The Growth Effect of External Debt in Nigeria: Does Structural Break Matters?

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ABSTRACT---- The *volatility in crude oil price in the global market has continuously heightened fiscal deficits in Nigeria, a net exporter of crude oil. Consequently, successive governments have often resorted to external borrowing to augment the available fiscal revenue. This has implications for economic growth. Therefore, this study evaluated the growth effect of external debt and accounted for structural break in the external debt-growth nexus in Nigeria. Annual data spanning 1981-2020 were sourced from global databases and analysed using the dynamic ordinary least square (DOLS) estimator. The result showed that external debt has growth-inhibiting effects on the Nigerian economy and that structural break matter in the analysis of the growth effect of external debt in Nigeria. The results imply that Nigeria needs to lower its external debt due to the high cost of debt servicing that accompany such debt while also improving the revenue-generating ventures in the country.*

Keyword---- External Debt, Economic Growth, Structural Breaks, DOLS, Nigeria
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1. INTRODUCTION

Sustainable economic growth remains a crucial goal of every government, especially those in developing countries. Thus, government make efforts to mobilize various forms of resources from different sources to achieve this lofty goal. Often times, when domestic resources are insufficient to power sustainable growth, government resort to seeking external assistance in the form of official development assistance (ODA) or external debts, which has implications for growth. There is an overwhelming evidence in support of a positive effect of ODA on economic growth as it is believed that ODA augments the volume of domestic resources needed to increase consumption and investment expenditures, which are critical for economic growth (Ogbuoji and Yamey, 2019; Chung and Hwang, 2022). On the other hand, the effects of external debts on economic growth are mixed. Some studies argued that external debt has growth-inhibiting effects as excessive external debts could instigate financial instability and crowd out domestic investment thereby, lowering economic growth potentials (Senadza et al., 2018; Essl et al., 2019; Ehikioya et al., 2020; Onyele and Nwadike, 2021). In addition, the huge cost of debt servicing could mop up domestic resources and undermine growth (Ogbonna et al., 2019; Yusuf and Mohd, 2021). However, other studies alluded that external debt has growth-enhancing effects as it, like ODA, increases the domestic resources need to bridge saving-investment gaps and finance infrastructural development, which are important to stimulate economic growth (Madow et al., 2021; Omesi et al., 2021).

External debt, as justified by the neoclassical growth models, is crucial for improving capital accumulation and productivity (Madow et al., 2021). The Nigerian government has continued to experience a shortfall in its revenue given the volatility of crude oil price, Nigeria's main export product and source of foreign exchange, in the global market (Ogunjimi, 2020a, 2020b). Consequently, it has become increasingly difficult for the Nigerian government to solely finance its annual budget without borrowing from various sources. Therefore, Nigeria's external debt has maintained an upward trend since the 1980s such that Nigeria is ranked among the world's highly indebted poor countries (HIPC). This unimpressive appellation is not befitting for the largest economy (in terms of gross domestic product and population) in Africa. External debt, as shown in Figure 1, rose sharply from US$11.4 billion in 1981 to US$33.5 billion in 2000 and US$44.6 billion in 2004. However, following the debt relief offered Nigeria by the Paris Club, one of Nigeria's major creditors, in 2005, Nigeria's debt plummeted to US$29.1 billion and US$13 billion in 2005 and 2006, respectively. The debt relief freed up additional domestic resources as the cost associated with debt servicing also reduced (Ogunjimi, 2019). This partly explains the remarkable growth in GDP that Nigeria experienced since the beginning of the 21st century except in 2016 and 2020, when the economy was dipped into a recession (see Figure 1).

Sadly, Nigeria's debt burden continued to soar despite the debt relief in 2005 such that it has risen astronomically to US$32.4 billion and US$70.6 billion in 2020 (see Figure 1). The recent spate of the COVID-19 pandemic, which had adverse effect on Nigeria, among other global economies, further raised public financing needs to salvage the Nigerian economy (Bolaji et al., 2021; Olanrewaju and Afolabi, 2022). It also provided further impetus for Nigeria, among other

low-income and lower-middle-income countries, to increase its external debts, despite the high cost of debt servicing, in a bid to mitigate the negative impacts of the pandemic. Nigeria's huge debt burden together with its associated cost of debt servicing has crippled the government capacity to carry out its fiscal responsibilities by narrowing the fiscal space the government can leverage to foster fiscal sustainability that will promote economic growth (Yusuf and Mohd, 2021).

This study extends the frontier of knowledge on the debt-growth nexus in four major ways. First, it evaluated the growth effect of external debt in Nigeria using more recent data. This empirical analysis is crucial to mitigate Nigeria's debt vulnerability and enable policymakers devise strategies of effectively mobilizing domestic resources and pursuing effective public debt management practices, which will foster sustained economic growth. Second, it accounts for the possible role of structural break in the external debt-growth nexus. This is pertinent because both external debt and economic growth might have been subjected to structural shifts in the past, which if ignored could produce misleading results. Despite the failure of past studies (Edeminam, 2021; Fagge and Ibrahim, 2018; Ogbonna et al., 2019; Omesi et al., 2021; Onyele and Nwadike, 2021; Yusuf and Mohd, 2021) to take cognizance of structural break, this study takes structural break into consideration in its modelling of the growth effect of external debts. Lastly, this study employs the dynamic ordinary least square (DOLS) estimator to analyse the growth effect of external debt in Nigeria. This estimator is chosen due to its ability to resolve any possible endogeneity problem that might arise between external debt and economic growth in Nigeria.

The other sections, after this introductory, are organized as follows: Section 2 gives a brief review of theoretical and empirical literature on the debt-growth nexus while Section 3 gives details of the methodology and data used in this study. Section 4 presents and discusses the empirical findings while Section 5 is the concluding section of this study.

Figure 1: Trends of External Debt and Real GDP in Nigeria

Source: World Development Indicator (2021)

2. LITERATURE REVIEW

The nexus between external debt and economic growth has been a subject of debate in the theoretical and empirical literatures. With regard to the theoretical literature, there are four major theories that underpin the relationship between external debt and economic growth: the debt overhang hypothesis, liquidity constraint hypothesis, debt laffer curve theory and the crowding-out effect hypothesis. According to Krugman (1988), the debt overhang hypothesis states that a borrowing country would find it difficult to repay its external debts if the contractual value of the debt exceeds the debt repayment amount and the country's benefit from the returns to investment is meagre. This lowers investment and stunts economic growth. Similarly, the liquidity constraint hypothesis shows that high debt burden affect growth through the balance of payments channel. This is because countries with high debt burden need huge foreign capital inflows to service their debts, particularly when the domestic currency has low value. This will compel such countries to devalue their currency thereby, lowering their growth especially if the countries are import-dependent (Serieux and Yiagadeesen, 2001). Fosu (1996) also hypothesized that external debt could influence growth via its impact on investment mix and factor productivity.

The crowding-out effect hypothesis, on the other hand, posits that high debt service burden lowers government revenue and crowds-out public investment, which has a ripple effect on private investment and growth (Serieux and Yiagadeesen, 2001). The debt laffer curve theory posits that the debt-growth nexus is asymmetric and it rests on the assumption that debt has an optimum level, beyond which growth could be impeded (Cohen, 1993). The basic idea behind the debt laffer curve theory is that if a country borrows externally beyond a certain threshold, repayment of such debt will be problematic thus, countries must borrow below the optimal debt level for such debt to stimulate economic growth (Pattillo et al., 2002).

With regard to empirical literature, there appears to be no consensus on the direction of the relationship between external debt and economic growth as the empirical findings are mixed. In a broad review of the debt-growth empirical literature, Saungweme and Odhiambo (2018) found overwhelming evidence on the negative impact of debt service on economic growth and also showed that the growth effect of public debt is dependent on the magnitude, composition and structure of the debt. Afterward, Saungweme and Odhiambo (2019) conducted an empirical analysis on the growth effect of public debt and debt servicing in Zambia between 1970 and 2017. The autoregressive distributed lag (ARDL) estimator and granger causality were employed to estimate the effect. The result revealed causality running from economic growth to public debt and that economic progress is crucial in determining public debt in Zambia. In a later study, Saungweme and Odhiambo (2020) applied the ARDL approach to estimate the growth effect of public debt servicing in South Africa from 1970 to 2017. The empirical finding showed that public debt servicing does not exert any influence on the growth of the South African economy irrespective of the time dimension considered.

Moreover, Senadza et al. (2018) examined the growth effect of external debt in 39 Sub-Saharan African countries between 1990-2013. The empirical result of the system Generalised Methods of Moments (GMM) estimator showed that external debt has negative growth effects in the sampled countries with the relationship being nonlinear. Ehikioya et al. (2020) also used the system GMM estimator to analyse the growth effect of external debt in 43 countries in African between 2001 and 2018. Findings revealed that external debt and economic growth have long-run convergence and that beyond a certain threshold, external debt will hinder economic growth in the sampled countries. Overall, the results showed that external debt has negative growth effect. In a panel study, Akram (2013) empirically examined the effect of public debt on the growth of four selected countries in South Asia between 1975 and 2011. The results confirmed the validity of the debt overhand and crowding-out effect of public debts as both public debt and its associated debt service cost have adverse effects on investment and growth in the sampled countries.

Yusuf and Mohd (2021) focused on evaluated the growth effect of external debt in Nigeria between 1980 and 2018 using the ARDL estimator. Findings revealed that external debt promoted short-term growth but impeded long-run growth while domestic debt stimulated long-term growth but dampen short-term growth. The study also confirmed that the debt overhang hypothesis holds in Nigeria as the huge debt service burden in the country retards growth. Omesi et al. (2021) evaluated the growth effect of debt and debt service in Nigeria using data spanning 2012-2019. The result showed that debt and debt service exert positive but insignificant influence on the growth of the Nigerian economy. Edeminam (2021) evaluated the growth effect of public debt in Nigeria between 1990 and 2019. Finding revealed that public debt adversely affects economic growth in the long-run but not in the short-run. Further result showed that debt servicing has a negative growth effect and no causal relationship was found between public debt and economic growth in Nigeria. Similarly, Onyele and Nwadike (2021) analysed how public debt affect Nigeria's economic stability using data from 1981 to 2019. The ARDL result showed that public debt and its components instigate short-term and long-term economic instability in Nigeria hence, the need for policymakers to deploy means of effective public debt management. Fagge and Ibrahim (2018) argued that institutions have important roles to play in public debt management in Nigeria. The study showed that Nigeria has transited from discretionary fiscal system to rule-based system after receiving debt relief from the Paris Club, one of its external creditors. It was also revealed that Nigeria need to harmonize its institutional frameworks and promote synergy among government agencies to facilitate effective public debt management.

On the other hand, Omedero (2019) analysed the effect of external debt financing on public capital investment in Nigeria using annual data spanning 1996-2018. The empirical result revealed external debt substantially lowered capital investment while the cost of debt servicing raised capital investment, which is counterintuitive. Overall, external debt hinders economic growth through its negative impact on capital investment. Similarly, Chukwu et al. (2021) employed the ARDL estimator to analyse how public debt affected private investment between 1985 and 2018 in Nigeria. The result showed that the variables converge in the long-run. However, public debt does not influence private investment in the short-run. In a similar study on Tanzania, Mabula and Mutasa (2019) employed the ARDL estimator to examine how public debt affect private investment from 1970 to 2016. Findings revealed asymmetric relationship between public debt and private investment in Tanzania and both domestic and external debts crowd-out investment in the short-run and long-run.

In a panel study comprising the four economic regions in Sub-Saharan Africa, Kengdo et al. (2020) employed the GMM estimator to analyse the effect of external debt on domestic investment between 1980 and 2017. The empirical finding showed that it external debt increased domestic investment in two of the economic regions but lowered domestic investment in the other two regions. The observed negative impact of external debts on domestic investment suggests that external debt will also hamper economic growth through the investment channel. The economic consequences of high public debt were explored by Burriel et al. (2020), who adopted the dynamic stochastic general equilibrium (DSGE) model to simulate the economic outcomes of high public debts. The study showed that huge debt amassed after the 2009 global financial crisis served a buffer for output but the observed huge debt following the COVID-19 pandemic is justifiable. The simulation results showed that highly indebted countries can lose output during shocks; are liable to spillover effects of high debts; could have their private investment crowded out; have lesser scope for counter-cyclical fiscal policy and could have their long-run growth deterred.

Clearly, there are divergent views in the empirical literature on the growth effects of external debt across different countries, even though the arguments tilt toward the negative direction. Given that macroeconomic variables are often subjected to structural shift following shocks, accounting for structural break in economic analysis becomes pertinent. However, there appear to be a dearth of studies that account for structural breaks in the debt-growth nexus, including in Nigeria. Moreover, the linearity or nonlinearity of the debt-growth nexus is inconclusive in Nigeria. Therefore, this present study fills these research gaps by examining whether the debt-growth nexus in Nigeria is linear or nonlinearity and establishing the growth effects of external debts in Nigeria using data from 1981 to 2020. Unlike previous studies on Nigeria, this study account for structural breaks and endogeneity using the dynamic ordinary least square (DOLS) estimator.

3. METHODOLOGY

3.1 Model Specification and Analytical Approach

In modelling the growth effect of external debt in Nigeria, this study extends the growth equation specified by Senadza et al. (2018), which expresses economic growth as a function of labour, capital, exports and external debt. The augmented growth equation is specified as:

$$RGDP_t = \varphi_0 + \varphi_1 EXD_t + \varphi_2 GFCF_t + \varphi_3 HCI_t + \varphi_4 TROP_t + \varphi_5 REER_t + \varepsilon_t \qquad (1)$$

Where RGDP, EXD, GFCF, HCI, TROP, REER, φ_1 and ε represent real GDP (a proxy for economic growth), external debt, gross fixed capital formation (a proxy for capital), human capital index (a proxy for labour force), trade openness (calculated as the percentage share of total trade in total GDP), real effective exchange rate, parameters and error term, respectively. The explanatory variables are selected based on their theoretical and empirical relationship with economic growth. Neoclassical and endogenous growth theories recognize labour (measured using human capital index) and capital (measured using gross fixed capital formation) as critical growth-enhancing factors and empirical studies have also shown these variables stimulate growth (Senadza et al., 2018; Saungweme and Odhiambo, 2020). An increase in these input factors will increase productivity and growth thus, their coefficients are expected to be positive. Trade openness, which describes the level of a country's bilateral and multilateral trade interaction with other countries, has been found to influence economic growth (Ehikioya et al., 2020; Afolabi and Oji, 2021; Afolabi, 2022). Countries with high trade openness often experience higher growth thus, the coefficient of trade openness is expected to be positive.

In addition, exchange rate is indispensable in international trade and its depreciation or appreciation could either stimulate or dampen growth based on whether the country is a net exporter or net importer (Ogunjimi, 2020a). Therefore, the sign of real effective exchange rate, which capture the value of Nigeria's domestic currency against other foreign currencies, could either be positive or negative. The real effective rate is selected over nominal exchange rate because Nigeria has multiple trade partners and exchanges its currency for these countries' currencies during foreign trade. The inclusion of external debt in the specified model is quite undebatable notably because it is the key explanatory variable in this study. Empirical studies have shown that external debt could either have a positive or negative impact on economic growth (Akram, 2013, Saungweme and Odhiambo, 2018, 2019, 2020; Yusuf and Mohd, 2021). Thus, the coefficient of external debt should have either a positive or negative sign. The variables in equation (1), except trade openness that is already in percentage, are transformed into natural logarithm to improve the data quality, aid result interpretation and correct for the likely problems that could arise when data deviates from their normal distribution. The prefix "L" is added to each of the transformed variable to signify the natural logarithm.

The DOLS method, developed by Stock and Watson (1993), is used to estimate the specified model because it has two key strengths over other long-run estimators. First, it resolves endogeneity problem that could arise from the relationship between external debt and economic growth through the lead and lags of the explanatory variables. Second, it accommodates non-stationary variables (Stock and Watson, 1993). The DOLS version of equation 1 is written as:

$$LRGDP_t = \varphi_0 + \varphi_1 LEXD_t + \varphi_2 LGFCF_t + \varphi_3 LHCI_t + \varphi_4 TROP_t + \varphi_5 LREER_t + d_{LEXD}(L)\Delta LEXD_t + d_{LGFCF}(L)\Delta LGFCF_t + d_{LHCI}(L)\Delta LHCI_t + d_{TROP}(L)\Delta TROP_t + d_{LREER}(L)\Delta LREER_t + \varepsilon_t \qquad (2)$$

Where Δ is the difference operator and $d_i(L)$ represents the leads and lags, which the DOLS estimator use to correct for endogeneity. Given that one of the key innovation of this study is accounting for structural break in the debt-growth nexus in Nigeria, the model with structural break is written as:

$$LRGDP_t = \delta_0 + \theta_1 DUM_t + \delta_1 LEXD_t + \delta_2 LGFCF_t + \delta_3 LHCI_t + \delta_4 TROP_t + \delta_5 LREER_t + d_{LEXD}(L)\Delta LEXD_t + d_{LGFCF}(L)\Delta LGFCF_t + d_{LHCI}(L)\Delta LHCI_t + d_{TROP}(L)\Delta TROP_t + d_{LREER}(L)\Delta LREER_t + \varepsilon_t \qquad (3)$$

The key difference between equations (2) and (3) is the inclusion of DUM, a dummy variable that takes value zero before the structural break and one afterwards. However, before equations 2 and 3 are estimated with the DOLS method, preliminary tests such as unit root test, structural break test and cointegration test are run to determine the stationarity

status, break dates and cointegration status of the variables, respectively. Afterwards, the models were re-estimated, as robustness check, using the Fully Modified Ordinary Least Squares (FMOLS) and Canonical Cointegration Regression (CCR).

3.2 Data Description and Sources

To analyse the growth effect of external debt in Nigeria and account for the structural break in the relationship between the two macroeconomic variables, annual data spanning 1981-2020 were sourced on key variables of interest were sourced from two major databases: World Development Indicator (WDI) and Penn World Table (PWT). The sample size is based primarily on data availability. Human capital index was sourced from PWT database while the data of other variables were sourced from the World Development Indicator database. The statistical properties of each of the variable for the sample period are displayed in Table 1. It shows that Nigeria's external debt ranged between US$11.4 billion and US$70.6 billion but averaged US$29.9 billion between 1981 and 2020. This somewhat high external debt suggests a shortfall in Nigeria's revenue profile as the country's revenue is insufficient to finance fiscal responsibilities. Nigeria predominantly relies on proceeds from crude oil export to finance its budget and crude oil price often use to benchmark the country's expected revenue in its annual budget (Aminu and Ogunjimi, 2019; Afolabi et al., 2022). In the same vein, real GDP ranged from US$113 billion to US$503 billion and averaged US$259 billion within the sample period. The rapid evolution of external debt and real GDP could imply that the external debt has spurred economic growth in Nigeria but, it is safer to determine this empirically. This study does this in the next section. Similarly, huge gaps are observed in some variables. Particularly, the huge gaps between minimum and maximum values of gross fixed capital formation, trade openness and real effective exchange rate suggest that these variables have evolved over time. On the other hand, human capital index averaged 1.5 within the period. The standard deviation of some of the variable being considered are relatively high.

Table 1: Data Description and Summary Statistics

Variables	Mean	Maximum	Minimum	Std. Dev.
External Debt (US$ billion)	29.90	70.60	11.40	12.60
Gross Fixed Capital Formation (US$ billion)	59.50	109.00	39.20	13.80
Human Capital Index	1.52	1.97	1.20	0.27
Real Effective Exchange Rate	147.97	536.89	49.74	117.19
Real GDP (US$ billion)	259.00	503.00	113.00	139.00
Trade (% of GDP)	32.17	53.28	9.14	12.27

Source: Computed from Eviews10

4. RESULTS AND DISCUSSION

4.1 Preliminary Test

Unit Root and Structural Break Tests

The importance of conducting unit root test in economic involving time-series and panel data cannot be undermined. It helps to display the stationarity status of the variables of interest, which will guide the choice of the appropriate estimation technique. Overall, unit root test helps to circumvent spurious results that could lead to misleading policy recommendations. The Augmented Dickey Fuller (ADF) unit root method is utilized to test the null hypothesis of variables contain unit root against its alternative hypothesis. Similarly, it is important to test for structural breaks to avoid spurious results and erroneous policy formulation. The Zivot-Andrews structural break test method is utilized in this study to check for structural shift in each of the variables used in the study. The results are these two preliminary tests are reported in Table 2. For the unit root test, all the variables are non-stationarity at level but became stationary after being differenced once. Thus, the alternative hypothesis of variables does not contain unit root at the first difference is accepted. These results satisfy one of the conditions to adopt the DOLS estimator, among other cointegrating equation estimators – variables should have high order of integration. However, it is crucial to determine the long-run relationship status of the variables to know if they converge or diverge in the long run.

On the other hand, the Zivot-Andrews structural break test results show that the variables have different break dates depending on if the test was carried out using intercept, trend and/or both. For the major variables of interest, the result of the intercept reveals that economic growth and external debt had a break in 2002 and 2005, respectively. The major events that led to the observed structural break in economic growth in 2002 was the competitive price of crude oil, Nigeria's main export product, in the international market and Nigeria's subscription to the debt relief for the HIPC initiative (Yusuf and Mohd, 2021). This lessened Nigeria's debt burden and the cost of debt servicing thus, making more financial resources available to propel economic growth. However, the observed structural break in external debt in 2005 is attributed to the

debt relief/forgiveness the Paris Club, one of Nigeria's major creditors, offered Nigeria (Ogunjimi, 2019). These break dates are incorporated into the empirical models to determine whether structural break matters in the external debt-growth nexus in Nigeria.

Table 2: Unit Root and Structural Break Tests

	Augmented Dickey Fuller (ADF) Test				Zivot-Andrews Structural Break Test		
	Level		First Difference				
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	Intercept	Trend	Intercept & Trend
LOG(RGDP)	-1.04	-1.75	-3.78*	-3.56*	-2.94** (2002)	-2.45 (1994)	-2.45* (1991)
LOG(EXD)	-2.02	-1.54	-4.57*	-4.51*	-3.86* (2005)	-3.42* (2013)	-6.44* (2006)
LOG(GFCF)	-2.40	-6.93	-5.10*	-5.20*	-6.39* (2001)	-5.06** (2012)	-6.48* (2001)
LOG(HCI)	0.64	-2.46	-4.64*	-4.45*	-1.01 (2001)	-1.53* (2014)	-1.45 (2014)
TROP	-2.34	-2.25	-7.51*	-4.78*	-4.17** (1989)	-4.62** (1998)	-4.54** (1995)
LOG(REER)	-2.24	-2.83	-4.72*	-4.73*	-3.19 (1989)	-	-4.58** (1994)

Note: * p<0.01, ** p<0.05. Numbers in parenthesis are structural break dates
Source: Computed from Eviews10

Cointegration Test

After knowing the stationarity status of variables, it is also important to know if the variables converge or diverge in the long-run. Cointegration test is useful in this regard as it helps to determine long-run convergence or divergence. The Johansen cointegration approach is adopted in this study following the result of the unit root test, which showed that all the variables are stationary at first difference. The two mechanisms of the Johansen approach - trace and maximum eigenvalue tests – test the null hypothesis of no cointegration. If the trace and maximum eigenvalue test statistics exceed the 5 percent critical value, the null hypothesis will be rejected. Thus, the cointegration results of the model with and without structural breaks are reported in Table 4. The trace test results show that the model without structural break has one cointegrating equation while the model with structural break has three. However, the maximum eigenvalue test results reveal that the model without structural break has no cointegrating equation while the model with structural break has one. Overall, the results suggest that the variables in both the models with and without structural breaks have long-run convergence. In other words, the variables have long-run relationship.

Table 3: Johansen Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Test			Maximum Eigenvalue Test		
		Trace Statistic	0.05 Critical Value	Prob.	Max-Eigen Statistic	0.05 Critical Value	Prob.
Model without Structural Break							
None	0.62	103.81	95.75	0.0124	36.88	40.08	0.1099
At most 1	0.50	66.93	69.82	0.0831	26.93	33.88	0.2674
At most 2	0.32	40.01	47.86	0.2223	14.41	27.58	0.7933
At most 3	0.30	25.59	29.80	0.1413	13.82	21.13	0.3803
At most 4	0.21	11.78	15.49	0.1678	8.98	14.26	0.2877
At most 5	0.07	2.80	3.84	0.0944	2.80	3.84	0.0944
Model with Structural Break							
None	0.78	162.27	125.62	0.0000	56.91	46.23	0.0026
At most 1	0.60	105.36	95.75	0.0093	34.38	40.08	0.1905
At most 2	0.48	70.97	69.82	0.0404	24.84	33.88	0.3957
At most 3	0.36	46.13	47.86	0.0720	17.21	27.58	0.5617
At most 4	0.32	28.92	29.80	0.0629	14.83	21.13	0.3010
At most 5	0.23	14.09	15.49	0.0806	9.97	14.26	0.2139
At most 6	0.10	4.12	3.84	0.0425	4.12	3.84	0.0425

Source: Computed from Eviews10

4.2 Growth Effects of External Debt in Nigeria (With and Without Structural Break)

The results of the preliminary tests suggest that the DOLS estimator is an appropriate technique for analyzing the effects of external debts on Nigeria's economic growth. For robustness check, the FMOLS and CCR estimators were used to check the veracity of the DOLS estimate. To clearly see the growth effects of external debt, the analysis is divided into two section. The first section (second, third and fourth columns of Table 4) presents the result of the effect without accounting for structural break while the other section (fifth to seventh column) takes cognizance of the observed structural shift in external debt and economic growth in Nigeria. With regard to the model without structural break, the results of DOLS, FMOLS and CCR estimators, reported in Table 4, shows that external debt has a significant negative impact on economic growth in Nigeria. In other words, external debt, despite being a major growth driver, has growth-inhibiting effect on the Nigerian economy. This suggests that the more Nigeria borrows from external creditors, the lower the rate of economic growth the country will experience. Put differently, as Nigeria's external debt soars, economic growth in Nigeria will plummet.

While this result seems counterintuitive given that external debt has the ability to raise the volume of domestic that could be mobilized to drive growth imperative, it is plausible for Nigeria. This is because apart from the pervasive public fund mismanagement in the country, the high cost of debt servicing constitutes a major challenge to debt repayment. The higher the debt burden, the more the government will raise present and future taxes to fund the repayment. This tax increase will reduce disposable income and lower investment expenditure, which will ultimately dampen growth. This result confirms the debt overhang and liquidity constraint hypotheses as well as the debt laffer curve theory, which all postulate an inverse relationship between external debt and economic growth. This result also lends support to previous empirical studies such as Senadza et al. (2018), Ehikioya et al. (2020), Yusuf and Mohd (2021), and Edeminam (2021).

However, for the model with structural breaks, the narrative seems different. The coefficient of external debt is positive and statistically insignificant, indicating that external debt has positive but insignificant growth effect in Nigeria. This result contrasts the earlier reported result of the model without structural break but it confirms the view of Omesi et al. (2021), who evaluated the growth effect of debt in Nigeria and found that debt and debt service exert positive but insignificant influence on the growth of the Nigerian economy. Interestingly, the coefficient of dummy variables, accounting for the structural break in the nexus between external debt and growth in Nigeria, is positive and statistically significant. This implies that structural break matters in the consideration of the growth effect of external debt in Nigeria. Intuitively, structural breaks should not be ignored when modelling the debt-growth nexus in Nigeria.

With regard to the control variables, the model without structural break shows that while gross fixed capital formation has an insignificant positive effect on economic growth in Nigeria across the three estimators, human capital index is found to have significant positive effect on the Nigerian economy. The narrative changed slightly when structural break is taken into consideration. Gross fixed capital formation and human capital index have growth-enhancing effect in Nigeria although human capital index has higher positive growth effect than gross fixed capital formation. This result lends support to the neoclassical and endogenous growth theories, which postulates that labour and capital are instrumental to propel economic growth. It also corroborates the findings of past studies (Senadza et al., 2018; Ehikioya et al., 2020), which showed that labour and capital are indispensable for sustained economic growth.

Against the conjecture of traditional and modern trade theories, the result of the model without structural break suggests that trade openness does not produce productivity gains in Nigeria. Specifically, the result shows that Nigeria's economic growth will decline by about 0.01 percent if the country increases its trade with the rest of the world by one percent. Interesting, the statistical significance of the trade openness coefficient suggest that trade openness is one of the major determinants of economic growth in Nigeria. This result negates the findings of Afolabi and Oji (2021) and Afolabi (2022), who showed that trade openness improved Nigeria's growth prospects. Similarly, the result of the model with structural break shows that trade openness has insignificant growth-inhibiting effect.

For real effective exchange rate, both the models with and without structural break signal that exchange rate appreciation has growth-enhancing effect while exchange rate depreciation dampens growth in Nigeria. Given Nigeria's high import dependence, an appreciation of the country's domestic currency in relation to other foreign currencies will make import cheaper and afford the country the opportunity of importing industrial machinery that could be used to bolster productivity and boost economic growth. On the other hand, in the event of exchange rate depreciation or devaluation, exports will become cheaper and Nigeria's products will be in high demand in the international market. This will encourage firms to raise their level of productivity for increased profitability (Ogunjimi, 2020a, 2020b).

The coefficient of determination of the six models signal that external debt, gross fixed capital formation, human capital index, trade openness and real effective exchange rate explain more that 97 percent of the variation in economic growth in Nigeria. This indicates that the six models have good fits and are reliable for policy formulation. The probability values of the normal distribution reveal that the residuals of all the estimated models, except the DOLS model without structural break, are normally distributed. Overall, the empirical analysis shows that external debt has debilitating effect on Nigeria's

economic growth, suggesting that policy efforts should be geared toward cushioning the adverse effect of external debt on Nigeria's growth, especially in the face of the paucity of domestic resources needed to fulfil fiscal responsibilities.

Table 4: Results of the Estimated Models

Variables	Models without Structural Break			Models with Structural Break		
	DOLS	FMOLS	CCR	DOLS	FMOLS	CCR
LOG(EXD)	-0.124** [-2.45]	-0.092*** [-1.91]	-0.086*** [-1.77]	0.080 [0.98]	0.038 [0.77]	0.033 [0.56]
LOG(GFCF)	0.093 [0.55]	0.100 [0.84]	0.092 [0.99]	-0.012 [-0.11]	0.157*** [1.80]	0.148** [2.08]
LOG(HCI)	2.969* [18.47]	2.908* [20.57]	2.905* [23.57]	2.365* [7.14]	2.020* [7.60]	2.047* [6.09]
TROP	-0.005** [-2.15]	-0.006* [-3.33]	-0.006* [-3.16]	-0.003 [-1.12]	-0.002 [-1.63]	-0.002 [-1.28]
LOG(REER)	-0.112** [-2.80]	-0.114* [-3.13]	-0.112* [-3.14]	-0.098 [-3.57]	-0.080* [-2.92]	-0.080* [-2.77]
DUM	-	-	-	0.298** [2.66]	0.283* [3.54]	0.273** [2.67]
C	26.412* [6.75]	25.456* [7.75]	25.500* [9.16]	24.144* [9.89]	20.886* [7.85]	21.212* [8.03]
Model Diagnostics						
Adj. R-squared	0.988	0.974	0.974	0.994	0.981	0.981
S.E. of regression	0.056	0.085	0.084	0.039	0.072	0.072
Long-run variance	0.003	0.011	0.011	0.001	0.006	0.006
Jarque-Bera	15.01 (0.0005)	0.585 (0.7464)	0.58 (0.7496)	1.18 (0.5554)	2.18 (0.3370)	2.07 (0.3551)

Note: * $p<0.01$, ** $p<0.05$ and *** $p<0.1$. Number in block brackets and parenthesis are t-statistics and p-values, respectively.
Source: Computed from Eviews10

5. CONCLUSION

The rising external debt profile of Nigeria has been a major cause of concern for policymakers and researchers, particularly with regard to its macroeconomic effects. Thus, the debt-growth nexus has been extensively explored albeit with mixed results. This study not only extends the debates on the external debt-growth nexus to more recent data, it also provides empirical evidence on the importance of taking structural breaks into consideration when modelling the relationship between external debt and economic growth in Nigeria. Annual data spanning 1981-2020 were sourced and the DOLS estimator, together with the FMOLS and CCR estimators, were employed to address the objectives of this study. The results revealed that external debt has significant growth-inhibiting effects on the Nigeria economy and that structural break matter in the debt-growth nexus in Nigeria. The major policy option from this study is that Nigeria needs to lower its external debt profile to increases its chances of experiencing sustained economic growth. In fact, Nigeria needs to dump policies that promote borrowing under unfavourable conditions. The Nigerian government and policymakers also need to devise modern tactics for effectively managing public debt, mobilizing domestic resources and improving debt transparency. The government also need to strengthen its fiscal frameworks and foster financial development to ensure that external debts are channeled to their intended purposes and well-managed for easy repayment.

6. REFERENCES

Akram, N. (2013). Empirical Examination of Debt and Growth Nexus in South Asian Countries. *Asia-Pacific Development Journal*, 20(2), 29-52.

Afolabi, J.A. and Oji, C.E. (2021). Nigeria-China Bilateral Relations: A Skewed or Balance Relation? *International Journal of Diplomacy and Economy*, 7(2): 129-145. DOI: 10.1504/IJDIPE.2021.118854

Afolabi, J.A., Olanrewaju, B.U. and Adekunle, W. (2022). Modelling Sectoral Sensitivity to Macroeconomic Shocks: Evidence from Nigeria. *Economic Horizons*, 24(3).

Aminu, A. and Ogunjimi, J.A. (2019). A Small Macroeconometric Model of the Nigerian Economy. *Economy*, 6(2), 41-55. DOI: 10.20448/journal.502.2019.62.41.55

Bolaji, M., Adeoti, J.O. and Afolabi, J.A. (2021). The imperative of research and development in Nigeria: Lessons from the COVID-19 pandemic. *International Journal of Technological Learning, Innovation and Development*, 13(2), 168-189. DOI: 10.1504/IJTLID.2021.116342

Burriel, P., Checherita-Westphal, C., Jacquinot, P., Schön, M. and Stähler, N. (2020). *Economic consequences of high public debt: evidence from three large scale DSGE models*. European Central Bank Working Paper Series No. 2450.

Chukwu, K.O., Ogbonnaya-Udo, N. and Ubah, C.B. (2021). Effect of Public Debt on Public Investment in Nigeria: 1985-2018. *Asian Journal of Economics, Business and Accounting*, 21(2), 98-114. DOI: 10.9734/AJEBA/2021/v21i230353

Chung, D. and Hwang, J.A. (2022). Economic and Social Impact of International Aid at National Level: Application of Spatial Panel Model. *World*, 3, 575-585. DOI: 10.3390/world3030031

Cohen, D. (1993). Low investment and large LDC debt in the 1980s, American Economic Review, 83(3), 437-449.

Edeminam, V.B. (2021). Impact of Public Debt on Economic Growth in Nigeria (1990 to 2019). *Advances in Economics and Business*, 9(1), 1-10. DOI: 10.13189/aeb.2021.090101

Ehikioya, B.I., Omankhanlen, A.E., Osuma, G.O. and Inua, O.I. (2020). Dynamic Relations Between Public External Debt and Economic Growth in African Countries: A Curse or Blessing? *Journal of Open Innovation: Technology, Market, and Complexity*, 6(88), 1-16. DOI: 10.3390/joitmc6030088

Essl, S., Celik, S.K., Kirby, P. and Proite, A. (2019). *Debt in Low-Income Countries: Evolution, Implications, and Remedies*. World Bank Group Policy Research Working Paper 8794.

Fagge, M. and Ibrahim, T. (2018). Public Debt Management in Nigeria: The Impacts of Institutional changes after exiting from the Paris Club in 2006. MPRA Paper No. 100364. Available at: https://mpra.ub.uni-muenchen.de/100364/

Fosu, A.K. (1996). The impact of external debt on economic growth in sub-Saharan Africa. *Journal of Economic Development*, 21(1): 93-117.

Kengdo, N.A.A., Ndeffo, L.N. and Avom, D. (2020). The effect of external debt on domestic investment in sub-Saharan African sub-regions. *Economic Research Guardian*, 10(2), 69-82.

Krugman, P. (1988). *Financing versus forgiving a debt overhang*. NBER Working Paper 2486.

Mabula, S. and Mutasa, F. (2019). The Effect of Public Debt on Private Investment in Tanzania. *African Journal of Economic Review*, 7(1), 109-135.

Madow, N., Nimonka, B., Brigitte, K.K. and Camarero, M. (2021). On the robust drivers of public debt in Africa: Fresh evidence from Bayesian model averaging approach. *Cogent Economics & Finance*, 9(1). DOI: 10.1080/23322039.2020.1860282

Ogbonna, K.S., Ibenta, S.N., Chris-Ejiogu, U.G. and Atsanan, A.N. (2019). Public debt services and Nigerian economic growth: 1970-2017. *European Academic Research*, 6(10), 22–34.

Ogbuoji, O. and Yamey, G. (2019). Aid Effectiveness in the Sustainable Development Goals Era: Comment on "It's About the Idea Hitting the Bull's Eye: How Aid Effectiveness Can Catalyse the Scale-up of Health Innovations". *Int. J. Health Policy Manag.*, 8, 184-186.

Ogunjimi, J.A. (2019). Impact of Public Debt on Investment: Evidence from Nigeria. *Development Bank of Nigeria Journal of Economics and Sustainable Growth*, 2(2), 1-28.

Ogunjimi, J.A. (2020a). Exchange Rate Dynamics and Sectoral Output in Nigeria: A Symmetric and Asymmetric Approach. *American Journal of Social Sciences and Humanities*, 5(1), 178-193. DOI: 10.20448/801.51.178.193

Ogunjimi, J.A. (2020b). Oil Price Asymmetry and Sectoral Output in Nigeria. *International Journal of Economics, Business and Management Studies*, 7(1), 1-15. DOI: 10.20448/802.71.1.15

Olanrewaju, B.U. and Afolabi, J.A. (2022). Digitizing Education in Nigeria: Lessons from COVID-19. *International Journal of Technology Enhanced Learning*, 14(4), 402-419.

Omesi, I., Nkak, P.E. and Orlu, C. (2021). Debt, Debt Servicing and Economic Growth: An Empirical Analysis of Nigeria. *IOSR Journal of Business and Management*, 23(5), 44-49. DOI: 10.9790/487X-2305034449

Omodero, C.O. (2019). External Debt Financing and Public Capital Investment in Nigeria: A Critical Evaluation. *Economics and Business*, 33, 111-126. DOI: 10.2478/eb-2019-0008

Onyele, K.O. and Nwadike, E.C. (2021). Impact of National Debt Burden on Economic Stability in Nigeria. *Economics and Business*, 35, 91-106. DOI: 10.2478/eb-2021-0006

Pattillo, C., Poirson H. and Ricci, L. (2002). External Debt and Growth. IMF Working Paper 02/69, 1-47. Available at: http://www.imf.org/pubs/2002

Saungweme, T. and Odhiambo, N.M. (2018). Public Debt Service and Economic Growth: A Survey of International Literature. *Applied Econometrics and International Development*, 18(2), 129-142.

Saungweme, T. and Odhiambo, N.M. (2019). Government debt, government debt service and economic growth nexus in Zambia: a multivariate analysis. *Cogent Economics & Finance*, 7(1), 1-17. DOI: 10.1080/23322039.2019.1622998

Saungweme, T. and Odhiambo, N.M. (2020). Public Debt Service in South Africa and Its Impact on Economic Growth: An Empirical Test. *The Review of Black Political Economy*, 1-15. DOI: 10.1177/0034644620960228

Senadza, B., Fiagbe, A.K. and Quartey, P. (2018). The effect of external debt on economic growth in Sub-Saharan Africa. *International Journal of Business and Economic Sciences Applied Research*, 11(1), 61-69.

Serieux, J. and Yiagadeesen S. (2001). T*he debt service burden and growth: Evidence from low income countries*. The North-South Institute, Ottawa.

Stock, J.H. and Watson, M.W. (1993). A simple estimator of cointegrating vectors in higher order integrated systems. *Econometrica*, 61, 783-820.

 Yusuf, A. and Mohd, S. (2021). The impact of government debt on economic growth in Nigeria. *Cogent Economics & Finance*, 9(1), 1-19. DOI: 10.1080/23322039.2021.1946249