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IMPACT OF PUBLIC DEBT ON INFRASTRUCTURAL DEVELOPMENT IN NIGERIA (1990-2023)

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ABSTRACT

The challenges of a high debt portfolio with deficit infrastructural development have affected the needed economic development in Nigeria. The study analyzed the impact of public debt on infrastructural development in Nigeria. The scope of the study was taken from 1990 to 2023; secondary data were sourced from the Debt Management Bulletin and Central Bank of Nigeria Bulletin. ARDL model was used to analyze the data, and the result revealed that external debt had positive and significant impact on infrastructural development in the long run on the other hand, the domestic debt had a negative but insignificant impact on infrastructural development in Nigeria which means that domestic if not well managed will lead to a decrease in infrastructural development in Nigeria. However, the ECT (-1) further revealed that the model is reliable with its value of (-0.522833) which shows that the model is converging. Based on the study's findings, it can be said that Nigeria uses its public debt to support infrastructural development. Nonetheless, to guarantee that infrastructural development in translate to economic growth in Nigeria, there is need for Government to constitute committee to properly monitor the implementation of loans collected. Therefore, any effort by Nigeria's government to boost infrastructural through infrastructural development by continuously using debt, especially external, should be steady make policy for proper monitoring of the implementation of the projects collected loans for. Similarly, Central of Bank of Nigeria, Federal Ministry of Finance and Federal Ministry of Works should ensure through projects tracking all capital projects are proper monitored of the implemented.

Keywords: Public Debts, Infrastructural Development, ARDL, Error Correction Model

1.0 INTRODUCTION

The global financial crisis of 2008 began more than sixteen years ago, and it appears that debt is overwhelming the world now. After years of weakness, global economic growth is still sluggish. Some economists blame high levels of debt, arguing that these have been keeping economies from reaching their full potential because people, businesses, and governments have been spending large sums of money on debt servicing when those same funds could have been used for more productive endeavors.

Prior to the crisis, the world's debt was rapidly increasing, and it kept rising after it. According to estimates from the McKinsey Global Institute, the global debt was $204 trillion by mid-2021, which was $121 trillion (or 145%) more than in 2007 the year right before the financial crisis and $68 trillion (or 50%) more than in 2007. Households, companies, and governments all made contributions to the rise. This design to identifywhyother scholars has failed to point out the significance/implication of exchange rate volatility to debt repayment in Nigeria

There are two sides to debt. It is evident that when used sensibly and sparingly, welfare is enhanced. However, when it is applied carelessly and excessively, bad things can happen. Over borrowing puts families and businesses at risk of insolvency and financial collapse. An excessive amount of debt hinders a nation's government's capacity to provide basic services to its people. These worries are supported by data, which also point to the necessity of thoroughly examining various types of non-financial debt, including government, corporate, and household debt. In the last thirty years, adding together these three sectors collectively, the debt-to-GDP ratio in developed nations has persistently increased over the past three decades, from 167% in 1990 to 314% today, or by more than 5 percentage points of GDP annually (Reinhart & Rogoff, 2019). Given the policies and demographics in place, it seems unlikely that this trend will change anytime soon.

What are the actual repercussions of this sharp rise in debt levels on the economic activities of the world? One of the pillars of contemporary civilization that propels economic expansion is finance. Nations remain impoverished indefinitely if they lack both debt and financing. People can buy even when they don't have any money right now if they can borrow and save. Businesses can invest using debt when their sales would alternatively, don't permit it. Furthermore, fiscal authorities can contribute to macroeconomic stabilization if they are authorized to borrow. However, as history has shown, borrowing can lead to weaknesses. Financial crises become more frequent and severe when debt ratios increase above a particular point (Reinhart & Rogoff, 2019).

Every developing country has a lot of macroeconomic issues to contend with. These issues range from high rate of unemployment, high poverty rate, high inflation rate, low level of productivity, low capital formation, low level of infrastructural facilities for development. It is generally expected that for such developing countries to proffer solution to all of these macro-economic issues, there is need to borrow funds from either external or internal sources and it can even be sourced from the both external and internal sources. Public debt has been described as a crucial instrument of fiscal policy available to government to fund the development of a nation. It is used to settle expenditures that will ultimately increase productivity, enhance good standard of living for the citizen and improve the growth of the economy. (Burhanudin, et al., 2017).

Also, according to Ezeabasili, et al. (2015), Public debt for developing countries occurs as a result of their inability to generate enough domestic savings to carry out productive activities towards economic growth and development. Such Public debtby countries are meant to supplement the domestic savings and allow such countries to develop their infrastructural facilities. Thus, second and third world countries like Nigeria often embark on external aids and outright borrowings given that the independent resources at their disposal alone could hardly make significant impact in bringing about the kind of radical development in infrastructure needed to measure up with other developed economy.

Many countries borrowed funds when they lack capacity to form adequate capital formation that can generate enough domestic savings to meet the needs for infrastructural facilities development in the country. The funds borrowed, if properly implemented, are meant to boost economic growth and development of the country by which the standard of living of the citizenry will be improved. Nigeria as a country incurred public debt both from domestic and external sources. The external public debt is typically owed to foreign creditors. These are multilateral agencies such as the Africa Development Bank, the World Bank, or the Islamic Development Bank, and bilateral agencies such as the China Exim Bank, the French Development Bank, or the Japanese Aid Agency. There are also foreign private creditors such as investors in Nigeria's

Eurobonds. The domestic debt, however, is contracted within Nigerian borders, usually through bond and Treasury bills which are purchased by Nigerian banks, local pension funds, and other domestic and foreign investors. The government also has some contractor arrears, and other local liabilities which form part of total public debt. (Sunday et al. ., 2016).

The term infrastructural development can be put as state of improvement in the general status of the basic physical and organizational structures and facilities that act as catalyze to economy activities in the country. Such facilities include the provision, construction, improvement and rehabilitation of capital and productive projects like roads, airports, hospitals, education and research institutes, power development, human resources development, improved security, among others, in consonance with international standards (Oluwalana & Alabi, 2021). The narrative back then was that paying the debt will free up cash that would be channeled towards capital expenditure and then usher in the economic boom we have craved for decades with increase in standard of living, creation of employment opportunities, reduction in poverty level and development in infrastructural facilities such as power supply and the good road that are paramount to economic activities in the country. Even the immediate past administration since 2015 claims that it has no choice than to borrowing more to finance deficit budget, and with all these forms and levels of debt incurred by past government administrations, the country is still battling with high poverty rate, low capital formation, poor power supply, high cost of living, high cost of doing business. It is on this fact that this study seeks to analysis the effect of public debt on infrastructural development in Nigeria.

In an attempt to bridge the gap between the need for infrastructural development and domestic resource so as to accelerate the pace of economic activities geared towards economic growth and development, Nigeria has continued to raise both internal and external loans. While there is nothing morally, economically and socially wrong with the raising of loans through internal and external sources, if such loans are channeled to productive uses that will facilitate economic development and subsequently be serviced and liquidated.

Nigeria, being a mono-product economy and relying solely on revenue from petroleum as the major driver of the economy has been bedeviled by the crisis in the world oil market. Therefore, in an attempt to rescue the economy from shipwreck, successive governments have adopted regular acquisition of huge sums public debts from both internal and external sources to finance infrastructural facilities in order to boost economic growth in the country. Given, the current global pandemic where all countries are independently striving for financial survival, then the issue of lending by surplus countries to non-surplus countries becomes a matter of close allies and symbiotic relationship (Ayodele et al., 2020).

Despite the excessive increase in borrowing over decade, levels of access to basic physical infrastructure such as clean water and improved sanitation, electricity and good roads in Nigeria are inadequate given its income levels and its rapidly growing population, also the deplorable situation of infrastructural facilities, alongside corruption and mismanagement of public finances has seriously undermined the effect of public debt on infrastructural development in Nigeria and this has considerably limits efforts towards achieving inclusive growth, sustainable development, and poverty reduction.

In the words of Ademola (2018), development is the quantitative change or a progressive series of such change in economic system or environment. Such quantitative aspect of living is made possible by infrastructures such as roads, water supply, basic education, health care facilities, electricity housing scheme development, recreational and transport facilities. Therefore, the term infrastructure development refers to the technical structures that enhance living condition in any society which included health facilities, agricultural facilities, good road network and telecommunications as well as energy and water supply.

It can be generally defined as the set of interconnected structural elements that provide a framework supporting an entire structure of development. It is an important term for judging a country or region's development. The term typically refers to the technical structures that support a society, such as roads, bridges, water supply, sewers, electrical grids, telecommunications, and so forth, and can be defined as "the physical components of interrelated systems

providing commodities and services essential to enable, sustain, or enhance societal living conditions". Viewed functionally, infrastructure facilitates the production of goods and services, and also the distribution of finished products to markets, as well as basic social services such as schools and hospitals; for example, roads enable the transport of raw materials to a factory (Ademola, 2018).

In the same vein, Egbetunde (2012) affirms that public debt and economic growth have long run relationship toward development, and they are positively related if the government is sincere with the loan obtained and use it for the development of the economy rather than channel the funds to their personal benefit. Therefore, the current situation of the economy catalyzed the interest of this study by looking at the current debt profile of the country and the infrastructural development condition, taking the scope of the study from 1996 to 2023 which covered the period before the country had debt forgiveness and after the debt forgiveness. However, it was noted that, the debt profile of the country has started rising again after receiving the debt pardoning in 2005 and there is no justifiable effect on infrastructural facilities development in the country. As a basis upon which this study is conducted, the following research questions are relevant:

i. What impact does external debt have on the infrastructural development in Nigeria?
ii. To what extent has Nigeria's domestic debt affected infrastructural development in Nigeria?

For the purpose of evaluating and efficiently analyze the objective of this study, the following hypotheses were formulated as a guide and they are all in null forms:

Ho1: External debt does not have any significant effect on infrastructural development in Nigeria.

Ho2: Domestic debt has no significant effect on infrastructural development in Nigeria.

2.1 Conceptual Review Public debt

Public debt can be defined as the profile of borrowings either external ore domestic for the purpose of financing deficits in governments spending, This can be classified in two, namely; External or Domestic debt. Public debt otherwise called government borrowings has over the years received much attention as a crucial component of any country's macroeconomic policy framework. Debt

management is also argued as an important factor that underpins the credibility and reputation of nations and ensures the stability of debt capital markets as well as the financial institutions that hold public debt. There is already a widespread recognition however in the international community that excessive foreign indebtedness of many developing countries remains a major impediment to their growth and stability (Udaibir, 2016).

According to Adejuwon (2017) the act of borrowing creates debts. Therefore, public debt which implies government borrowing or government debt is the resources of money in use in an organization, which is not contributed by its owners and does not in any way belong to owners. Debt is generated by the gap between domestic saving and investment, which can increase in absolute terms over time. As the gap widens and the debt accumulates, interest rates also accumulate and the country must borrow increasing amounts just to maintain a constant flow of net imports. It must also borrow to re-finance maturing debt obligations. Like the economies of other countries in Sub-Saharan Africa, Nigeria is a developing one with numerous difficulties. The lack of funding to carry out many of her developmental initiatives is a major obstacle (Dokuwbo & Ola 2017). Due to factors including an excess supply of oil, low demand on the global market, and events in the economy that could have an impact on production, the monocultural economy's sole source of income frequently experiences price reductions. The Covid-19 epidemic in 2020, which caused global activity to halt, is a prime example of such an event. Significant reductions in revenue in 2020 had an impact on the nation's development goals, and the government had to borrow money to carry out some of the programs. spending plan. For example, the initial budget of almost N9.1 trillion must be adjusted to account for predicted oil prices of $60 per barrel. Due to the epidemic, to roughly N 8.1 trillion benched marked against $30 per barrel. As a result of the epidemic in 2020, several governments, particularly poor nations in Africa like Nigeria, borrowed money to fund various programs (Desmond, 2020). An additional harsh, depressing, and regrettable factor contributing to the country's debt dilemma is the significant build-up of the budget deficit and the government's incapacity to cut back on spending, particularly on non-essential

and non-value-adding items. Thus, Khalil and Junaidu (2019) observed that the budget deficit accumulation and the inability of successive governments to accurately identify and measure the cost of activities and governance in order to eliminate or reduce to the barest minimum the cost of activities and engagement that pose the greatest threat to the growth of the country's economy are not yielding results (Horgan, 2018). Similarly, in the account of Odozi (2019) Domestic debts are debt instruments issued by the federal government and denominated in local currency. State and local government can also issue debt instruments, but debt instrument currently in issue consists of Nigerian treasury bills, federal government development stocks treasury bonds and federal government bonds. Domestic Debts are debts that originate from within the geographical region of a country, which are contracted through debt instruments such as treasury bills, treasury certificates and treasury bonds. Others are development stocks, FGN bonds and Promissory notes. In Nigeria, several factors have been advanced to explain the changing domestic debt profile between the 1960s and now. The major factor includes high budget deficits and low output growth.In the words of Oshandami (2016), domestic debt is defined as a debt instrument issued by the federal government and denominated in local currency. In main beliefs, state and local government areas can issue debt instruments, but their capacity to issue such debt instrument must go with the treasury certificates, federal government development stock and treasury bonds. Out of these, treasury bills, treasury certificates and development stocks are merchandisable and traversable while treasury bond paths and advances are not marketable but held exclusively by the Central Bank of Nigeria. It can be defined as debt issued in domestic currency; as debt liabilities owed by residents to residents of the same economy or as debt issued in the home country and under the jurisdiction of a domestic court. This consists of government borrowing from within her domestic economy. This type of debt, unlike external borrowing, does not increase the total resources available to that country. There is simply a transfer of resources from one end to the other for public service purposes (Nurudeen & Usman, 2023).

2.2Empirical Review

Many scholars have carried out a lot of studies on the impact of public debt on various economic variables like economic growth, inflation rate, unemployment rate, infrastructures. According to Olabode and Usenobong (2023) examines external debt servicing and economic growth in Nigeria from 1985 to 2021. Ordinary Least Squares (OLS) techniques was used and the result revealed that, debt service statistically significant in driving economic growth of the Nigeria. The study concluded that the external debt service burden drains the country's income, which should have been channeled to increase future production. The study however, recommended that proper management of the external debt stocks by governments in more productive sectors could bring further growth.

Similarly, the work of Richard et al. (2022) on external debt and infrastructural developments in emerging economies from 1979-2019 and the Autoregressive Distributed lag (ARDL) model was employed, and the Error Correction Model was used to test the speed of adjustment in the long run. The findings revealed that external debt has a positive and significant effect on the dependent variable in the short-run, but shows no significant correlation with infrastructural developments proxy by capital investments in the long-run and negatively insignificant. The study concluded that, foreign debt had significant relationship with the dependent variable in the short-run, but insignificantly correlated with infrastructural development in the long-run. Therefore, the study recommended that, external borrowing contracts should be based on sound credit appraisals, to finance self-liquidating priority projects. The works of Awa et al., (2022) The study analyzed the effect of external public debt on infrastructural development in Nigeria taking the scope from 2008-2021. To achieve this objective, debt servicing cost (DSC), Trade Debt (TD) and balance of payment (BOP) were use as proxies for external public debt while infrastructural development is proxy by federal government capital expenditure on infrastructures. Ordinary least square (OLS) model was employed as technique used to analyzed the data. The findings revealed that debt servicing cost has negative significant effect on Federal Government Capital expenditure (FGCE); but trade debt has no significant effect on FGCE, while balance of payment has negative significant effect on FGCE in

Nigeria. The implication of the study is that Nigerian Public external debt usage is not favorable to the Nigerian economy. The study therefore recommended that external debt should be used for the purpose for which it was borrowed for and such debts should be used on the basic infrastructural development that will help to improve on the business environment and economic output making for ease of repayment. Furthermore, the studies of John et al., (2022). Analyzed the Impact of public debt profile on economic growth: Evidence from Nigeria. Using autoregressive distributed lag (ARDL) model and bounds test method to carried out cointegration test for the long-run investigation of which the scope of the study was taken from 1990 to 2020 and data were sourced from the Central Bank of Nigeria's statistical bulletins. The results revealed a long-term link between the study variables and equally uncovered that all the explanatory variables were statistically significant. Specifically, economic growth is significant and negatively responsive to changes in external debt.

Nwala et al., (2021) carried out a disaggregated analysis of the effect of domestic public debt on economic growth in Nigeria from 2007Q1 to 2020Q2. The findings revealed that, there is a long-run equilibrium relationship between banking sector debt, non-bank public debt, Central Bank of Nigeria debt - ways and means advances and GDP. The result equally shows that while banking sector and non-bank public debt have statistically positive significant effect on economic growth, the Central Bank of Nigeria debt - ways and means advances has a negative but significant effect on economic growth in Nigeria. Therefore, the study recommends that the government should give more priority to banking sector and non-bank public debt in funding budget deficit and that borrowing from the CBN by the Government should be restricted to refinancing of maturities only.. Also, Aladejana et al., (2021) a study was carried out to evaluate debt burden, implications for infrastructural development in Nigeria for the period 1986-2019. Annual time-series data was employed and Fully Modified Ordinary Least Squares (FMOLS) was used to t analyze the relationship among the variables. The results of the findings revealed that both current and lagged coefficients show a positive and significant relationship between domestic debt and infrastructural development; while the

current and lagged coefficient of external debt shows a negative relationship with infrastructural development and not statistically significant during the study period. The study, therefore, concluded that the external debt has not contributed significantly to the development of Nigeria's infrastructure and that the huge external debt profile of Nigeria even before the debt forgiveness of 2005/2006 to date is not justifiable and is uncalled for.

2.3 Theoretical Framework

This research also depends on David Ricardo's 1819 theory of national debt. The notion of public debts was developed by David Ricardo, who asserted that the government's regular and extraordinary expenditures were primarily payments for the support of unproductive labourers. Consequently, any savings from government incidentals would either go toward income or the capital providers. In 1816, Ricardo conjectures in a letter to McCulloch that the state's public expenditures are unprofitable endeavours. Precious (2015) claims that rather than being an attempt to explain public debt, Ricardo's theory of public debt was predicated on the idea that government debt acquisition resulted from the inefficient character of public expenditure by the government to fund public spending that is necessary for economic expansion. According to the argument, the focus should be more on acquiring resources from the public's vast assets when it comes to supporting public expenditures.

3.1 Methodology

3.2 Type and Source of Data Populate

3.3 Model Specification

The relationship that exists between public debt and infrastructural development in Nigeria is dynamic in nature, which means, the two variables influence each other in dynamic ways. Therefore, a model is adapted from Awa et al (2022) titled review external debt servicing and economic growth in Nigeria.

FGCE=(EDC,EXCH,INFL) (1)

Where: GDP is gross domestic product, EXDS is External debt servicing, INFR is Inflation rate and EXC is exchange rate. However, equation one was modified in order to capture some macroeconomic variables that are considered very important to infrastructural development in Nigeria and also, to analyze the short and long-run relationship among the variables. However, the ARDL model was used to capture the reaction and relationship among the

variables. However, if the variables exhibit long-run relationships through the Bond test, the ECT model will help the study to measure the speed of adjustment among the variables. The area of location is Nigeria and the variables to be used are.

FGCE=(EXD,DMD) (2)

$FGCE=\alpha_0 + \beta_1 EXD + \beta_2 DMD + \mu$ (3)

Where: FGCE,Federal government capital Expenditure as a proxy for infrastructural development, External debt (EXD) and Domestic debt (DMD). The following ARDL model will be employed for this research work.

3.3.1Autoregressive Distributed Lag Model (ARDL)

$$\Delta fgce_t = \beta_0 + \sum_{i=1}^{q} \beta_1 fgrc_{t-1} + \sum_{i=1}^{q} \beta_2 exd_{t-1} + \sum_{i=1}^{q} \beta_3 dmd_{t-1} + \beta_4 \Delta fgce_{t-i} + \beta_5 \Delta exd_{t-i} + \beta_6 \Delta dmd_{t-i} + \mu_t \quad (5)$$

Where: FGCE – Federal Government Capital Expenditure in Nigeria; EXD-External debt; DMD- Domestic debt and U-Error term

4.0 DISCUSSION OF RESULTS

4.1Descriptive Statistics

Table 4.1: Descriptive Analysis

	FGCE	DMD	EXD
Mean	1367.836	7887.653	21013.98
Median	800.7350	3889.925	26181.08
Maximum	6335.580	53258.01	42495.16
Minimum	212.9300	343.6700	3544.490
Std. Dev.	1667.008	10859.64	13015.88
Skewness	2.028004	2.789634	-0.049058
Kurtosis	5.927353	11.96168	1.605638
Jarque-Bera	29.19069	130.0132	2.279516
Probability	0.000000	0.000000	0.319896
Sum	38299.41	220854.3	588391.3
Sum Sq. Dev.	75030721	3.180000	4.570000
Observations	28	28	28

Source: *E-views Results output, 2024*

The Table shows the descriptive statistical characteristics of the variables included in the study. The skewness, which measures the asymmetry distribution of variables around its mean, is normally distributed and positive for all the variables. When skewness is positive it has a long right tail. A negative skewness is indicated by a long left tail, while zero skewness means the distribution is normal. Thus, the

Infrastructural Development in Nigeria (FGCE) (1367.836) have normal distribution, DMD (7887.653) and EXD (21013.98) all have a long right tail, Also, the Jarque–Bera statistics of normality show that IFDN, DMD and EXD are normally distributed from the corresponding probability which is greater than 0.05 p/value.

From Table 1 also, Infrastructural Development in Nigeria (FGCE) mean value was 1367.836%, its maximum and minimum values were 6335.580 and 212.9300 % respectively. It also has a standard deviation value of 1667.008 %, implying that Infrastructural Development in Nigeria (FGCE) was well dispersed to the mean value and normally distributed. The skewness statistics had the value of 2.028004 and positively skewed. The kurtosis statistics was 5.927353 meaning that the distributions of the variable normally distributed.

Domestic debt (DMD) statistics reveal that the mean value was 7887.653. Maximum and minimum values were 53258.01 and 343.6700 respectively. The value of the standard deviation was 10859.64. This reveals that the values were well dispersed and they tend towards nor mal distribution. The skewness statistics for DMD was 2.789634 and positively skewed. The kurtosis statistics was 11.96168 and meaning that the distributions were peaked with respect to normal distribution. The Jarque-Bera statistics was 130.0132 and probability value 0.000000. This means DMD is significant.

External debt (EXD) statistics reveal that the mean value was 21013.98. Maximum and minimum values were 42495.16 and 3544.490 respectively. The value of the standard deviation was 13015.88. This reveals that the values were not well dispersed and they tend towards normal distribution. The skewness statistics for EXD was -0.049058 and negatively skewed. The kurtosis statistics was 1.605638 and it was leptokurtic meaning that the distributions were peaked with respect to normal distribution. The Jarque-Bera statistics was 2.279516 and probability value 0.319896. This means EXD was insignificant and but normally distributed.

4.2 Unit Root Test

The Augmented Dickey Fuller (ADF) unit root test was employed to test for the integrated level and the stationarity of the variables. This study employed ADF test on

the data to ensure that the variables are stationary because working with non-stationary data makes the result of the regression spurious: Table 4.1 below shows the unit root result.

Table 4.2:Augmented Dickey Fuller Test for Unit Root

Variables	ADF Stat	Critical value 1%	Critical value 5%	Critical value 10%	Order of Integration
ΔFGCE	-3.882016	-4.440739	3.632896	-3.254671	I(0)
ΔEXD	-3.636593	-4.374307	-3.603202	-3.238054	I(1)
ΔDMD	-2.702502	-2.674290	-1.957204	-1.608175	I(1)

Source: *E-views Results output, 2024*

Table 4.2 shows the result of the ADF test on all the variables such as Infrastructural Development in Nigeria (IFDN), External debt (EXD) and Domestic debt (DMD). The test was carried out with trend and intercept. The result revealed that the EXD and DMD. variables were non-stationary at level but became stationary after the first difference, meaning they are integrated of order one I (1). However, Infrastructural Development in Nigeria (IFDN) was stationary at level, which means it was integrated at order I(0).

4.3 Co-integration of ARDL-Bounds Test

This section shows the ARDL co-integration bounds test of the variables used in this paper.

Table 4.3: ARDL-Bound Testing

Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	K
F-statistic	7.444783	5
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.63	3.35
5%	3.1	3.87
2.5%	3.55	4.38
1%	4.13	5

Source: *Researcher's Computation Using EViews-12 (2024)*

Table 4.3 shows the ARDL bounds test for co-integration that was carried out for all two variables based on the research objectives. The model result shows that the F-statistic derived from the ARDL bounds test is 7.444783, and when compared with

the critical values obtained from the Pesaran Table at a 5% level of significance, its value exceeded both 3.12 and 4.25 for 1(0) and 1(1), respectively. Meaning that Infrastructural Development in Nigeria (IFDN), External debt (EXD) and Domestic debt (DMD) are co-integrated at a 5% level of significance.

Table 4.4: Method- ARDL-ECM and Long Run Estimates
Dependent Variable: IFDN
Error Correction Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FGCE(-1))	0.329422	0.161330	2.041913	0.0528
D(DEM)	0.336880	0.051349	6.560600	0.0000
D(DEM(-1))	0.059570	0.136959	0.434949	0.6677
D(DEM(-2))	0.737346	0.160143	4.604303	0.0001
CointEq(-1)*	-0.522833	0.090112	-5.802014	0.0000
R-squared	0.960798			
Adjusted R-squared	0.948867			
F-statistic	80.52893			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.647081			
Long-Run Estimates				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
EXD	0.259893	0.078939	3.292307	0.0032
DEM	-0.147185	0.128282	-1.147353	0.2630
C	-273.4373	208.6716	-1.310372	0.2030

Source: *Researcher's Computation Using EViews-12 (2024)*

From the ECT (-1), the value was -0.522833 which means that the model is not exploding rather converging toward equilibrium in the long run. The disequilibrium in the model will be re-adjusted to equilibrium at the speed of 52% in the long run and was statistically significant with the p/value (0.0502) which was less than 5%. Also, the coefficients of the estimated ARDL model in the short-run, there is a positive relationship between infrastructural development and its first lagged value. This is theoretically in line with our a-priori expectation, and also, the result was statistically insignificant at 5% for the first lagged. This result justifies the level of infrastructural development in the country. Also there is a there is a positive relationship between infrastructural development and domestic debt at the current period, first lag

and second lag value at the short run. This is theoretically in line with our a-priori expectation direct (relationship), and also, the results revealed that it was statistically insignificant at 5% and 10% for the first lag but the current period and second lag was statistically significant at 5% because the probability value is low than 10% level of significance.

More so the long run result revealed that there is a positive relationship between infrastructural development and external debt in Nigeria and this is theoretically in line with a-priori expectation direct (relationship), and also, the results were statistically significant at 5% level of significance which implies that external debt in Nigeria has a positive and significant impact in Nigeria given the coefficient value of 0.25983 and probability value of 0.0032. Therefore, an increase in external debt in Nigeria will lead to an increase or a unit increase in infrastructural development. On the other hand, domestic debt in Nigeria has a negative relationship with infrastructural development in Nigeria. This is theoretically disagreed with the a-priori expectation direct (relationship), and also, the result was statistically insignificant at 5% level of significance which implies that domestic debt in Nigeria has a negative and insignificant impact in Nigeria given the coefficient value of -0.147185 and probability value of 0.2630. Therefore, an increase in domestic debt in Nigeria will lead to a decrease or a unit decrease in infrastructural development. This is because most domestic debt in Nigeria is not properly channelled to the right infrastructural development needs in Nigeria.

R2 = The value of R2 (0.960) shows that 96% of variations in infrastructural development were explained by Domestic debt (DMD) and External debt (EXD) while the remaining 4% were unexplained. The value of Adj-R2 (0.95) shows that 95% of variations in infrastructural development were explained by Domestic debt (DMD) and External debt (EXD) while the remaining 5% were unexplained. F-statistic (80.5) which is high compared with Prob(F-statistic) value of (0.0000) which is less than 0.05, it means that the model has a good fit and statistically significant. Durbin-Watson stat. value of (1.647) proved that the model is free from the Auto-correlation problem.

Furthermore, the hypothesis that stated H01: external debt has no significant impact on infrastructural development in Nigeria is rejected given that the value of 0.0032 is less than 5 percent level of significance. This implies that the external debt has a positive and significant on infrastructural development in Nigeria. On the contrary, the hypothesis that stated H02: domestic debt has no significant impact on infrastructural development in Nigeria is accepted given that the value of 0.0897 is greater than 5 Nigeria.

percent level of significance. This implies that the domestic debt has a negative and insignificant impact on the infrastructural development in Nigeria.

4.5 Post-Estimation Checks (ARDL Diagnostic Test)

The paper ARDL diagnostic checks captured below are crucial for validating the robustness and reliability of the regression model that estimates the impact of public debt on infrastructural development in

Table 4.5: Results of ARDL Diagnostic Checks

Tests		Outcomes	
		Coefficient	Probability
Breusch-Godfrey-Serial-Correlation Test	F-stat.	0.999594	0.3849
Heteroscedasticity-Breusch-Pagan-Godfrey Test	F-stat.	1.187933	0.3481
Normality Test	Jarque-Bera	0.159924	0.9232
Linearity Test	F-stat	3.633882	0.0698

Source: *Author's Computation Using EViews-12 (2024)*

Table 4.5 is the Breusch-Godfrey Serial Correlation LM Test checks for autocorrelation in the residuals of the regression model. Autocorrelation occurs when residuals are not independent of each other, which can lead to inefficient estimators and biased standard errors. The outcome of this test, with an F-statistic of 0.999594 and a probability of 0.3849, suggests that there is no significant serial correlation in the model. A high p-value indicates that the study fails to reject the null hypothesis of no serial correlation, thus confirming that the residuals of the model are independent across time, which is a desirable property in time series analysis. Also, the Heteroscedasticity Breusch-Pagan-Godfrey Test is used to detect the presence of heteroscedasticity, a condition where the variance of the errors is not constant across

all levels of the independent variables. Heteroscedasticity can render the standard errors inaccurate, leading to unreliable hypothesis tests. The test yields an F-statistic of 1.187933 with a probability of 0.3481, indicating that there is no significant evidence of heteroscedasticity within the model. This means that the variance of the error terms is constant, allowing for confidence in the estimated standard errors and the statistical tests that rely on them.

The Normality Test, specifically the Jarque-Bera test, is employed to determine whether the residuals of the model are normally distributed. The normality of residuals is an important assumption, as it underpins the validity of various statistical tests, including the t-tests on the estimated coefficients and the F-test on the overall model. The Jarque-Bera statistic is 0.159924 with a probability of 0.9232, which indicates that the residuals are normally distributed. With a high p-value, the null hypothesis that the residuals are normal cannot be rejected, satisfying another critical assumption of the classical linear regression model.

Finally, the Linearity Test checks if the relationship between the independent variables and the dependent variable is correctly specified as linear. A non-linear relationship may indicate that the model is specified, which can lead to biased estimates. The F-statistic for the linearity test is 3.633882 with a probability of 0.0698. This result implies that there is no significant evidence against the linearity assumption of the model. Hence, the linear specification of the relationship between the public debt indicators and infrastructural development in Nigeria appears to be appropriate.

4.6Discussion on Findings

The result revealed that external debt had positive but significant impact on infrastructural development in the lag run. This evidence further shows that external debt if well invested will creates more infrastructure for economic growth and sustainable development.is such that The budgetary framework in Nigeria is such that deficits spending are to be finance through external sources such as; NEXIM Bank of China, German Cooperation(GIZ), African Development Bank(AfDB)etc, The funds borrowed from the sources are significant enough to cause the desired development the country. On the other hand, domestic debt was negative and

statistically insignificant impact on infrastructural development in Nigeria which means that domestic debt, this development t may have been caused by one major factor which may be poor level of financial development. The Sub-Saharan African countries is suffering from poor state of financial development t which h prevents them from borrowing the needed funds domestically to finance infrastructure capable of promoting economic growth and the required size of foreign direct investment.

5.1 CONCLUSION AND RECOMMENDATIONS

The challenges of debt repayment and exchange volatility has created macroeconomic crisis in the fiscal environment, hence this paper was designed to examiethe main objective(To exam in ethe impact of public debt on federal government capital expenditure) The paper employed the Autoregressive Distributed Lagged(ARDL) model to examines the relationship between public debt and Federal government capital expenditure in Nigeria, the outcome of the analysis shows that External debt was found to be positive and statistical l y significant in driving FGCE. On the other hand, domestic debt was found to be negative an d insignificant in driving FGCE in Nigeria. Consequently, the study recommended the following policies:

i. Any effort by Nigeria's government to boost infrastructural through infrastructural development by continuously using debt, especially external, should be steady make policy for proper monitoring of the implementation of the projects collected loans for.
ii. Similarly, Central of Bank of Nigeria, Federal Ministry of Finance and Federal Ministry of Works should ensure through projects tracking all capital projects are proper monitored of the implemented.

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Appendix A

Table 1: Data for Regression Analysis

Year	FGCE	EXD	DEM
1990	24	298.61	84.09
1991	28.3	328.45	116.2

1992	39.8	544.26	177.96
1993	54.5	633.14	273.84
1994	70.9	648.81	407.58
1995	121.1	716.87	477.73
1996	212.9	617.32	419.98
1997	269.7	595.93	501.75
1998	309	633.02	560.83
1999	498	2,577.37	794.81
2000	239.5	3,097.38	898.25
2001	438.7	3,176.29	1,016.97
2002	321.4	3,932.88	1,166.00
2003	241.7	4,478.33	1,329.68
2004	351.3	4,890.27	1,370.33
2005	519.5	2,695.07	1,525.91
2006	552.4	451.46	1,753.26
2007	759.3	438.89	2,169.64
2008	960.9	523.25	2,320.31
2009	1,152.80	590.44	3,228.03
2010	883.9	689.84	4,551.82
2011	918.5	896.85	5,622.84
2012	874.7	1,026.90	6,537.54
2013	1,108.40	1,387.33	7,118.98
2014	783.1	1,631.50	7,904.03
2015	818.4	2,111.51	8,837.00
2016	653.6	3,478.91	11,058.20
2017	1,242.30	5,787.51	12,589.49
2018	3,215.50	7,759.20	12,774.40
2019	3,781.20	9,022.42	14,272.64
2020	3,265.40	12,705.62	16,023.89
2021	4,712.80	15,855.23	19,242.56
2022	6,335.58	18,702.25	22,210.36
2023	4,523.75	14,071.38	17,937.36

Source: *Central Bank of Nigeria Statistical Bulletin 2023*

Commented [U1]: What is FGCE? This is really contradict what you specified as a Infrastructural Development in Nigeria (IFDN). If it is not IFDN, you have to get data on IFDN and re estimate.