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IMPACT OF PUBLIC DEBT ON ECONOMIC GROWTH: EVIDENCE FROM VECM IN NIGERIA, 1981-2021.

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Abstract
Public debt is one of the major challenges facing developing economies. The paper examines the impact of public debt on economic growth in Nigeria from 1981 and 2021. The study employed Johansen co-integration test within Vector Error Correction Model (VECM). Granger Causality test were also used in detecting the causal relationship among the study's variables. The Findings of the Johansen co-integration result reveals presence of long run relationship amongst the variables. The VECM result indicates that; log of External Debt (LEDEBT) exhibit negative impact by -0.9% and -0.003% decrease in GDP in the long run and short run periods respectively. In the same vein, log of domestic debt (LDDEBT), shows a long run positive impact on Nigeria's GDP but in the short run; LDDEBT lead to -0.052% decrease in GDP. Accordingly, the result of the Granger causality test exhibit presence of causality effect running from LEDEBT and LDDEBT to GDP in the long run with no causal effect in the short run, Therefore, the study recommends that, government should refrain itself from excess borrowing externally and lay emphasis on utilizing the domestic barrowings to finance capital and recurrent expenditure which will eventually foster economic growth.

Keywords: Co-integration, Domestic Debt, Economic Growth, External Debt and VECM

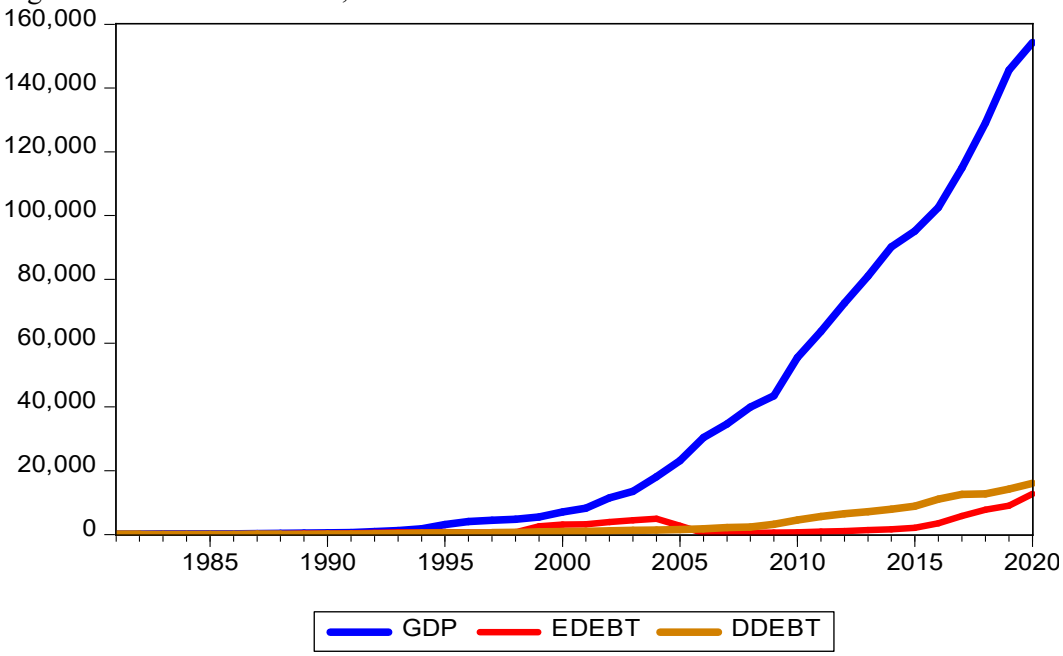
1.0 Introduction

One of the major challenges facing developing countries is the issue of their growing public debts profile. Servicing and repayment of the debt may create problems towards growth of those countries. Thus, the amount spend on debt service is large enough in such a way that,

countries could otherwise utilize it in financing their growth projects. Hence, high debt servicing and repayments may therefore, leads to constraints country's growth scenario as opined by Al-Zeaud, (2014). Arguably, various scholars are against budget deficit financing through public debt, this is due to its deteriorating impact on growth. Though, Bilan and Ihnatov (2015) asserted that most of the extraordinary growth in the developing countries since 1950's can be described as debt-related growth**,** especially when the debt resources are used to finance public investment expenditure, but when the debt is high enough it can adversely affect economic growth.

Over the years, Nigeria financed its budget deficit through public debts with the aim of achieving the desired level of economic growth and development despite the lack of consensus whether such debt can help in achieving the stated objective. The nature of the Nigeria's public debt trend is depicted below:

Figure 1.1 the Trend of GDP, LDDEBT and LEDEBT in billions of Naira.



Source: Authors computation using eviews 10.

The trend nature of the Nigeria's public debt from the above figure 1.1 illustrated that, from the year 1995, Nigeria's external debt increases until it reaches the year 2005, this was resulted from debt relief of 2005. From 2005 Nigeria's domestic debt increases more than

the external barrowing up to the year 2020. On the other hand, GDP is increasing throughout the period of the study see (Debt management office report, 2021).

Accordingly, data from Central Bank of Nigeria (CBN, 2021), Nigeria's total public debt was ₦39,556,032.50 million as at December 31, 2021 while as at December 31, 2020 it was ₦32,915,514.85 million. This means that, Nigeria's public debt rose by ₦6,640,517.65 million which represent 16.79% increase in one year. The external debt component of the nation at the same time were ₦15,855,231.25 million and ₦12,705,618.48 million respectively representing the increase of ₦3,149,612.77 which is 19.86% increase in one year. Likewise, the domestic debt component owed as at the end of December 2021 it was ₦23,700,801.25 million while as at December 31, 2020 was ₦20,209,896.37 million representing ₦3,490,904.88 million which is 14.73% increase in one year.

Thus, the question that begs for an answer between financing the deficit through external public debt or domestic public debt has continued to attract the attention of scholars and policy makers. In Nigeria, there are several studies related to this important area. However, the major problem with their studies is that, the findings were mostly contradicting. The contradiction is that, some scholar's claims negative relationship between domestic debt and economic growth (Okon, Maji, Clement & Denies, 2013; Uma, Eboh & Obidike, 2013) on the other hand, Egbetunde (2012) found positive relationship between domestic debt and economic growth. Similarly, on the issue of the external debt, Ekperiware and Oladeji, (2012) found positive relationship between external debt and economic growth. But Uma, Eboh and Obidike (2013) observe negative relationship between economic growth and external debt.

Furthermore, previous researches gave little emphasis to the dynamic nature of the effect of public debt on economic growth taking into account domestic and external debt separately in order to examine variation in their influence on economic growth. This study will fill in the literature gaps by disaggregating public debt into domestic and external debts and employs non-theoretical Vector Error Correction Model (VECM) to analyze the relationship between public debt and economic growth in Nigeria. This study will therefore empirically examine the impact of public debt on Nigeria's economic growth. Specifically, this study would also examine the dynamic impact and explore relationship between public debts on the economic growth in Nigeria using annual time series data from 1981 to 2021.

Consequently**,** this paper is structured in to five sections. Following the introductory section, is section two which is literature review, methodology is the section three, while

section four is the result and discussions. Section five is the conclusions and recommendations of the paper.

2.0 Literature review

This comprises the conceptual, theoretical and empirical review of the literatures, followed by the establishing the literature gap of the study

2.1 Conceptual Literature

In this section the concept of public debt and economic growth were discussed.

2.1.1 The Concept of Public Debt

Debt has no precise fixed meaning and may be regarded essentially as that amount which person, organisaton, state or nation legally own to another. Kwaba and kosimbei (2015) describe public debt as the level of debt liabilities owed by a government to its creditors. Public Debt is a specified amount owed to lenders outside or within the debtor's country (Ikudayisi, Akin-Olagunju, Babatunde, Irhivben and Okoruwa, 2015).

External debts are economic obligations taken from elements outside the country on behalf of a sovereign state by its government while domestic debts are financial contracts entered into by government or its representatives within the walls of a country. It might come in terms of bonds and Treasury bill issuance (Ikudayisi, Akin-Olagunju, Babatunde, Irhivben and Okoruwa, 2015).

2.1.2 The Concept of Economic Growth

Economic growth is defined by Haller (2012) as an increase of the national income per capita, and it involves the analysis, especially in quantitative terms, of this process, with a focus on the functional relations between the endogenous variables; in a wider sense, it involves the increase of the GDP, GNP and NI, of the national wealth, including the production capacity, expressed in both absolute and relative size, per capita, encompassing also the structural modifications of economy. Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percent rate of increase in real gross domestic product, or real GDP. Of more importance is the growth of the ratio of GDP to population (GDP per capita, which is also called per capita income).

2.2 Theories of Debt Overhang and Crowding in/out Hypothesis

Numerous economic theories were established in understanding the nexus between public debt and economic growth, for the purpose of this study, the theory of Debt Overhang and crowding in/out hypothesis were used.

2.2.1Theory of Debt Overhang

Krugman and Obstfeld (2003), defines debt overhang as a situation in which investments are reduced or postponed since the private sector anticipates that the returns from their investment will serve to payback creditors. Implying that, the expected future public debt service of a country is likely to be an increasing function of the Country's output level. However, the burden of debt distorts the country's incentives, since the benefits of good performance go largely to creditors rather than itself (Krugman, 1988). The debt or country shares only partially in any increase in output and exports because a fraction of that increase will be used to service the external debt. The theory implies that debt reduction will lead to increased investment and repayment capacity and, as a result, the portion of the debt outstanding becomes more likely to be repaid.

2.2.2 Theory of Crowding in/out Hypothesis

Crowding in suggests that huge Government spending directed towards production of capital goods can potentially increase the stock of public capital investment and thus crowd in private sector participation. Undertaking such projects would require Government to issue debt instrument or raise taxes (Piana, 2001). On the other hand, according to Elmendorf & Mankiw (1999), the implication of huge borrowings by the Government is an increase in interest rates. The increase in interest rates may reduce or crowd out private-sector investments in plants and equipment. This decline in investment means that the overall economy has a smaller capital stock with which to work which then decreases future growth rates.

2.3 Empirical Literature Review

Numerous scholars have empirically investigated the association between public debt and economic growth in the developing and developed countries on multidimensional approaches. Interestingly, evidence so far does not provide a clear consensus regarding debt-GDP relationship. Henceforth, those studies were found to be conflicting or contradicting. For instances; Veronica (2021) examines the impact of public debt on economic growth in Nigeria using annual time series data from 1990 to 2019 collected from Central of Nigeria statistical bulletin. The variables are Real GDP, public debt, Inflation, debt to GDP ratio, debt servicing to GDP ratio, and exchange rate. Vector error correction model was employed and empirical results showed that the impact of public debt

on economic growth was negative and significant in the long run. The impact of public debt on economic growth was negative but insignificant in the short run. In addition, the impact of ratio of debt servicing to GDP was significant and negative in the short and long run. There was no causality between public debt and economic growth. Contrarily, Efanga, Etim and Jeremiah (2020) studied the impact of public debt on economic development in Nigeria from 1981 to 2018. They employed autoregressive distributed Lag (ARDL) model to analyze data source from Central Bank Statistical Bulletin and World Bank Database. The inferential results suggested that public debt had positive and significant impact on economic development in Nigeria. This means that both domestic and external debt were found to have positive and significance impact on Nigeria's economic growth.

Alagba and Eferakeya (2019) analyze the effect of domestic debts on the economic growth in Nigeria from 1981 to 2018. The study used ordinary least square method (OLS) and the findings showed that the effect of domestic debts on economic growth is positive and statistically significant in Nigeria while foreign debts contribute less to the economic growth of the country. Cost of debts servicing is significant and has a negative effect on economic growth.

Similarly, Sunday and Haruna (2019), examined the optimal point beyond which government debt impairs economic performance in Nigeria. Dynamic Ordinary Least Square (DOLS) method was employed to estimate the magnitude of the coefficients. The results showed a significant relationship between government debt and Nigeria's economic performance. Thus, government debt is growth-enhancing at low levels but growth-retarding at a high level with the optimal government debt estimated as 9.98% of the gross domestic product (GDP). This implies that borrowing beyond such a limit becomes growth retarding in the economy.

Similarly, Sunday, Ngozi, Michael and Ogochukwu (2016) examined the impact of public sector borrowings on prices, interest rates, and output in Nigeria. The study employs Vector autoregressive and Granger causality test. The findings reveal that shock to external debt stock increases prime lending rate, but with a lag. However, the level of external and domestic debt over the period of this study had no significant impact on the general price level and output.

On the other hand, Blake (2015) investigates the impact of public debt on economic growth using quarterly data from 1990 to 2014. They employ an autoregressive distributed-lag model (ARDL), which jointly captures both short-run and long-run effects. The results suggest that public debt has a non-linear impact on economic growth both in the long and

short runs as indicated by the statistical significance of the non-linear variable. Furthermore, in the long-run, at low levels of debt, economic growth increases by 0.06 per cent after a one percentage point increase in the ratio of debt to GDP, while at high levels of debt, a one percentage point increase in the ratio of debt-to-GDP reduces economic growth by 0.02 per cent. Similarly, in the short-run, at high levels of debt, economic growth is reduced by 0.04 per cent after a one percentage point increase in the ratio of debt-to-GDP, while at low levels of debt, a one percentage point in ratio of debt to GDP increases GDP by 0.19 per cent. The results also indicate that ratios of debt to GDP in excess of 100 per cent have a negative and statistical significant impact on economic growth. The Granger causality tests indicate that there is no bi-directional causality between the public debt and economic growth.

Similarly, Al-Zeaud and Al-awawdeh (2014) investigated the causal relationship between public debt and economic growth in Jordan. They used annual time-series data from 1990 to 2012. Co-integration and causality tests were used to access the relationship among the variables. The result of the study revealed that, there is a unidirectional causality running from GDP to Debt and not vice versa at 5% level. This means higher Debt would not lead to higher GDP and also GDP would not lead to higher Debt. The result of the regression reveals that GDP, budget deficit, and inflation rates positively affect debt while exchange rates and interest rates negatively affect interest rates.

Furthermore, Ngereboa (2014) empirical examined the relationship between domestic debt and poverty in Nigeria from 1986-2012, Ordinary Least Square Technique, Vector Auto regression (VAR), and Granger Causality Approaches were employed. The result shows that a 1% increase in domestic debt will result in about 15% increase in RGDP or about 15% reduction in the poverty level in Nigeria. Further, the result on pair wise Granger causality reveals that there is no directional relationship between real gross domestic product and domestic debt. In other words, the domestic debt is not much a major predictor of Nigeria's poverty level. Therefore, the empirical result shows that debt has positive effect on poverty.

2.4 Literature Gap

The major gaps discovered in the literature were, some researchers uses GDP at constant basic prices while some choses per capita or nominal GDP as a proxy of economic growth. Therefore, this research uses GDP at constant basic price as proxy of economic growth, for the public debt, this research uses the disaggregation form of the domestic debt and external debt as vector composition to represent public debt, LTGREXP and LTGRCEXP were controlled on GDP which were not been used in the literature investigated in this research.

More so, most of the studies used OLS, ARDL and VAR in their research creating gap by employing VECM which previous researches gave little emphasis and have not been used clearly in their studies. In addition the time gap is here by established through an update in the study from 1981 to 2021.

3.0 Methodology

This paper investigated the impact of public debt on economic growth in Nigeria, Annual time-series data sourced from the central Bank of Nigeria (CBN) statistical bulletin were used. The data spans from 1981-2021. Vector error correction model is applied for the study. Economic growth is proxied by GDP at constant basic prices, Public debt is proxied by the composition of domestic and external debt, while total government recurrent and capital expenditure are additional control variables that may influences economic growth, all the variables were expressed in billions of Naira.

3.1 Sources of Data

The study employed secondary data on annual bases covering the period of 1981 to 2021. The data of all the variables were obtained from the central bank of Nigeria (CBN, 2021) statistical bulletin. The study contains 48 observations which are reasonably sufficient to perform time series method of estimation.

3.2 Model Specification and Measurement of Variables

The study have adopted the regression model used in the of Umaru, Hamidu and Musa(2013), Atique and Malik (2012) with inclusion of additional variables of interest, thus the model of this study will also be modified by inclusion DDEBT, EXTDEBT TGREXP AND TGCEXP on economic growth. Government Recurrent and Capital Expenditure were used as control variable due to their influence on economic growth over time, this surfaces from the previous research of (Chandana, Adamu and Musa, 2021). Therefore, the variables used in the model of the study is specified in logarithmic form as follows;

The functional model:

$$GDP = f(DOMDEBT, EXTDEBT, GCEXP, GREXP) \quad (1)$$

The functional model equation (1) is transformed into mathematical log form model below

$$lGDP_t = \alpha_0 + \alpha_1 lDDEBT + \alpha_2 lEXTDEBT_t + \alpha_3 lTGCEXP_t + \alpha_4 lTGREXP_t \quad (2)$$

The mathematical model equation (2) is also transformed into econometric model equation as;

$$lGDP_t = \alpha_0 + \alpha_1 lDDEBT + \alpha_2 lEXTDEBT_t + \alpha_3 lTGCEXP_t + \alpha_4 lTGREXP_t + \mu_t \quad (3)$$

The econometric model is respecified in to Vector error correction model and specified below

The VECM Model:

$$\Delta\, lGDP_t = \alpha_0 + \sum_{i=1}^{k-1} \alpha_1\, \Delta lGDP_{t-i} + \sum_{i=1}^{k-1} \alpha_2\, \Delta lDDEBT_{t-i} + \sum_{i=1}^{k-1} \alpha_3\, \Delta lEXDEBT_{t-i} + \sum_{i=1}^{k-1} \alpha_4\, \Delta lTGCEXP_{t-i} + \sum_{i=1}^{k-1} \alpha_5\, \Delta lTGREXP_{t-i} + \lambda_1\, ECT_{t-i} + \mu_{1t} \quad (4)$$

Where; (GDP) growth domestic product as proxy of economic growth, (TDDEBT) total domestic debt and (TEDEBT) total external debt, (TGCEXP) government capital expenditure, (TGREXP) government recurrent expenditure and l is the natural log of the variables.

4.0 Results and Discussion

4.1 Method of Data Analysis

The techniques of time series analysis employed in this study include; the unit root test, Lag length selection criteria, Johansen Co-integration techniques, vector Error Correction Model (VECM) causality test along line with their corresponding diagnostic test. Eviews 10 statistical package was used throughout the estimation procedure. Unit root test is used to check whether a time series is stationary or not (Brooks, 2014). For this study the Augmented Dickey Fuller (ADF) and Phillip Perron (PP) unit root test is applied. The choice ADF is informed by its effectiveness in taking care of serial correlation by using lag values of the dependent variable while the PP is an alternative way of unit root test that use nonparametric statistical method to take care of the serial correlation in the error terms without adding lagged difference terms (Gujarati, 2003). In addition, the research uses the AIC criteria (-3.007) which is lesser than the respective SC (1.611) and HQ (-1.395). On the other hand, Cointegration Tests based on Vector autoregressive (VAR) was conducted in case of non-stationary series to ensure long-run relationships among the multi-variate framework, taking into consideration the probability of detecting one or more co-integrating vectors using either Trace test (TR) or Maximum Eigenvalue Test (L-Max) (Brooks, 2014). Vector Error Correction Model (VECM) is a restricted vector autoregressive (VAR) model that is within cointegration framework and it take care of both short-run and long-run relationship among the variables. The speed of adjustment from short-run to long-run was also measured by the estimated ECM. Furthermore, Causality Wald test block exogeiniety is employed to know the direction of relationship among the variables of the study. Finally, Diagnostic tests were also followed for robustness purpose.

4.2 Unit root Test for the variables

To avoid spurious regression, unit root test is employed which is mandatory in ensuring and ascertaining the stability of the data, ADF and PP unit root were used in the study.

Table 1: Unit root result

Variables	ADF STAT	Critical Values at 5%	PP Stat	Critical Values at 5%	Order of Integ.
LGDP	-3.335	-2.941	-3.254	-2.941	I(1)
LEDEBT	-3.2454	-2.941	-4.793	-2.941	I(1)
LDBEBT	-4.611	-2.941	-4.611	-2.941	I(1)
LTGCEXP	-6.357	-2.941	-6.357	-2.941	I(1)
LGREXP	-8.394	-2.941	-8.331	-2.941	I(1)

Source: Authors computation using Eviews 10

From table 1 of the unit root result, all the variables (LGDP, LEDEBT, LDDEBT, LTGCEXP and LGREXP) are non-stationary variables, that is; I(1), for stationarity to exits, the decision rule established that; the statistic values of the ADF & the PP must be greater than the critical value at all levels, going by the output of the result , the ADF and the PP statistics at first difference are greater than the critical bands at 5% level of significance. This warrant adopting of the Johansen co-integration technique within VECM approach after the preceding lag length selection criteria. Finally, Granger causality test will be imposed for robustness purpose of the model in the study.

4.3 The lag length Selection Criteria

The lag selection criteria is vital and is done by the system automatically, this will enhance robustness and the fitness of the model, degrees of freedom will not be lost and the model will be free from trap in serial autocorrelation, in addition, the smaller the lag the better the model and the larger the lag the less fitness of the model (Akaike, 1974).

Table 2: VAR Lag Order Selection Criteria Result

Lag	AIC	SC	HQ
0	8.114542	8.334476	8.191305
1	-1.751217	-0.431618*	-1.290641
2	-1.830909	0.588356	-0.986520
3	-1.907502	1.611429	-0.679300
4	-3.007255*	1.611342	-1.395241*

*Note:*Indicates lag order selected by the criterion AIC Akaike information Criteria, SC Swartz information Criteria, HQ; Hanann Quinin Information criteria.*
Source: Authors computation using Eviews 10

From Table 2 the Akaike information criteria (AIC) and Hannan Quinn Criteria (HQ) proposed four (4) lags as an appropriate lag order for co-integration while Swartz Information Criteria (SC) indicates one (1) lag as an appropriate lag order for co-integration. The research uses the AIC criteria (-3.007) which is lesser than the respective SC (1.611) and HQ (-1.395).

4.4 Johansen Co-integration

To determine the number of Co-integrating vectors, Johansen & Juselius (1990) suggest trace and Max eigen statistics, However, Johansen test is VAR based co-integration technique that examines the linear combination of the variables. Existence of co-integration justify the use of VAR base method, this is because of its power and advantage of testing co-integration in more than two series.

Table 3: Johansen Co-integration Estimates

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.611270	75.74788	69.81889	0.0156
At most 1	0.377922	39.84280	47.85613	0.2282
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.611270	35.90508	33.87687	0.0283
At most 1	0.377922	18.03820	27.58434	0.4920

Trace and Max-eigenvalue test indicates 1cointegrating eqn(s) at the 0.05 level,
** denotes rejection of the hypothesis at the 0.05 level.*
Source: Authors computation using Eviews 10

From table 3 both Trace and Max Eigen values exhibits one co-integration equation, therefore this findings suggest the existence of long run relationship between public Debt and economic growth in Nigeria at 5% level of significance, the paper proceeded to estimate the normalization of the co-integration equation with respect to GDP using the VECM.

4.5 The VECM Model

VECM is purposeful in dealing with the deficiency arising from the process of differencing the time series data to become stationary there by neglecting the unforeseen information in the original model, Therefore, the coefficients of the VECM will be interpreted as the short run elasticities while the co-integration vector will be interpreted as the long run elasticities of the model.

4.5.1 Estimate of the Long run coefficients normalized on Log of GDP

The estimation of the VECM model is contained in the subsequent Table 4 (a) and (b) as the long run and short run estimates normalized on log of GDP

Table 4 (a): Co-integration Equation Normalized on LGDP

LGDP	LEDEBT(1)	LDDEBT(1)	LTGCEXP(1)	LTGREXP(1)
1.000	0.090	-0.421	-0.060	-0.510
	(0.020)	(0.060)	(0.039)	(0.059)
	[4.464]	[-6.978]	[-1.558]	[-10.239]
C	-2.805			

Note: values in the round ( ) brackets are the standard errors and values in the square brackets are [ ] are the t-statistics.
Source: Authors computation using Eviews 10

Table 4 (a) shows the coefficients of the normalized equation (VECM) which is interpreted inversely, it therefore implies that there is a negative long run relationship between LEDEBT and LGDP, a 1% increase in external Debt will lead to 0.9% decrease in GDP, for the domestic debt, total government capital and recurrent expenditure exhibits positive relationship with LGDP, a 1% increase in these variables will lead to an increase in the GDP by 42%, 0.6% and 51% respectively, all things being equal. This indicates that external debts is eroding GDP in Nigeria, while domestic debt, capital and recurrent expenditure triggers economic growth in Nigeria in the long run. In addition, the study is in line with apriori expectations of the variables, in addition, this is also in line with the research work of Blake (2015); Sunday, Ngozi, Michael & Uguchukwu (2016); Alagba & Eferakeya (2019), they postulates that in the long run, high debt is deteriorating the economy through an increase in the lending rate which will ultimately have negative and insignificant impact to the economy.

4.5.2 The short run Estimates

To capture the dynamic relationship of public debt, external and domestic debts, total current and capital government expenditure on economic growth in Nigeria, the subsequent table of the error correction result explains the speed of adjustment to the long run equilibrium after the short run divergence from equilibrium in the model.

Table 4 (b): Vector Error Correction Model Result

Variables	Coefficients	Standard Error	t-Stat.	Prob.
ECT_{t-1}	-0.488	0.107	-4.547	0.000
LEDEBT	-0.003	0.027	-0.118	0.906
LDDEBT	-0.052	0.117	-0.442	0.6611
LTGCEXP	0.057	0.038	1.496	0.1445
LTGREXP	-0.186	0.060	-3.059	0.0045
C	0.162	0.039	4.097	0.0003
R-Squared (0.663)	Adj-R-Squared(0.597)	Durbin Watson (2.029)	F-Stat (10.629)	S.E of Reg (0.073)

Note; 3 lags were used after adjustment of the default VECM lag selection from the system
Source: Authors computation using Eviews 10

Table 4 (b) is the short run result estimate extracted from the original VECM output of the long run estimate estimation equation, the ECT_{t-1} satisfies the expected theoretical underpinnings of negative signs and statistical significance, this satisfies the relative certainty of convergence to the long run equilibrium from the short run turbulences.

According to the result, the coefficient of the ECT_{t-1} (-0.488) lagged by one period implies that, 48.8% shocks of the GDP is corrected annually to adjust GDP and other variables to the long run equilibrium, this indicates a high speed of adjustment from the short run disturbances. Furthermore, the result indicates the existence of long run causality effect running from LEDEBT, LDDEBT, LTGCEXP and LTGREXPS to GDP, this is certain from the coefficient values of -0.488, t-stat (-4.547) and the prob value statistical significance at 1% (0.000). Accordingly, in the short run, a 1% increase in LEDEBT, LDDEBT, LTGCEXP and LTGREXPS is related to -0.003%, -0.0525%, 0.057%, 0.186% decrease in GDP respectively at 5% level of significance, all other things being equal. This indicates a very low speed of adjustment to the long path equilibrium, in other words, LEDEBT, LDDEBT, LTGCEXP and LTGREXPS have no significant influence in reverting the Nigeria's economy towards long run equilibrium momentum from the short run turbulence, these findings are in line with the apriori expectation, indicating minimal

influence of the variables in promoting the economy in the short run, more so, this is consistent with the findings of Veronica (2021); Alagba and Efarikya (2019). According to their findings, public debt on growth in Nigeria is negative and insignificant in the short run, this is because of the relative terms and conditions of the foreign debt and servicing to economic growth.

4.6 The Diagnostic Test

The result of the diagnostic test were presented in the Table 5 for the purpose of robustness and fitness of the data used by the research

Table 5 VECM Diagnostic Tests Results

Tests	Tests Statistics	P-values
Lm Serial Correlation	0.095	0.909
Normality Test	0.881	0.644
White Heteroskedasticity Test	1.258	0.304

Source: Authors computation using eviews 10

The diagnostic test results in Table 5 indicates that the LM test, Normality and hetesroskeadasticity p-Values are 0.909, 0.644 and 0.304 respectively which is greater than 5% level of significance, showing absence of serial correlation, normality and presence of homokeadscticity of the distribution..

4.7 Granger Causality test

Table 6 Short and long run Causality Test (Block Exogeniety Wald Test)

X/Y	ΔLGDP	ΔLEDEBT	ΔLDDEBT	Δ LTGCEXP	ΔLTGREXP
ΔLGDP	-	1.548 (0.461)	1.057 (0.589)	1.615 (0.446)	6.101 (0.047)
ΔLEDEBT	5.306 (0.070)	-	2.957 (0.228)	0.066 (0.968)	1.722 (0.423)
ΔLDDEBT	2.278 (0.320)	0.025 (0.988)	-	8.188 (0.016)	0.503 (0.778)
ΔLTGCEXP	1.747 (0.417)	1.444 (0.485)	3.053 (0.217)	-	3.017 (0.221)

ΔLTGREXP	3.778 (0.151)	4.102 (0..129)	0.748 (0.6880	0.398 (0.819)	-
ECTt-1	-0.488 [-4.547]	-0.959 [-1.517]	-0.220 [-1.102]	-0.325 [0.706]	-0.028 [-0.075]

Note: Values in round () brackets are prob. values while values in the square [] brackets indicates t-statistics at 5% level of significance
Source: Authors computation using eviews 10.

Granger causality test were imposed to check the possible feedback effect that might exist, wald test block exogeniety was used in detecting the causal effect of the variables, accordingly, from the estimated output in the Table 6 when GDP and LDDEBT are the dependent variables, there exists a causality effect running from LTGREXP and LTGCEXP to the GDP in the short run, While maintaining no causal effect from the other variables to the GDP in the short run. This indicates that, LTCEXP and LTREXP has statistical inference in influencing the GDP in the short run while LEDEBT and LDDEBT has no relevance in influencing the Nigeria's GDP in the short run. Furthermore, the ECT_{t-1} captures the long run causality representation in the Wald test VAR based causality theorem, the coefficient of the ECT_{t-1} equation shows that there is long run causality effect from GDP to the other variables at 5% level of significance. This could be attest in the t-statistical values of the square bracket of ECT_{t-1} equation [-4.547.],this mean that there is long run causality effect from the independent variables to the dependent variable, the independent variables has statistical influence or relevance to Nigeria's GDP in the long run.

5.0 Conclusions and Recommendations

5.1 Conclusions

The study uses the VECM and Granger Wald test / Block exogeniety approach in analyzing the impact public debt on Nigeria's economic growth from 1981 to 2021. Based on the findings from the study conducted, the following conclusions can be made. First, domestic debt impacted positively on economic growth whereas external debt impacted negatively on economic growth in long run; secondly, both domestic and external were found to have negative and statistically insignificant impact on economic growth in the short run; lastly, Granger causality test confirms presence of causality effect from external debt and domestic debt to GDP in the long run. Thus, domestic debt and external debt can be used to predict the future value of gross domestic product particularly in long run.

5.2 Recommendations

Based on the forgoing findings, the paper recommends that, the Federal Government of Nigeria should refrain itself from excess external debt due to its spillover effect of decreasing the GDP in the long run. Also, emphasis should be put on utilizing the domestic debt to finance both capital and recurrent expenditures; this is because of the relative importance of these variables in influencing the Nigerian economy in the long run. Moreover, Government should focus on capital expenditure in the short run to promote the economy forward, other variables, external debt, domestic debt and recurrent expenditure are draining factors of the economy in the short run.

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