR and EXR. This identification step preserves no information about the nature of the debts since a higher percentage of EDTR necessarily corresponds to a lower percentage of DDTR and vice versa.

The functional model is given:

$$RGDP = f(EDTR, DDTR, DTSR, EXR) \quad \text{Model 3.1}$$

Econometrically, the conceptual multiple linear regression model is stated as:

$$RGDP_t = \beta_0 + \beta_1 EDTR_t + \beta_2 DDTR_t + \beta_3 DTSR_t + \beta_4 EXR_t + \mu_t \quad \text{Equation 3.1}$$

The identified joint estimation is stated as:

$$RGDP_t = \alpha_0 + \alpha_1 EDTR_t + \alpha_2 DTSR_t + \alpha_3 EXR_t + \varepsilon_t \quad \text{Equation 3.2}$$

$RGDP_t$  = Real Gross Domestic Product in period t

$EDTR_t$  = External Debt Ratio in period t

$DDTR_t$  = Domestic Debt Ratio in period t

$DTSR_t$  = Debt Servicing Ratio in period t

$EXR_t$  = Exchange Rate in period t

$\beta_0, \alpha_0$  = Intercept terms

$\beta_1 - \beta_4, \alpha_1 - \alpha_3$  = Regression coefficients to be estimated

$\mu_t, \varepsilon_t$  = Stochastic error terms

The analysis was carried out in a similar overall process to the sustainability-index journal guide. Data were summarized using descriptive statistics and correlation analysis to pinpoint the preliminary association, which were later followed by the VIF diagnostics for the explanatory set identified. The variables are strictly positive and are very different in scale, so it was decided to run a unit-root diagnostic on the natural logs of the variables, which were then used in the cointegration and dynamic robustness checks. To test for the existence of a common long run equilibrium relationship between the logged variables, Engle-Granger testing method was used. The baseline levels regression was retained to ensure the comparability with the original study, followed by Jarque-Bera normality testing, Breusch-Pagan and White heteroscedasticity testing and HC1 heteroscedasticity consistent standard errors. The bounds specification of ARDL (1,1,1,1) was employed to test long-run sensitivity, along with one lead and one lag of first differences (differential) in dynamic OLS and the associated unrestricted error-correction model. The hypothesis tests were conducted at 5% level of significance and the robustness discussion placed in the framework of consistency of the coefficient signs and significance, instead of the use of the specific estimator.

#### 4.0 Results and Findings

Results are reported as was done in the journal guide and include descriptive evidence, diagnostics, baseline estimation, robustness checks, hypothesis testing and discussion.

**Table 4.1: Descriptive Statistics of the Variables**

| Statistic    | RGDP      | EDTR    | DDTR    | DTSR      | EXR      |
|--------------|-----------|---------|---------|-----------|----------|
| Mean         | 48,264.46 | 44.9236 | 55.0764 | 16,577.08 | 117.7538 |
| Median       | 46,802.76 | 45.1744 | 54.8256 | 8,211.79  | 98.1142  |
| Maximum      | 80,606.53 | 78.1119 | 86.8393 | 65,732.34 | 645.1839 |
| Minimum      | 21,881.56 | 13.1607 | 21.8881 | 153.8994  | 0.7417   |
| Std. Dev.    | 20,980.83 | 23.6295 | 23.6295 | 18,365.73 | 114.9258 |
| Skewness     | 0.0394    | 0.0316  | -0.0316 | 1.0960    | 3.0306   |
| Kurtosis     | 1.4070    | 1.5526  | 1.5526  | 3.0174    | 14.6375  |
| Jarque-Bera  | 3.4980    | 2.8859  | 2.8859  | 6.6071    | 236.7352 |
| Probability  | 0.1739    | 0.2362  | 0.2362  | 0.0368    | 0.0000   |
| Observations | 33        | 33      | 33      | 33        | 33       |

**Source:** Researcher's Computation (2026)

Overall, Nigeria's real output and public-debt indicators have varied significantly between 1992 and 2024 as presented in Table 4.1. RGDP recorded a mean of 48,264.46 and a median of 46,802.76, with values ranging from 21,881.56 to 80,606.53. For the two shares of debt, EDTR averaged 44.92%, whereas DDTR averaged 55.08%, showing a complementary relationship between the two shares of debt, and both had the same standard deviations: 23.63 and opposite signs of the skewness coefficient. DTSR was much more spread out with a mean of 16,577.08, a median of 8,211.79 and a standard deviation of 18,365.73, showing that there was a much greater variation in servicing burden relative to the total debt used in the project. The maximum EXR was 645.18 while the average was 117.75. The Jarque Bera probabilities suggest that the distributions of the variables RGDP, EDTR and DDTR are approximately normal at the 5% level, while the distributions of the variables DTSR and EXR are markedly right skewed with heavier tails.

### Correlation Analysis

The pair-wise correlation coefficients are presented in Table 4.2.

**Table 4.2: Correlation Analysis Result**

|      | RGDP    | EDTR    | DDTR    | DTSR    | EXR     |
|------|---------|---------|---------|---------|---------|
| RGDP | 1.0000  | -0.6278 | 0.6278  | -0.7613 | 0.6856  |
| EDTR | -0.6278 | 1.0000  | -1.0000 | 0.3159  | -0.1459 |
| DDTR | 0.6278  | -1.0000 | 1.0000  | -0.3159 | 0.1459  |
| DTSR | -0.7613 | 0.3159  | -0.3159 | 1.0000  | -0.5829 |
| EXR  | 0.6856  | -0.1459 | 0.1459  | -0.5829 | 1.0000  |

**Source:** Researcher's Computation (2026)

The correlation matrix shows that there is a negative correlation between RGDP with EDTR and DTSR, respectively -0.6278 and -0.7613, as well as a positive correlation with DDTR and EXR, respectively 0.6278 and 0.6856. The correlation of -1.0000 between EDTR and DDTR is not a coincidence, it is an arithmetic result of the way the two ratios have been calculated: both ratios are percentages of the same overall debt and so the two percentages always add up to 100. This perfect negative relationship makes simultaneous estimation with an intercept unidentified. EDTR is moderately correlated with DTSR (0.3159) and weakly correlated with EXR (-0.1459), while DTSR and EXR are moderately negatively correlated (-0.5829), with all the non-redundant regressors being different. The pattern indicates that debt-service pressure shifted countercyclically to changes in output and exchange rates during a large portion of the sample, but this does not imply that these changes in exchange rates caused the changes in output and debt-service pressure.

### Multicollinearity Diagnostics

**Table 4.2a: Variance Inflation Factor (VIF) Results**

| Variable | VIF   | Tolerance | Decision   |
|----------|-------|-----------|------------|
| EDTR     | 1.114 | 0.898     | Acceptable |
| DTSR     | 1.651 | 0.606     | Acceptable |
| EXR      | 1.518 | 0.659     | Acceptable |

**Source:** Researcher's Computation (2026) for the identified joint model

The VIF diagnostics after the exact redundant variable DDTR was removed from the joint model are reported in table 4.2a. The VIFs for EDTR, DTSR and EXR are relatively low (well below typical warning levels) and the tolerance statistics are comfortably high ( $>0.10$ ). So, there is no serious multicollinearity among the identified explanatory set. This result should not be confused with the original specification of four variables: If the EDTR and DDTR were entered with a constant, exact multicollinearity would result because  $DDTR = 100 - EDTR$ . Eliminating DDTR from the joint equation does not mean to ignore an awkward variable, it does eliminate an identification problem - it is still observed in the individual regression.

### Test for Stationarity: Augmented Dickey-Fuller Unit Root Test

The Augmented Dickey-Fuller test was applied to the natural logarithms of the strictly positive series, and the results are presented in Table 4.3.

**Table 4.3: ADF Unit Root Test Results**

| Variable | ADF Statistic (Level) | ADF Statistic (1st Diff.) | Order |
|----------|-----------------------|---------------------------|-------|
| lnRGDP   | -0.4081               | -2.9306*                  | I(1)  |
| lnEDTR   | -1.6112               | -3.8287*                  | I(1)  |
| lnDDTR   | -1.9162               | -3.8849*                  | I(1)  |
| lnDTSR   | -0.2848               | -5.8485*                  | I(1)  |
| lnEXR    | -1.8214               | -7.6144*                  | I(1)  |

**Note:** \* indicates rejection of the unit-root null at 5% after first differencing. The 5% critical values are approximately -2.96, subject to lag selection.

**Source:** Researcher's Computation (2026)

The ADF results in Table 4.3 indicate that the level series are non-stationary but become stationary once first differenced. lnRGDP has a first-difference ADF statistic of -2.9306, while lnEDTR, lnDDTR, lnDTSR and lnEXR record -3.8287, -3.8849, -5.8485 and -7.6144 respectively. The results thus indicate that all variables recorded are of order 1 and I(1) for the specified ADF models. This gives a basis to look at the variables whether they have a stable long-run relationship or not, as it is not only a static levels regression that may be influenced by common trends.

### Cointegration Test

The Engle-Granger procedure was employed to test for co-integration among lnRGDP, lnEDTR, lnDTSR and lnEXR in the specified model where the logged series were obtained.

**Table 4.4: Engle-Granger Cointegration Test Results**

| Statistic                     | Value   | Decision at 5%                 |
|-------------------------------|---------|--------------------------------|
| Engle-Granger tau-statistic   | -3.2631 | Do not reject no cointegration |
| MacKinnon approximate p-value | 0.2835  | $p > 0.05$                     |
| 5% critical value             | -4.4580 | Tau is not more negative       |
| Observations                  | 33      | —                              |

**Source:** Researcher's Computation (2026)

The Engle-Granger tau-statistic value of -3.2631 is not more negative than the 5% critical value of -4.4580 and the approximate probability value is 0.2835. This is not enough to reject the null hypothesis of no cointegration. This finding contradicts the bounds evidence from ARDL which was obtained at a later stage and shows the long run conclusion to be estimator-sensitive. Therefore, the static OLS coefficients are not automatically regarded by the journal as the long run coefficient, but the ARDL, DOLS and error-correction results are taken as robustness evidence.

### Normality Test

The Jarque-Bera test was applied to the residuals of the identified baseline OLS model.

**Table 4.5: Normality Test (Jarque-Bera) on OLS Residuals**

| Statistic             | Value  |
|-----------------------|--------|
| Jarque-Bera Statistic | 1.8235 |
| Probability           | 0.4018 |
| Skewness (Residuals)  | 0.3365 |
| Kurtosis (Residuals)  | 2.0880 |
| Observations          | 33     |

**Source:** Researcher's Computation (2026)

In Table 4.5, the Jarque-Bera statistic of 1.8235 has a probability of 0.4018, so the null hypothesis of normally distributed residuals is not rejected at the 5% level. Both the skewness (0.3365) and the kurtosis (2.0880) depart from normality, with the first being modestly positive and the second modestly negative, but not strong enough to conclude that the sample is not normally distributed. This diagnostic is more favorable than other individual variable diagnostics based on the distributional results, because OLS normality deals with the OLS model residuals, not with the raw series.

### Heteroscedasticity Test

Breusch-Pagan and White tests were used to assess whether the variance of the baseline residuals was constant.

**Table 4.6: Heteroscedasticity Test Results**

| Test              | Statistic | Probability |
|-------------------|-----------|-------------|
| Breusch-Pagan LM  | 3.1574    | 0.3680      |
| Breusch-Pagan F   | 1.0228    | 0.3969      |
| White $nR^2$      | 16.4098   | 0.0588      |
| White F-statistic | 2.5278    | 0.0351      |

**Source:** Researcher's Computation (2026)

The Breusch-Pagan LM and F probabilities in Table 4.6 are both greater than 0.05, which does not lead to rejection of the assumption of homoscedasticity. The White diagnostics are less uniform with the  $nR^2$  probability of 0.0588 slightly exceeding 5% and the White F probability of 0.0351 slightly under 5%. The evidence, therefore, does not show that there was severe heteroscedasticity under all the formulations but is sufficiently mixed that heteroscedasticity-consistent standard errors should be reported. This is particularly apt as the series involve significant exchange-rate and fiscal changes and the baseline model has a low Durbin-Watson statistic indicating strong serial dependence.

### Cointegration and Robust Long-run Inference

Evidence from the long run is not consistent. The Engle-Granger test does not reject the hypothesis of no cointegration, while the ARDL bounds test below is larger than the 5% upper bound. In the logged version of the DYNAMIC OLS model, the external-debt share coefficient

is negative and statistically significant as is the debt servicing coefficient, while the exchange-rate coefficient is not statistically significant. The unrestricted error-correction form has a negative adjustment coefficient that is only marginally insignificant at the conventional 5% level. The conclusions, based on the results reported above, suggest a more stable direction of the debt-composition and debt-service impacts than the exact strength of the long-run adjustments; thus, the results are presented as a mix between baseline and corrected and dynamic results.

### Baseline Regression Analysis

The identified multiple regression result is presented in Table 4.7.

**Table 4.7: Multiple Regression**

| Variable           | Coefficient | Std. Error | t-Statistic | Prob.  |
|--------------------|-------------|------------|-------------|--------|
| C                  | 65,077.376  | 4,308.688  | 15.1038     | 0.0000 |
| EDTR               | -396.792    | 67.942     | -5.8401     | 0.0000 |
| DTSR               | -0.4474     | 0.1064     | -4.2038     | 0.0002 |
| EXR                | 71.5809     | 16.3115    | 4.3884      | 0.0001 |
| R-squared          | 0.8475      |            |             |        |
| Adjusted R-squared | 0.8317      |            |             |        |
| F-statistic        | 53.7267     |            |             |        |
| Prob(F-statistic)  | 0.0000      |            |             |        |
| Durbin-Watson      | 0.4200      |            |             |        |

**Source:** Researcher's Computation (2026)

The estimated regression line is stated as follows:

$$RGDP_t = 65,077.376 - 396.792(EDTR)_t - 0.447(DTSR)_t + 71.581(EXR)_t + \varepsilon_t.$$

The model identified predicts about 84.75% of the sample variance in RGDP and the adjusted R-squared of 0.8317 is still high given the number of regressors. The F-statistic for the combination of EDTR, DTSR and EXR is 53.7267 with a probability of less than 0.0001; this suggests that the combination of these is significant in the specification of the levels. The signs of EDTR and DTSR are negative and EXR is positive. The coefficient for DDTR is not reported in this table because if it were determined along with a constant and EDTR, then it would be the exact sign-reversed counterpart of EDTR if each debt share is used independently. The Durbin-Watson statistic is 0.4200, significantly below 2, suggesting strong positive serial correlation and, thus, the conventional OLS probabilities are used in conjunction with robust and dynamic estimates.

**Table 4.8: OLS Regression with Heteroscedasticity-Consistent Standard Errors**

| Variable | Coefficient | Robust Std. Error | t-Statistic | Prob.  |
|----------|-------------|-------------------|-------------|--------|
| C        | 65,077.376  | 4,669.389         | 13.9370     | 0.0000 |
| EDTR     | -396.792    | 61.611            | -6.4402     | 0.0000 |
| DTSR     | -0.4474     | 0.1291            | -3.4655     | 0.0017 |
| EXR      | 71.5809     | 20.7309           | 3.4529      | 0.0017 |

**Source:** Researcher's Computation (2026)

The main coefficient conclusions are unaffected by using HC1 heteroscedasticity-consistent standard errors, as shown in Table 4.8. The EDTR is still negative and significant ( $p < 0.0001$ ), the DTSR is still negative and significant ( $p = 0.0017$ ) and the EXR is still positive and significant ( $p = 0.0017$ ). The correction adds to the uncertainty of some coefficients, in particular EXR, but does not affect 5% decisions. However, HC1 correction alone is not sufficient to

make the results free of serial correlation and the dynamic specifications are still needed to determine if such relationships persist if the lag structure and the long run adjustment are modeled more explicitly.

**Table 4.9: Dynamic Long-run Robustness Checks**

| Estimator   | Key Result                                                                                                                                             | Interpretation                                                                     |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| ARDL bounds | ARDL(1,1,1,1); $F = 5.087$ ; 5% upper bound = 4.011                                                                                                    | Bounds test supports a level relationship.                                         |
| DOLS (logs) | EDTR = -0.400 ( $p < 0.0001$ ); DTSR = -0.195 ( $p < 0.0001$ ); EXR = 0.035 ( $p = 0.175$ )                                                            | Debt-share and servicing effects remain negative; EXR is not robustly significant. |
| ECM/UECM    | ECT(-1) = -0.105 ( $p = 0.052$ ); $\Delta$ EDTR = -0.045 ( $p = 0.105$ ); $\Delta$ DTSR = -0.004 ( $p = 0.701$ ); $\Delta$ EXR = 0.016 ( $p = 0.059$ ) | Adjustment is negative but borderline; short-run effects are weaker.               |

**Source:** Researcher's Computation (2026)

The dynamic checks confirm the basic findings but do not substantially alter the overall direction of the findings. The ARDL bound statistic (5.087) is greater than the upper bound threshold of 5% (around 4.011), and so the bound is likely to be "true" a level relationship in this specification is supported. The DOLS coefficient on EDTR is negative and statistically significant at -0.400, the DTSR coefficient is negative and statistically significant at -0.195, and the coefficient for the logged EXR is not statistically significant, though they are positive. The adjustment term is negative (-0.105) and the probability associated with it is 0.052, which is just above the conventional 5% threshold, in the UECM. The mixed pattern points to the fact that the negative debt composition and servicing links are relatively stable while the specific exchange-rate effect and the speed of long-run adjustment are relatively more sensitive to the model.

### Test of Hypotheses

The five null hypotheses were tested at the 5% level. The first four are the simple OLS tests from the underlying study to make it possible to directly test each stated objective. In the fifth hypothesis, the identified joint model is used as it is algebraically not possible to have EDTR and DDTR together with a constant. Qualification for interpretation is carried out using robust and dynamic estimates when they vary from the static estimates.

### Hypothesis One

$H_{01}$ : External debt ratio has no significant effect on economic growth in Nigeria.

The simple OLS result gives EDTR a coefficient of -557.420, a t-statistic of -4.491 and a probability of 0.0001. So, the null hypothesis is rejected in the original individual specification and the EDTR is negatively associated with RGDP. The identified joint model also yields a negative coefficient (-396.792;  $p < 0.0001$ ), and this effect remains significant with HC1 correction. The estimate of the DOLS is also negative and significant. The sign varies across the main estimators, but in all cases, the sign is the same, and it suggests that at least for the time frame studied, a higher proportion of external debt relative to total debt is correlated with a lower growth performance.

### Hypothesis Two

$H_{02}$ : Domestic debt ratio has no significant influence on economic growth in Nigeria.

The coefficient of DDTR in the separate OLS regression is 557.420, the t-statistic is 4.491 and the probability value is 0.0001. The null hypothesis is thus rejected in the individual model, which suggests a positive relationship between the domestic component of public debt and RGDP. This should be considered as the inverse of the EDTR result due to the relationship of  $DDTR = 100 - EDTR$ . In other words, a 1% increase in DDTR translates into a 1% decrease in EDTR, so the two separate coefficients are merely two expressions of the same debt-composition shift but from different angles.

### **Hypothesis Three**

H<sub>03</sub>: Debt servicing ratio has no significant effect on economic growth in Nigeria.

The simple OLS result displays a coefficient for DTSR of -0.8697, a t-statistic of -6.5376 and a probability value less than 0.0001. The null hypothesis is rejected and the result is that a heavier servicing burden is negatively associated with RGDP. The HC1 probability is 0.0017, the negative identified joint coefficient is very significant (-0.4474;  $p = 0.0002$ ), and the DOLS logged coefficient is also negative and very significant ( $p = 0.0015$ ;  $r = -0.4527$ ). There is weaker short-run evidence for the UECM coefficient, but overall the evidence suggests that the constraint of debt-service obligations on the supply of resources to economic activity may restrict economic performance if those resources are taken up for debt repayments.

### **Hypothesis Four**

H<sub>04</sub>: Exchange rate has no significant effect on economic growth in Nigeria.

In the static specification, the coefficient for EXR is 125.156, the t-value is 5.243, and the probability is  $< 0.0001$ , thus, the null hypothesis is rejected in the static specification. This multiple model identifies also a positive and significant coefficient of 71.581 and the HC1 correction does not affect its significance at 5%. The DOLS log coefficient, however, is statistically insignificant and the short-run UECM effect is just barely. The evidence thus suggests a positive within-sample static association, but indicates that the exchange-rate effect is not as strong as the negative debt-composition or servicing effect once the dynamic structure is included.

### **Hypothesis Five**

H<sub>05</sub>: External debt ratio, domestic debt ratio, debt servicing ratio and exchange rate have no significant combined effect on economic growth in Nigeria.

The F statistic is 53.7267 with a probability less than 0.0001, meaning that the null hypothesis of no important combined effect is rejected. The model shows a positive explanatory power of 84.75% for the variation in RGDP and statistically significant coefficients for EDTR, DTSR and EXR. The two ratios are complementing rays and EDTR is an implicit representation of DDTR; including both would make the model unidentified. Combined, the results on the joint conclusion that debt composition, servicing pressure and exchange-rate conditions can jointly account for a significant proportion of the real-output variation in the specified levels model, although the low value of the Durbin-Watson statistic, and the mixed evidence on cointegration caution in making a dynamic statement.

### **Discussion of Findings**

The findings are discussed in relation to the objectives of the paper and the empirical evidence reviewed.

### **External Debt Ratio and Economic Growth**

The authors identified a negative relationship between external debt ratio and economic growth in the paper. The simple OLS coefficient was -557.420 with  $p = 0.0001$  and the identified joint coefficient was -396.792 which was still significant after HC1 correction. The negative and significant DOLS logged coefficient was also one of the most consistent results across the static and long run robustness estimators. The positive effect of external debt is in line with Ajayi and Edewusi (2020) who reported negative short run and long-term effects of external debt on the growth of Nigeria and also with Ejinkonye et al. (2025) who noted that external debt has a negative and significant effect on GDP of Nigeria. It is also in line with the debt-overhang theory, which states that when the claims of the foreign creditors grow large, as the debtors become less willing to undertake fresh productive investment, they are less inclined to repay the loan, or do so at a higher price. It does not mean that all external borrowing was bad: it means that, in this sample, a change in the ratio of total debt to the external component of debt was correlated with a decline in RGDP. One possible mechanism is exchange-rate exposure, which makes foreign-currency obligations more expensive in terms of the naira. Exchange-rate exposure is one possible mechanism, as it makes foreign-currency obligations more expensive in terms of the naira.

### **Domestic Debt Ratio and Economic Growth**

The separate regression showed that RGDP was positively and significantly related to domestic debt ratio with the coefficient of 557.420 and  $p$  value of 0.0001. The sign supports that of Ajayi and Edewusi (2020) which indicated positive domestic debt effect whereas that of Ejinkonye et al. (2025) indicated the positive and significant relationship between domestic debt and GDP. In a similar vein, Nymphas et al. (2023) show that domestic debt had a positive effect on growth in their model for Nigeria. The present coefficient should not be considered as an independent effect which can be added to the EDTR effect as the two ratios are exact complements. The positive DDTR coefficient can mathematically be equated with the negative EDTR coefficient as each is applied independently: it represents reallocating a fixed debt portfolio (100%) of domestic debt and external debt to their new components. This interpretation also helps to understand how studies like Nkemjika et al. (2024) can yield disparate domestic-debt estimates if they use a different absolute value of debt, or if they adopt a different specification for the domestic debt. The discovery thus reinforces the significance of debt structure but doesn't provide evidence that unlimited domestic borrowing would boost growth.

### **Debt Servicing Ratio and Economic Growth**

In the simple regression, the identified multiple regression, the HC1 corrected model and the DOLS specification, debt servicing ratio was inversely related with economic growth and statistically significant. The simple coefficient of -0.8697 suggests that an increase in the servicing burden was related to a decrease in RGDP, and the joint coefficient of -0.4474 reveals that the negative relationship stayed even after debt composition and exchange rate were taken into account. The result obtained is similar to the result of Nymphas et al (2023) which reported that in the long run, external debt-service payments had growth implications and Kolawole et al (2024) which emphasized the growth implications of debt servicing in Nigeria. Chukwu (2021) also concluded that the debt-service relationship was not good, with the findings being non-significant in the study. The discovery is consistent with Debt Overhang Theory, in which debt service is the mechanism by which debtors' commitment to repay loans is a demand for the fiscal resources available to the borrowers. The debt burden can reduce, rather than support growth, if a country's debt-service payments take priority over revenues that are more likely to be used to fund infrastructure, education, health, or other productive activity.

### **Exchange Rate and Economic Growth**

As the static regressions indicate, there is a positive correlation between the nominal exchange rate and RGDP. Both EXR and HC1 were simple at 5% and identified at 5%, respectively, with coefficients of 125.156 and 71.581, respectively, which was not altered by HC1. Despite its a priori negative expectation, which it met, this result contradicts the negative a priori expectation of the paper, as also does the result of Nzeh (2020) in a different specification of Nigeria. The dynamic evidence is not as strong either – positive but insignificant logged EXR coefficient in DOLS and marginal short-run UECM coefficient. This implies that a large part of this static positive sign is due to the fact that both the nominal RGDP scale and the naira exchange rate varied greatly over the sample period, and not just to the proposition that depreciation is "growth-enhancing. The more plausible reading on public-debt management is that the exchange-rate conditions have a material effect on the debt outcome, since a depreciation will increase the domestic-currency cost of foreign debt, although the size of the direct output coefficient is model-sensitive.

### **Robustness Implication of the Diagnostic Tests**

It should be stressed that the baseline OLS results are subject to important qualifications given the diagnostic and robustness results. Second, by construction, EDTR and DDTR are perfectly collinear, and they cannot be seen as independent drivers in one intercept containing equation; the model identified is correct with respect to the use of one debt-composition share. Second, the residuals are approximately normal with no obvious serious multicollinearity after the redundant share is removed and a mixed, but not overwhelming, amount of heteroscedasticity exists. Third, the very low Durbin-Watson statistic in the baseline regression suggests that serial correlation would be present in the regression, which would restrict the use of conventional static standard errors. Fourth, unlike the Engle-Granger test, the ARDL bounds test indicates cointegration and therefore is estimator insensitive. Lastly, DOLS weakens the conclusion of the exchange rate by removing the negative EDTR and DTSR relationships, but keeps the negative exchange-rate conclusion, and the UECM adjustment term is negative, though just insufficiently so at 5%. The strongest evidence in the data set relates to the ED, and the negative ED effect on growth was not countered by the positive external-debt share effect, while the positive DDTR effect was the mirror image of the negative ED effect.

## **5.0 Conclusion and Recommendations**

### **Conclusion**

The paper concludes that public debt has component-specific relationship with economic growth in Nigeria for the period 1992 - 2024. The sizes of the external and domestic shares of total debt are negatively and positively related to RGDP, respectively, in the separate regression, given that they are exact complements, with a larger external share of total debt. The relationship between debt-servicing pressure and output is always negative for the primary static, corrected and DOLS specifications. In the static models, the nominal exchange rate has a positive relationship with RGDP, although this relationship is less strong in the dynamic estimation. Although the identified joint model is statistically significant and it has a significant proportion of the output variation explained, the high serial correlation and the mixed cointegration evidence should be interpreted with caution when using the levels OLS coefficient results to infer long-term causal effects. Overall, the evidence suggests that it is not only the size of public borrowing, but also the composition, cost of servicing, and foreign-currency exposure of public debt that matter for the implications of public debt for Nigeria's growth.

### **Recommendations**

Based on the findings and conclusion of the paper, the following recommendations are made:

- i. The Federal Government and Debt Management Office should manage the composition of public debt so that reliance on external borrowing does not create excessive foreign-currency repayment exposure, especially during periods of sustained naira depreciation.
- ii. Borrowed resources should be tied more closely to identifiable productive projects with measurable economic returns, and project monitoring should be strengthened so that debt-financed expenditure expands the revenue and output base from which future obligations are serviced.
- iii. Debt-service management should focus on refinancing risk, maturity structure and borrowing terms in order to reduce the proportion of fiscal resources absorbed by interest and principal payments and preserve expenditure on infrastructure, health, education and other growth-enhancing functions.
- iv. Domestic borrowing should be developed as part of a balanced debt portfolio while avoiding excessive competition with private-sector credit, and fiscal and monetary authorities should coordinate debt and exchange-rate policies because currency depreciation can sharply raise the naira cost of external obligations.

### **Limitations and Directions for Further Research**

The analysis is executed at the annual level and reflects the level of measurement that was employed in the project supplied to the study, such as a debt-servicing ratio whose scale is dependent on the units of the debt-service series and total-debt series. EDTR and DDTR are complements, and it is impossible to estimate them together with a constant; they are estimates of the same shift in the portfolio composition from two opposite perspectives. Also, there is a high level of positive serial correlation in the baseline levels model and there are differences between Engle-Granger and ARDL bounds procedures in the long-run evidence. Future research should validate the unit consistency of the debt-service series, include inflation and interest rates, and account for structural breaks from debt relief, recession, COVID-19 and recent exchange-rate reform, among others. Comparative studies across the African economies and models that enable non-linear debt thresholds can also assist in determining conditions of growth-supporting borrowing becoming debt overhang.

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