Chapter Fourteen

External Debt, External Debt Servicing and Nigeria's Economic Growth

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Introduction

Developing economies need sustained economic growth and development to alleviate poverty, and reduce unemployment and income inequality. Financing sustained growth and development requires huge capital, which is lacking in less developed countries (LDCs) due to low levels of income and high propensity to consume, low tax revenues, low rate of saving, low level of investment and low capital formation. In addition, most LDCs do not have technological capability and sufficient foreign exchange to meet their developmental need. This underscores the need for foreign capital inflows in the development process of the LDCs. Foreign capital inflow to a country takes the forms of external debt flows, foreign aid, foreign direct investment, foreign portfolio investment and worker's remittances (Adeola, 2017; Musa, 2019).External debts have been widely utilized by developing countries to finance fiscal deficits, supplement domestic savings and investment, augment current and future consumption, and raise capital formation through increased investment and human capital development.

The positive effects of external debt accrue when the accumulated debt stock is not excessive (that is not beyond a certain optimal threshold) and external loans obtained are prudently managed and deployed in productive investment and provision of investment goods whose returns are adequate to meet debt servicing obligations as of when due. In a situation where foreign indebtedness is excessive and contracted loans are not optimally deployed in productive investments that can yield adequate returns to meet debt servicing obligations, external debt may impede economic growth and macroeconomic stability. Bilan & Ihnatov (2015) posits that public debt is always a two-sided story: although public indebtedness can promote economic growth, especially when debt resources are used for financing public investment expenditure, it can negatively affect economic growth when the debt is very high.

Huge external debt is often associated with a heavy external debt burden as well as huge external debt servicing obligations which has far-reaching negative implications on economic growth. Based on the Debt Overhang Hypothesis

(DOH), huge external debt impedes economic growth as it leads to an increase in the future tax on the national output which alters an individual's incentive to save and invest (Krugman, 1988). It reduces the incentive to invest in new technologies and human capital as well as makes the government not invest in activities like structural reforms and fiscal adjustments (Sachs, 2002). It also creates uncertainty in the macroeconomic environment by making the inflation rate and interest rate high and more volatile. Uncertainty in the economy engenders the "wait-and-see" strategy and, "postponement" of investment by domestic and foreign investors (Serven, 1997; Ekpo et al, 2024).

According to the Liquidity Constraint Hypothesis (LCH), huge debt service payment in highly indebted countries reduces investible funds available for domestic investment (Hoffman & Reisen, 1991), as a reasonable proportion of returns from investment which could have been retained in the country would be used for repayment of debt obligations. In addition, the Direct Effect of Debt Hypothesis (DEEH) maintains that even if the debt service payment does not adversely affect investment and saving, it may decline the output growth of the country directly through diminishing productivity due to adverse changes in the investment mix. It stresses that even if the debt burden does not affect investment, it may directly influence the efficiency and productivity of existing capital, hence, influencing the output level and the economic growth (Fosu, 1996). Also, a heavy external debt burden may curtail further inflow of foreign loans from the international capital market into the economy because as the external debt/GDP ratio of a country gets higher, creditors become concerned about the ability of the country to repay the debt. Consequently, requests for new loans will be subjected to higher interest rates to provide a greater return on the higher risk.

However, external debt does not necessarily result in slow economic growth. A nation cannot deploy debt resources in viable public investment, meet its debt service payments and have inadequate knowledge of the nature, structure and magnitude of the debt that breeds economic hardship and woes (Were, 2001). Undoubtedly, these have been the major challenges faced by most developing countries. The inability of many LDCs, Nigeria inclusive, to judiciously employ external loans in a productive investment whose yields could effectively meet the debt servicing requirements and repayment has exposed them to a high debt service burden whose resultant effect creates additional problems for the nation, particularly the persistent fiscal deficit which is driven by higher levels of debt servicing.

Nigeria has been obtaining foreign loans to finance its development projects – iron and steel mills, roads, electricity generation plants, etc. The first official external debt incurred was a $28 million loan obtained from the World Bank in 1958

to finance a railway lines project (Onoh, 2013). This was followed by a $13.1 million loan obtained in 1964 from the Italian government for the construction of the Niger dam. During the oil boom period (1973 – 1976), there was no need for external loans because substantial foreign exchange and revenue were earned, so the external debt level was low till 1977. However, the substantial increase in foreign exchange earnings and government revenue during the oil boom of 1973 through 1976 resulted in unnecessary affluence in Nigeria.

The production and consumption patterns that emerged during the era of the oil boom were import-based with huge foreign exchange requirements and were extremely difficult to sustain in the years of the oil glut. As the oil boom collapsed in early 1978, the Nigerian economy experienced a huge deficit in government finances, depleted external reserves and deficits in the balance of payments. To fill the revenue-expenditure gap and exports-imports gap, the government resorted to massive borrowing from multilateral and bilateral sources which resulted in huge accumulated external debt and external service burden such that by 1992, Nigeria was classified among the heavily indebted poor countries (HIPC) by the World Bank. The main objective of this study is to examine the effect of external debt and external debt servicing indicators on Nigeria's economic growth for the period (1981- 2022) given the upsurge in the level of external debt, using Autoregressive Distributed Lag (ARDL) model.

Origin of External Debt Crisis in Nigeria

The genesis of external debt crises in Nigeria could be traced to the first "jumbo loan" of $1 billion obtained in 1978 with a high lending rate, limited tenure and grace periods from the international capital market which brought the total external debt of the country to $2.2billion (Adesola, 2009). The spate of external debt increased thereafter following massive external borrowing by both the Federal and State Governments. Statistics indicate that as of 1985, the external debt was $18.65 billion. It grew to $33.43billion in 1990 and in 2000 and 2004, the external debt was $31.58billion and $36.69billion respectively (CBN, 2013). The country's huge external debt stock was indeed a serious drag on the economy due to the huge debt burden. It was difficult for the government to meet the country's debt servicing obligations and carry out macroeconomic reforms to increase the GDP growth rate. Debt Management Office (DMO, 2006) reported that Nigeria's external debt profile was a source of concern as over $32billion was expended on debt servicing between 1985 and 2001. Aluko &Arowolo (2010) stressed that before external debt cancellation in 2005, Nigeria paid $4.9billion yearly on debt servicing. External debt burden undermined economic growth and development until Obasanjo's led civilian administration (2003-2007) pursued and obtained external debt cancellation of about $18billion for Nigeria from the Paris Club in 2005.

Consequently, the external debt burden was reduced as external debt stock fell from $20.47billion in 2005 to about $3.96billion in 2006 (CBN, 2013).A few years after the debt relief, the external debt of Nigeria started accumulating at a dreadful rate due to an abrupt sharp increase in external borrowing. The external debt increased to $7.206billion in 2010 and $10.718billion in 2015. As of 2019 and 2020, Nigeria's external debt stood at $27.676billion and$ 33.348billion respectively. It increased further to $38.391billionin in 2021, as a result of the effect of the outbreak of COVID-19 pandemic that caused the "lockdown" of the global economy in general and the Nigerian economy in particular. Dickson (2021) asserts that several measures adopted by national governments to contain the transmission of the disease have created major economic shocks resulting in retardation in key economic sectors in many African countries, for instance, Nigeria. As a result, in 2022, Nigeria's external debt stood at $41.69billion and $42.495billion in 2023 (DMO, 2024).

The upward trend of Nigeria's external debt has raised concern among policymakers, researchers and economists because despite the increasing trend of external borrowing and external debt of Nigeria, the country is characterized by a high incidence of poverty, high rate of unemployment, insecurity and deplorable economic infrastructure. For instance, poverty incidence has risen from 27.2per cent in 1980 to 67per cent in 2010, and as of 2023, it was 66.8 per cent while the multidimensional poverty index survey of 2022 reveals that 63.0 per cent of persons within Nigeria (133 million people) are multidimensionally poor (NBS, 2023).

Literature Review

External debt is the portion of a country's debt incurred from foreign lenders such as foreign financial institutions, international financial institutions, the governments of foreign nations and foreign private individuals and organizations. It is an accumulated outstanding interest-bearing fund sourced by the government of a nation from outside the nation's border in foreign currency to finance current and past budget deficits. External debt, including interest, is usually paid in the currency in which the loans were obtained. Investopedia (2018) defines external debt as the portion of a country's debt that was borrowed from foreign lenders, including governments, international financial institutions and commercial banks, which must be repaid together with interest in the currency in which the loan was made. The World Bank (2019) describes external debt as debt owed by a nation to non-residents repayable in foreign currency, food or services.

External borrowing sources include bilateral sources such as governments and their agents like China Exim Bank, the French Development Bank and the Japanese Aid Agency and multilateral sources such as the World Bank, International

Monetary Fund (IMF), African Development Bank and the Islamic Development Bank and foreign commercial banks. There are also the London Group of creditors and the Paris Club group of creditors. Hence, the compositions of external debt of a country are bilateral, multilateral and commercial debts. The sources of external loans to Nigeria include bilateral and multilateral sources such as the World Bank, International Monetary Fund (IMF), African Development Bank (ADB), China Exim Bank as well as the London Group of creditors and the Paris club group of creditors.

Theoretical Framework

The theoretical bases for this study are dual-gap theory, three-gap theory and crowding-out theory (debt overhang theory and liquidity constraint theory). The dual-gap theory, which encompasses the saving-investment gap and foreign exchange gap, postulates that economic development is a function of investment (Hassan et al, 2015). Investment is essentially a product of domestic savings, which in most cases is inadequate to finance domestic investment in LDCs to attain the desired growth rate of the economy. Given this sequence of events, the government devices strategies for obtaining the amount of foreign capital that can be invested in the domestic economy from abroad. The premise is that domestic investment can be financed through domestic savings as well as inflows of foreign capital. This is illustrated by using national income identity.

The aggregate expenditure (Y) of an opened economy is given as the sum of private consumption expenditure (C), investment expenditure (I), government expenditure (G) and expenditure on exports (X) such that:

$$Y = C + I + G + X \quad (1)$$

On the other hand, national income (Y) is usually allocated to consumption (C), savings (S), taxes (T) and imports (M) in a manner that:

$$Y = C + S + T + M \quad (2)$$

The total expenditure of the economy is expected to be equal to the total income received. Hence, equating (2) and (1) with rearrangement results in:

$$(I - S) = (G - T) + (X - M) \quad (3)$$

Assuming government decides to plan its expenditure in such a way that it equals to its tax revenue, the result will be:

$$(I - S) = (X - M) \quad (4)$$

Equation (4) is the foundation of dual gap analysis. When the available domestic saving falls short of the level required to realize the target growth rate in the

economy, a saving-investment gap is thought to be in existence, hence borrowing is induced. Similarly, if the maximum import requirement necessary to achieve the growth target is larger than the maximum possible level of export, then there is an export-import (or foreign exchange) gap. Therefore, equation (4) shows that constraints to financing growth (Y) are the investment-saving gap on the left-hand side of the equation and the foreign exchange gap (external finance gap) on the right-hand side of the equation. Thus, growth in the domestic economy can be financed by domestic savings and/or foreign capital inflows in the form of external borrowing. The foreign capital inflows, in the form of external borrowing, will augment domestic investment and stimulate economic growth by filling either the saving gap or the foreign exchange gap.

The three-gap theory developed by Bacha (1990), is an extension of the saving-investment gap and foreign exchange gap to include a third gap, called the fiscal gap. The fiscal gap occurs when government expenditure exceeds revenue, resulting in a budget deficit. To finance the budget deficit, it becomes expedient for the government to borrow from domestic sources (the private sector or the Central Bank) or foreign sources. To avoid crowding-out of domestic private investment and inflationary pressure as a result of borrowing from the domestic private sector and Central Bank respectively (Ekpo et al, 2024), external borrowing becomes inevitable.

The Crowding-Out theory comprises Debt Over-hang theory and Liquidity Constraint theory are traditional hypotheses which trace the effect of external debt through its influence on saving and investment levels. Debt over-hang refers to a negative relation between debt and investment (Sundell & Lemdel, 2011). It is a situation where substantial financial resources of a country are used for debt servicing such that financial resources left for the government to implement growth-oriented economic programmes are greatly reduced, thereby stifling economic growth. In other words, debt servicing becomes a tax on domestic production such that the amount spent on it hampers meaningful economic growth activities. The debt over-hang theory, developed by Krugman (1988), states that high accumulated debt stock results in higher taxes on future output and hence, reduces an individual's incentive to save and invest (that is crowds-out private investment) and retards growth. The implication is that a large debt burden, measured as debt outstanding, would reduce savings, investment and presumably output in the debtor's country. Similarly, the liquidity constraint theory states that the debt servicing requirement reduces funds available for domestic investment purposes (Hoffman & Reisen, 1991).

Empirical Review

Many cross-sections and country-specific empirical studies have been carried out in developed, emerging and developing economies to examine the effect of external debt on economic growth. The findings of those studies reveal inconsistent and mixed results. While some studies report a positive relationship between external debt and economic growth, other studies reveal that external debt affects economic growth adversely and, some other studies show a non-linear relationship between external debt and economic growth. Shykolnyk & Koilo (2018)argued that the positive, negative and non-linear interactions in line with the three groups of theoretical economic growth models: Keynesian and neoclassical theory of growth, debt over-hang theory and the principle of the Laffer curve, employed to study the effect of external debt on growth. The Keynesian and Neoclassical theories of growth offer supporting evidence for a positive relationship based on the emphasis that external borrowing is one of the sources for financing capital formation and, a crucial ingredient for economic growth, provided the borrowed funds have been productively used.

The debt over-hang theory, the theoretical framework devoted to analysing the reasons for the negative impact of high levels of external debt on economic growth, stresses that debt over-hang occurs when the present value of the expected income of a country is less than the accumulated debt. The non-linear impact of external debt on economic growth is the product of the group of models based on the principles of the Laffer curve, which represents an eclectic concept that combines the provisions of the Keynesian and neoclassical theory and debt overhang theory. Sachs (1986) asserted that the central point in the principle of the Laffer curve is the assumption of the existence of a critical level of external debt after the achievement of which further attraction of foreign loans will yield a negative impact on economic growth. The non-linear form of the relationship is explained by the reduction in the absolute size and efficiency of investment caused by the technical efficiency of capital and the impact of an unfavourable macroeconomic situation.

In cross-section studies of Iyoha (1999), Fosu (1996), Pattilo et al (2002), Bhattacharya & Nguyen (2003), and Schclarek (2004), the findings indicate that external debt hurts economic growth. Fosu (1996) employed the World Bank data and the augmented production function framework to examine the impact of debt on the economic growth of LCDs in Africa for the period (1970 - 1996). The result shows that debt burden, whether measured as debt service or debt outstanding, on average, has been deleterious to growth in Sub-Saharan Africa (SSA) countries. While its effect on the level of investment is rather weak, debt adversely influences the nature and productivity of investment. Iyoha (1999) investigated the impact of alternative debt stock reduction scenario packages of 5%, 10%, 20% and 50% in

1986 on investment and economic growth in the subsequent years for SSA countries. The findings show that external debt reduces investment through both a "disincentive" effect and "crowding-out" effects. It further shows that 20% debt stock reduction, on the average, increased investment by 18% and gross domestic product (GDP) growth by1% in SSA countries during the 1987-1994 period. Pattilo et al (2002) used panel data with fixed effect to study the impact of external debt on economic growth of 93 LDCs between 1969 and 1998, and found that external debt hurt economic growth for debt/GDP ratio over 35-40%.

Schclarek (2004) used dynamic system GMM panel estimator to evaluate the effect of external debt on economic growth of 59 LDCs and 24 industrialized countries from 1970 to 2002 and found a linear negative effect of external debt on growth. Clement et al (2003) examined the channels through which external debt affects economic growth in low - income countries (LICs). The results indicate that the substantial reduction in external debt stock projected for highly indebted poor countries (HIPC) would directly increase per capita income growth by about 1% point per annum while reduction in debt service could also provide an indirect boost to growth through positive effect on public investment.

Shkolnyk & Koilo (2018) employed ARDL model to examine the effect of external debt on economic growth in Ukraine and 10 other emerging economies for the period (2006-2016). The results show that external debt has a non-linear impact on economic growth and huge external debt, in conjunction with macroeconomic instability, impedes economic growth in emerging economies. The result also showed that there exists a critical level of debt burden for emerging economies, where the marginal impact of external debt on economic growth becomes negative. It should be noted that cross-section studies have been criticized of been associated with the problem of ignoring each country's characteristics. Against the proponents of cross-section studies view that all countries possess homogenous economic structure, Forbes (2000) argued that the homogeneity of countries in cross-section studies cannot be fully ascertained. He refuted the usefulness of the results of cross-section studies on the ground that it has no specific policy implementation based on the fact that some salient features of individual countries in a group of countries being studied have been ignored. In effect, this stresses the advantage of country-specific studies over cross-section studies.

Even in country-specific studies, empirical results are also mixed. Kharusi & Ada (2018) investigated the relationship between external borrowing and economic growth in Oman for the period (1990 - 2015) using ARDL approach and found a significant negative impact of external debt on economic growth. Mohammed (2018) employed Vector Error Correction Method (VECM) to study the effect of external debt on economic growth of Sudan from1969 to 2015. He

found that external debt proxied by the external debt to exports ratio contributed positively to GDP growth. Hameed et al (2008) studied the relationship between external debt and economic growth in Pakistan between 1970 and 2003. He found that debt servicing burden has negative effect on productivity of labour and capital, thereby adversely affect economic growth. In the same vein, Malik et al (2010) employed econometric technique to examine the relationship between external debt and economic growth in Pakistan for the period (1972 - 2005) and found that external debt had significant negative effect on economic growth, implying that an increase in external debt led to decline in economic growth. Lashari et al (2017) investigated the impact of domestic and foreign debt on economic growth in Pakistan for the period (1972-2010) using ARDL approach. The finding shows that both foreign and domestic debt servicing negatively influenced the economic growth inPakistan.

Karogol (2002) employed production function model and multivariate cointegration method to explore the relationships between external debt servicing and economic growth in Turkey during 1956-1996. The result shows that debt service had negative impact on economic growth in the long-run. Kasidi & Said (2013) investigated the impact of external debt on economic growth of Tanzania for the period (1990 – 2010) and found that external debt had significant positive impact on economic growth while debt servicing exerted negative impact.

Ndubuisi (2017) examined the impact of external debt on economic growth in Nigeria for the period (1981–2015) using Ordinary Least Square (OLS) method. The findings show that external debt stock had significant positive effect on economic growth while debt servicing payment exerted insignificant negative impact on economic growth. Adedoyin et al (2016) studied the impact of external debt on economic growth in Nigeria for the period (1981- 2014) using ARDL model. The result indicated that a significant relationship existed between external debt and economic growth both in the long-run and short-run. Sulaiman & Azeez (2012) employed OLS method and Error Correction Method (ECM) to study the effect of external debt on economic growth of Nigeria using dataset of 1970-2010. The result from the ECM shows that external debt has a positive but insignificant impact on economic growth.

Using Nigeria as a case study, Ogunmuyiwa (2011)examined whether external debt actually promotes economic growth in developing countries from 1970 to 2007 using VECM. The results show no causality between external debt and economic growth, as causation between debt and growth was found to be weak and insignificant. Amassoma (2011) investigated the causal nexus between external debt, domestic debt and economic growth in Nigeria between 1970 and 2009 using a Vector Autoregressive (VAR) model and a Vector Error Correction (VEC) model.

He found a bi-directional causality between domestic debt and economic growth and a unidirectional causality from economic growth to external debt in Nigeria. Ayadi & Ayadi (2008) conducted a comparative study on the impact of external debt with its servicing requirements on economic growth of Nigeria and South Africa using the neoclassical growth model which incorporates external debt, debt servicing indicators and some macroeconomic variables. The study employed OLS and Generalized Least Square (GLS) methods, and the result indicates negative impact of external debt and debt servicing on the economic growth of Nigeria and South Africa.

3. Methodology

Model Specification

External debt is one of the sources of financing capital formation in a country and capital formation facilitates productivity which results in economic growth. The model of this work aligns with the neoclassical growth model developed by Mankiw, Romer, and Weil (1992) and adopted by Musa (2019). It is derived from aggregate production function by including external debt and external debt servicing as inputs together with domestic capital and labour. The findings of some recent studies show that there is an inverted U-shaped relationship between external debt and economic growth (Casares, 2015). This implies that there are diminishing returns to external debt due to recipient countries having absorptive capacity constraints. This relationship is captured by including a square term, ED^2, in the model. Other explanatory variables that have been found to explain growth consistently included in this model are exchange rate, trade openness and financial deepening. The model for the study is expressed in mathematical form as:

$$Y = f(K, L, ED, ED^2, EDS, ER, TOP, FD) \quad \text{--- (1)}$$

The model in equation (1) is transformed into econometric form as shown in equation (2):

$$Y = a_0 + a_1K + a_2L + a_3ED + a_4ED^2 + a_5EDS + a_6ER + a_7TOP + a_8FD + U_t \quad \text{--- (2)}$$

The logarithmic form of the model is presented in equation (3):

$$\ln Y = a_0 + a_1\ln K + a_2\ln L + a_3\ln ED + a_4\ln ED^2 + a_5\ln EDS + a_6\ln ER + a_7\ln TOP + a_8\ln FD + U_t \quad \text{--- (3)}$$

Where Y is real gross domestic product used as a proxy for economic growth, L is labour force, K is gross capital formation as a proxy for domestic capital, ED is external debt, ED^2 is external debt squared as a proxy for the recipient country absorptive capacity constraint, EDS is external debt servicing, ER is exchange rate, TOP is trade openness and FD is financial deepening (fiscal deficit to RGDP ratio). a_0 is the constant term while a_1, ---, a_8 are coefficients. The natural log is denoted by ln and U_t is the stochastic error term while t represents time.

1.2 Data Source and Estimation Technique

Time series data for the period (1981 - 2022) were used in the estimation of the model. The data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin (2022) and World Development Indicator (2022). The Autoregressive Distributed Lag (ARDL) model, otherwise known as the bounds testing approach proposed by Pesaran et al (2001) was employed to evaluate the long-run and short-run impact ofexternal debt and external debt servicing on economic growth of Nigeria. The ARDL model was preferred to the conventional Johansen co-integration method that uses a system of the equations to estimate long-run relationship for four major reasons. First, the ARDL model can be estimated by Ordinary Least Squares (OLS), once the model lag order is identified. Second, the long-run and short-run parameters of ARDL model can be estimated simultaneously. Third, the ARDL is applicable irrespective of the order of the integration of the regressors, whether the variables are stationary at I(0), I(1) or has a mixed of I(0) and I(1). However, this technique will crash if integrated order of I(2) is present. Fourth, this method is efficient especially with small (finite) sample sizes. As proposed by Pesaran et al. (2001) and adopted by Choong et al. (2005) and Taban (2010), the vector autoregressive (VAR) model of order p denoted by VAR(p) is constructed to establish the relationship between external debt, debt servicing and economic growth in Nigeria thus:

$$Z_t = \mu_o + \delta_t + \Sigma\varphi Z_{t-1} + \varepsilon_t \qquad t = 1, 2, - - -, T \quad (4)$$

Where μ_o is (k+1) vector of intercepts and denoting a (k+1) vector of trend coefficients. The vector error correction model (VECM) for equation (4) is derived as:

$$\Delta Z_t = \mu_o + \delta_t + \lambda Z_{t-1} + \Sigma \Upsilon_t \Delta Z_{t-1} + \varepsilon_t \quad (5)$$

Where λ and Υ are vector matrices that contain the long-run multipliers and short-run dynamics coefficients of the VECM respectively. Z_t is a vector of x_t and y_t variables respectively, where y_t is the dependent variable defined as real GDP denoted by Y and x_i = [(K, L, ED, ED^2, EDS, ER, TOP, FD] is a vector matrix of a set of explanatory variables. All the variables are transformed to their logarithmic form as in equation (3). As a requirement, y_t must be an 1(1) variable while $x_t$explanatory variables can either be 1(0) and 1(1). E_t is a stochastic error term. To derive the preferred model, following the assumptions made by Persran et al (2001) in case II, that is, unrestricted intercepts and no trends, Equation (6) becomes an unrestricted error correction model (UECM) as:

$$\Delta Z_t = \mu_o + \lambda Z_{t-1} + \Sigma \Upsilon_i \Delta Z_{t-1} + \varepsilon_t \quad (6)$$

Decomposing into x_t and y_t the reduced form of Equation (6) is stated as:

$$\Delta y_t = A_y o y_{t-1} + \beta_{xx} X_{t-1} + \Sigma \Upsilon_i \Delta y_{t-1} + \Sigma \Upsilon_i \Delta x_{t-1} + \varepsilon_t \quad (7)$$

Bringing in the variables of interest, the UECM of Equation (7) becomes thus:

$$\Delta \ln Y_t = a_o + a_1 \ln Y_{t-1} + a_2 \ln K_{t-1} + a_3 \ln L_{t-1} + a_4 \ln EXD_{t-1} + a_5 \ln EXD^2_{t-1} + a_6 \ln EXDS_{t-1} + a_7 \ln EXR_{t-1} + a_8 \ln TOP_{t-1} + a_9 \ln FD_{t-1} + \Sigma^n_{k-1} b_1 \Delta \ln Y_{t-k} + \Sigma^n_{k-1} b_2 \Delta \ln K_{t-k} + \Sigma^n_{k-1} b_3 \Delta \ln L_{t-k} + \Sigma^n_{k-1} b_4 \Delta \ln ED_{t-k} + \Sigma^n_{k-1} b_5 \Delta \ln ED^2_{t-k} + \Sigma^n_{k-1} b_6 \Delta \ln EDS_{t-k} + \Sigma^n_{k-1} b_7 \Delta \ln ER_{t-k} + \Sigma^n_{k-1} b_8 \Delta \ln TOP_{t-k} + \Sigma^n_{k-1} b_9 \Delta \ln FD_{t-k} + \varepsilon_t \ldots (8)$$

Where Δ is the first difference operator, a_i are long-run multipliers and b_i are short-run dynamic coefficients and a_o is the intercept (drift).

ARDL testing approach: The testing procedure of the ARDL approach involves three steps. First, OLS is conducted on equation (8) to test for the existence of co-integrating long-run relationship normalized on Y_t based on the Wald test (F-statistic) for the joint significance of the lagged levels of variables. The null and the alternative hypothesis are as follows:

H_o: $a_1 = a_2 = a_3 = a_4 = a_5 = a_6 = a_7 = a_8 = a_9 = 0$ (no long-run relationship)

H_1: $a_1 \neq a_2 \neq a_3 \neq a_4 \neq a_5 \neq a_6 \neq a_7 \neq a_8 \neq a_9 \neq 0$ (a long-run relationship exists)

The computed F - statistic value is compared with the critical bound values given in Pesaran et al. (2001). The optimal lag length for estimating equation (7) is selected using the Schwarz Bayesian Criterion (SBC). The upper and lower bound critical values assume that the explanatory variables are purely 1(0) and purely 1(1) respectively. The null hypothesis of no co-integration is accepted if the F-statistic lies below the lower critical values but rejected if the F-statistic lies above the upper critical values, which means that the dependent and the explanatory variables share a long-run level relationship. The results are inconclusive if the computed F-statistic lies in between the lower and upper bound critical values. When co-integration is established, the next step involves estimating the long-run ARDL model for ln Y as follows:

$$\ln Y_t = a_o + \Sigma^n_{k-1} a_1 \ln Y_{t-k} + \Sigma^n_{k-1} a_2 \ln K_{t-k} + \Sigma^n_{k-1} a_3 \ln L_{t-k} + \Sigma^n_{k-1} a_4 \ln ED_{t-k} + \Sigma^n_{k-1} a_5 \ln ED^2_{t-k} + \Sigma^n_{k-1} a_6 \ln EDS_{t-k} + \Sigma^n_{k-1} a_7 \ln ER_{t-k} + \Sigma^n_{k-1} a_8 \ln TOP_{t-k} + \Sigma^n_{k-1} a_9 \ln FD_{t-k} + \varepsilon_t \quad (9)$$

Finally, the error correction model (ECM) as derived from equation (9) was estimated to obtain the short-run dynamics parameters as shown below.

$$\Delta \ln Y_t = a_o + \Sigma^n_{k-1} b_1 \Delta \ln Y_{t-k} + \Sigma^n_{k-1} b_2 \Delta \ln K_{t-k} + \Sigma^n_{k-1} b_3 \Delta \ln L_{t-k} + \Sigma^n_{k-1} b_4 \Delta \ln ED_{t-k} + \Sigma^n_{k-1} b_5 \Delta \ln ED^2_{t-k} + \Sigma^n_{k-1} b_6 \Delta \ln EDS_{t-k} + \Sigma^n_{k-1} b_7 \Delta \ln ER_{t-k} + \Sigma^n_{k-1} b_8 \Delta \ln TOP_{t-k} + \Sigma^n_{k-1} b_9 \Delta \ln FD_{t-k} + \Omega ECM_{t-1} + \varepsilon_t \ldots (10)$$

where Ω is the coefficient of ECM for short-run dynamics.

4. Empirical Results and Discussion

Descriptive Statistics: Table 14.1 presents the descriptive statistics of the variables used in the study. The mean value of Y, K, L, ED, ED^2, EDS, ER, TOP, and FD are 37473.69, 7299937, 40960297, 4465.597, 9921235, 48695472, 117.299,

31.3848 and 12.033, respectively. The standard deviation is shown to be 37473.69, 7299937, 40960297, 4465.597, 9921235, 48695472, 117.299, 31.384 and 12.033 for Y, K, L, ED, ED^2, EDS, ER, TOP, and FD respectively.

Table 14.1. Descriptive Statistics of Annual Data Series (1981- 2022)

	Y	K	L	ED	ED^2	EDS	ER	TOP	FD
Mean	37473.69	7299937.	40960297	4465.597	9921235.	48695472	117.2991	31.38483	12.03333
Median	27112.63	435908.6	39421365	669.3250	448416.8	3560660.	115.2550	33.38961	8.250000
Maximum	78549.00	45348400	67518491	46250.00	60205185	2.92E+08	413.4900	53.27796	23.12000
Minimum	13779.26	8799.500	23026874	2.330000	5.430000	2331.200	0.610000	9.135846	5.920000
Std. Dev.	37473.69	7299937.	40960297	4465.597	9921235.	48695472	117.2991	31.38483	12.03333
Skewness	0.522246	1.936944	0.474746	3.143742	1.807272	1.768928	1.036220	-0.193725	0.611621
Kurtosis	1.658550	5.604394	2.169534	12.03098	4.835137	4.912469	3.162014	2.120278	1.585300
Jarque-Bera	5.058294	38.13228	2.784615	211.9094	28.75716	28.30443	7.562196	1.617051	6.120969
Probability	0.079727	0.000000	0.248501	0.000000	0.000001	0.000001	0.022798	0.445515	0.046865
Sum	1573895.	3.07E+08	1.72E+09	187555.1	4.17E+08	2.05E+09	4926.562	1318.163	505.4000
Sum Sq. Dev.	1.98E+10	6.78E+15	6.27E+15	4.13E+09	1.26E+16	2.62E+17	610223.2	6238.593	1463.459
Observations	42	42	42	42	42	42	42	42	42

Source: Author's computation

4. 2 Correlation Analysis: The correlation matrix, presented in Table 14.2, shows that each variable correlates perfectly with itself; hence, the correlation coefficient of 1.0. Also, Y has positive correlation with all the explanatory variables in the model, which is theoretically expected. There is a strong positive relationship between Y and K, Y and L, Y and ER, and Y and FD. A moderately strong correlation exists between Y and ED and, Y and ED^2 while Y and TOP depicted weak coefficient, implying no correlation exists. A negative linear relationship exists between K and TOP, ED and TOP, ED^2 and TOP, EDS and TOP, and TOP and FD.

Table 14.2: Correlation Matrix

	Y	K	L	ED	ED^2	EDS	ER	TOP	FD
Y	1								
K	0.820	1							
L	0.946	0.760	1						
ED	0.578	0.857	0.512	1					
ED^2	0.644	0.860	0.650	0.807	1				
EDS	0.800	0.895	0.786	0.700	0.877	1			
ER	0.919	0.915	0.891	0.779	0.859	0.889	1		
TOP	0.081	-0.179	0.195	-0.127	-0.121	-0.128	0.025	1	
FD	0.945	0.781	0.862	0.540	0.538	0.702	0.840	-0.003	1

Source: Author's computation

Unit Root Test Result

The unit root test result is presented in Table 14.3. The Augmented Dickey-Fuller (ADF) and Phillip Peron (PP) tests results show that the order of integration level of the variables was a mixture of both I(0) and I(1); indicating the suitability of the variables for ARDL bounds test.

Table 14.3: Unit Root Test Results

Variables	ADF Test			PP Test		
	Level	1st Diff.	Remarks	Level	1st Diff.	Remarks
RGDP	-1.682571	-3.632222 **	I (1)	---	---	---
TOP	-2.279800	-8.273685*	I (1)	-2.279800	-12.86928*	I (1)
L	---	---	---	-7.242694*	-12.87927*	I (0)
K	---	---	---	0.950976	-4.352744*	I (1)
FD	-1.909450	-5.533174*	I (1)	-1.839596	-7.204427*	I (1)
ER	-0.363532	-5.363631*	I (1)	-0.488478	-5.363631*	I (1)
EDS	-2.157120	-5.847405*	I (1)	-2.094213	-9.332197*	I (1)
ED	5.169749	0.410065	--	1.739349	-8.715653*	I (1)
ED^2	-1.178561	-5.268269*	I (1)	-1.178561	-5.208988*	I (1)

Note: *, ** and *** imply statistical significance at 1%, 5% and 10% levels respectively
Source: Author's computation

Lag Length Selection Result: The lag length selection test result is shown in Table 14.4. The study selected a maximum lag length of 3 for the dependent variable and independent variables based on the suggestions of five criteria (sequential modified LR test statistic (LR), Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), Hannan-Quinn information criterion (HQ).

Table 14.4: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-133.1953	NA	1.19e-08	7.292067	7.675966	7.429807
1	141.4169	408.3976	6.43e-13	-2.636762	1.202226	-1.259366
2	259.8479	121.4678	1.91e-13	-4.556304	2.737774	-1.939251
3	467.2241	116.9814*	3.67e-15*	-11.03713*	-0.287967*	-7.180425*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level),
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author's computation

1.5 Co-integration Test Result: The ARDL bounds testing approach was employed to examine the cointegration relationship between dependent and independent variables. The results presented in Table 14.5, show that the calculated F- statistic (10.44958) is above the upper bound critical values at 1% significance level, which implies the existence of cointegration among variables in the model. Having established the presence of co-integrating relationship among the variables, the ARDL approach was employed to determine the long-run and short-run coefficients.

Table 14.5: ARDL Bound Test Result

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Significance.	I(0)	I(1)
F-statistic	10.44958	10%	1.95	3.06
K	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1

Source: Author's Computation

Long-run ARDL Estimated Results: The long-run ARDL result is presented in Table 14.5. The result shows that the coefficient of external debt (lnED) is – 0.3796, indicating a negative impact of external debt (InED) on economic growth (lnY). It is significant at 5% significance level. The result implies that 1% increase in external debt will reduce economic growth by 0.38%. This result aligns with Obademi (2013) and Solomon (2016) whose findings revealed that external debt harms economic growth in Nigeria. The coefficient of external debt servicing (InES) is 0.0305, indicating a positive but statistically insignificant impact of external debt servicing on economic growth. The statistically insignificant result implies that the positive relationship is weak, and should be accepted with caution. However, Ezike & Mojekum (2011) and Grace et al. (2019) reported that external debt servicing hurts economic growth in Nigeria. Similarly, Tokede (2023) stressed the ravaging consequences of debt servicing in Nigeria, by observing that N15.22trillion has been spent on domestic and external debt servicing in the past 10 years and in recent times, about 100 per cent of Nigeria's revenue has been expended on debt servicing.

The external debt absorptive capacity constraint ($InED^2$) showed positive relationship with economic growth, implying that the Nigerian economy still has absorptive capacity for external debt. In line with this result, the negative impact of external debt on economic growth reported in this studycould be as a result of external borrowing not being fully and efficiently utilized on public investment in the country to expand the productive capacity of the economybecause of the prevalence of weak institutions in Nigeria. Contrary to apriori expectation, the coefficient of domestic capital (InK), -0.4787 indicates a negative impact on economic growth and is significant at 5% significance level. The coefficient of labour force (InL) is 4.889, showing a positive relationship with economic growth (lnY). It was significant at 5% significance level. The implication is that1% increase in labour force (InL), holding other explanatory variables constant, will increase economic growth by about 4.9%. This finding notwithstanding, it is worthy of note that a vast labourforce in Nigeria is wasted due to unemployment caused by non-proactive governance. As Tunji (2012) has reported, Nigeria is going through one of its worst unemployment crises in recent times.

The coefficient of exchange rate (lnER) is 0.083314, indicating positive impact on economic growth, though statistically insignificant. The coefficients of trade openness (InTOP) and financial deepening (InFD) indicate positive and statistically significant impact on economic growth.

Table 14.6: Long-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
InK	-0.478711	0.164925	-2.902605	0.0440**
InL	4.889314	1.397607	3.498346	0.0249**
InED	-0.379589	0.127377	-2.980040	0.0407**
$InED^2$	0.139657	0.052253	2.672714	0.0556***
InEDS	0.030532	0.051241	0.5958590.5833	
InER	0.083314	0.100596	0.8282070.4541	
InTOP	0.279635	0.098991	2.824860	0.0476**
InFD	0.644206	0.158855	4.055296	0.0154**

Note: *, ** and *** imply statistical significance at 1%, 5% and 10% levels respectively.

Source: Author's computation

Short-Run ARDL Estimates: The short-run ARDL model result is presented in Table 14.7. The result shows that the current value of external debt (D(InED)) exerted positive but insignificant impact on economic growth while the first lagged value of external debt (D(InED(-1)) and second lagged value of external debt(D(InED(-2))) indicated a significant positive impact on economic growth. It shows that in the short-run, external debt has positive impact on economic growth in Nigeria. The current value of external debt servicing (D(InEDS)), first lagged value of external debt servicing (D(InEDS(-1))), second lagged value of external debt servicing (D(InEDS(-2))) revealed positive and significant impact on economic growth. The current value of external debt absorptive capacity constraint ($D(InED^2)$) exerted a significant positive effect on economic growth while the first lagged value of absorptive capacity constraint ($D(InED^2(-1))$) and the second lagged value ($D(InED^2(-2))$) showed negative and significant effect on economic growth. Thus, absorptive capacity constraint shows negative effect indicating that in the short-run there is diminishing returns to external debt in Nigeria.

The first lagged value of real gross domestic product (D(InY(-1))) showed significant negative impact while second lagged value D(InY(-2)) had significant positive effect on economic growth. The current value of domestic capital (D(InK)) maintained the same negative significant negative impact on economic growth as it had in the long-run. The current value of labour force (D(InL)), first lagged value of labour force (D(InL(-1))), second lagged value of labour force (D(InL(-2))) showed negative and statistically significance impact on economic growth. Also, the current value of exchange rate (D(InER)), first lagged value of exchange rate (D(lnER(-1))), second lagged value of exchange rate (D(InER(-2))) exerted negative and statistically significant effect on economic growth. The current value of trade openness (D(InTOP)), first lagged value (D(InTOP(-1))), second lagged value (D(InTOP(-2))), showed negative and statistically significant effect on economic growth. The first lagged value of financial deepening (D(InFD(-1))), and second lagged value (D(InFD(-2))) showed negative and statistically significant effect on economic growth.

Table 14.7: Short-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-34.36405	2.046377	-16.79263	0.0001*
D(InY(-1))	-0.243556	0.077416	-3.146072	0.0346**
D(InY(-2))	0.332916	0.042034	7.920103	0.0014*
D(InK)	-0.076736	0.009549	-8.036169	0.0013*
D(InK(-1))	0.098876	0.011390	8.680785	0.0010*
D(InL)	-0.152641	0.038067	-4.009807	0.0160**
D(InL(-1))	-3.023123	0.179982	-16.79682	0.0001*
D(InL(-2))	-1.499237	0.161800	-9.265965	0.0008*
D(InED)	0.002693	0.004704	0.572470	0.5976
D(InED(-1))	0.171321	0.012534	13.66900	0.0002*
D(InED(-2))	0.114395	0.009856	11.60660	0.0003*
$D(InED^2)$	0.006356	0.002327	2.731545	0.0524**
$D(InED^2(-1))$	-0.059024	0.004193	-14.07743	0.0001*
$D(InED^2(-2))$	-0.035478	0.003199	-11.09121	0.0004*
D(InEDS)	0.028161	0.003944	7.140919	0.0020*
D(InEDS(-1))	0.040586	0.004242	9.567476	0.0007*
D(InEDS(-2))	0.013611	0.003537	3.847867	0.0183**
D(InER)	-0.125128	0.008965	-13.95702	0.0002*
D(InER(-1))	-0.167676	0.015605	-10.74529	0.0004*
D(InER(-2))	-0.124694	0.010365	-12.03038	0.0003*
D(InTOP)	-0.028229	0.006514	-4.333530	0.0123**
D(InTOP(-1))	-0.148923	0.014084	-10.57388	0.0005*
D(InTOP(-2))	-0.065852	0.007418	-8.877121	0.0009*
D(InFD)	0.174291	0.016576	10.51474	0.0005*
D(InFD(-1))	-0.196190	0.016183	-12.12301	0.0003*
D(InFD(-2))	-0.111904	0.014234	-7.861873	0.0014*
ECM(-1)	-0.483864	0.028807	-16.79699	0.0001*

R-squared	0.990003	Mean dependent var	0.044499
Adjusted R-squared	0.968342	S.D. dependent var	0.036983
S.E. of regression	0.006580	Akaike info criterion	-7.003532
Sum squared resid	0.000520	Schwarz criterion	-5.851836
Log likelihood	163.5689	Hannan-Quinn criter.	-6.590314
F-statis tic	45.70567	Durbin-Watson stat	3.000973
Prob(F-statistic)	0.000000		

Note: *, ** and *** imply statistical significance at 1%, 5% and 10% levels respectively.
Source: Author's computation

The coefficient of ECM has the correct sign, which is negative and statistically significant at a 1% level. The ECM result indicated that the speed of adjustment of about 48.39% annually of the short-run equilibrium will converge towards equilibrium in the long-run. The adjusted R^2 shows that 96.83% variation in the dependent variable is explained by the explanatory variables. The F-statistic 45.706(0.000) confirmed the fitness of the coefficient of determination and shows an overall significant level of the explanatory variables jointly in explaining real gross domesticproduct.

Diagnostic Tests

The Breusch–Godfrey test for serial correlation results is presented in Table 10. The result shows no evidence of serial correlation as the p-value of the model (0.1845) is greater than 0.05% level of significance.

Table 14.10: Breusch-Godfrey Serial Correlation LM Test

F-statistic	4.418614	Prob. F(2,2)	0.1845
Obs*R-squared	31.80259	Prob. Chi-Square(2)	0.0000

Source: Author's computation

Also, the result of Breusch-Pagan Godfrey test for heteroskedasticity presented in Table 14.11 reveals that the null hypothesis cannot be rejected since the Obs*R-squared (33.64729) with Prob. Chi-Square (34) (0.4848) is insignificant. Invariably, there is no heteroskedasticty.

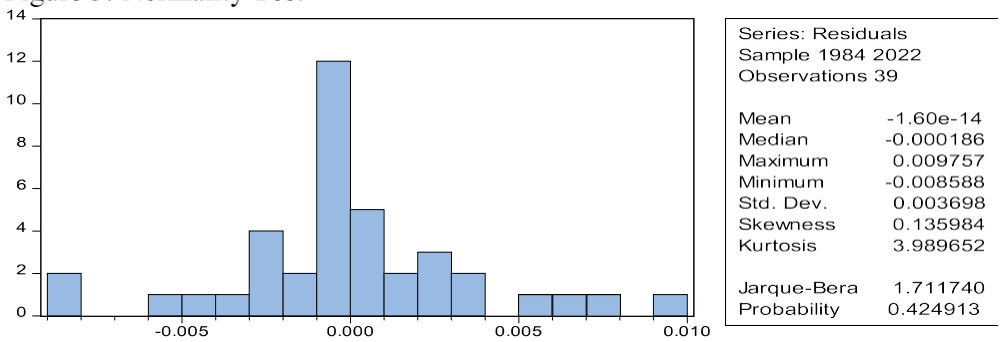
Table 14.11: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.739533	Prob. F(34,4)	0.7290
Obs*R-squared	33.64729	Prob. Chi-Square(34)	0.4848
Scaled explained SS	0.529092	Prob. Chi-Square(34)	1.0000

Source: Author's computation

The Jarque-Bera normality test result is shown in Figure 3. It indicates that the residual of the model is normally distributed since the p-value of 1.711740 is greater than 0.05% significance level.

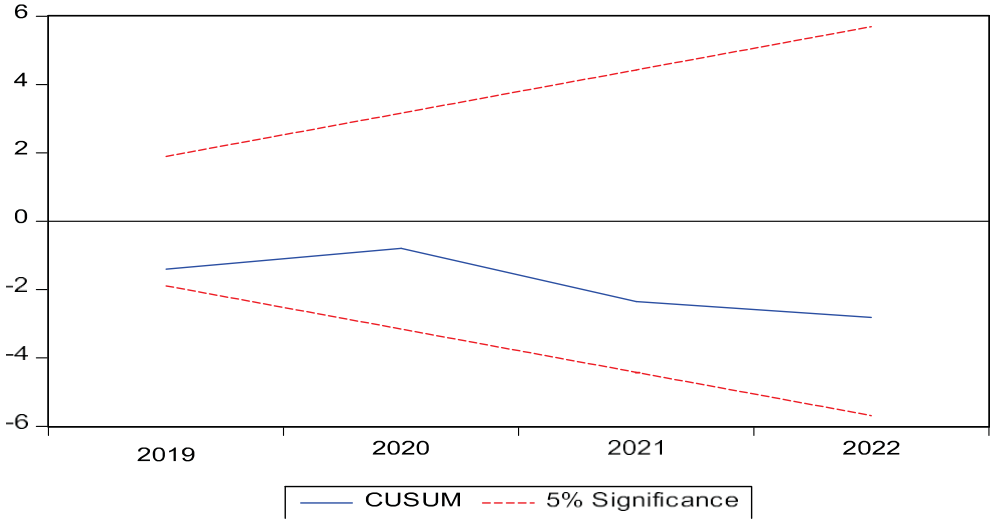
Figure 3: Normality Test



Source: Extracted from Eviews 10

The cumulative sum of recursive residuals (CUSUM) and CUSUM of squares tests proposed by Brown et al (1975) were also conducted to assess parameter stability. Figures 4 and 5 present plots of CUSUM and CUSUMSQ test statistics that fall inside the critical bands of the 5% confidence interval of parameter stability. The results indicate that the estimated parameters are stable over the period, (1980 – 2022).

Figure 4: CUSUM Test



Source: Extracted from Eviews 10

ect of external debt and external debt servicing on
for the period (1981- 2022) using Autoregressive
del. The result shows that external debt (lnED) boost
in the short-run but led to decline in economic growth
xternal debt servicing had a positive and significant
both in the short-run andlong-run, implying none
ffect in Nigeria. The external debt absorptive capacity
ositive relationship with economic growth in the long-
p in the short-run, implying a non-linear relationship.
stic capital (lnK) had significant negative impact on
short-run and in the long-run while labour force (lnL)
ct on economic growth in the long-run and negative

nEXR) exerted negative and statistically significant
he short-run and in the long-run, positive impact on
atistically insignificant. Trade openness (lnTOP) and
nave positive and significant impact on economic
gs of this study, it is recommended that external loan
ance high priority projects which have the potential of
ebt and direct impact on economic development. Also,
oject-tied and should be prudently utilized on the
mpletion to avoid beaucoup abandoned projects in the
ultiple external loans for a particular project.

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