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Effect of Public Debt on Recurrent Expenditure in Nigeria

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Abstract
This study investigates the effect of public debt on recurrent expenditure in Nigeria for the period 2010Q1 to 2021Q1. Quarterly time series data for domestic debt, external debt and recurrent expenditure were collected from Central Bank of Nigeria statistical bulletin. Philip Perron test was used to test the stationarity of the data and the ARDL Bound cointegration test was utilized to determine presence of long run relationship. Vector Error Correction Model (VECM) was used for analysis since cointegration was established in the series. Wald test method was used to test the effect of domestic debt and external debt on recurrent expenditure in Nigeria. The findings showed that domestic debt has insignificant relationship with recurrent expenditure in Nigeria, while external debt has significant effect on recurrent expenditure in Nigeria. It was recommended that government should only obtain public loans whose interest rates are very low in order to reverse the effect of domestic public borrowing in its economy especially in the long run.

Keywords: Domestic debt, External debt, Recurrent expenditure.

1. Introduction

In every mixed economic system, government performs two main functions; economic (allocation, redistribution, regulation and stabilization) and non-economic functions (defense, security, law and order, etc). Since the end of World War II, the size of government increased (Iyoha, 2007; Wu & Lin, 2010) in developed and developing economies with respect to its economic obligations/functions. Reconstructing the devasted economies of the world became the top priority of most governments. The growth of government expenditure in advanced countries tilted towards transfer payment and subsidies while that of the less advanced countries (like Nigeria) were more on social and community services (Iyoha, 2007). These services are funded under government recurrent expenditure.

Recurrent expenditure comprises all payments other than for capital assets, including on goods and services, (wages and salaries, employer contributions), interest payments, subsidies and transfers. Recurrent expenditure on goods and services is expenditure, does not result in the creation or acquisition of fixed assets (new or second-hand). It consists mainly of expenditure on wages, salaries and supplements, purchases of goods and services and consumption of fixed capital (depreciation).

The economy of Nigeria is driven mostly by government participation in economic activities since independence. Government had religiously carried out its economic responsibilities in areas of social and community services, economic services and transfers (CBN, 2017). Efforts had been made to deeply involve the private sector in socio-economic activities and in recent times these efforts seen to be productive. Despite that, government is still the largest employer of labour, and also, provides social and community services for its citizens, as noted by Iyoha (2007), and indulges in expenses on transfers, making its recurrent expenditure to rise beyond what its revenue could carry. This brought about the introduction of public debt in order for government to meet up with this rising recurrent expenditure and also carry out some capital projects.

Public debt is defined as the total financial responsibilities acquired by governmental bodies of a nation, which includes money that is owed to individuals, mutual funds, hedge funds,

pension funds, foreign governments and others. It comprises government liabilities, future pension payments and payments for goods and services that the government contracted but not yet paid for. Public debt is one of the methods of financing government operations (Odo, Igberi & Anoke, 2016). Public debt is in different forms: internal or domestic debt (owed to lenders within the country) and foreign or external debt (owed to foreign lenders). Debt repayment arises in short term (on or less than one year), medium term (between boundaries of short and long term) and long term (more than ten years). This study however focuses on the domestic debt and external debt form of public debt.

The continuous rise in the public debts has been a major concern, as the public debts currently stands at about N35.5trillion, while the recurrent expenditure too is on nonstop increase year on year. This has been a major burden on the Nigerian government because debt servicing in the first five months of 2021 was 98% of the total revenue generated in the same period (CBN, 2021). Meanwhile, more fresh loans are still in the pipeline because government spending keeps increasing by the day.

Several studies like Odo, Igberi and Anoke (2016) investigated the causal relationship between total public debt and public expenditure in Nigeria. Uguru (2016) studied the link between public debt and government expenditure in Nigeria. Antra (2015) investigated the active nature of public expenditure components and public debt. However, none of them considered the relationship between public debt and recurrent expenditure. Also, this study used quarterly data from 2010Q1 to 2021Q1 which covers period after the global financial crisis of 2008/2009. Wald test was used to ascertain the effect of both domestic and external debt on recurrent expenditure in Nigeria.

The broad objective of this study is to examine the effect of public debt on recurrent expenditure in Nigeria. The specific objectives are to:

i. Examine the effect of domestic debt on recurrent expenditure in Nigeria.
ii. Determine the effect of external debt on recurrent expenditure in Nigeria.

To achieve the objectives of this study, the following hypotheses were developed:

H_{01}: Domestic debt has no significant effect on recurrent expenditure in Nigeria.

H_{02}: External debt has no significant effect on recurrent expenditure in Nigeria.

2. Conceptual Framework

2.1 Concept of Public Debt

Public debt also known as government debt or national debt is debt owed by government or total debt of all governmental units, including state and local governments (Saungweme & Odhiambo, 2019). Public debt, also known as public interest, government debt, national debt and sovereign debt, (United States Department of the Treasury, 2020) contrasts to the annual government budget deficit, which is a flow variable that equals the difference between government receipts and spending in a single year. The public debt is a stock variable, measured at a specific point in time, and it is the accumulation of all prior deficits. Public debt is defined as the total financial responsibilities acquired by governmental bodies of a nation, which includes money that is owed to individuals, mutual funds, hedge funds, pension funds, foreign governments and others. It considers government liabilities, future pension payments and payments for goods and services that the government contracted but not yet paid for (Mindaugas & Janina, 2018).

2.2 Concept of Domestic Debt

Borrowing may be considered as a second-best alternative to money creation during periods of unemployment. In this way, it is seen as an instrument of managing the economy. Domestic loan is also seen as a means of filling domestics savings gap especially in the face of dwindling government revenues from domestic sources. It is particularly so in the face of fluctuating prices of primary commodity exports and hence dwindling foreign exchange earnings. Governments with large recurrent budget deficits may be forced to close the budget gaps by tapping into domestic savings, including through issuance of domestic debt.

Domestic borrowing enables a developing country increase its rate of real investment just as it is seen as an `engine of growth'. In this sense, it increases per capita GNP or its component measures. Thus, debt acts as a source of capital formation. Such resources can be diverted from unproductive channels (such as real estate, jewellery, etc) to productive ventures such as agricultural production of goods for export, mineral exploration and extraction, industrialization, transport and communication, rural and urban development, raw materials development, technical education, health-care services, balance of payments adjustments, tourism, infrastructure development, etc (Anyanwu, 2013).

Domestic debt instruments in issue in Nigeria usually consist of treasury bills (TBs), treasury certificates (TCs) Federal Government development stocks (DS), bonds and means advances. The TBs, TCs and DS are marketable and negotiable while bonds and ways and means advances are not, but are rather held solely by the Central Bank of Nigeria (Adofu & Abula, 2017). Governments use the debt instruments to borrow in order to close the resource gap between savings and investment. Alison (2013) explained three theoretical reasons for government domestic debt. They are budget deficit financing, monetary policy implementation (i.e., buying and selling of treasury bills in the open market), and development of the financial instruments to deepen the financial market.

2.3 Concept of External Debt

External debt is one of the sources of financing capital formation in any economy. Adepoju, Salau and Elijah (2017) noted that developing countries in Africa are characterized by inadequate internal capital formation due to the vicious circle of low productivity, low income, and low savings. Therefore, this situation calls for technical, managerial, and financial support from Western countries to bridge the resource gap. On the other hand, external debt acts as a major constraint to capital formation in developing nations. The burden and dynamics of external debt show that they do not contribute significantly to financing economic development in developing countries. In most cases, debt accumulates because of the servicing requirements and the principal itself. In view of the above, external debt becomes a self-perpetuating mechanism of poverty aggravation, work overexploitation, and a constraint on development in developing economies

(Nakatami & Herera, 2007).

Like most developing countries of the world, Nigeria relies substantially on external funds for financing its development projects – iron and steel mills, roads, electricity generation plants etc. Such external funding usually takes the form of external loans. In the early years of political independence (i.e. 1960 through 1975), the size of such loans was small, the rate of interest concessionary, the maturity was longterm, and the source was usually bilateral or multilateral in nature.

According to Ayadi and Ayadi (2018) and Ayadi, Toluwase, Ayadi and Chatterjee (2013), external debt burden had dramatically limited developing countries' participation in the world economy and the attendant debt servicing obligations continue to manifest as an impediment to economic growth and development.

2.4 Concept of Recurrent Expenditure

According to Modebe, Regina, Onwumere and Imo (2012), government expenditure is usually categorized into recurrent and capital expenditure. These are further broken down into their compositions. For instance, recurrent expenditure is composed of; administration (examples includes, general administration, defense, internal security); economic services (includes, agriculture, construction, transport, communication and among others); social and community services (includes, education, health, housing and among others); and transfers (includes, public debt charges or interests for both internal and external debts, pensions and gratuities, among others) (Olugbenga & Owoye, 2017; Ezirim & Ofurum, 2013).

Mohamed (2013) stressed that re-current expenditure is used for; determining income and expenditure, helps in policy making and planning, authorizing future expenditure, used for performance measurement and evaluation of managers versus employees, motivating both managers and employees, coordinating activities of multi-purpose of organizations and department among others.

3. Empirical Review

3.1 Domestic Debt and Recurrent Expenditure

Amayo (2019) investigated the long run relationship between public debt and the productive and non-productive components of expenditure (capital and recurrent expenditure). The study utilized the endogenous growth model to study this relationship. Annual time series data for public debt, capital expenditure, recurrent expenditure and interest rates were collected from various economic surveys and annual public debt reports between 1980 to 2015. Augmented dickey fuller and Philip Perron tests were used to test the stationarity of the data and the Johansen cointegration test was utilized to determine presence of long run relationship. Vector error correction model (VECM) was used for analysis since cointegration was established in the series. The results showed that there was a significant positive relationship between public debt and recurrent expenditure and a significant negative relationship between public debt and capital expenditure. It also found that the government of Kenya borrows heavily to finance its recurrent expenditure thus explaining the continued rise in the level of public debt. The study used annual time series of which the recent economic events might not be well captured, while this study used quarterly data to check for the effect of public debt on recurrent expenditure.

Ogwuma, Orikara and Uruakpa (2018) investigated the relationship between domestic public debts, capital expenditure and recurrent expenditure on economic growth in Nigeria using data spanning (1980 – 2016). Secondary data were collected from the CBN statistical bulletin and National Bureau of Statistics. Recurrent expenditure and capital expenditure were used as proxies for public expenditure and gross domestic product represents economic growth. The study made use of ordinary least square of multiple regressions. The adopted Augmented Dickey – Fuller (ADF) unit root test shows that, at level, none of the variables was achieved at first difference. The Johansen co-integration test results shows evidence of long run relationship of the variables. The study reveals that domestic public debt and recurrent expenditure have negative and insignificant effect on economic growth in Nigeria, while capital expenditure has a positive and significant effect on economic growth in Nigeria. The study recommends that government should only obtain public loans whose interest rates are very low in order to reverse the devastating effect of domestic public borrowing in its economy especially in the long run. Government should commit more of its funds to capital projects especially infrastructural development in order to boost its economic growth among others.

Ezebuilo (2015) examined the size of public expenditure in Nigeria. Analysis of public expenditure constitutes a central issue in public sector economics and public finance literature. Short-Run Error Correction Model and long-run static equation were used for comparing the influence of those variables on the size of government spending. The long-run static equation served as a test to compare short-run dynamics with the long-run relationships. Ordinary least squares (OLS) estimation technique was used. The stationarity tests showed that none of the variables was stationary at level form, but only after their first difference. The results of the study show that the size of revenue and growth rate of national income (output) and private investment significantly influence the size of public expenditure both in the short run and long run. External and domestic debts significantly influence the size of government expenditure only in the short run. It was recommended that the revenue base should be expanded; conducive environment should be created for private investment to thrive, and debt accumulation should be reduced and used for stabilization only in the short run. The conclusion to draw from the study is that revenue, private investment, and income boost public spending while public debts might be counterproductive.

Lora and Olivera (2006) assessed the effects of total public debt (external and domestic) on social expenditure worldwide and in Latin America using an unbalanced panel of around 50 countries for the period 1985-2003. The most robust and important finding is that higher debt ratios do reduce social expenditures, as popular opinion holds. This effect comes mostly from the stock of debt and not from debt service payments, indicating that debt displaces social expenditures not so much because it raises the debt burden, but because it reduces the room (or the appetite) for further indebtedness. Loans from multilateral organizations like the World Bank or the Inter-American Development Bank do not seem to ameliorate the adverse consequences of debt on social expenditures. In accordance with popular wisdom, our results indicate that defaulting on debt

obligations does help to increase social expenditures. Nonetheless, Latin America is different in some respects. The adverse effects of debt and debt-interest payments are significantly stronger in the region, which makes defaults more beneficial to social expenditures. While many of these conclusions are very heterodox, their main policy implication is not; there is no better way to protect social expenditures than to avoid over indebtedness, especially in Latin America.

3.2 External Debt and Recurrent Expenditure

Odo, Igberi and Anoke (2016) investigated the causal relationship between total public debt and public expenditure in Nigeria from 1980 to 2015.The focus of the study is to determine if government borrowing in Nigeria is based on the need to provide social services and infrastructure as provided in the budget or by mere reason of privileged access to financial institutions both domestically and internationally as posited by Adam Smith (1776) in his theory of public debt. Applying co integration, vector error correction model and Wald test econometric tools of analysis to public debt, government capital expenditure, government recurrent expenditure and interest rate variables within the study period, the study obtained the following results. The trace statistics indicates two (2) co integration equations at five percent (5%) level of significance, suggesting that there is a long run relationship among the variables tested and that the results can be relied upon in taking long run policy decisions in the economy. The findings of the VEC test indicate that government capital and recurrent expenditure has significant positive relationship with public debt in the Nigerian economy. The Wald test result shows that unidirectional causality runs from both capital and recurrent expenditure to public debt in Nigeria. An obvious implication of this result is that government borrowing in Nigeria is triggered by government deficit budgeting, a situation which is well known in Nigeria at both federal and state levels. It therefore becomes necessary that the government budgeting process need to be reexamined to ensure that allocative efficiency is achieved in our budgeting system and that borrowing to finance budget deficit must be done objectively and realistically. This study therefore recommends the introduction of planning-programming-budgeting systems (PPBS) and Zero based budgeting (ZBB) in preference to the current practice of incremental budgeting (IB) in our public finance at both federal and state levels as is the current global practice considering that these budgeting approach seeks to intensify competition for budget resources and consequently aids the realization of government fiscal policy goals in the economy.

Uguru (2016) studied the link between public debt and government expenditure in Nigeria from 1980 to 2013. Using data from Central Bank of Nigeria Statistical Bulletin for the years under consideration, the author estimated a model with public debt as the dependent variable and the independent variables were capital expenditure and recurrent expenditure respectively. The author made use of the ordinary least square estimation technique at 5% level of significance which revealed a significant relationship between public debt and government expenditure in Nigeria. Based on his result, he recommended the government of Nigeria to hurriedly reduce its recurrent expenditure and focus more on capital expenditure so as to meet the Vision 20:2020. He also suggested the need for diversification of the economy so as to reduce much reliance on crude oil proceeds and thereby reducing the tendency of the government contracting more debt obligation

Oluremi (2015) examined the causal relationship between public expenditure and national debt in Nigeria. The model was specified following Solow's growth model inspiration regarding granger causality test, with data on each variable ranging from 1981 to 2012. Augmented dickey fuller was used for stationarity test. Public expenditure is financed majorly by domestic debt, while external debt is not significant in the development of infrastructural facilities. Consequently, based on the results obtained and interpreted, the null hypothesis is rejected. Thus, from the foregoing, the study concluded that 'public expenditure granger causes domestic debt and Nigeria as a nation borrowed to finance their recurrent expenditure, though with high level of corruption and misappropriation of public funds and poor administration has impeded the growth of the sector but with inadequate investment on infrastructural facilities that can boost the revenue generated in order to balanced or surplus budget in the economy. In order to achieve meaningful development, the government expenditure must be wisely spent in other to make the country more productive. Most especially expenditure on infrastructural facilities should be increased in other to attract foreign investors and not to waste the money on heavy debt servicing annually.

Antra (2015) investigated the active nature of public expenditure components and public debt through an intertemporal optimization framework based on Chatterjee and Turnovsky (2007). He explained that public expenditure is classified as 'productive' and 'less-productive' based on the rationale that a percentage of the productive public expenditure corrects disequilibrium in the public debt in the long-run. He reported the 'second order' conditions from the model which stated that as physical infrastructure increases, the marginal social value of a unit of capital reduces, meaning that beyond its optimal level, an increase in physical infrastructure could still affect public debt inversely; however, this will be at the cost of 'crowding out' of private investment. He used Indian Public Finance data (1980-2013) to test the theoretical representation and analyses of the relationship between public expenditure and debt, using time series methods to discuss the hypothesis that capital expenditure of government is productive public expenditure. The result of the correlation, co integration and ECM shows that real capital expenditure is co integrated with real public debt of the Central and the General government and in the long run, real capital expenditure adjusts to bring real public debt on a convergent path. The amount of disequilibrium corrected is 0.01 and 0.035 for the Central and the Consolidated General Government respectively. He recommended that key policy implications towards increasing public capital expenditure in the Indian economy should be made while complementing it with private investment stimulus to stabilize public debt in the long run.

4. Theoretical Framework

4.1 Theory of Allocative Efficiency in Public Expenditure

This theory was propounded by Dunne and Smith in 1983. According to this theory, all financial plans ration resources

by allocating money for some uses and withholding it from other areas depending on the desired direction of the government in power. The efficacy of public programs depends on these allocations, but governments face numerous challenges to making accurate competent allocations in the economy. The main task of modern public expenditure management is to create the conditions that promote allocative efficiency. Allocative efficiency means the ability of government to allocate resources on the basis of the effectiveness of public programs in meeting its strategic target. This involves the power to transfer resources from previous priorities to new ones, and from less to more useful programs in the economy.

Allocative efficiency demands that the government establish and prioritize targets and that it assesses the real contribution of government spending to those set targets. To allocate efficiently government must be tactical and evaluative; it must both look ahead and identify what it wants to realize and look back to scrutinize the outcome. The relationship of deliberate planning and program appraisal to ongoing budget technique has been a regular issue in government expenditure management. Establishing a tight link has been a frequent theme in budget reform during the past half century in developing economies yet many governments have tried, only few have succeeded.

According to Khan and Murova (2015), measuring efficiency of public expenditures has considerable value for government: public expenditures constitute a significant percentage of domestic output with a direct impact on public policy involving services such as education, health care, public safety, transportation, and welfare. Public expenditure efficiency has been associated with the quality of institutions and good governance practices (e.g., controlling corruption and supporting transparency) (Borge, Falch & Tovmo, 2018; Rajkumar & Swaroop, 2008). Studies on efficiency have recently taken a variety of approaches, depending on the study's goals. Variables have consequently been added to equations (i.e., models) in an effort to have a well-designed model to measure and evaluate government spending on public services and programs such as education, health services, and defense (Aubyn, 2014; Mann & Sephton, 2015; Ouertani, Naifar & Ben Haddad, 2018; Rajkumar & Swaroop, 2008).

Michael Farrell is known for studying institutions in the 1900s; he argued that there are two types of efficiency: technical efficiency (TE) and allocative efficiency (AE). According to Farrell (1997), TE refers to the input-output relationship, and it reflects the ability to avoid waste by producing as much output as input usage would allow and, conversely, by using as little input as output production would allow, while AE reflects the optimal allocation of input factors. Many studies applied Farrell's concepts (i.e., technical efficiency and allocative efficiency) while exploring public spending efficiency (Hauner & Kyobe, 2010; Khan & Murova, 2015; Wang & Alvi, 2011). However, some scholars think Farrell's approach is suited to evaluate the efficiency of an organization's work and output more than the efficiency of a government's spending (Ghali, 2017; Rayp & Van De Sijpe, 2007).

The rate of failure had been soaring for the reason that striving for allocative efficiency increases informational burdens, transaction costs, and political conflict in an economy. Informational needs are higher because of the demand for additional facts on program impacts; political conflict escalates because of efforts to redistribute budgetary resources. The duty of modern public expenditure management is to improve allocative efficiency without overstraining the ability of government to process information and deal with conflict. Except information demands and budgetary conflict are manageable, governments may favor sub optimal allocations that permit them to muddle through the yearly financial plan exercises which has become an annual ritual in developing economies.

It is instructive to note that allocative efficiency cannot be achieved under the current incremental budgeting system in Nigeria, which promotes inefficiency and has the tendency to swell the size of the public sector. Incremental budget does not encourage fiscal discipline by supposing that expenditure will grow annually and thereby expanding the totals as such budgeting principle calls to question due process assumption in public finance. Consequently, recent developments in the field of public finance tend to favour planning-programming-budgeting systems (PPBS) and Zero based budgeting (ZBB) instead of incremental budgeting. PPBS gives budgeting a longer time period to grow its analytical capacity while zero based budgeting seeks to redistribute resources within the context of initial programs and expenditure. Even though the duo are procedurally different, both PPBS and ZBB seek to intensify competition for budget resources while PPBS provides information on the cost effectiveness of alternative means of realizing government goals, ZBB strives to have every spending unit prepare alternative budgets each with incremental resources and output.

The efficiency of government expenditure could bring about judicious use of borrowed funds which could be domestic debt or external debt. This could also bring about reduction in government debts since there will not be double spending on a particular government expense. This theory underpinned this study.

5. Methodology

The research design adopted for this study is ex post facto design. This study uses quarterly time series data covering the period 2010Q1 to 2021Q1 (Appendix 1). The variables of the study are domestic debt, external debt and recurrent expenditure. Data for the study was obtained from the Central Bank of Nigeria Statistical Bulletin. Descriptive statistics was used to explain the data. A stationarity test was conducted to test for the presence of unit root in the time series data. In addition, co-integration test was conducted to investigate possible correlation among the variables of this study. A vector error correction model was also used: Vector error correction model is a restricted type of VAR designed for use of non-stationary series that are known to be co-integrated. The data obtained was also analyzed using Wald test through Eviews 10 Statistical Package. The analysis process of this study follows the following steps:

The Phillips-Perron (PP) unit root test was employed to determine the order of integration of the variables in an attempt to establish stationarity level of the variables. The PP unit root test is conventionally said to have greater unit root detection ability when compared with the ADF unit root test. The PP test is thus preferred to the Augmented Dickey Fuller (ADF) because it deals with potential correlated error by employing a correction factor that

estimates the long run variance of the error process.

$$\Delta y_{t-1} = \alpha_0 + \lambda y_{t-1} + \ldots + \lambda y_{t-p} + \varepsilon_t$$

Cointegration

Pesaran, Shin and Smith (2001) developed ARDL bound tests using the F-Bound test. The F-statistics is compared with the critical values, which are the lower bound and the upper bound critical values. The comparison help test for the presence of cointegrating vectors between domestic debt, external debt and recurrent expenditure.

$$\Delta Y_t = \mu + \sum_{i=1}^{n-1} \Gamma i \Delta Y_{t-i} + \sum_{i=0}^{m-1} \gamma i \Delta X_{t-i} - ECM_{t-1} + \varepsilon_t$$

where Δ is the first difference operator, Y_t is a p x 1 vector of stochastic variables, X_t is the independent variable, ECM is the error-correction coefficient and is also called the adjustment coefficient, l is a vector of constants, and ε_t is a vector of normally, independently, and identically distributed errors with zero means and constant variances and p is number of variables.

Error Correction Model

Granger (1987) showed that if two variables are cointegrated, then they have an error correction representation. The Error Correction Model (ECM) provides information about the long run, short run relationship as well as the speed of adjustment between the variables in incorporating to the estimated equation, the error correction term (ECT).

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \lambda \hat{u}_{t-1} + Y_t$$

The model is specified as follows:

REX = f (DD, ED) ……………………………………………………….. (1)

The econometric form of equation (1) is represented as:

$$REX_t = \alpha + \beta_1 DD_t + \beta_2 ED_t + \mu_t \quad \ldots\ldots (2)$$

Where: DD = Domestic Debt; ED = External Debt; REX = Recurrent Expenditure; α =Intercept or Constant; β = Slope of the regression line with respect to the independent variables; μ=Error Term. The Cointegration model of the study is represented by:

$$\Delta REX_t = \mu + \sum_{i=1}^{n-1} \Gamma i \Delta REX_{t-i} + \sum_{i=0}^{m-1} \gamma_1 \Delta DD_{t-i} + \gamma_2 \Delta ED_{t-i} + ECM_{t-1} + \varepsilon_t \quad \ldots\ldots (3)$$

Where: DD = Domestic Debt; ED = External Debt; REX = Recurrent Expenditure; and ECM = Error-correction coefficient; ε = Error term; Δ = First difference operator; μ =Intercept or Constant; $_{t-i}$ = Time lagged; γ_1– γ_2= Coefficient of independent variables.

6. Results and Discussion

The data presented in appendix 1 were analyzed using descriptive statistics, unit root test, ARDL bound test cointegration, error correction model, Wald test, while post estimation analysis such as serial correlation test, heteroskedasticity, normality test and Cusum test were also carried out.

Table 1: Descriptive Statistics.

	REX	DD	ED
Mean	400156.4	9521755.	4016000.
Maximum	918785.0	16513929	12705618
Minimum	119305.5	3466360.	640392.5
Std. Dev.	182568.3	3748628.	3749857.
Observations	45	45	45

Source: Eview version 10 output

The table above reveals that recurrent expenditure having a mean value of 400156.4, meaning that Nigerian government spent an average recurrent expenditure of N400156million for the period under consideration, while the deviation from the mean (standard deviation) was 182568.3. This means that recurrent expenditure is normally distributed because the standard deviation value was lower than the mean value. The maximum recurrent expenditure within the period of this study was 918785. This implies that the highest recurrent expenditure is not more than N918785million within the 45 quarters. The table shows the minimum value to be N119306million.

Table 1 also shows that the domestic debt had mean value of N9521755million while the deviation from the mean was N3748628million. This indicates that the domestic debt is normally distributed. The maximum value within the period under consideration was 16513929, implying that the highest level of domestic debt was not more than N16513929million. While the minimum value was N3748628million indicating the lowest level of domestic debt.

Finally, external debt had mean value of N4016000million while the deviation from the mean was N3749857million. This indicates that the external debt is normally distributed. The maximum value within the period under consideration was 12705618, implying that the highest level of external debt was not more than N12705618million while the minimum value of N640392.5million indicates the lowest level of external debt.

Table 2: Unit Root Test.

Variables	Adj. T-Statistic	Prob. Values	Order of Integration
REX	-7.695393	0.0000	I(0)
DD	-5.714349	0.0001	I(1)

ED	-6.154889	0.0000	I(1)

Source: Researcher's Computation 2021.

To examine the existence of stochastic non-stationarity in the series, the research establishes the order of integration of individual time series through the unit root tests. The test of the stationarity of the variables adopted was Phillips-Perron (PP) test. The variables tested are REX, DD and ED with results as presented in Table 2 above.

From Table 2, it can be seen that REX was found to be stationary at level, that is, at order I (0). While DD and ED were found to be stationary at first difference, that is, at order I (1). The PP test statistics are greater than their respective tabulated values and their p-values are all below the 0.05 significant level for this study. Since the variables were found stationary at level I (0) and first order I (1), the Bound test approach to co-integration is applied to determine the long run relationship among the variables.

Table 3: ARDL Bound Test.

ARDL Long Run Form and Bounds Test				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I (1)
			Asymptotic: n=1000	
F-statistic	9.449520	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5

Source: Extract of Eview 10 output

The decision criteria is: if the value of the F-statistics is lower than the I (0) bound we cannot reject the null hypothesis of no cointegration, but if the F-statistics is higher than the values of the I(1) bound we reject the null hypothesis. In this study we obtained 9.449520 F-statistics which is greater than the I (0) bound values of 2.63 (10%), 3.1 (5%), 3.55 (2.5%), 4.13 (1%) and I(1) bound values of 3.35(10%), 3.87 (5%), 4.38(2.5%), 5(1%). Since the F-statistics was greater than I (1) bound values of 10%, 5%, 2.5% and 1% we reject the null hypothesis that there is no cointegration. Therefore, this means that there is longrun relationship among Recurrent expenditure, Domestic Debt and External Debt. Which implies that the series are related and can be combined in a linear fashion, that is, even if there are shocks in the short run, which may affect movement in the individual series, they would converge with time (in the long run).

Table 4: ARDL Error Correction Regression.

ARDL Error Correction Regression				
ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REX(-1))	0.269771	0.146458	1.841969	0.0761
D(DD)	0.077803	0.047291	1.645204	0.1111
D(DD(-1))	-0.071872	0.053364	-1.346820	0.1888
D(DD(-2))	-0.074338	0.053385	-1.392500	0.1747
D(DD(-3))	0.125437	0.051718	2.425414	0.0220
D(ED)	-0.025609	0.040542	-0.631677	0.5327
D(ED(-1))	0.079375	0.042948	1.848155	0.0752
D(ED(-2))	-0.124243	0.040722	-3.051029	0.0049
D(ED(-3))	0.089993	0.038894	2.313804	0.0282
CointEq(-1)*	-1.531017	0.236670	-6.468993	0.0000
R-squared	0.827931	Mean dependent var		14753.76
Adjusted R-squared	0.777975	S.D. dependent var		170542.7
S.E. of regression	80358.91	Akaike info criterion		25.63461
Sum squared resid	2.00E+11	Schwarz criterion		26.05256
Log likelihood	-515.5096	Hannan-Quinn criter.		25.78681
Durbin-Watson stat	1.919363			
* p-value incompatible with t-Bounds distribution.				

Source: Eview Version 10 Output, 2021

The cointegrating equation as indicated by cointEq(-1) met the two attributes of the error correction model which are it should have a negative coefficient as shown by – 1.531017 and the p-value should not be more than 0.05 as shown by 0.0000. In other to ascertain the contribution of each of the independent variables (i.e. Domestic Debt and External Debt) on the dependent variable (Recurrent Expenditure) the study went further to carry out Wald test.

Wald Test for Testing Individual Hypothesis

Table 5: H_{01}: Domestic debt has no significant effect on recurrent expenditure in Nigeria.

Wald Test:		

Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	2.488046	(5, 28)	0.0551
Chi-square	12.44023	5	0.0292
Null Hypothesis: C (3) =0, C(4)=0,C(5)=0, C(6)=0,C(7)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(3)		0.077803	0.055757
C(4)		-0.118362	0.084025
C(5)		-0.002466	0.086223
C(6)		0.199775	0.087957
C(7)		-0.125437	0.060146
Restrictions are linear in coefficients.			

Source: Eview Version 10 Output, 2021

From the Wald test used for testing the effect of domestic debt, it was evident that domestic debt has insignificant effect on recurrent expenditure because the p-value was 0.0551 which is a bit higher than 0.05, though significant at 0.10. Domestic debt also had F-statistics of 2.488046. Therefore, the study accepts the null hypothesis (H_{01}) which states that domestic debt has no significant effect on recurrent expenditure in Nigeria.

Table 6: H_{02}: External Debt has no significant effect on the recurrent expenditure in Nigeria.

Wald Test:			
Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	3.970579	(5, 28)	0.0076
Chi-square	19.85290	5	0.0013
Null Hypothesis: C(8)=0,C(9)=0,C(10)=0, C(11)=0,C(12)=0			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(8)		-0.025609	0.048417
C(9)		0.134274	0.071454
C(10)		-0.203618	0.070334
C(11)		0.214236	0.066379
C(12)		-0.089993	0.054290
Restrictions are linear in coefficients.			

Source: Eview Version 10 Output, 2021

From the Wald test used for testing the effect of external debt, it was evident that external debt has significant effect on recurrent expenditure because the p-value was 0.0076 which is less than 0.05. External debt also had F-statistics of 3.970579. Therefore, the study rejects the null hypothesis (H_{02}) which states that external debt has no significant effect on recurrent expenditure in Nigeria.

Table 7: Post Estimation Test.

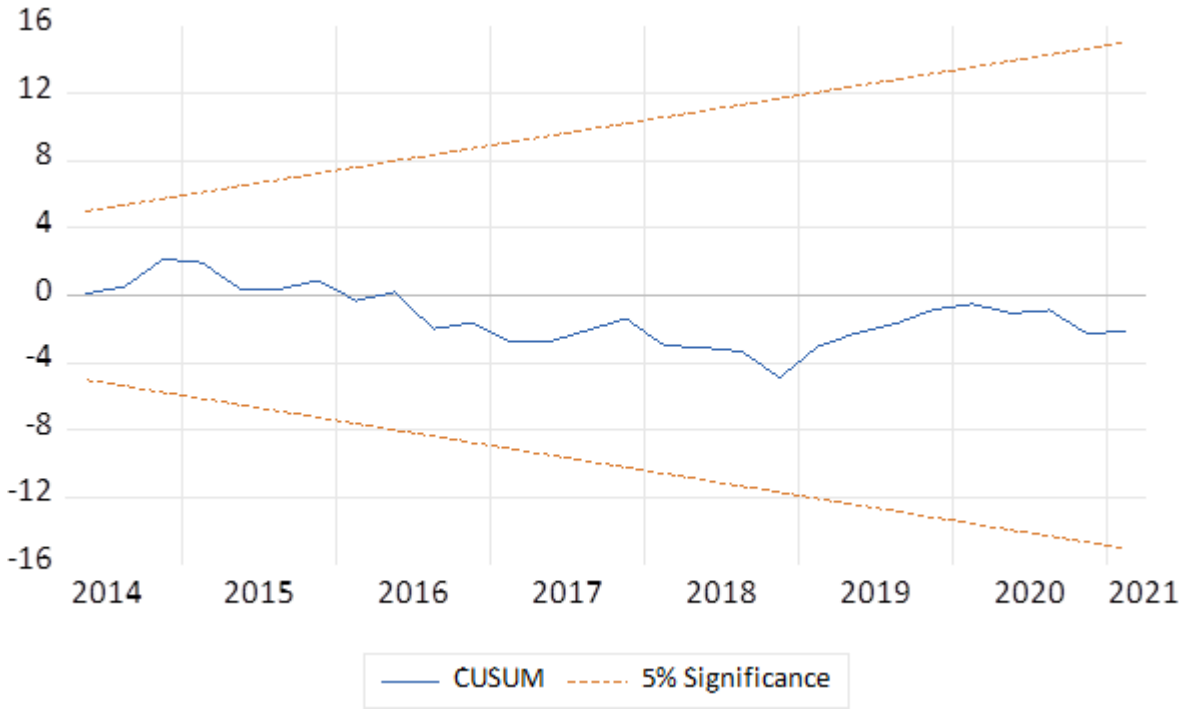
Description	Probability values
Normality Test:	
Jarque-Bera	2.169308
P-value:	0.338019
Serial Correlation	
F-statistics	1.368428
P-value	0.2722
Heteroskadasticity Test	
F-statistics	0.716300
P-value	0.7235

Source: Researcher's computation, 2021

Table 7 above indicates that the data is skewed, denoting that the data are normal. This is corroborated by the Jarque-Berra Statistic of 2.169308 and its corresponding P-value of 0.338019 which are all greater than the p-value of 0.05.

The Breusch-Godfrey Serial Correlation LM Test indicates that there is no autocorrelation. This is given by the F-statistic of 0.716300 and its corresponding P-value of 0.2722. The Breusch Pegan Test of Heteroskedasticity given the F-statistics 2.045294 and its corresponding P-value of 0.0637 indicates that there is no problem of heteroskedasticity.

Fig. 8: CUSUM TEST.



Source: Eview Version 10 Output, 2021

The stability of the model was checked using the CUSUM test and it shows that the model is stable as it is within the 5% boundary.

7. Conclusion and Recommendations

This study examined the effect of public debt on recurrent expenditure in Nigeria for the period 2010Q1 to 2021Q1. Based on the findings of the study, it can be concluded that there is an existence of longrun equilibrium relationship between public debt and recurrent expenditure in Nigeria. The study concludes that domestic debt has no significant effect on recurrent expenditure, which is in line with the findings of Ogwuma, Orikara and Uruakpa (2018). This means that domestic debt as an index of public debt in Nigeria do not influence a proportionate increase in the recurrent expenditure. The study also found out that external debt has significant effect on recurrent expenditure, which is in tandem with the findings of Ezebuilo (2015). This implies that the increase in external debt will increase the recurrent expenditure.

Based on the findings of this study, it is recommended that government should only obtain public loans whose interest rates are very low in order to reverse the effect of domestic public borrowing in its economy especially in the long run. Also, the government should try and reduce the debt burden used in financing recurrent expenditure as they might find it hard to repay back in the future.

Appendi

8. Appendix I

Period	Recurrent Expenditure	Domestic Debt	External Debt
Mar-10	193,814.50	3,466,360.00	644,992.56
Jun-10	247,165.70	3,764,763.71	640,392.45
Sep-10	119,305.50	4,229,625.34	686,242.86
Dec-10	313,880.91	4,551,822.39	689,845.27
Mar-11	160,871.70	4,869,023.90	799,922.64
Jun-11	268,302.10	5,210,437.26	827,562.18
Sep-11	309,748.80	5,317,995.95	879,681.28
Dec-11	394,177.90	5,622,843.71	896,832.62
Mar-12	239,286.00	5,966,769.46	931,617.46
Jun-12	245,434.90	6,152,874.74	950,612.83
Sep-12	226,548.00	6,346,041.32	990,625.54
Dec-12	281,177.00	6,537,536.31	1,026,888.91
Mar-13	204,541.00	6,493,318.88	1,049,354.29
Jun-13	215,848.00	6,850,748.74	1,088,583.63
Sep-13	309,347.00	7,032,883.32	1,300,042.66
Dec-13	502,802.50	7,118,978.85	1,387,305.53
Mar-14	272,516.00	7,183,176.75	1,441,791.11
Jun-14	267,335.00	7,421,097.30	1,460,300.00
Sep-14	241,836.00	7,651,098.50	1,497,402.23
Dec-14	331,998.00	7,904,025.47	1,647,838.84
Mar-15	476,585.00	8,507,540.00	1,864,429.67

Jun-15	213,290.00	8,396,590.00	2,031,897.80
Sep-15	281,129.00	8,612,228.36	2,091,087.08
Dec-15	478,418.00	8,836,995.86	2,111,530.71
Mar-16	374,490.00	9,970,053.22	2,205,346.05
Jun-16	283,622.00	10,606,334.22	3,187,114.87
Sep-16	352,890.00	10,845,220.00	3,535,585.60
Dec-16	393,239.00	11,058,210.00	3,478,915.40
Mar-17	614,188.00	11,971,336.53	4,229,955.20
Jun-17	405,930.00	12,033,450.02	4,602,877.30
Sep-17	345,409.00	12,495,784.04	4,693,913.75
Dec-17	715,557.00	12,589,486.13	5,787,512.64
Mar-18	550,977.00	12,576,758.18	6,746,279.29
Jun-18	385,205.00	12,151,437.66	6,752,011.78
Sep-18	604,136.00	12,286,812.35	6,614,611.17
Dec-18	441,146.00	12,774,405.70	7,759,229.99
Mar-19	594,265.00	13,113,420.78	7,860,875.93
Jun-19	418,940.00	13,412,796.09	8,322,629.83
Sep-19	756,455.00	13,901,546.03	8,271,040.50
Dec-19	542,178.00	14,272,644.79	9,022,421.64
Mar-20	653,792.00	14,534,746.84	9,987,300.00
Jun-20	607,578.00	15,455,699.13	11,363,243.93
Sep-20	741,761.00	15,846,230.77	12,186,349.77
Dec-20	511,138.00	16,023,885.38	12,705,618.48
Mar-21	918,785.00	16,513,929.18	12,470,366.21

Source: CBN statistical bulletin 2021

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