## "Impact of public debt profile on economic growth: Evidence from Nigeria"

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# IMPACT OF PUBLIC DEBT PROFILE ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIA

#### Abstract

An excessive increase in public debt characterizes the contemporary development of the global economic and financial system. The paper aims to examine the short- and long-run impact of state debt on economic growth in Nigeria. The model was estimated using an autoregressive distributed lag (ARDL) bounds testing method to cointegration for the long-run investigation. At the same time, the contemporaneous dynamics were explored using an unrestricted error correction model. The data were collected from the Central Bank of Nigeria's statistical bulletins and annual reports, and it spanned the years from 1990 to 2020. The study uncovers evidence of a long-term link between the study variables. In addition, the study finds that all the explanatory is statistically significant. Specifically, economic growth is significant and negatively responsive to changes in external debt by 0.19% and debt servicing by 0.07%, contrary to its positive response to changes in domestic debt and exchange rate by 0.27% and 0.18%, respectively. The paper, therefore, recommends that government may consider more domestic borrowings to foreign borrowings that should only be resorted to when it is indispensable. Moreover, the government should also strive to balance loan servicing and the economic sustainability.

**Keywords** debt, external debt, economic growth, domestic

borrowings, trade balance, Nigeria

JEL Classification H63, H68, O40

#### INTRODUCTION

Nowadays, it is impossible to find a country that can perform without borrowing. Thus, the use of public loans can be explained by the lack of state financial resources necessary to cover the balance of payments and state budget deficits, finance programs and projects, maintain the stability of the national monetary unit, etc. Therefore, the effective use of loans can become a positive factor in economic development. However, at the same time, an excessive and uncontrolled increase of state debt can negatively affect economic independence and become a burden on the national economy (Zhuravka et al., 2021).

There has been a raging debate concerning Nigeria's rising debt profile. Some people believe that as long as the debt is being judiciously utilized, it will bring about the usual benefits. However, it is against the view of others who submit that the current borrowing should be controlled; the creditor countries among which China is most pronounced shall take over major assets, thereby resulting in economic colonization. This situation is currently happening in Uganda, where the country's only major airport is on the verge of being taken over by the Chinese.

According to the World Bank (2020), debt is of utmost importance to developing economies, always saddled with a scarcity of resources.

The alternative is to borrow to fast-track investment and capital formation since domestic savings and foreign exchange earnings required to finance investment in the local economy are usually meager. To most economies, therefore, debt is inevitable but will only be helpful if it is judiciously expended for the purpose for which it is sort in the first place. This is because borrowing provides funds for investments as well as financing deficits in the balance of payments (Onyele & Nwadike, 2021).

Ohwofasa et al. (2012) submit that the genesis of the debt crises in Nigeria began in early 1980 when government revenue began to dwindle due to volatility in prices of crude oil at the global market. The fall in government revenue affected the execution of development projects prompting the government to seek funds elsewhere, especially from external sources leading to debt accumulation. The International Commercial Banks's willingness to grant loans to developing countries acting under the pretext of helping to foster economic development drive compounded the debt problem in Nigeria. Undoubtedly, the continuous rise in borrowings has negatively affected development programs in Nigeria as servicing the debts consumes a quantum of the country's foreign exchange earnings with a concomitant impact on net foreign reserves that is grossly inadequate to finance development projects.

In the last few decades, both domestic and external debts in Nigeria have been rising with leaps and bounds. The amount that is being budgeted annually for debt servicing, especially external debts, has become a source of worry. More often than not debt servicing gulps a more significant allocation in the country's budget than the amount allocated for capital expenditure. The COVID-19 pandemic that occurred in late 2019 saw external debt rising in geometric progression. For instance, available records from the Debt Management Office show that the external debt in Nigeria stood at over USD 6 billion in 2010 while over USD 1 billion was embarked for debt service payment. It was six years after the country exited The Paris Club in 2006. In 2015, external debt grew to USD 21.1 billion and further to USD 127.1 billion in 2020. In the same period, debt service payments skyrocketed from USD 2.2 billion in 2015 to USD 11.2 billion in 2020.

Similarly, the domestic debt structure was also observed to be rising astronomically. However, despite the enormous increase in the country's public debt, economic growth has not performed very well. The economy's average growth rate between 2010 and 2014 was 6.1%, which became negative recording –1.6% in 2016. In 2018 and 2020, the economy's growth rate has become embarrassing as it stood at –1.9%, respectively.

Sulaiman and Azeez (2012), Ndubuisi (2017), Odubuasi et al. (2018), and Ugwuanyi et al. (2021) argue that the impact of public debt, especially the external debt component, on economic growth is positive. However, Udeh et al. (2016), Okon and Monday (2017), and Onyele and Nwadike (2021) established a negative relationship. Meanwhile, Ohwofasa et al. (2012) found no relationship between public and economic growth in Nigeria. Thus, the structure and composition of debt instruments, the terms of borrowing, and the mode of financing fiscal deficits are laced with severe implications for debt servicing nations. In the aftermath of debt crises, debtor countries find it challenging to generate a meaningful development endeavor that will alter the debt stock as well as the terms of debt to maintain a sustainable level of debt services. This is why developing countries, including Nigeria, wallow in debt and their citizens in abject poverty while policy to address the problem to exit the debt trap has continued to elude policymakers. The study is being carried out against this backdrop.

#### 1. LITERATURE REVIEW

The uncontrolled increase of the global public debt causes growing anxiety among academia and economic experts worldwide.

Thus, Stawska (2015) investigated state debt in the emerging economies and highlighted that its high rate in developing countries deteriorates conditions for investments and capital formation, which causes the slowdown in economic growth.

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Tiftik and Mahmood (2020) profoundly examined the long-term debt dynamics and found out that in 2020 global debt surpassed 340% of the world GDP. Finally, Buryk et al. (2019) investigated the influence of public debt on economic growth in different countries. The obtained results allowed defining 3 groups of states: states with the economic downturn, states with slow economic growth, states with a high level of economic growth.

Aybarç (2019) stated that public debt should be returned at the expense of interest on profits to ensure economic growth. He also classified state debt as the debt for development and forced debt (voluntary and compulsory debt). Forced debt is received in a crisis (severe economic downturn, social and political instability, war, etc.). Getting compulsory debt is always riskier than receiving a voluntary one. D'yakonova et al. (2018) studied the links between Ukraine's state debt and the performance efficiency of its enterprises (both exporters and importers) in the global environment.

As mentioned above, a number of theories exist to explain the link between government debt and economic progress: the dual gap theory, crowding out theory, debt overhang theory, and dependency theory. The role of debt in the economy is a point of contention among economists. For example, the debt overhang theory depicts a huge debt position that prevents further borrowing. However, the crowding-out hypothesis reveals the level of public sector debt that hinders the private sector from evaluating the debt market. Meanwhile, proponents of the dual-gap theory argue that a country's investment needs exceed its savings, necessitating external borrowing. In contrast, supporters of the dependency theory argue that developing countries will continue to rely on developed economies for assistance, including borrowing, to finance their developmental needs due to the capitalist tendencies of developed economies (Ferraro, 2008 cited in Ekor et al., 2021).

Sulaiman and Azeez (2012) used the empirical corridor to investigate the influence of external debt on Nigerian economic growth. The data from 1970 to 2010 were analyzed using the ordinary least square technique using an error-correcting model. The variables were found to have a long-term association. The study also discovered that

external debt has a considerable favorable impact on Nigeria's economic growth.

According to Ohwofasa et al. (2012), the variation in crude oil prices resulted in a decrease in revenue in Nigeria, forcing the government to turn to foreign borrowing as a source of revenue. Their study, which lasted from 1986 to 2011, looked at the relationship between external debt management and Nigeria's macroeconomic performance. As dependent variables, per capita income, unemployment rate, and literacy rate were used. Debt service payment, external debt, foreign direct investment, and balance of payments were independent variables in all three models. The study was conducted using the Ordinary Least Squares (OLS) method. As a result, the study found no indication of a link between economic performance metrics and foreign debt components.

Udeh et al. (2016) investigated the impact of external debt on Nigerian economic growth. The GDP was modeled as a function of external debt stock, external debt service payment, and exchange rate, which is a proxy for economic growth rate. As a result, the study indicates that both in the short and long run, external debt and debt service payments have a considerable negative influence on economic growth. For 1980–2013, the study employs the error correction method to examine the contemporaneous relationship.

Meanwhile, Okon and Monday (2017) examined how responsive economic development is related to changes in foreign debt, external debt servicing payments, exchange rate, and per capita income in Nigeria, which serves as a proxy for the poverty level. The analysis reveals that changes in foreign debt have a large negative impact on economic growth, whereas changes in exchange rate and per capita income have a considerable beneficial impact. The study used the ordinary least square technique to analyze data from 1986 to 2016.

From 1985 to 2015, Ndubuisi (2017) investigated the relationship between external debt and economic development in Nigeria. Economic growth was the dependent variable, while external debt stock, external debt services, exchange rate, and external reserve were the explanatory variables. The study makes use of an error correction model

as well as a causality test. It was concluded, among other things, that Nigeria's external debt stock has a strong positive impact on economic growth. In addition, the analysis discovers unidirectional causation in Nigeria between external debt and economic development.

Between 1981 and 2017, Odubuasi et al. (2018) looked at the relationship between Nigeria's economic growth and debt components. External debt, debt service payments, and government capital spending were included as explanatory variables in the study. The co-integration, an error-correcting technique, and a granger causality test were used for the analysis. As a result, the variables had a long-term association. Furthermore, the analysis revealed that external debt has a significant positive impact on Nigeria's economic growth. Finally, Festus and Saibu (2019) looked at the effects of external debt on Nigerian economic growth from 1981 to 2016. The study used the autoregressive distributed lag (ARDL) model, which found, among other things, that external debt had a considerable negative influence on Nigeria's economic growth.

According to Muhammad and Abdullahi (2020), the second wave of external debt ballooning began after the country departed external commitment following the Paris Club of creditors' debt write-off in 2006. The study examined the influence of external debt servicing on Nigerian economic growth from 1985 to 2018. It was found that economic growth in Nigeria is significantly and negatively responsive to changes in foreign debt payment in the period under review, using the ARDL model.

Eke and Akujuobi (2021) investigated the impact of Nigeria's state debt on economic growth from 1981 to 2018. The study indicates that changes in foreign debts have a significant and negative impact on economic development in the short run, using a co-integration and error correction model. Domestic debt, meanwhile, has a substantial positive impact on Nigeria's economic growth.

The relationship between external debt and economic growth in Nigeria is examined by Ekor et al. (2021). The ARDL model is applied to data from 1976 to 2008. According to the report, external

debt and debt service payments had a considerable detrimental influence on Nigeria's economic growth.

From 1981 to 2019, Onyele and Nwadike (2021) examined the impact of Nigeria's public debt burden on economic growth. The total debt to GDP ratio was used to measure debt burden, while the debt service cost to government revenue ratio was used to determine revenue sufficiency. Reserve sufficiency was also measured: the short-term external debt to reserve ratio. The study reveals that in the long run, debt burden, revenue adequacy, reserve adequacy, and exchange rate all have a significant negative impact on economic development when using the autoregressive distributed lag (ARDL) model. In the near run, changes in income and reserve adequacy have a favorable impact on economic growth, whereas changes in debt burden have a negative impact.

Ugwuanyi et al. (2021) examined the effects of external debt management on Nigerian economic growth from 1986 to 2018. GDP, a proxy for economic growth, was calculated as a function of external debt service, balance of payments, foreign debt, and exchange rate. The study demonstrates that external debt management had a considerable positive influence on Nigeria's economy using the OLS regression technique.

#### 2. AIM

The study aims to examine the short- and long-run impact of government debt on economic growth in Nigeria using ARDL model.

#### 3. METHODOLOGY

The model is specified in line with Muhammad and Abdullahi (2020), who assess the impact of external debt on economic growth in Nigeria by:

$$GDP = f(EDT, DDT, DSP, EXR).$$
 (1)

The long stochastic form of equation (1) becomes:

$$GDP_{t} = \alpha_{0} + \alpha_{1}EDT_{t} + \alpha_{2}DDT_{t} + \alpha_{3}DSP_{t} + \alpha_{4}EXR_{t} + \varepsilon_{t},$$
(2)

where *GDP* – gross domestic product at 2010 constant price, *EDT* – external debt stock, *DDT* – domestic debt, *DSP* – debt service payment, *EXR* – exchange rate. The a-priori expectation of the study is that a positive relationship should exist between economic growth and external debt as well as domestic debt. In contrast, debt service payment is expected to have a negative relationship. On the contrary, the exchange rate will exhibit either positive or negative relationship.

### 3.1. Estimation technique

Pesaran and Pesaran (1997) introduced the autoregressive distributed lag (ARDL) model, which was expanded by Pesaran et al. (2001). The model is known for analyzing both short- and longterm estimation simultaneously. It is a two-step model that starts with the F-statistics from the Wald test, which is utilized for the bound test of co-integration. If the F-statistic is below the lower bound, no co-integration is conceivable by definition, according to a critical value computed by Narayan (2005). If the F-statistic, on the other hand, is greater than the upper bound, the variables are co-integrated, indicating the presence of a long-term link. Finally, the test will be inconclusive if the F-statistic falls between the two critical thresholds. The ARDL testing technique begins with the estimate of a vector autoregressive (VAR) model to determine the lag length, as suggested by Schwarz Information Criteria (SBC) and Akaike Information Criteria (AIC). As a result, the ARDL model of equation (2) is calculated by:

$$\Delta InGDP_{t} = \alpha_{0} + \sum_{i=1}^{K} \alpha 1i\Delta InGDP_{t-1} +$$

$$+ \sum_{i=1}^{K} \alpha 2i\Delta InEDT_{t-1} + \sum_{i=1}^{K} \alpha 3i\Delta InDDT_{t-1} +$$

$$+ \sum_{i=1}^{k} \alpha 4i\Delta InDSP_{t-1} + \sum_{i=1}^{k} \alpha 5i\Delta InEXR_{t-1} +$$

$$+ \beta_{1}InGDP_{t-1} + \beta_{2}InEDT_{t-1} +$$

$$+ \beta_{3}InDDT_{t-1} + In\beta_{4}InDSP_{t-1} +$$

$$+ \beta_{4}InEXR_{t-1} + \varepsilon_{t}.$$

$$(3)$$

The estimation in equation (3) is the standard ARDL model, and  $\alpha$  is the short run while  $\beta$  is the long run. The null hypothesis is that there is no co-integration is expressed by:

 $H_0$ :  $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_4 = 0$  is tested against the alternative hypothesis.

$$H_1$$
:  $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$ .

If the bound test reveals evidence of a stable long-run relationship, the next step is to estimate the short-run, which is done simply by multiplying the long-run by the short-run as  $\beta$ 's in equation 3 by ECM as follows.

$$\Delta InGDP_{t} = \sigma_{0} + \sum_{i=1}^{K} \sigma 1i\Delta InGDP_{t-1} +$$

$$+ \sum_{i=1}^{K} \sigma 2i\Delta InEDT_{t-1} + \sum_{i=1}^{K} \sigma 3i\Delta InDDT_{t-1} +$$

$$+ \sum_{i=1}^{k} \sigma 4i\Delta InDSP_{t-1} +$$

$$+ \sum_{t-1}^{k} \sigma 5i\Delta EXR_{t-1} + \lambda ECM_{t}.$$

$$(4)$$

In equation 4, the  $ECM_{t-1}$  is the error correction term coming from the proven long-run equilibrium relationship, whereas  $\lambda$  denotes the rate at which the equilibrium process converges.

Pesaran et al. (2001) aver that the reliability of the equilibrium multipliers should be ascertained by assessing for the stability of the parameters in the ECM using Brown et al. (1975) cumulative sum of recursive residuals (CUSUM) and the cumulative sum of the square of recursive residuals (CUSUMSQ).

#### 3.2. Unit root test

The Augmented Dickey-Fuller (ADF) test was used to determine the level of stationarity of the variables, ensuring that none of the variables has the integration of order 2, which might cause the model to fail. This test is also used to rule out artificial regression. The following is an estimate for the ADF test:

$$\Delta Y_t = \alpha_t + \omega Y_{t-1} + C_{2t} + \sum_{t=1}^p \delta_t \Delta Y_{t-1} + \varepsilon_t, \quad (5)$$

where  $Y_t$  is the relevant time series,  $\Delta$  denotes the first difference operator, t denotes a linear trend, and  $\varepsilon$ t denotes the error term.

 $\omega = 0$  is the null hypothesis for the presence of  $H_o$ : a unit root.

If the null hypothesis is not rejected, the test is repeated on other changes in the series. The null hypothesis is rejected after more differencing is done until stationarity is reached.

## RESULTS AND DISCUSSION

Nigeria has the highest level of external debt in Sub-Saharan Africa, which has been rescheduled several times (Table 1). This development, notwithstanding, does little to contain the arrears of this debt.

Table 1. Structure of economic growth and government debt in Nigeria, 1990-2020 (%)

Source: World Bank (2020).

	GDP at Government debt			lebt
Year	2010 constant price	External debt	Domestic debt	Debt servicing
1990-1994	2.6	23.7	54.5	17.8
1995–1999	2.0	61.5	15.6	1.8
2000–2004	8.5	13.9	11.6	0.8
2005–2009	6.8	-19.8	19.2	6.1
2010-2014	6.1	22.8	21.0	127.2
2015	2.8	29.4	11.8	5.7
2016	-1.6	64.8	25.1	4.4
2017	0.8	66.4	13.8	43.8
2018	-1.9	30.6	1.5	125.1
2019	2.3	19.4	11.7	28.7
2020	-1.9	40.8	12.3	17.2

Thus, it kept mounting over time despite being rescheduled and refinanced by the country's creditors, namely the Paris Club, the London Club, and other independent creditors. According to available evidence, external debt in Nigeria remained low until about the mid-1970s, when it stood at USD 1.5 billion but rose to USD 2.5 billion in 1975. However, in 1980, due to outstanding debt, the external debt rose to USD 8.9 billion. The situation was caused by a decline in oil earnings and increases in trade arrears occasioned by the country's inability to foot the bills of importations of needed goods and services. This resulted in non-concessional borrowing from foreign donor agencies and countries. As a result, Nigeria's external debt skyrocketed, reaching USD 30 billion by 2005, the majority of which was borrowed from the Paris Club of creditors. Although the Nigerian government and the Paris Creditors announced a final debt relief of USD 18 billion in 2006 following the country's repayment of USD 12 billion based on a series of negotiations, external debt has risen again. As a result, the debt relief turned out to be just temporary since the level of external debt continues to rise at a rapid pace. This is evident from Figure 1, which demonstrates that all three external debt components have grown by double digits for the most part.

This is why most Nigerians are concerned about the country's growing reliance on debt to fund annual budgets. In the last few years, China has been the preferred destination where the Nigerian government looked into for loans to address the

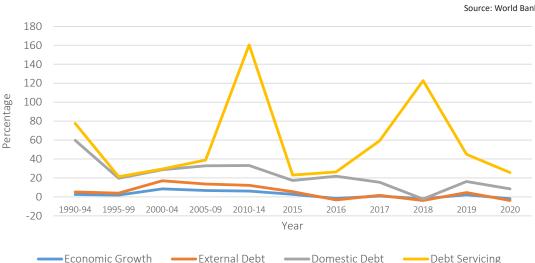


Figure 1. Trend of economic growth and government debt in Nigeria

Source: World Bank (2020)

**Table 2.** Stationarity results

Source: Authors' estimation (EViews-8).

ADF-test			PP-test			
Variable (s)	Level (s)	1st diff	Integration	Level(s)	1 <sup>st</sup> Diff	Integration
LGDP	-4.15	-5.33	l(l)	-5.33	-6.45	l(1)
LEDT	-3.13	-3.74	l(I)	-3.26	-4.67	l(1)
LDDT	-2.04	-4.14	l(1)	-3.43	-6.34	l(1)
LDSP	-4.62	-5.54	I(O)	-5.46	-7.76	I(O)
LEXR	-2.67	-4.52	l(I)	-2.67	-6.58	I(1)
alpha = 5percent	-3.55	-3.56	-	-3.55	-3.56	-

severe infrastructural decades. This prompted analysts and experts to express worry that such a loan agreement with China has the potential to compromise the country's sovereignty. Table 2 indicates that some variables are stationary while others reach stationarity at the first-order differencing using the unit root test.

As recommended by AIC and SBC from the VAR estimation, the ARDL model is estimated with 1 lag length in Table 3. In addition, to verify robustness, the model was put through diagnostic tests such as the heteroscedasticity ARCH LM test, serial or auto-correlation LM test, and model CUSUM stability test are all examples of model stability tests.

**Table 3.** ARDL model estimation (dependent variable: DLGDP)

Source: Authors' computation (EViews-8).

Variable (s)	Coeff.	SEE	t-values	Probs.
Constant	0.14	0.05	2.80	0.02
$\Delta LGDP(-1)$	0.13	0.08	1.62	0.08
$\Delta LEDT(-1)$	0.18	0.07	2.57	0.04
$\Delta LDDT(-1)$	0.08	0.02	4.00	0.00
$\Delta LDSP(-1)$	-0.09	0.03	-3.00	0.00
$\Delta LEXR(-1)$	0.34	0.12	2.83	0.02
LGDP(-1)	-0.08	0.02	-4.00	0.00
LEDT(-1)	0.12	0.06	2.00	0.05
LDDT(-1)	1.23	1.12	1.10	0.68
LDSP(-1)	-0.44	0.15	-2.93	0.54
LEXR(-1)	-0.12	0.16	-0.75	0.62

Diagnostic test		
R-squared	0.82	
Durbin Watson value	2.06	
ANOVA-F-stat	5.33	
Autocorrelation L-M test	0.66 (0.45)	
Heteroscedasticity L-M test 0.51(0.72)		

From the tests, the model fits the necessary post-estimation tests and is satisfactory. At this

level, no model interpretation is required except to obtain F-statistic from the bounds co-integration test. Table 4, therefore, is the bound test that indicates evidence of co-integration between debt components and economic growth. The F-statistic of 8.45 surpasses the upper bounds value as shown by 4.01 obtained from Table 4.

Table 4. ARDL bound test for co-integration

Source: Authors' computation (EViews-8).

Variable (s)	5 percent (%)		10 perc	ent (%)
K	I(O)	l(1)	I(O)	l(1)
4	2.86	4.01	2.45	3.52

Note: Computed F-Statistics = 8.45.

In Table 5, the short-run ECM is the rapidity of modification term between the short and long run. The DW statistic value of 1.99 falls in the region of no autocorrelation of 1.59-2.41, implying that it does not have serial correlation issues. In addition, the F-stat shows that the entire model is statistically significant, while the R2 reveals that the fit exhibited by the model is relatively robust. Finally, it is observed that the independent variables account for a 67% variation in economic growth in the period under consideration. This evidence is supported by the CUSUM plot depicted in Figure 2 and the diagnostic tests in Table 5 that checked for the model validity.

The tests indicate that the model is normally specified and is serially uncorrelated as it is homoscedastic. The diagnostic tests that use F-statistic are presented with corresponding p-values in parenthesis. Looking at the results in Table 5, it could be observed that all four explanatory variables, including a one-period lag of GDP, are statistically significant in the short run in explaining changes in the dependent variable. Although domestic debt and exchange rate have a positive impact on

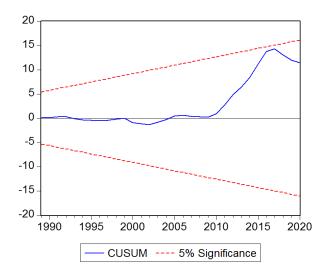


Figure 2. CUSUM test

economic growth, the relationship between the latter and debt from foreign countries and debt payment services is negative.

**Table 5.** Estimated ECM (dependent variable: DLGDP)

Source: Authors' computation (EViews-8).

Variable (s)	Coeff.	SEE	t-values	Probs.
Intercept	0.32	0.11	2.91	0.00
$\Delta LGDP(-1)$	0.13	0.04	3.25	0.00
$\triangle LEDT(-1)$	-0.19	0.06	-3.17	0.00
$\Delta LDDT(-1)$	0.27	0.11	2.45	0.04
$\Delta LDSP(-1)$	-0.07	0.02	-3.50	0.00
$\Delta LEXR(-1)$	0.18	0.06	3.00	0.00
<i>ECM</i> (−1)	-0.42	0.13	-3.23	0.00

Diagnostic test		
R-squared	0.67	
Durbin Watson value	1.99	
ANOVA-F-stat	3.43	
Autocorrelation L-M test	0.56(0.42)	
Heteroscedasticity L-M test	0.33(0.61)	

Observably, a unit increase in external debt led to a 0.12% decrease in economic growth, while a 1% rise in domestic debt saw economic growth increase by 0.27%.

The negative sign of foreign debt and services payment of debts are in line with several previous studies, including Festus and Saibu (2019), Muhammad and Abdullahi (2020), Eke and Akujuobi (2021), and Ekor et al. (2021). Contrariwise, the findings could not support Ndubuisi (2017), Odubuasi et al. (2018), and Ugwuanyi et al. (2021).

The ECM term in Table 5 signifies the presence of a long run. The coefficient is statistically significant as it observes the usual negative sign. This negative sign ensures the restoration of equilibrium whenever disequilibrium occurs. This is what is expected if the variables are co-integrated. Therefore, the impact of all the explanatory variables on economic growth is significant in the long run. ECM, the residual from the long-run model, is significant. The magnitude of this coefficient implies that a convergence to equilibrium takes approximately a speed of about 42% for any disequilibrium corrected. Notably, the ECM is dynamically stable as the plots of CUSUM lie within the 5% critical bounds that confirm the model's stability.

#### CONCLUSION

The study undertakes a review of the association between public debt and the growth of the Nigerian economy. It was observed in the paper that government debt, made up of domestic and external debts, has been considered burdensome to the economy, most especially the external debt. The study uses descriptive and econometric techniques to explore the variables' contemporaneous dynamics. The study observes fluctuations in the data trend, most especially the debt service payment. One notable finding

is that external debt exhibited a significant negative impact on economic growth while domestic debt took the opposite direction. One reason for this development is the high level of corruption among government officials in Nigeria, as a large chunk of the borrowed is believed to have gone into the private pockets of politicians.

Similarly, the projects executed under the so-called loan are not according to specification in most cases. There is also the problem of budgeting a vast amount for servicing the loans annually, thereby creating employment in the donor countries and unemployment in Nigeria. The positive sign of domestic debt is predicated on the fact that both the principles and interests are utilized within the local economy. The primary conclusion that can be drawn in the study is that borrowing from any sources may not be the problem but rather the holistic utilization of the amount borrowed. Therefore, based on the findings, it is recommended that the government consider more domestic borrowings to foreign borrowings, which should only be resorted to when it is vital. In addition, in servicing foreign loans, it should be done so that the local economy is not worse. This means that the government may strive to balance loan servicing and economic sustainability. Finally, the maintenance of a moderate exchange rate should be the government's watchdog.

#### **AUTHOR CONTRIBUTIONS**

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#### REFERENCES

- Aybarç, S. (2019). Theory of Public Debt and Current Reflections. In B. Açıkgöz (Ed.), *Public Economics* and Finance. IntechOpen. https:// doi.org/10.5772/intechopen.82730
- Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relations over time. *Journal of* the Royal Statistical Society, 37(2), 149-192. Retrieved from https:// www.jstor.org/stable/2984889
- 3. Buryk, Z., Bashtannyk, V., & Ragimov, F. (2019). Economic growth: macroeconomic effects of Public Borrowings at the global level. *Problems and Perspectives in Management*, 17(3), 169-183. https://doi.org/10.21511/ppm.17(3).2019.14
- D'yakonova, I., Nikitina, A., Sukhonos, V., & Zhuravka, F. (2018). Methodological bases of estimating the efficiency of economic security management of the enterprises in the global environment. *Investment Management and Financial Innovations*, 15(2), 145-153. https://doi.org/10.21511/ imfi.15(2).2018.13
- Eke, C. K., & Akujuobi, N. E. (2021). Public debt and economic growth in Nigeria: An empirical investigation. *International Journal of Development and Management Review, 16*(1), 178-192. Retrieved from https://www. ajol.info/index.php/ijdmr/article/ view/208148
- Ekor, M., Orekoya, T., Musa, P., & Damisah, O. (2021). Does external debt impair economic growth in Nigeria? *Journal of Economics and Finance*, 12(2), 20-26. Retrieved from https://mpra.ub.unimuenchen.de/107844/
- 7. Ferraro, V. (2008). Dependency theory: An introduction. In G. Secondi (Ed.), *The development economics reader* (pp. 58-64). London: Routledge. Retrieved from https://www.mtholyoke.edu/acad/intrel/depend.htm
- 8. Festus, G. E., & Saibu, M. O. (2019). Effect of external debt on Nigerian Economy: Further evidences (MPRA Paper No. 92704). Retrieved from https://mpra.ub.uni-muenchen.de/92704/

- 9. Muhammad, M. A., & Abdullahi, K. (2020). Impact of external debt servicing on economic growth in Nigeria: An ARDL approach. *International Journal of Business and Technopreneurship, 10*(2), 257-268. Retrieved from https://ijbt.unimap.edu.my/images/stories/IJBT%20JUN%202020/IJBT\_Vol\_10\_June\_2020\_8\_257-268.pdf
- Narayan, P. K. (2005). Reformulating critical values for the bounds F-statistics approach to co-integration: An application to the tourism demand model for Fiji (Discussion Papers No. 02/04). Monash University, Melbourne, Australia. https://doi. org/10.4225/03/5938abda7b4ab
- 11. Ndubuisi, P. (2017). Analysis of the impact of external debt on economic growth in an emerging economy: Evidence from Nigeria. *African Research Review, 11*(4), 156-173. https://doi.org/10.4314/afrrev.v11i4.13
- Odubuasi, A. C., Uzoka, P. U., & Anichebe, A. S. (2018). External debt and economic growth in Nigeria. *Journal of Accounting* and Financial Management, 4(6), 98-108.
- 13. Ohwofasa, B. O., Nana, J. U., & Kumapayi, A. A. (2012). External debt management and macroeconomic performance of the Nigerian economy, 1986–2011. *Journal of Economics and Sustainable Development*, 3(13), 58-62. Retrieved from https://

- www.iiste.org/Journals/index.php/ JEDS/article/viewFile/3489/3514
- Okon, E. O., & Monday, O. I. (2017). Empirical and evidence-based investigation: External debt, poverty and economic growth nexus. *International Journal of Applied Economic, Finance and Accounting*, 1(1), 37-47. https://doi. org/10.33094/8.2017.11.37.47
- Onyele, K. O., & Nwadike, E. O. (2021). Impact of national debt burden on economic stability in Nigeria. *Economics and Business*, 35(1), 91-106. https://doi. org/10.2478/eb-2021-0006
- Pesaran, H. M., & Pesaran, B. (1997). Working with Microfit 4.0: Interactive econometric analysis. Oxford University Press.
- 17. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326. https://doi.org/10.1002/jae.616
- 18. Stawska, J. (2015). The public finance sector debt and economic growth in Poland in the context of financial crisis. *Magnanimitas*, 6, 570-578. Retrieved from https://core.ac.uk/download/pdf/80534769.pdf
- Sulaiman, L. A., & Azeez, B.
   A. (2012). Effect of external debt on economic growth in Nigeria. *Journal of Economics and Sustainable Development*, 3(8), 71-79. Retrieved from https://www.researchgate.net/publica

- tion/267704835\_Effect\_of\_External\_Debt\_on\_Economic\_Growth\_of\_Nigeria
- Tiftik, E., & Mahmood, K. (2020). Global Debt Monitor COVID-19 Lights a Fuse. Institute of International Finance. Retrieved from http://ru.economia.unam. mx/184/1/Global%20Debt%20 Monitor\_April2020.pdf
- 21. Udeh, S. N., Ugwu, J. I., & Onwuka, I. O. (2016). External debt and economic growth: The Nigeria experience. European Journal of Accounting Auditing and Finance Research, 4(2), 33-48. Retrieved from https://www.eajournals.org/wp-content/uploads/External-Debt-and-Economic-Growth-The-Nigeria-Experience.pdf
- Ugwuanyi, G. O., Ugwuanyi, W. N. J., Efanga, U. O., & Agbaeze, C. C. (2021). External debt management and economic development in Nigeria. *Revista Geintec Journal*, 11(4), 5027-5044. https://doi.org/10.47059/revistageintec. v11i4.2527
- 23. World Bank. (2020). *International debt statistics*. Retrieved from https://www.worldbank.org/en/programs/debt-statistics/ids
- 24. Zhuravka, F., Filatova, H., Šuleř, P., & Wołowiec, T. (2021). State debt assessment and forecasting: time series analysis. *Investment Management and Financial Innovations*, 18(1), 65-75. https://doi.org/10.21511/imfi.18(1).2021.06