Public Debt and Economic Development in Nigeria

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Abstract
This study was carried out to ascertain the impact of public debt on economic development in Nigeria from 1981 to 2018. Ex – post facto research design was employed; data used for analysis were elicited from Central Bank Statistical Bulletin of 2018 and World Bank Database: World Development Indicator 2018. Gross fixed capital formation was employed as the dependent variable, while foreign debt and domestic debt were utilized as proxy for public debt and exchange rate was employed as a control variable. This study employed Auto Regressive Distributed Lag (ARDL) Model to analyze data, other diagnostic tests such as; test of Normality, Auto correlation test, Heteroskedasticity test and Breusch-Godfrey Serial Correlation LM test were also carried out and they confirmed the validity and reliability of the model employed; the inferential results suggested that public debt had positive and significant impact on economic development in Nigeria. The study recommended that since both foreign and domestic debt had positive significant impact on economic development in Nigeria, government should continue borrowing to finance the national budget and achieve key macro-economic goals such as price stability, improvement in standard of living, provision of social and economic amenities amongst others, which will bring about economic development in Nigeria.

Keywords: public debt, economic development, gross fixed capital formation, exchange rate, foreign debt and domestic debt.

1. Introduction

The main protagonist of public debt is the Keynesian school of thought. They believe that government intervention in the workability and running of the economy is inevitable. The opined that it is sacrosanct that government borrow when there is need for injection of money into the economy to provide certain amenities and infrastructure that would aid the achievement and attainment of key macroeconomic objectives amongst others in any economy. In Nigeria, the inception of government borrowing can be traced back to the financial reform that was initiated by the administration associated with our colonial masters in 1958 which gave rise to the creation of public financial assets to finance fiscal deficit. Paragraph 35 of the central Bank of Nigeria ordinance 1958 states that the central bank shall be entrusted with issuance and management of federal government loans publicly issued in Nigeria upon such terms and conditions as may be agreed within the government and the central bank.

In order to enhance economic growth and development, developing countries like Nigeria borrow to make up for the deficit they have in their budget, but this will result to having investment opportunities with higher rates of return compared to other countries that do not borrow as much in developed economies. This becomes effective as long as borrowed funds

and some internally ploughed back funds are properly utilized for productive investment, and do not suffer from macroeconomic instability, policies that distort economic incentives, or sizable adverse shocks. Growth therefore is likely to increase and allow for timely debt repayments.

Public debt may be grouped either in terms of term or area sourced from. In terms of term, public debt may be classified in to long-term debt when the debt is expected to last for a longer period of time and short-term debt if debt is designed to last for one or two years only. Also, it can be classified in terms of source; that is external debt and domestic debt. For the purpose of this research, concentration will be more on external debt and domestic debt as types of public debts to ascertain which one contribute more to the economic development of Nigeria and also look at both as a group in order to evaluate their combine impact on economic development in Nigeria. External debt refers to any financial resources which government and organizations are using that are borrowed from outside the shores of Nigeria. Regardless of where it is borrowed from, it has both advantages and disadvantages; therefore any government or institution that has the intention of borrowing from these international institutions should consider the merits and demerits associated with it before set out to secure the fund. Domestic debt therefore is defined as debt that government borrowed within the country, it involves the same currency. Therefore all the amount of money that government owes internally such as Treasury Bills, Treasury Certificates, and Federal Government Development Stock, Ways and Means Advances and Treasury Bonds are all regarded and grouped as domestic debt

The impact that public debts have in enhancing economic development has overtime been researched by several scholars, but recently it has undergone a very notable revival probably prompted by the substantial weakening of public finances in different economies, that may be attributed to the 2008 financial crisis (Alejandro & Ileana, 2017). Several empirical documentations exist on the dichotomy in favor of and against public borrowings as a way of promoting and enhancing economic development in an economy. Some of this literature include Elom-Obed, Odo, Elom-Obed and Anoke (2017), Peter, Denis and Chukwuedo (2013), Tajudeen(2012) and Eze, Nweke, and Atuma (2019), etc. it important to note that public debt is bad when it becomes chronic and burdensome for the government to repay; however, countries cannot avoid it since it is capable of providing key macro-economic goals which will improve the standard of living of the citizens and also act as a catalyst of economic development. In light of this, public debt was described as a necessary evil. This implies that borrowing remains good until it reached the point in which it makes the economy worse off.
Arguably, scholars postulated that countries with less debt-burdened tends to have higher rates of development than the countries with higher debt-burdened. This is so because the developing countries and less developed countries accumulate more debt for the reason of promoting economic growth and development due to their inability to generate enough resources to bridge budget deficits gap and enhance economic development. Governments prefer debt accumulation in financing budget deficits due to its anti-inflationary effects unlike imposing taxes or printing new money which is most likely to bring about hyperinflation in the economy. Although taxes can be used by the government to finance the budget deficit, it however, tends to distort the structure of relative prices; and public debt, if it exceeds the carrying capacity of the economy, creates problems of international equity among nations (Akram, 2011).

2. Empirical review
2.1 Theoretical review
The classical hypothesis
According to Akpakpan (1999), the classical economics refers to the economic doctrine of Adam Smith and his followers, which was further developed with the works of David Ricardo, John Stuart Mill and the Reverend Thomas Malthus. The classical economic ideas were so well established and widely accepted for over a century that they were labeled, classical (Dewett, 2009). The hey-day of classical economics, according to Anyanwu (1995), was during the years 1800-1850.

According to the classical theory fiscal deficit financed by debt is largely offset by the crowding out effect of deficit financing on private sector investment, and by extension, lowers the level of economic growth. In addition to the crowding out effect on private investment, the society will have to bear the burden of increase in public debt as a result of debt financed expansion in government expenditure. This opposition to deficit financing on the part of the classical economists was based on the assumption of full employment. Obviously, if there is already full employment, any extra expenditure financed by debt or by created money is bound to create inflationary rise in prices. In sum, according to classical economic theory, excessive deficit financing can lead to poor economic performance.

The Ricardo hypothesis of Public Debt
This theory of public debt was propounded by David Ricardo in 1819. In his Principles, Ricardo developed the theory of public debts by stating that the ordinary and extraordinary spending of government were mainly payments made to sustain unproductive laborers. Therefore, any saving from the government expenses would be included in the income if not to the capital of the contributors. Ricardo in a letter written to McCulloch in 1816 believed that public expenditure was wasteful venture undertaken by the state. Ricardo's theory of public debts was then, based on the fact that the primary burden to the community was derived from the wasteful nature of public expenditure itself rather than from the methods adopted to finance such expenditure (Precious, 2015). The theory postulated that financing public expenditure should be focused on drawing the funds from the liquid resources of the community. This is because to focus on the economy, does not make any significant difference whether the funds were raised by loans or taxes. Accordingly, Ricardo argument about payments of interest on public debt deals with a transfer of wealth from one pocket to another within the society. Thus, when countries borrow, it is uncertain whether the loan would be used productively or unproductively. If the loan is used productively, it leads to growth, but it is used unproductively, it deters economic growth in the economy (Okoye, Modebe&Evbuomwan, 2013). In conclusion, this theory is relevant to this study as it would help to determine whether actually, the government expenditures in Nigeria have over time been used productively or unproductively according to the theory.

The Keynesian Theory of Public Debt
The Keynesian theory of public debt was developed partly as a result of the economic crisis created by the great depression of the 1930s in the 19th century. In the theory, constant unbalanced budgets and rapid increase in public debt affect the nations" financial stability. It conceived that huge public debt is a national asset rather than a liability and hence, continuous deficit spending is very essential to the economic growth of nations because, it leads to full employment (Precious, 2015).

The Keynesian theory postulated that the economy tends to equilibrium at full employment, which was an attack on the classical principles of budgeting and public finance. By assumption, Keynes assume that if there were unemployed resources that the private sector could not

employ, these resources can be put to use by adopting an unbalanced budget. Accordingly, Keynes upheld that a rise in public debt via the multiple effects would raise the National Income. It linked public borrowing with deficit financing and urge the government to borrow for all purposes in order to increase effective demand in the economy, which would, in turn, result in increased employment and output. Lerner (1955), opined that duly importance should be given to certain advantage of public borrowing while considering burden thesis of public debt. The economic effect of public debt is assessed in the consideration of the nature of the expenditure for which debt is incurred and in terms of the income generating potentialities. In modern theory, duly importance was given to the net burden of public debt. Furthermore, the theory postulated that additional flow of income generated by increased debt to finance expenditure leads the payment of taxes to serve the debt. During the period of unemployment, public debt increase contributes to current capital for the nation. More so, the theory stated that public borrowing promotes the development of more and more institutionalized sources of savings like stock, capital market, insurance companies, and Banks.

Theory of Economic Development
Growth Theory
The idea that economic development should naturally result in the erosion of dualism (in labor and other markets) establishes a link from classical development economics back to growth theory as pioneered by Abramovitz and Solow. This, in brief, seeks to break economic growth into separable components, the most important being (a) growth in the supply of labor and capital, (b) improvements in the efficiency with which they are allocated between sectors in line with their marginal productivity, and (c) sector specific improvements in technology. Within this framework, dual economy models may be viewed as a special case that highlight one historically important set of barriers to efficient resource allocation. Empirical studies confirm that growth in low income countries is attributable more to capital accumulation, whereas in high income countries it is attributable more to technological change.

 More sophisticated 'endogenous' growth models also incorporate causal links between these sources of growth, and the effect of increasing returns to scale. For example, technological change has to be embodied in capital stock and can proceed more rapidly where this is growing. The pace of technological change in different sectors is also determined by expenditure on research and human capital accumulation. Economies of scale also result from expansion of the size of markets and opportunities for specialization. But the relationship between growth and the institutions that govern resource allocation remain important. In this sense, the dual economy model is just the leading example of a range of disaggregated models that can accommodate more complex market fragmentation, and inter-sectoral rigidities. An additional important factor is the contribution to growth of natural resources. Where abundant, these help to sustain the rate of profit. But natural resources may also be a 'curse' on growth, by attracting labor and capital (and the attentions of policy makers) away from sectors with higher economies of scale and therefore longer-term growth potential.

2.2 Empirical review
Elom-Obed, Odo, Elom-Obed and Anoke (2017) empirically analyzed the relationship between public debt and economic growth in Nigeria from 1980-2015. The study adopted Vector Error Correction Model (VECM) approach of econometric data analysis. The variables used in the study include real gross domestic product (RGDP), foreign debt, domestic debt and domestic private savings. The results of the study indicated that: (i) External debt have significant negative impact on economic growth within the period under study. (ii) Domestic debt (DMD) has significant negative relationship with economic growth within the period under consideration. (iii) External debt and domestic debt granger cause RGDP in Nigeria with

causality running from external debt and domestic debt to RGDP. The implication of this result is that the negative correlation between debt stocks (external debt and domestic debt) and economic growth which is contrary to a prior expectation may be highlighting the misappropriation and wrong application (corrupt practices) of the borrowed funds. Based on findings, the study recommends therefore that (i) Government should reduce external debt and the ones obtained should be strictly used for purposes intended to ensure positive effect. (ii) Government should cut down on domestic borrowing and ensure that the already borrowed funds are applied for purposes intended to ensure positive effect and through growth. (iii) With the evidence of negative causality running from both external and domestic debt stock to economic growth (RGDP) suggests that government should cut down in both borrowings to ensure economic stability and sustainable growth.

Peter, Denis and Chukwuedo (2013)analysed the importance of domestic debt on economic growth of Nigeria. The objective of the study is to investigate the relationship between government domestic debt and economic growth and policy that is likely to improve private sector investment and break growth resistance problem. To empirically determine the relationship between domestic debt and some macroeconomic variables, we employed the error correction model procedures following an examination of properties of the time series using unit root and co-integration test. Findings show that domestic debt and credit have a significant and direct relationship with GDP and that debt servicing has inverse relationship with GDP and also government expenditure has a direct but not significant relationship with GDP. The implication of the findings concludes that domestic debt should be invested in productive sector of the economy and more specifically in the real sector and further productivity gain will be achieved in the improvement on capital project expenditure.

Tajudeen(2012) examined the causal nexus between public debt and economic growth in Nigeria between 1970 and 2010 using a Vector Autoregressive (VAR). The variables used in the study were tested for stationarity using the Augmented Dickey Fuller and Philip Perron test. The result showed that the variables are stationary at first differencing. Co-integration test was also performed and the result revealed the presence of co-integration between public debt and economic growth. The co-integration results show that public debt and economic growth have long run relationship. The findings of the VAR model revealed that there is a bi-directional causality between public debt and economic growth in Nigeria. The paper concluded that public debt and economic growth have long run relationship, 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.

Eze, Nweke, and Atuma (2019) conducted a study on Public Debts and Nigeria's Economic Growth. The broad objective of this study was to analyze the impact of public debts on economic growth in Nigeria for the period 1981-2017. The study adopts ex-post facto research design. Multiple regression analysis was utilized in the study in which the ARDL model and Chow Breakpoint test were the methods used in the analysis. Data obtained from the Central Bank of Nigeria (CBN) statistical bulletin, volume 28, 2017 on gross domestic product growth (GDP), public investment (LPUINV), external debt (LEXD), domestic debt (LDDs), total public debt (LTPUBT), government expenditure (LGEX), national savings (LNS), consumer price index (CPI) and interest rate (INR) were analyzed in the study. The results revealed that external debt has a negative and significant impact on GDP while domestic debt has a negative and insignificant effect on GDP. Similarly, government expenditure has a positive and significant impact on GDP, while national savings and consumer price index have a positive and insignificant effect on LGDP. The results also showed that external debt has a negative

and significant impact on LPUINV, while LDD has a positive and insignificant effect on LPUINV. More so, the results indicated no evidence of significant structural break between the variables. Thus, the study recommends that the government should discontinue the use of external debt in financing budget deficit in the economy but can intensify efforts to stimulating revenue internally through efficient investments and economic diversification. Based on the results still, the government should not utilize domestic debt in financing fiscal deficit, rather there is a dire need to enhance revenue domestically or reduce its current expenditures in order to effectively finance capital investment projects in Nigeria.

3. Methodology
3.1 Research design
This study adopts the *ex-post facto* research design as it deals with event that had taken place and secondary data were readily available for collection. Gross Fixed Capital Formation in Nigeria was adopted as the dependent variable, while foreign debt and domestic debt were employed as independent variables and exchange rate was utilized as a control variable. The model was estimated using the Auto-Regressive Distributed Lag (ARDL) Model. Since we are making use of annualized time-series data and the study cover a long sample period, we made sure our data set were not impaired by unit root; hence we tested for stationarity of the series by employing the Augmented Dickey-Fuller (ADF).

3.2 Source of data collection
Data for this study are elicited from Central Bank of Nigeria Statistical Bulletin of 2018 and World Bank Database: World Development Indicators, 2018. The study period covers 1981 through 2018.

3.3 Method of data analysis
This study used descriptive statistics, unit root test, correlation and Auto Regressive Distributed Lag (ARDL) Model in testing the hypotheses of the study. E-view 9.0 econometric statistical software package was used for the analysis.

3.4 Model specification
This research utilizes a primary model formulated by the authors; the model for this research is built or structured to establish the functional relationship between public debt and economic development in Nigeria, 1981 - 2018. The model tested in this study is a multiple regression stated below:

GFCF=F(FDBT,DDBT,EXR)…………………………..……………….…………….(1)

By modifying the functional model in equation (1) into econometric model:

$GFCF=\beta_0+\beta_1 FDBT_t+\beta_2 DDBT_t+\beta_3 EXR_t + \mu_t$...……..……………………...……… (2)

Where β_0, β_1, β_3 are the parameters

GFCF = Gross Fixed Capital Formation in Nigeria

EXR = Exchange rate

FDBT = Foreign Debt

DDBT = Domestic Debt

μ_t =Stochastic disturbance

3.5 Expected results
Foreign debt is expected to have a positive impact on gross fixed capital formation in Nigeria. Domestic debt is expected to have a positive impact on gross fixed capital formation in Nigeria. Exchange rate is expected to have a negative impact on gross fixed capital formation in Nigeria.

4. Data analysis and interpretation of results
4.1 Pre-estimation test result (Unit Root Test)
Table 4.1 Unit root test

Variables	Augmented Dickey-Fuller test statistic	Probability Value	Critical value at 5%	Integration order/Inference
GFCF	-3.450749	0.0153	-2.943427	I(0)
EXR	-3.537770	0.0125	-2.945842	I(1)
DDBT	-5.999982	0.0000	-2.951125	I(1)
FDBT	-3.885410	0.0182	-3.587527	I(1)

Source: Author's analysis using e-view 9 output with data in appendix

The unit root test from table 4.1 above shows that the variables were stationary at I(0) and I(1). As such, the appropriate estimation technique to employ for analysis is Auto – Regressive Distributed Lag (ARDL) Model.

4.2 Correlation analysis
Table 4.2 Correlation matrix

	GFCF	FDBT	DDBT	EXR
GFCF	1.000000	-0.483860	-0.651947	-0.515865
FDBT	-0.483860	1.000000	0.606954	0.683270
DDBT	-0.651947	0.606954	1.000000	0.861948
EXR	-0.515865	0.683270	0.861948	1.000000

Source: Author's analysis using e-view 9 output with data in appendix

From the result of correlation analysis in table 4.3 above, all the independent variables recorded negative relationship with the dependent variable, while other variable had positive relationship amongst them.

4.3 Descriptive statistics
Table 4.3 Descriptive statistics

	GFCF	FDBT	DDBT	EXR
Mean	36.47387	1505.475	2574.968	104.4552
Median	35.36755	633.0807	846.5303	111.1675
Maximum	89.38105	7759.200	12774.40	306.1000
Minimum	14.90391	2.331200	11.19260	4.536700
Std. Dev.	19.36187	1861.106	3723.529	78.39935
Skewness	1.009675	1.621403	1.587104	0.719999
Kurtosis	3.683025	5.079072	4.306539	3.421495
Jarque-Bera	7.195132	23.49402	18.65584	3.564487
Probability	0.027390	0.000008	0.000089	0.168260
Observations	38	38	38	38

Source: Author's analysis using e-view 9 output with data in appendix

The descriptive statistics presented in Table4.3 shows that DDBT has the highest mean value of 2574.97, followed by FDBT which has 1505.5, while GFCF and EXR have 36.5 and 104.5 respectively. Note that the Mean describes the average value for each data series in the model. From the analysis, DDBT has the highest Standard Deviation as it recorded 3723.5, implying that it is the most volatile variable in the model as it has the highest percentage of dispersion

from the mean. From Table 4.3 above, three variables, GFCF, FDBT and DBT with 1.00, 1.62 and 1.59 respectively, are skewed a little to the right, while EXR which haso.72 is skewed to the left.

Kurtosis measures the peakedness or flatness of the distribution of a series. The kurtosis of a normal distribution is 3. If it exceeds 3, it means that the distribution is peaked or leptokurtic relative to the normal. Conversely, if it is less than 3, it shows that the distribution is flat or platykurtic relative to the normal. From Table 4.3 above, GFCF, FDBT, DDBT and EXR are peaked or leptokurtic because they have 3.7, 5.1, 4.3 and 3.4 respectively.

Jarque-Bera (JB) tests whether the series is normally distributed or not. The test statistic measures the difference of the skewness and kurtosis of the series with those from a normal distribution. In JB statistic, the null hypothesis which states that the distribution is normal is rejected at 5% level of significance. From the results of the analysis presented in Table 4.3 above, only EXR with a Jarque-Bera statistic of 3.6 with a Probability of 0.17 is accepted as being a normal distribution since its p-value is greater than 5% level of significance, while other variables are said to be not normally distributed.

Although these skewness and kurtosis indicate departure from normality, such point is not strong enough to discredit the goodness of the dataset for the analysis in view. The number of observation of 38 depicts the duration of the study.

4.4 ARDL model result
Table 4.4 ARDL result
Dependent Variable: GFCF
Method: ARDL
Date: 04/11/20   Time: 07:57
Sample (adjusted): 1985 2018
Included observations: 34 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): FDBT DDBT EXR
Fixed regressors: C
Number of models evalualed: 500
Selected Model: ARDL(3, 0, 0, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GFCF(-3)	0.469262	0.120878	3.882099	0.0008
FDBT	0.001952	0.000531	3.676939	0.0013
DDBT	0.000750	0.000336	2.233221	0.0356
EXR(-4)	0.102183	0.034174	2.990045	0.0065
C	13.00395	3.560264	3.652525	0.0013

R-squared	0.965954	Mean dependent var	31.64681	
Adjusted R-squared	0.951152	S.D. dependent var	13.24025	
S.E. of regression	2.926307	Akaike info criterion	5.241552	
Sum squared resid	196.9553	Schwarz criterion	5.735375	
Log likelihood	-78.10639	Hannan-Quinn criter.	5.409960	
F-statistic	65.25638	Durbin-Watson stat	2.118086	
Prob(F-statistic)	0.000000			

Source: Author's analysis using e-view 9 output with data in appendix

From the ARDL Model result above in table 4.4, the selected model was (3, 0, 0, 4) for GFCF, FDBT, DDBT and EXR respectively.

A keen observation of the result revealed that the R-squared was approximately 97%, this means that the independent variables accounted for about 97% variations in the dependent variable while the remaining 3% may be attributed to variables not included in the model. Put differently, foreign debt, domestic debt and exchange rate accounted for about 97% changes in gross fixed capital formation, while the remaining 3% could be attributed to stochastic variables.

The result revealed that all the independent variables had positive and significant impact on gross fixed capital formation such that a unit increase in foreign debt would bring about a 0.002 unit increase in gross fixed capital formation, while a unit increase in domestic debt would bring about a 0.0008 unit increase in gross fixed capital formation. Also, a unit increase in exchange rate would bring about a 0.1 unit increase in gross fixed capital formation. In the same vein, a unit decrease in foreign debt would bring about a 0.002 unit decrease in gross fixed capital formation, while a unit decrease in domestic debt would bring about a 0.0008 unit decrease in gross fixed capital formation. Also, a unit decrease in exchange rate would bring about a 0.1 unit decrease in gross fixed capital formation.

The result further revealed that the overall model was a good fit owing to the f-statistic value of 65.3 and its corresponding p-value of 0.000 which shows that the model is significant at 5% level of significance. Durbin Watson Statistic of 2.1 showed that the variables were free from auto-correlation since it is within the region of 2.

Figure 4.1(Top 20 Models)

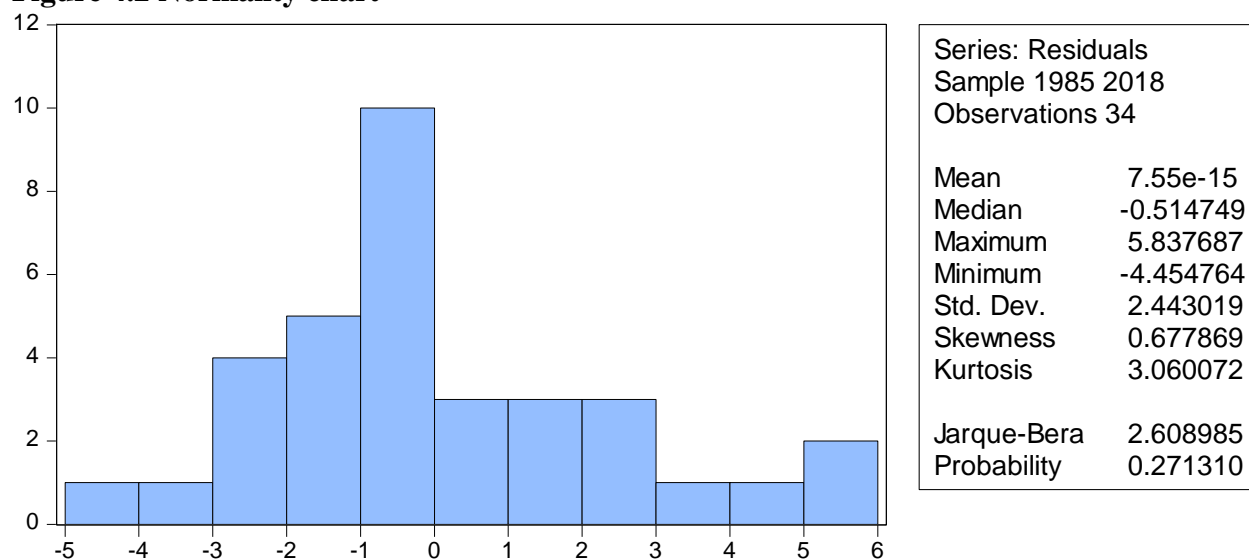Akaike Information Criteria (top 20 models)
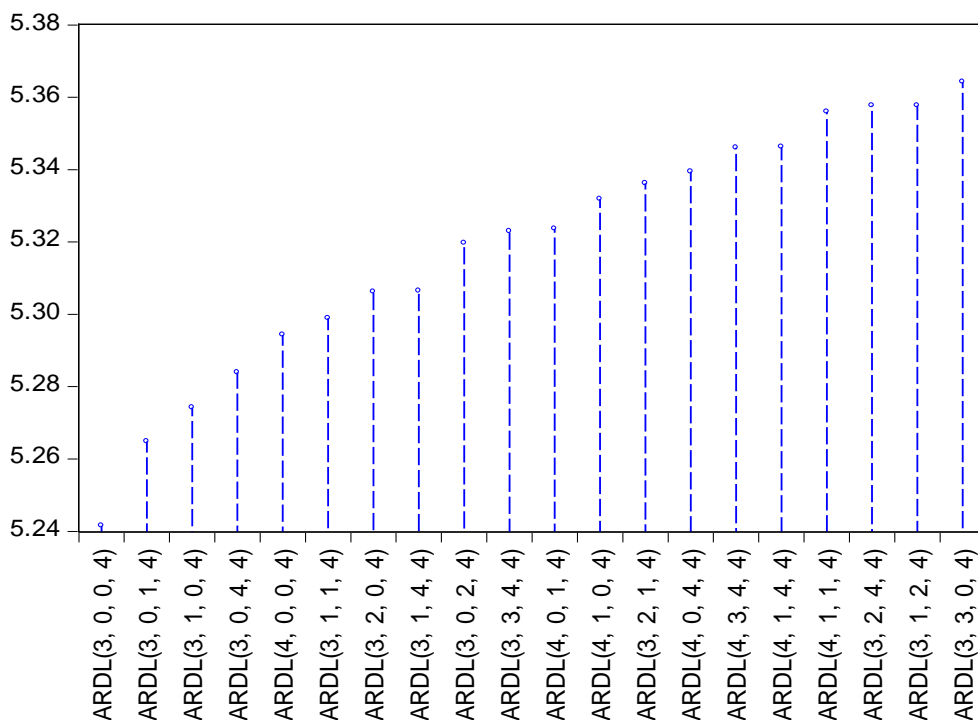
Source: Author's analysis using e-view 9 output with data in appendix

The figure above reveals the top 20 models. It reveals the best model selected by ARDL Model analysis as being (3, 0, 0 and 4) and interpreted in table 4.4 above. This was done in order to further proof the validity and reliability of the selected model.

4.2 Test of Normality
Figure 4.2 Normality chart

Series: Residuals	
Sample 1985 2018	
Observations 34	
Mean	7.55e-15
Median	-0.514749
Maximum	5.837687
Minimum	-4.454764
Std. Dev.	2.443019
Skewness	0.677869
Kurtosis	3.060072
Jarque-Bera	2.608985
Probability	0.271310

Source: Author's analysis using e-view 9 output with data in appendix

This test is conducted to ensure that the data employed in this study are normally distributed. Observing from the normality diagram in the figure above, as well as the Jarque-Bera value of 2.60 and its corresponding p-value of 27% which is >5% significant level confirms that the data are normally distributed.

4.5 Test for auto correlation
Table 4.5Correlogram Q-statistic
Q-statistic probabilities adjusted for 3 dynamic regressors

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
.*|. |	.*|. |	1	-0.144	-0.144	0.7704	0.380
.*|. |	.*|. |	2	-0.153	-0.177	1.6639	0.435
.|*. |	.|. |	3	0.091	0.042	1.9941	0.574
.*|. |	.*|. |	4	-0.160	-0.175	3.0439	0.551
.*|. |	**|. |	5	-0.179	-0.227	4.3911	0.495
.*|. |	***|. |	6	-0.178	-0.352	5.7802	0.448
.|*. |	.|. |	7	0.175	0.001	7.1764	0.411
.|. |	.*|. |	8	0.007	-0.094	7.1790	0.517
.|*. |	.|. |	9	0.082	0.053	7.5106	0.584
.|. |	.*|. |	10	-0.004	-0.182	7.5115	0.676
.*|. |	.*|. |	11	-0.082	-0.200	7.8692	0.725
.|*. |	.|. |	12	0.119	-0.015	8.6519	0.732
.|. |	.|*. |	13	0.019	0.119	8.6721	0.797
.*|. |	.*|. |	14	-0.180	-0.180	10.645	0.714
.|. |	**|. |	15	-0.056	-0.238	10.844	0.764
.|*. |	.*|. |	16	0.146	-0.097	12.292	0.724

Source: Author's analysis using e-view 9 output with data in appendix

This test is carried out to further test for auto correlation and to consolidate on the result of Durbin Watson Stat in table 4.4. The result of Correlogram Q-Statistic in table 4.5 above, suggest that the variables are free from auto correlation, since the correlogram Q- Stat. table indicates that all p-values were >5% hence, the conclusion that the model was free from auto correlation.

4.6 Test for heteroskedasticity
Table 4.6 Test for heteroskedasticity
Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.462793	Prob. F(10,23)	0.2161
Obs*R-squared	13.21757	Prob. Chi-Square(10)	0.2118
Scaled explained SS	6.230195	Prob. Chi-Square(10)	0.7956

Source: Author's analysis using e-view 9 output with data in appendix

The Heteroskedasticity test above suggests that the variables are free from the problem of Heteroskedasticity since the p-values of F-stat. and Obs*R-squared of 0.22 and 0.21 respectively are > 5% significance level. This outcome is further strengthened by the p-value of approximately 0.80 for the Scaled explained SS which also suggest the absence of Heteroskedasticity.

4.7Test for serial correlation
Table 4.7 serial correlation
Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.099745	Prob. F(2,21)	0.3514
Obs*R-squared	3.223461	Prob. Chi-Square(2)	0.1995

Source: Author's analysis using e-view 9 output with data in appendix

In line with the rule, the Breusch-Godfrey Serial Correlation LM Test table above shows that the probability values of 0.35 and approximately 0.20 for both F-statistic and Obs*R-squared respectively are statistically insignificant at 5% level of significance. Hence, the null hypothesis that there is serial correlation in the model is rejected. Thus, the model is said to be free from serial correlation.

4.8 Stability Diagnostic Test
Table 4.8 Ramsey RESET Test
Equation: UNTITLED
Specification: GFCF GFCF(-1) GFCF(-2) GFCF(-3) FDBT DDBT EXR EXR(
     -1) EXR(-2) EXR(-3) EXR(-4) C
Omitted Variables: Squares of fitted values

	Value	Df	Probability
t-statistic	0.887551	22	0.3844
F-statistic	0.787747	(1, 22)	0.3844

Source: Author's analysis using e-view 9 output with data in appendix

From the Ramsey reset test result in table 4.8 above, the t-statistic of 0.886 and its corresponding p-value of 0.38 suggest that the model is correctly specified, so null hypothesis of linear specification not rejected at 5% level of significance, since the p-value is <5%.

4.9 A priori Economic Expectation Result

The result is evaluated based on economic theories and literatures in line with what is obtainable in Nigeria and what is applicable all over the world.

Table 4.9 A priori Expectation

Variables	Expected Signs	Actual Signs	Remark
FDBT	Positive (+)	Positive (+)	Conform
DDBT	Positive (+)	Positive (+)	Conform
EXR	Negative (-)	Positive (+)	Do not Conform

4.10 Summary of findings

The correlation analysis revealed that all the independent variables had a negative impact with the dependent variable. The normality test result revealed that the data set were normally distributed; the Ramsey reset test result suggested that the model was correctly specified. Serial correlation result also showed no presence of serial correlation; same can also be said for both test for auto correlation and test for heteroskedasticity as both results confirmed that the variables were free from correlation and heteroskedasticity problem.

The ARDL model further revealed that all the independent variables (foreign debt, domestic debt and exchange rate) had positive and significant impact on the dependent variable (gross fixed capital formation). On this note, inference can be drawn that public debt had significant positive impact on economic development in Nigeria. The findings of this study is in consonance with the empirical documentations of Peter, Denis and Chukwuedo (2013) and Tajudeen(2012) and in negation or in contrast with the studies ofElom-Obed, Odo, Elom-Obed and Anoke (2017) and Eze, Nweke, and Atuma (2019).

5. Conclusion and recommendations

5.1 Conclusion

This study was conducted to ascertain the impact of public debt on economic development in Nigeria, the study employed gross fixed capital formation as dependent variable while foreign debt, domestic debt and exchange rate were used as independent variables. several test and analysis had been conducted ranging from pre - estimation test, diagnostic tests such as Ramsey stability test, serial correlation test, normality test amongst others and ARDL model. The ARDL model results suggested that public debt had positive and significant impact on economic development in Nigeria and the diagnostic test further ensured the reliability and validity of the model, variables and estimation techniques employed. The findings of this study were in agreement with the study conducted by Peter, Denis and Chukwuedo (2013) and Tajudeen(2012). The result of this study further supports the Keynesian postulation which opined that government intervention in the regulation of the economy is paramount and cannot be over emphasized.

5.2 Recommendations

1. This study recommends that since foreign debt impacted positively on economic development in Nigeria, government should continue borrowing to finance the national budget and achieve key macro-economic goals such as price stability, improvement in standard of

living, provision of social and economic amenities amongst others, which will bring about economic development in Nigeria.

2. Also, just as in the case of foreign debt, domestic debt yielded positive impact on economic development. As such, government should ensure that funds borrowed within Nigeria should be put to proper and judicious use that is capable of bringing economic development in Nigeria and improve the standard of living of the populace.

3. Exchange rate recorded a positive and significant impact on economic development just like the two other variables. As such, this study recommends that monetary authorities in Nigeria regulate exchange rate and formulate exchange rate policies that are capable of enhancing economic activities in the economy and thereby bring about economic development in Nigeria.

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Appendix
Data used for analysis

YEAR	GFCF(N'Billion)	FDBT(N'Billion)	DDBT(N'Billion)	EXR(N)
1981	89.38105	2.33	11.19	110.39
1982	85.9339	8.82	15.01	109.86
1983	75.75313	10.58	22.22	109.84
1984	58.94738	14.81	25.67	113.20
1985	46.39088	17.30	27.95	99.90
1986	54.95059	41.45	28.44	51.89
1987	49.98771	100.79	36.79	14.72
1988	43.64422	133.96	47.03	4.5367
1989	52.48869	240.39	47.05	7.3916
1990	53.12219	298.61	84.09	8.0378
1991	48.40018	328.45	116.20	9.9095
1992	43.77439	544.26	177.96	17.2984
1993	44.47636	633.14	273.84	22.0511
1994	42.06784	648.81	407.58	21.8861
1995	37.20593	716.87	477.73	21.8861
1996	36.62556	617.32	419.98	21.8861
1997	38.47746	595.93	501.75	21.8861
1998	40.61495	633.02	560.83	21.8861
1999	38.34181	2,577.37	794.81	92.6934
2000	34.10954	3,097.38	898.25	102.1052
2001	30.92589	3,176.29	1,016.97	111.9433
2002	27.58251	3,932.88	1,166.00	120.9702
2003	29.3868	4,478.33	1,329.68	129.3565
2004	27.11797	4,890.27	1,370.33	133.5004
2005	24.99612	2,695.07	1,525.91	132.147
2006	26.16665	451.46	1,753.26	128.6516
2007	20.18004	438.89	2,169.64	125.8331
2008	18.85977	523.25	2,320.31	118.5669
2009	21.11545	590.44	3,228.03	148.8802
2010	16.81501	689.84	4,551.82	150.298
2011	16.36056	896.85	5,622.84	153.8616
2012	14.95883	1,026.90	6,537.54	157.4994
2013	14.90391	1,387.33	7,118.98	157.3112
2014	15.8027	1,631.50	7,904.03	158.5526
2015	15.4901	2,111.51	8,837.00	193.2792
2016	15.36674	3,478.91	11,058.20	253.4923
2017	15.47433	5,787.51	12,589.49	305.8000
2018	19.80983	7,759.20	12,774.40	306.1000

Source: Central Bank of Nigeria Statistical Bulletin of 2018 and World Development Indicators 2018