# Public Debt and Infrastructural Development in Nigeria; An Empirical Investigation

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## ABSTRACT

This study examines the impact of public debt on infrastructural development in Nigeria from 1990-2022, as debt load has become one of the most critical impediments limiting recovery and growth on the continent, but if these debts both internally and externally sourced are being channelled and utilized effectively to improvement of public infrastructure might influences level of the economy, hence contentious in macroeconomics theories. Relying on data from the World Bank Development Indicators and the outcome of various pre-estimation tests ; the Augmented Dickey Fuller and Phillip Peron method were employed to determine the stationarity trend in the data, the correlation analysis to test the relationship between the variables, the study adopted the Auto Regressive Distributive Lag Model (ARDL) estimation technique to determine the relationship between public debt (proxied by domestic debt and external debt) and capital expenditure a proxy for public infrastructure in Nigeria. The long-run results revealed that external debt and internal debt is insignificant but have positive impact of capital expenditure in Nigeria, which implies the misallocation of funds to the development of infrastructures in the country. The study further revealed that the debt service payment and Inflation rate has negative impact of the capital expenditure at the current Lag but has positive association at Lag 1 and not statistically significant at both Lag. The study conclude that public debt positively impact infrastructural development in Nigeria. The research recommend that government should ensure that debts incurred are channel towards the specific and identified infrastructural productive projects and not just for solving short run problems

**Keywords:** Public Debt, Infrastructural Development, Inflation, Debt Service.

**JEL Code :** E31, H63, R42

## INTRODUCTION

Bridging the domestic resource gap to promote economic development has always been the justification for countries, especially emerging countries, to take out loans, both domestic and foreign. Thus, it wouldn't seem out of the ordinary for any developing nation, such as Nigeria, to recourse to borrowing, given that the money is spent in a way that will encourage capital expenditures that will further advance infrastructure development (Pattillo, et al, 2011). Ayadi and Ayadi (2018) reveal that borrowing is expected to increase resource availability even while the government requires resources for public expenditures. However, minimizing debt limits, might greatly increase the amount of money accessible for government capital expenditures aimed at boosting the economy (Ayadi & Ayadi, 2018). According to Musibau et al. (2018), if those borrowings are not managed meticulously they may soon put a pressure on government budgets because they would require an increasing number of funds to be transferred for debt servicing, which will leave inadequate funds for regular and development investments. Resource mismanagement can easily result in the build-up of excess debt, which has been a major barrier to development in Nigeria's rising economy.

The international community acknowledges that the majority of developing countries' high levels of foreign debt are a major impediment to their capacity to advance and stabilize financially. This supports the theory that developing countries as Nigeria have often accrued large amounts of public debt, leading to the build-up of trade credit arrears at incredibly low interest rates. This has decreased the domestic economy's capital expenditure budget (Eke & Akujuobi, 2021). Gohar and Butt (2012) claim that cumulative debt service payments cause

governments, especially those in developing nations, a number of issues since they need repayment of loans in excess of their original amount, which hinders the nation's economic growth.

A nation's growth and investment are significantly impacted by public debt until unsustainable levels of external debt servicing take hold and impede growth as attention is diverted from financing private investment to repaying debt (Matandare *et al*. 2018). Debt, according to Pattilo et al. (2017), has a positive effect on growth at low levels. However, as debt accumulates, it starts to negatively affect a country's capacity to fund its capital expenditures. Moreover, exorbitant payments for debt service divert funds away from the social, health, and educational sectors, (Fosu, 2018). This distorts the intention of borrowing, which is to promote development and growth rather than engulf the country in a sea of debt servicing obligations that deplete most of its resources and impede progress because of exorbitant payment of interest on foreign loans.

One of the biggest issues facing developing nations, such as Nigeria, is the issue of public debt, which has been perceived as impeding Nigeria's progress and expansion. Many governments face difficulties with the terms of public debt repayment, or debt service especially in Nigeria (Pattillo, 2017). For example, Nigeria, the largest economy in ECOWAS, received debt forgiveness from the Paris Club after paying three times its actual commitment. Nigeria's governments have failed to solve the issue of debt payback, since they continue to borrow without demonstrating adequate utilisation of prior borrowings. High debt service payments thus hinder Nigeria's economic growth, supporting a World Bank analysis that found rising countries like Nigeria have a greater burden of local and foreign debt repayment than developed ones (World Bank analysis, 2011).

When world oil prices started to drop in 1978, Nigeria's debt servicing obligations started to mount. Nigeria had some debts prior to this occurrence, including one from the World Bank (1958) for US$38 million loaned for railway development and another from the Paris Club debtor countries (1964) for US$13.1 million obtained from the Italian government for the construction of a dam on the Niger River. The first large borrowing of US$1 billion, known as the "Jumbo loan," was made possible via the International Capital Market (ICM) in 1978 (Adesola, 2015). It is undoubtedly a reflection of corrupt practices by our leaders that the country has an excessive amount of debt despite being able to manipulate the Paris Club debt a decade ago without investing the same amount in domestic capital projects. These practices include a lack of transparency, theft of public funds, a low propensity for saving, poor debt management, dependence on a single product (crude oil), and so on. The purpose of this study is to determine the relationship between the two primary components of government debt both domestic and foreign and infrastructure development, which is measured by capital spending by the federal government (Pattillo, 2017).

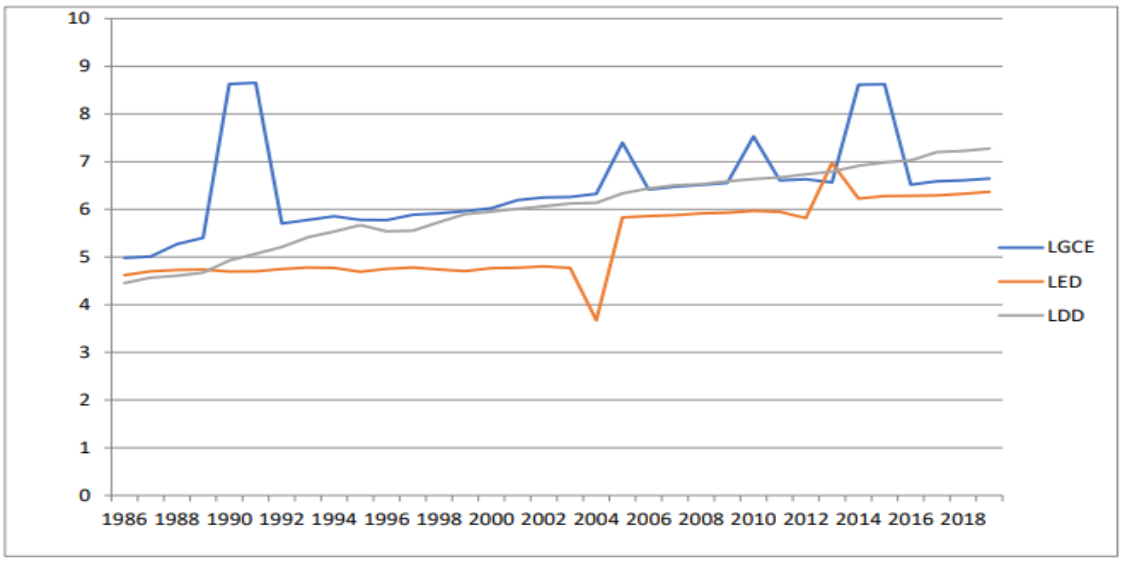
Although borrowing is required to support the economy, especially in light of the effects of the pandemic, it is unclear how sustainable Nigeria's debt position is, especially in light of the country's rising debt, which reached N33.1 trillion as of March 2021, a 162.7% rise in fewer than five years. Upon combining the liabilities of the AMCON and the CBN, debt might amount to N48.7 trillion, or approximately 32.7 percent of GDP (Ayadi & Ayadi, 2018). No matter how low the debt-to-GDP ratio may seem 32%, it is important to remember that debt is paid for with revenues. As a result, if debt servicing rises even as revenues decline, the issue of the underdevelopment of vital infrastructure through capital expenditure will persist (The cable, 2022).

The main objective of this study is to investigate the impact of public debt on capital project spending in Nigeria. In spite of the huge resources expended on infrastructure in Nigeria, yet we are still struggling with comatose education sector, lack of access to world class healthcare facilities and services, while countries like USA, China, and Japan had gone far in terms of providing basic amenities of life and other livelihood to their citizens as a means for achieving human capital development. To the students, the study will help deepen our understanding on how to use debt sustainably to achieve infrastructural development that is necessary for economic growth of Nigeria. It will also serve as an academic precedence for students who want to also further the study on public debt and economic growth vis a viz capital expenditure (Olukoye 2009).

This paper focuses on the effect of public debt on capital project spending or infrastructural development in Nigeria. Also, this study covers between 1990 to 2022 period. This period was carefully selected because it is long enough to satisfy the econometric requirement for time series estimation and also it was the period that

comprise both the military which orchestrated many infrastructural development, and the democratic dispensation where administrative bottles on financing seems to be prevalent in Nigeria.

### 1.1 Graphical Trend of Infrastructural Spending, External Debt and Domestic Debt from 1986 to 2018.




According to the graph above, government capital expenditure (GCE), a proxy for infrastructure development in Nigeria, showed an upward trend from 1986 to 2018. In contrast, external debt (ED) and domestic debt (DD), which measure debt burden, showed positive trends. The external debt (ED) and domestic debt (DD) both increased between 1998 and 2003. Following this, the external debt (ED) declined as a result of Nigeria receiving debt relief from the Paris Club, its bilateral official creditors, between October 2005 and April 2006. This helped to regain investor confidence in the country's economy.

However, due to inadequate lending, inefficient loan utilization, and subpar debt management methods in Nigeria, domestic debt (DD) has been rising without a matching increase in infrastructure development. The graph illustrates how, between 2012 and 2015, there was a notable increase in government capital expenditure, which is a stand-in for infrastructure development, together with a decrease in the burden of external debt (Ajayi & Edewusi 2020)

## LITERATURE REVIEW

### 2.1 Conceptual Review

**a) Public Debt:** Debt is a product of borrowing. Therefore, borrowing by the government entails public debt or government debt. According to Adejuwon et al. (2010), debt is the term used to describe the financial resources that are utilized by an organization but are not provided by its owners and do not in any way belong to them. The difference between domestic savings and investment, which might grow over time in absolute terms, is what causes debt. Interest rates rise in tandem with the gap widening and debt accumulation, and the concerned nation will have to borrow more money in order to keep net imports flowing continuously. In order to re-finance maturing debt obligations, it must also borrow (Adejuwon et al, 2010). Public borrowing and debt are regarded as significant sources of funding for the government. The government may borrow money if the amount of money it receives in taxes and other sources is insufficient to pay for its expenses. In times of financial crisis and natural disasters like war, drought, etc., these kinds of borrowings can become increasingly important (Kalyan City Life, 2011).

According to Adedokun (2014), public debt is the result of deficits accruing from an excess of government spending over revenue, primarily from taxes and returns on investment. Nigeria continues to experience internal financial constraints, much like other emerging nations. Due to this limitation, external debt has become a crucial addition to local resources in order to support these developing nations' sustainable economic growth. This can happen if the projects' economic gains outweigh the interest paid on the debt. On the other hand, high foreign

debt typically prevents economic expansion. Due to the weight of their debt, indebted nations are now spending more money on debt payment than on vital developmental projects (Ekperiware and Oladeji, 2012). In Nigeria, the debt issue has grown to crisis proportions.

**b) Infrastructural Development:** Infrastructure development is the process of creating the basic frameworks needed for a community or culture to function. They are often infrastructures such as roads, water supplies, sewerage, electrical grids, information technology, renewable energy, and so forth. According to Nworji and Oluwalaiye (2012), capital expenditures are costs associated with capital projects such as building roads, airports, healthcare facilities, educational institutions, national telecommunications, power generation, etc. Capital expenditures, or the costs associated with capital projects, strengthen a country's infrastructure. Therefore, it is obvious that improving a country's infrastructure has an impact on its economy (Olukoye, 2009).

Thus, government capital investment has been included in the analysis of infrastructure development. Undoubtedly, the mobilization of substantial financial resources by the national government is necessary to achieve a notable improvement in the nation's infrastructure at any given period. This is the rationale behind national economic managers' efforts to save money in the middle of a tight budget in order to gradually gather sufficient funds to undertake significant capital investments (infrastructure development) in the economy. Capital accumulation, according to Todaro and Smith (2003) and Baghebo and Edoumiekumo (2012), is a necessary part of economic growth and development in any civilization. It happens when a certain amount of current revenue is set aside and invested to increase output and incomes in the future. According to Baghebo and Edoumiekumo (2012), capital accumulation includes all the institutions and processes that are a part of a certain structure of who owns the means of production, how surpluses are taken out of the economy, and how those surpluses are mobilized and directed to increase the economy's potential for production. Infrastructure is defined by Wikipedia as the fundamental services and facilities required for an economy to run smoothly, as well as the physical and organizational framework required for a society or business to operate.

Hard and soft infrastructure are the two categories of infrastructure that Oyedele (2012) propose. Soft infrastructure refers to all the institutions needed to uphold a nation's cultural, social, and economic norms, including the banking, education, health, judicial, and governance systems as well as security, hard infrastructure refers to the vast physical networks required for the operation of a modern industrial nation (Kumar, 2005 in Oyedele, 2012).

## 2.2 Theoretical Review

**a) Ricardo Theory of Public Debt:** According to Ricardo's public debt theory, the most significant burden on society as a whole comes from the inefficient quality of public spending, not from how or where public debt is financed or sourced from. Regarding the matter of financing public expenditures, the consensus is that the funds will, in all cases, originate from the resources of the community or society at the time of expenditure; it makes no difference to them whether the funds are obtained through debt or loans. If money is obtained by a loan, it is considered public debt. When a loan is acquired outside of the nation, it is considered foreign debt. The repayment of this external debt is contingent upon payments made mostly in foreign currency. Changes in the exchange rate between the foreign currencies and the local currency engaged in the exchange are caused by the essentially constant demand for these hard currencies to pay off debts contracted in these foreign currencies (Ayodele, 2012).

**b) The Debt Overhang Theory:** According to the debt overhang theory, excessive levels of borrowing result in debt traps, high levels of debt, and a slowdown in growth in the economy. The debt overhang theory states that predicted debt servicing costs will deter future domestic and international investment if there is a chance that the nation's future government debt will exceed its capacity to repay it. Prospective investors would be deterred by the belief that more production would result in higher taxes from governments to pay down the national debt. As a result, they would be less eager to incur current costs of investment in order to boost output in the future (Gordon & Cosimo, 2018).

According to Krugman (1988), cumulative public debt serves as a penalty on future output while also reducing the motivation to save and invest. The idea specifically stated that paying down debt lowers the amount of money

available for investments; as a result, a binding liquidity constraint on debt would discourage investment and further impede growth. According to the hypothesis, public debt service and stock have an impact on development of infrastructure, which in turn has an impact on economic growth by influencing the makeup of public spending or deterring private investment. By reducing the amount of public funds available for investments in infrastructure and human capital, debt service may impede growth (Coccia, 2017). The theory goes on to say that public debt might affect growth in non-linear ways, through the accumulation of capital

**c) Debt Crowding-out Theory:** The debt crowding out hypothesis states that increased debt service payments might cause a nation's budget deficit to rise, which will decrease public savings unless private savings rise to make up the difference. Consequently, this could lead to an increase in interest rates or a reduction in the amount of credit available for private investment, ultimately slowing down economic growth. Higher interest rates discourage private sector investment when the government borrows more money to pay for more spending or lower taxation. If more borrowing raises interest rates because it increases demand for money and loanable funds, which in turn raises prices the private sector, which is sensitive to interest rates, will probably cut investment because of the lower rate of return. Potential increase in output will be negatively impacted in the long run by a decline in business-fixed investment, or supply-side economic growth (Alfred, 2014). Because government spending boosts demand for private sector goods through the multiplier effect, which in turn stimulates fixed investment through the acceleration effect, the crowding-out impact is lessened (Joy & Panda, 2020).

By raising interest rates, decreasing disposable income, and raising wages, the government may be able to finance its deficit through borrowing from both domestic and foreign sources. This will ultimately affect company profitability and, consequently, private investment. As a result, private investment may be discouraged or crowded out, which would lower economic productivity (Spilioti & Vamvoukas, 2015). Keynesian economists contended that fiscal expansion tends to boost aggregate demand for goods produced by the private sector by means of the fiscal multiplier, thereby promoting the expansion of private investment.

Private sector savings decline as a result of increased government spending that is financed by borrowing. There are two basic causes behind this: First, private sector savers purchase government bonds when fiscal policy is expansionary, which reduces their savings available to finance private sector investment. Furthermore, increased government borrowing typically results in higher interest rates, which discourage private investment. Moreover, present borrowing discourages private investment by pushing the tax burden onto future generations (Gordon & Cosimo, 2018). According to classical economists, public debt is bad for the economy, especially if borrowing by the state weakens the budget process's financial discipline and the private sector's ability to obtain credit.

This theory maintained that by discouraging private investment and turning off prospective foreign investors, state debt repayments the majority of which are foreign crowd out economic growth. On the other hand, the Ricardian equivalency hypothesis asserts that attempts to stabilize the fiscal budget have no effect on economic expansion. This theory is predicated on the idea that changes in private savings correspond with changes in government spending and revenue (Saungweme et al., 2019).

### 2.3 Empirical Review

Though certain research tend to differ, there appears to be convergence and consensus from a small number of studies regarding the broad relationship between public debt and debt and infrastructure development. Below is a summary of a few of these carefully chosen empirical studies, broken down into developing and developed nations:

AL-Tamimi and Jaradat (2019) used annual time series data spanning a period from 2010 to 2017 to examine the effect of external debt on economic growth in Jordan. The empirical result showed that external debt significantly hampered economic expansion. As a result, the study recommended foreign direct investment as a substitute for traditional funding.

Matandare and Tito (2018) assessed Zimbabwe's economic development and state debt. The research design used in the study was quantitative. Secondary time series data from the World Development Indicators database covering 36 years (1986-2016) were collected. The study's data were examined inferentially. The study's findings

showed a significant unfavorable relationship between Zimbabwe's economic development and external debt. The study also determined that while external factors have a significant positive association with economic growth, the exchange rate and inflation had negative significant relationships with economic growth in Zimbabwe. Based on the results, the authors proposed that the government should increase efforts to finance its growth plans by increasing domestic revenue sources because the accumulation of external debt hinders economic growth. They also suggested that diversifying the economy is essential and that the government should create new revenue-generating sectors to support economic growth.

Said and Yusuf (2018) investigated the relationship between state debt and Tanzanian economic growth. After secondary time series data spanning 45 years was gathered, a quantitative research approach was used. The study employed co-integration and the Vector Error Correction Mechanism (VECM) Approach to analyze the data gathered. The VECM estimate demonstrated that, during the course of the study period, Tanzania's economic growth and state debt were negatively correlated. Furthermore, the results of the Granger causality test showed that public debt and economic growth are not causally related. Based on these conclusions, the report recommended that the government and decision-makers cease the gradual build-up of foreign debt and refrain from hiding the purpose of such debt

Shkolnyk and Koilo (2018) used a variety of econometric methodologies to experimentally investigate the relationship between external debt and economic development in Ukraine between 2006 and 2016. The study found that macroeconomic volatility and a high level of external debt limit economic growth. The analysis also showed that Ukraine's debt load, like that of other developing nations, had prevented them from experiencing the anticipated economic growth.

Ndubuisi (2017) used the ordinary least squares method along with a few additional statistical methods to expand the study on the effect of external debt on Nigeria's economic growth from 1985 to 2015. The exchange rate and external reserve were used as control variables, and the external debt stock and external debt servicing were the main independent variables. The GDP was also used in the study as a dependent variable. The results thus showed that while the stock of external debt had a large beneficial influence on Nigeria's economic growth, debt servicing payments had a little negative impact. The currency rate and foreign reserve, which make up the control variable, have a big effect on GDP. Therefore, the report suggested using external debt to fund the expansion of infrastructure.

Ideniyi, Ogonna, and Ifeyinwa (2016) looked at Nigeria's public spending and debt. The study employed the qualitative research approach to collect secondary time series data covering a 35-year period (1980-2015). The data from the study were analyzed using econometric estimate techniques such co integration, vector error correction model, and Wald test. The study's conclusions showed that public debt and public spending in Nigeria do not have a long-term relationship. However, government capital and recurrent spending have a substantial positive link with public debt in the Nigerian economy. These results led the study to recommend the adoption of zero-based budgeting (ZBB) and planning-programming budgeting systems (PPBS) over the existing incremental budgeting (IB) method.

Udofia and Akpanah (2016) examined into how Nigeria's external debt affected the country's economic expansion. Using the co-integration test and the error correction test, the problem was empirically investigated for Nigeria between 1980 and 2012. The results of this investigation confirmed the conventional theory linking growth and external debt. It also discovered that Nigeria does not have a debt overhang issue. The study suggests that, in order to finance development initiatives in Nigeria, higher export revenue generated by an export-led growth strategy and investments in human capital be made, since these may ultimately prove to be the most advantageous options as compared to taking on external debt.

Ugwuegbe, Okafor, and Azino (2016) examined the impact of foreign aid and external borrowing on Nigeria's economic growth between 1980 and 2013 using annual time series data. They employed GDP as a measure of economic growth, and the exogenous variables were the exchange rate regime, foreign aid, external debt, and foreign reserve. The following econometric approaches were used: Johansen Cointegration, Augmented Dickey Fuller (ADF), Error Correction Method (ECM), and Ordinary Least Square (OLS) multiple regression. The findings indicate that while foreign aid has a favorable but negligible impact on Nigeria's economic growth,

external debt has a positive and considerable impact.

# METHODOLOGY

**3.1 Data and Data source**: Secondary data is employed in the study. The World Development Indicator was the source of the statistics for capital spending, inflation, debt service payments, and foreign and domestic debt for a 32-year period (1990–2022).

**3.2 Model Specification:** The study adapts the work of Barro and Greiner (1990) model to examine the relationship between public debt and expenditure.

The relationship can be functionally expressed as;

*CAPEX = f (EDEBT, DDEBT, DSPAY and INFR)* …….. (1)

The model is transformed into a linear econometric form as;

$CAPEX = \beta 0 + \beta 1\ EDEBT + \beta 2\ DDEBT + \beta 3 DSPAY + \beta 4\ INFR + \mu$…….. (2)

Where; *CAPEX*; Government Capital Expenditure, *EDEBT:* External Debt, *DDEBT*: Domestic Debt, *DSPAY:* Debt servicing payment *INFR*: Inflation Rate. $\beta 0$: Intercept of the model, $\beta 1, \beta 2, \beta 3$ *and* $\beta 4$ are the coefficient of the independent variables, $\mu$ is the error term

**3.3 Econometrics Technique:** This study investigates the relationship between public debt and capital expenditure of the Federal Government of Nigeria. These are various estimations technique. These are discussed below;

**3.4 The Classical Linear Regression Model (CLRM):** The stationarity level of the data would affect the estimate technique, and the Classical Multiple Regression Model (CLRM) would be used. With the help of the E-view statistics tool, the analysis will be completed electronically. The study will use a 5% level of significance. The Dickey Fuller Unit Root and Johnsen Cointegration test methodologies were used to determine the validity of the time series data, i.e., whether the data are stationary or non-stationary and whether the variables co-integrate.

**3.5 Auto Regressive Distributed Lag (ARDL):** The dependent variable in an autoregressive distributed lag model is a function of both its own previous lagged values and the current and past values of other explanatory variables. Unlike previous procedures, the ARDL cointegration method does not require pretests for unit roots. As a result, the ARDL cointegration technique is robust when there is a single long-run link between the underlying variables in a small sample size and is preferred when working with variables that are integrated of various order, I (0), I (1), or a combination of the two. The Wald test, or F-statistic, is used to determine the long-term association between the underlying variables. According to this method, the series' long-term association is considered formed when the F. Statistic is greater than the critical value band.

# RESULTS AND DISCUSSION OF FINDINGS

**4.1 Descriptive Statistics:** In the table presented 4.1, the average mean of Capital expenditure (CAPEX) is estimated to be 25.78 with maximum and minimum values of 26.47 and 28.46 respectively. It also has a low standard deviation value of 2.03. The estimated mean of external debt (EDEBT) is 27.09 with maximum and minimum values of 30.17 and 21.57 and has a standard deviation value of 2.04, the analysis also revealed that the domestic debt (DDEBT) has the maximum of value of 30.40 and minimum value of 23.14. The debt service (DSPAY) has the mean value of 21.44 and maximum values of 22.90 and minimum value of 20.02 with low standard deviation of 0.67, Inflation Rate (INF) has the highest maximum value of 72.83 and lowest minimum value 5.38, it has the highest standard deviation of 16.87.

From the result below, Capital expenditure (CAPEX), external debt (EDEBT) and domestic debt (DDEBT) are negatively skewed while debt service (DSPAY) and Inflation rate (INF) are positively skewed. Capital

expenditure (CAPEX), domestic debt (DDEBT), debt service (DSPAY) are said to be platy kurtic (short tailed) as their kurtosis value are less than 3 while external debt (EDEBT) and Inflation rate (INF) are leptokurtic as their kurtosis values are more than 3. However, the Jarque Bera statistics result indicates that residuals of most of the variables are not normally distributed.

Table 1: Descriptive Statistics

| | CAPEX | EDEBT | DDEBT | DSPAY | INF |
|---|---|---|---|---|---|
| Mean | 25.77705 | 27.09742 | 27.23889 | 21.43764 | 18.99895 |
| Median | 26.47628 | 27.18618 | 27.58578 | 21.39579 | 12.71577 |
| Maximum | 28.45914 | 30.17307 | 30.40510 | 22.89883 | 72.83550 |
| Minimum | 22.13425 | 21.56913 | 23.13829 | 20.02091 | 5.388008 |
| Std. Dev. | 2.026575 | 2.042663 | 2.216111 | 0.666656 | 16.86848 |
| Skewness | -0.588937 | -0.914608 | -0.306196 | 0.021988 | 1.823489 |
| Kurtosis | 1.860493 | 3.345030 | 1.887112 | 2.776882 | 5.159022 |
| Jarque-Bera | 4.476437 | 5.775127 | 2.689238 | 0.086192 | 29.93637 |
| Probability | 0.106648 | 0.055712 | 0.260639 | 0.957819 | 0.000000 |
| Observations | 32 | 32 | 32 | 32 | 32 |

Sources; Author's computation 2024.

**4.2 Unit Root:** Presented in table 2. is the unit root mixed level of Stationarity result, while Capital expenditure (CAPEX), External debt (EDEBT), Domestic debt (DDEBT) is stationary at 1st difference level, the other 2 variables; total debt service (DSPAY) and Inflation rate (INF) are stationary at level. This empirically suggest that autoregressive distributed lag may be better applied Granger and Newbold (1987).

Table 2: Unit root result

| Variable | Test Equation | ADF-FCs | Prob. | PP | Prob. | Integ. |
|---|---|---|---|---|---|---|
| CAPEX | Trend & Intercept | -6.380698 | 0.0000 | -6.38069 | 0.0000 | I (1) |
| EDEBT | Trend & Intercept | -4.688898 | 0.0030 | -4.68889 | 0.0030 | I (1) |
| DDEBT | Trend & Intercept | -4.848178 | 0.0019 | -4.83853 | 0.0020 | I (1) |
| DSPAY | Trend & Intercept | -3.567870 | 0.0460 | -3.57375 | 0.0454 | I (0) |
| INF | Trend & Intercept | -4.068448 | 0.0145 | -4.03578 | 0.0128 | I (0) |

Sources; Author's computation 2024.

**4.3 Co-integration Test:** The study tests for the existence of any long run relationship among the variables; Presented in Table 3 is the test for co-integration in the series. The results suggest that we reject the null hypothesis of no co-integration among the variables.

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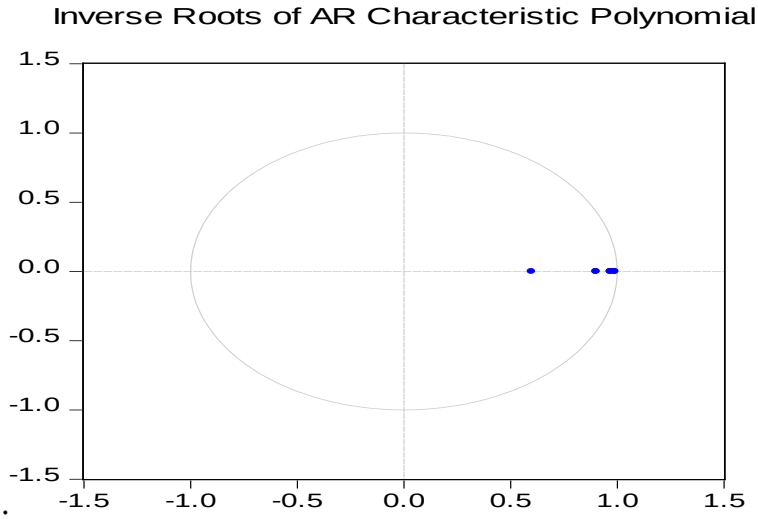
Table 3: Co-integration Test

| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob. |
|---|---|---|---|---|
| None * | 0.627959 | 86.90611 | 69.81889 | 0.0012 |
| At most 1 * | 0.480096 | 49.33357 | 47.85613 | 0.0361 |
| At most 2 | 0.321414 | 24.47735 | 29.79707 | 0.1810 |
| Author's Computation 2024<br><br>Trace test indicates 2 cointegrating eqn (s) at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |

**4.4 Model stability test:** The unit variables are on the horizontal axis within the unit circle which suggest that the model is stable and suitable for the regression.

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**4.5 Correlation Analysis:** Correlation between variables expresses the preliminary test of variable association in an empirical study. In table 4. there are positive associations result among pubic debt proxy by external and internal debt with infrastructural development proxy by capital expenditure, this indicates that public debt both internal or external sourced are being utilized effectively on infrastructural development in Nigeria, this result is interdem with finding of Ideniyi, Ogonna and Ifeyinwa (2016). However, the debt service payment and inflation rate have negative relationship with capital expenditure

Table 4: Correlation matrix

| | LCAPEX | LEDEBT | LDDEBT | LDSPAY | INF |
|---|---|---|---|---|---|
| LCAPEX | 1.000000 | | | | |
| LEDEBT | 0.844972 | 1.000000 | | | |
| LDDEBT | 0.968830 | 0.856665 | 1.000000 | | |
| LDSPAY | -0.112624 | 0.053604 | -0.045843 | 1.000000 | |
| INF | -0.295364 | -0.083035 | -0.263086 | 0.021208 | 1.000000 |

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Author's Computation 2024.

**4.6 Estimation Result- ARDL Estimation Technique:** Following the outcome of the multiple level of stationarity within the data series, the Auto Regressive Distribution Lag Model was used in the study for estimation, presented in Table 5 is the ARDL long run result that examines the relationship between public debt and capital expenditure in Nigeria. The result revealed that external debt and internal debt is insignificant but have positive impact of capital expenditure in Nigeria, the outcome revealed that 1 percent increase in capital expenditure would produce 0.05 and 0.12 percent in external and internal debt respectively. This findings can be justified by the findings of Aladejana, et. al (2021).

Moreover, the debt service payment and Inflation rate has negative impact of the capital expenditure at the current Lag but has positive association at Lag 1 and not statistically significant at both Lag. From the result, the coefficient of the model is negative at -0.597, which satisfies the negative condition and indicate that the speed of adjustment between the short run dynamics and Long run equilbrum is 59.7 percent in absolute value. The coefficient of determination (R-squared – 0.980715) indicate 98.7% of the total variation in the dependent variable in public debt is attributable to the influence of other factors not included in the regression equation. The F-statistics- 225.20 with probability value of 0.0000 which is less than 0.05 shows that the influence of explanatory variables on the dependent variables is statistically significant

Table 5: ARDL Estimation result

| Dependent Variable: LCAPEX | | | | |
|---|---|---|---|---|
| Method: ARDL | | | | |
| Sample (adjusted): 1990 2022 | | | | |
| Included observations: 33 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| LCAPEX (-1) | 0.820279 | 0.121818 | 6.733622 | 0.0000 |
| LEDEBT | 0.050736 | 0.055159 | 0.919814 | 0.3648 |
| LDDEBT | 0.127200 | 0.107155 | 1.187065 | 0.2442 |
| LDSPAY | -0.096639 | 0.085931 | -1.124620 | 0.2694 |
| LDSPAY (-1) | 0.114029 | 0.086519 | 1.317962 | 0.1972 |
| INF | -0.000165 | 0.004296 | -0.038294 | 0.9697 |
| INF (-1) | 0.007022 | 0.003757 | 1.868967 | 0.0711 |
| C | -0.597957 | 2.318129 | -0.257948 | 0.7982 |
| R-squared | 0.980715 | Mean dependent var | | 25.85836 |
| Adjusted R-squared | 0.976360 | S.D. dependent var | | 1.985861 |
| S.E. of regression | 0.305334 | Akaike info criterion | | 0.645858 |
| Sum squared resid | 2.890085 | Schwarz criterion | | 0.987101 |

| | | | |
|---|---|---|---|
| Log likelihood | -4.594226 | Hannan-Quinn criter. | 0.768293 |
| F-statistic | 225.2045 | Durbin-Watson stat | 2.281574 |
| Prob(F-statistic) | 0.000000 | | |

Author's Computation 2024; From E-views

**4.7 Post-Estimation Test**

**4.7.1 Serial Correlation analysis:** Presented in Table 6 is a test for serial correlation, the study fails to reject the null hypothesis. This indicates the absence of serial correlation in the series.

Table 6: Serial Correlation

| | | | |
|---|---|---|---|
| F-statistic | 0.631883 | Prob. F (5,28) | 0.6770 |
| Obs*R-squared | 3.954413 | Prob. Chi-Square (5) | 0.5560 |

Source: Computed by the author, 2024.

**4.7.2 Heteroscedasticity Test:** Presented in Table 7 is the test for Homoscedasticity. The p- value of 0.042 is less than 0.05so therefore the study rejects the null hypothesis of homoscedasticity in the series which indicates that series are heteroskedastic.

Table 7. Heteroscedasticity Test

| | | | |
|---|---|---|---|
| F-statistic | 2.761997 | Prob. F (5,33) | 0.0343 |
| Obs*R-squared | 11.50587 | Prob. Chi-Square (5) | 0.0422 |
| Scaled explained SS | 5.383562 | Prob. Chi-Square (5) | 0.3709 |

Source: Computed by the author, 2024.

**4.8 Discussion of Findings:** The relationship between Nigeria's state debt and infrastructure development was investigated in this study. In order to satisfy the ARDL assumptions, both the parameter estimate and the estimated regression were completed. The first objective's research, which looked at the connection between Nigeria's capital expenditures and external debt, showed that there is a small but positive association between the two. According to the findings, a 1% rise in external debt will, on average, boost government capital expenditure in Nigeria by 0.05 percent while keeping all other factors same. This suggests that when the federal government obtains external loans and uses them more wisely for capital projects, the economy is likely to develop, which will increase the amount of capital expenditures made by the government that follows. This may be the cause of the literature's preference for using external borrowing when necessary to finance infrastructure deficits. This result supports the economic theory that suggests that a developing nation's ability to borrow at acceptable rates will probably contribute to that nation's economic growth. The state of poverty in the economy is expected to improve as growth is increased—at least above a 5% growth rate.

Countries like Nigeria, which have a limited capital stock and are in the early stages of development, borrow to boost growth. Because of this, they probably have access to opportunities that have better rates of return than those found in industrialized economies (Igbodika, Jessie, and Andabai, 2016). As long as the borrowed money is reinvested domestically, this theory's efficacy is based on the manufacturer's goals. Macroeconomic volatility does not affect the funds when they are invested profitably. Thus, growth is probably going to pick up and make timely debt repayment possible. Growth will have a good effect on per capital income when this cycle is sustained for a while, which is necessary to reduce poverty.

Debt service payment and capital expenditure in Nigeria do not have a substantial long-term link, according to the study of objective three, which looks at whether there is a relationship at all. The results support the findings of Patillo et al. (2002) and Clemens et al. (2003), who pointed out that high levels of debt have a detrimental impact on growth rates due to repayment obligations that deplete the economy if policymakers do not allocate funds to areas where they are most needed. The study conducted by Barry and Portes (1986) aimed to determine the factors that influence the debt stock of about thirty countries at a specific point in their economic development.

They concluded that high debt and default have a tendency to lower the real growth rate and the state's reputation. Applying a growth accounting model to a sample of 61 developing nations, Patillo et al. (2002) found that there was an almost one-point decrease in the growth of physical capital per capita and total factor productivity for every twofold increase in the average level of external debt. Their research allowed them to demonstrate that debt would have a reverse U-curve with growth based on the LAFFER curve. In summary, prudent management of borrowed funds can promote economic expansion through investment avenues; yet, misallocating the funds may have a negative impact on economic growth.

## SUMMARY, CONCLUSION AND RECOMMENDATION

**5.1 Summary:** This study noticed that the major weakness of many African countries which is the increasing trend of their public debt and inadequate provision of infrastructural development. The main objective of this study is to investigate the impact of public debt on capital expenditure in Nigeria. To achieve the main objective, specific objectives such as; to examine the effect of external debt on capital expenditure in Nigeria, to examine whether domestic debt has enhanced capital expenditure in Nigeria, and lastly, to examine the long run relationship between debt service payment and capital expenditure in Nigeria.

Concepts, Theories and empirical finding linking public debt, infrastructural development and economic growth were reviewed. The data for capital expenditure, external debt, domestic debt, debt service payment and inflation were sourced from the World Development Indicator, for the period of 32 years (1990-2022). Several test both pre and post estimation test were carried out, following these test the ARDL Estimation Techniques was employed to examine the relationship between public debt and capital expenditure in Nigeria

**5.2 Major Findings**; the major findings of the regressions are as follows:

**5.2.1 External Debt and Capital Expenditure;** the paper seeks to investigate the effect of external debt on capital project spending in Nigeria. the result from the ARDL estimation method reveals that the external debt has positive impact on capital expenditure in Nigeria, which implies that the external debt drives and improve capital expenditure in Nigeria but not statistical significant to capital expenditure. The correlation Analysis conducted to test the association of variables also indicated that the external debt has strong positive impact on capital expenditure.

**5.2.2 Internal Debt and Capital Expenditure**; the paper seeks to examine whether domestic debt has enhanced capital expenditure in Nigeria. The result of the correlation matrix supported by the ARDL Estimation technique reveals that internal debt is not statistically significant but has positive impact or has enhanced the capital project spending positively in Nigeria

**5.2.3 Debt Service Repayment and Capital Expenditure**; the paper seeks to examine the long run relationship between debt service payment and capital expenditure in Nigeria, the result of the correlation matrix supported by the ARDL Estimation technique reveals that debt service repayment is not statistically significant but has positive impact or has enhanced the capital project spending positively in Nigeria, finding from this study supported that traditional view between external debt and growth. It also found the non-existence of debt overhang problem for Nigeria.

**5.3 Other Findings:**

**5.3.1 Inflation rate and Capital Expenditure**; from the result of both the correlation analysis and ARDL

Estimation Technique, it was observed that the inflation rate has negative impact on the Capital expenditure in the Long run at the current Lag but has positive impact at Lag 1. This indicate that the high cost of goods and services incurred on executing capital project in the economy.

**5.4 Implication of Findings:** The above findings established the fact that public debt has positive impact on capital expenditure in order to improve economic growth only if the borrowings can be channelled alone to the reason why they are being sourced for. The study's findings indicate that Nigeria's external debt has not significantly contributed to the country's physical infrastructure development, and that Nigeria's infrastructure would deteriorate if its level of debt servicing to its various creditors increased. Therefore, Nigeria's massive external debt profile during 2005–2006, even before the debt forgiveness program, is unjustified and inappropriate.

Additionally, it is determined that domestic debt is superior to external debt in terms of overall growth and infrastructure development, and that the accumulation of domestic debt plays a major role in the process of national development by increasing output, employment creation, and aggregate demand. Long-term borrowing, both domestic and foreign, is detrimental to Nigeria's infrastructure development because of ineffective loan usage, bad debt management techniques, and the dishonest and corrupt behavior of public servants.

**5.5 Conclusion:** Using data from 1990 to 2020, this study investigated the impact of public debt on capital project spending in Nigeria. The primary statistical method of analysis used in this research was the Autoregressive Distributed Lag Model (ARDL). The ARDL results indicate that there is a positive but negligible correlation between capital expenditure and foreign debt as well as an internal debt to capital expenditure link. The outcome also demonstrated how capital expenditure is negatively impacted by debt service payments.

**5.6 Recommendations:** The research's conclusions lead to the following suggestions being made;

i) that the government should reduce its excessive borrowing and allocate its remaining borrowing funds to initiatives that would eventually yield sufficient returns to pay off these debts,

ii) despite the fact that public debts are intended to be used to finance deficits in order to increase economic growth and development in the debtor nation and raise citizens' standards of living, the Nigerian government should make sure that debts are only taken out for specific, productive infrastructure projects rather than merely short-term issues.

iii) a review of the budgeting procedure is necessary to ensure that debt is allocated to capital projects in an efficient manner.

iv) The government ought to persist in its pursuit of comprehensive reforms and suitable policy measures to guarantee the smooth integration of all debt inflows into the actual economy, thereby realizing transformed economic growth and enduring sustainable economic development.

v) To ensure debt sustainability, make sure the associated interest rate is less than or equal to the country's rate of economic development before taking on any more foreign debt.

### 5.7 Suggestion for Further Studies

A segment study focusing on the individual debt, such as "the effect of domestic debt on economic growth between 1990 and 2022 in sub-Saharan African economies," should be carried out because the work integrated the many types of public debt.

## REFRENCES

1. Adejuwon, K. D. & Fatile, J. O. (2010), Public sector reform in Africa: Issues, lessons and future directions. Journal of Sustainable Development in Africa, 12(8), 145-157.Adedokun (2014)
2. Adofu, I. & Abula, M. (2010). Domestic Debt and the Nigerian Economy, Current Research. Journal of Economic Theory, 2(1); 22-26.

3. Ajayi, I., & Edewusi, D. (2020). Effect of public debt on economic growth in Nigeria: An Empirical Investigation. International Journal of Business and Management Review, 8(1), 18-38.
4. Ajah, B.A & Jacob, Z (2021). Effect of public debt on capital expenditure in Nigeria International Journal of Economics, Commerce and Management. 8(11). 19-37
5. Akhanolu, I.A., Babajide, A.A., Akinjare, V., Oladeji, T. & Osuma, G. (2018). The Effect of Public Debt on Economic Growth in Nigeria: An Empirical Investigation. International Business Management. 12(6), 436-441.
6. Akinwunmi, A.A. & Adekoya, R.B. (2018). Assessment of the Impact of External Borrowing on the Economic Growth of the Developing Countries-Nigerian Experience. Asian Business Research. 3(1), 29-40.
7. Aladejana, S. A., Okeowo, I. A., Oluwalana, F. A., & Alabi, J. A. (2021). Debt Burden and Infrastructural Development in Nigeria. International Journal of Academic Research in Business and Social Sciences, 11(1), 419-432.
8. Alfred, G. (2014). Public Debt and the Dynamics of Economic Growth. Annals of Economics and Finance 15-1, 185–204.
9. AL-Tamimi, K. A., & Jaradat, M. S. (2019). The role of small medium enterprises in reducing the problem of unemployment in Jordan. European American Journals. Amilcar, S. (2016). Impact of Public Debt on Economic Growth in Advanced Economies. International Journal of Managerial Studies and Research. 4(2), 70-76.
10. Ayadi, F.S., & Ayadi, F.O (2018). The Impact of External Debt on Economic Growth: A Comparative Study of Nigeria and South Africa. Journal of Sustainable Development in Africa, 10(3).
11. Ayodele, T.D. (2012). Nigerian Debt Burden and the Bogey of Debt Serving. Journal of Management and Corporate Governance, 4, 41-46.
12. Baghebo, M., & Edoumiekumo, S. (2012). Domestic private capital accumulation and economic development in Nigeria (1970-2010). International journal of academic research in business and social science, 295, 69-88. Barro and Greiner (1990)
13. Barry and Portes (1986). The Impact of External Debt on Economic Growth:
14. Blake, T. (2015). Investigating the Impact of Public Debt on Economic Growth in Jamaica. Fiscal and Economic Programme Monitoring Department Bank of Jamaica. 1-22.
15. Clemens et al. (2003). External debt, public investment and growth in low-income countries. IMF, Working Paper, WP/03/249.
16. Coccia, M. (2017). Sources of technological innovation: Radical and incremental innovation problem-driven to support competitive advantage of firms. Technology Analysis & Strategic Management, 29(9), 1048-1061.
17. Eke, C.K &Akujuobi, N.E (2021): Public Debt and Economic Growth in Nigeria: A Empirical Investigation. file:///C:/Users/user/Downloads/208148-Article%20Text-517597-1-10 2021 0604. pdf178-192.
18. Ekperiware, M. C., & Oladeji, S. I. (2012). External debt relief and economic growth in Nigeria. American journal of Economics, 2(7), 195-205.Fosu (2018)
19. Gordon and Cosimo (2018). Public Debts' Component and Crowding Out Effect of Private Domestic Investment in Nigeria.
20. Gohar, M., Bhutto N.A & Butt F. (2012). The Impact of External Debt Servicing on the Growth of Low-Income Countries. Sukkur Institute of Business Administration. Retrieved from unidep.com
21. Ideniyi I. G., Ogonna K. & Ifeyinwa C., (2016). Public Debt and Public Expenditure in Nigeria: A Causality Analysis. Research Journal of Finance and Accounting. 7(10), 27-38.
22. Igbodika, M.N., Jessie, I. C & Andabai, P.W (2016) Domestic Debt and the Performance of Nigerian Economy (1987-2014): An Empirical Investigation European Journal of Research and Reflection in Management Sciences 4 (3) 2016.
23. Joy, J., & Panda, P. K. (2020). Pattern of public debt and debt overhang among BRICS nations: An empirical analysis. Journal of Financial Economic Policy, 12(3), 345-363.Kalyan City Life 2011
24. Krugman, P. (1988). Financing vs. forgiving a debt overhang. Journal of development Economics, 29(3), 253-268.
25. Kumar, N. (2005). The power of power in supplier-retailer relationships. Industrial marketing management, 34(8), 863.

26. Matandare, M. A., & Tito, J. (2018). Public debt and economic growth nexus in Zimbabwe. Journal of Economics and Sustainable Development, 9(2), 2222-2855.
27. Musibau, H. O., Mahmood, S., Ismail, S., Shamsuddin, Z., & Rashid, N. (2018). Does External Debt Cause Economic Growth? An Experience from ECOWAS Member Countries. International Journal of Academic Research in Business and Social Sciences, 8(11), 1256–1264.
28. Ndubuisi, P. (2017). Analysis of the impact of external debt on economic growth in an emerging economy: Evidence from Nigeria. African research review, 11(4), 156-173.
29. Nworji and Oluwalaiye (2012) Government expenditure and service sector growth in Nigeria. Journal of Economics and Management, 40(2), 74-90.
30. Odo S.I., Igberi., C.O & Anoke C.I(2016) Public Debt and Public Expenditure in Nigeria: A Causality Analysis. Research Journal of Finance and Accounting.7, (10) 27.
31. Olukoye (2009) Analysis of the impact of external debt on economic growth in an emerging economy: Evidence from Nigeria. African research review, 11(4), 156-173.
32. Oyedele, O. A. (2012). Public-Private Partnership (PPP) and infrastructure provision in Nigeria. In AARCHES 2012 Biennial General Meeting and Annual Conference.
33. Pattillo, D. J. (2017). Reference and Ontology: How Can We Refer to Abstract Objects? University of Notre Dame. Patillo, C., Ricci, L. and Poirson, H. (2002). External debt and growth. IMF Working Paper, no 02/ 69
34. Pattillo, M. C. A., Berg, M. A., Portillo, R., Buffie, M. E. F., & Zanna, L. F. (2012). Public investment, growth, and debt sustainability: Putting together the pieces. International Monetary Fund.
35. Pattilo, c., Poirson, J., & Ricci, L. A. (2011). External debt and growth, Review of Economies and Institutions.2(3)
36. Yusuf, S., & Said, A. (2018). Public Debt and Economic Growth: Evidence from Tanzania. Journal of Economics, Management and Trade, 21(7), 1-12.
37. Salmon, J & de Rugy, V (2020). Debt and Growth: A Decade of Studies. Retrieved from https://www.mercatus.org/publications/government-spending/debt-and-growth-decade-studies
38. Sami A.K and Mbah S.A (2018) External Debt and Economic Growth: The Case of Emerging Economy. Journal of Economic Integration 33 (1), March 2018, pp1141~11571
39. Saungweme, T., & Odhiambo, N. M. (2019). Government debt, government debt service and economic growth nexus in Zambia: a multivariate analysis. Cogent Economics & Finance, 7(1), 1622998.
40. Shkolnyk, I., & Koilo, V. (2018). The relationship between external debt and economic growth: Empirical evidence from Ukraine and other emerging economies. Investment Management and Financial Innovations, 15(1).
41. Spilioti, S., & Vamvoukas, G. (2015). The impact of government debt on economic growth: An empirical investigation of the Greek market. The Journal of Economic Asymmetries, 12(1), 34-40.
42. The Cable (July, 2022). From Obasanjo to Buhari… how FG's debt profile surged 658% to N26.9trn in 21 years. https://www.thecable.ng/from-obasanjo-to-buhari-how-fgs-debt-profile-surged-658-to-n26-9trn-in-21-years
43. Todaro, M. P., & Smith, S. C. (2020). Economic development. Pearson UK.
44. Udofia and Akpanah (2016): External Debt Burden and Infrastructural Development Nexus in Nigeria: An ARDL Approach. Available at SSRN 3936677.
45. Uguru, L.C (2016). The Link between Public Debt and Government Expenditure Pattern: The Nigeria Experience IOSR Journal of Business and Management Volume 18(1).37-41
46. Ugwuegbe, S. U., Okafor, I. G., & Akarogbe, C. A. (2016). Effect of external borrowing and foreign aid on economic growth in Nigeria. International Journal of Academic Research in Business and Social Sciences, 6(4), 155-175.