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Impact of External Debt on Economic Growth in Nigeria: 1986-2019

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ABSTRACT

The study examined the impact of external debts on economic growth in Nigeria between 1986 and 2019. The specific objectives of this study were to: examine the impact of external debt stock on economic growth in Nigeria; assess the impact of external debt servicing on economic growth in Nigeria and investigate the extent to which external debt interest has impacted on economic growth in Nigeria. It was discovered that debt is synonymous to underdevelopment, poverty, unemployment which has led to low living standard of the people and Nigeria's huge debt stock has prevented it from embarking on higher domestic investment which would lead to higher growth and development which is a major problem to Nigeria. The findings shows that Nigeria's economic growth has been adversely but significantly affected by rising external debt servicing and the study recommended that external debt should be effectively utilize for sustainable development and diversification of Nigeria's economy will reduce the rate of external debt. The study adopted the ex-post facto research design being of secondary nature and was used to test the hypotheses. Descriptive Statistics, Unit Root Test, Co-integration, Auto-regressive Distributive Lag and Error Correction Mechanism estimates, were used to estimate and to test the impact of external debt on economic growth in Nigeria were demonstrated.

INTRODUCTION

Background to the Study

Over the years, in an economy where domestic savings are low, combined with a high current account payment deficit, the government has played a role in stimulating economic growth. This also provides a rationale for the government to borrow the funds needed to raise domestic savings. Low capital accumulation and a lack of resources to meet increasing public expenditure are characterized by many world economies (Aluko & Arowolo, 2018). Most governments are forced to resort to domestic and international borrowing to plug budget deficits and fund growth as public spending continues to increase and budget deficits widen (Saheed, Sani, & Idakwoji, 2015). Internally, for fear of fuelling inflation, governments can collect funds through taxes, coinage, or internal debt, the least favoured currency. Studies have consistently shown a negative relationship between debt and economic growth, McBride (2017) noted. It has been suggested that there is a threshold for the government to raise funds to finance public expenditure.

The most common means of raising domestic debt are treasury bills and government bonds. Higher domestic borrowing will increase interest rates and push the private sector out, slowing down growth and thus requiring external borrowing (Miller & Foster, 2017; Checherita & Rother, 2019). A nation's debt structure impacts individual citizens, government institutions, private sector organizations such as banks and eventually, the entire economy. In this context, the debt structure is the size of both domestic and foreign debt. External debt involves the undertaking of external monetary debt, including the undertaking of government guarantees to

non-residents in other currencies, usually the US dollar, adjusted for external commitments. External currency debt consists of secured corporate and public debt, medium and long-term (over one year) debt, such as bilateral and multilateral debt, industrial loans and loans. It also involves institutional lenders' short-term debt (less than one year), private non-guaranteed debt, IMF debt, and foreign currency debt obligations (Khattak, 2018). The choice of a means of funding in the face of public deficits is motivated by cost and risk, and various goals such as low inflation, stable exchange rates, low interest rates, favourable yield curves, adequate foreign reserve coverage, and activity of the domestic market (Beaugrand, Loko, & Mlachila, 2012).

In the modern world, external borrowing has become indispensable, according to Nelasco (2017), because it complements domestic savings and helps countries to conduct productive activities. External borrowing is desirable and can provide the requisite financing for rapid economic growth, as it is channelled into raising the productive capacity of the economy and encouraging economic growth and development. Nelasco (2017) adds that heavy investment in infrastructure such as highways, rail lines, irrigation canals and power stations that force the government to undertake external borrowing is needed in the capital growth and industrialization process. Speedy industrialisation requires heavy imports from abroad of capital goods such as equipment and machinery and technical know-how.

To make up the balance of payments deficit created by heavy imports, governments have to borrow heavily from other countries. But it poses a danger to the economic growth and stability of the country when external debt

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is unsustainable (Geburu, 2015). High external debt does not, however, necessarily imply sluggish economic growth; rather, it is the inability of the nation to meet its debt obligations. As such, to expand their tax base and better service their debts, countries need to use debt productively and create employment. Traditionally, by calculating external indicators such as debt-to - GDP ratios and macro-economic indicators such as GDP, inflation, exchange rates, interest rates, foreign reserves, trade balances and levels of investment, external debt effects are evaluated (Shabbir, 2019).

Two wide reasons for countries to resort to external borrowing, however, have been identified; and the first is to promote higher demand or to finance temporary balance of payment deficits. The second explanation is defined as systemic reasons for the lack or circumvention of severe budget constraints of long-term domestic credit (Adesola, 2019). The persistent need for government borrowing to finance the budget deficit has contributed to the rise of external debt, which is influencing the economy's inflation trend (Olayede, 2012). Inflation is a global issue which, because of its undesirable consequences, constantly affects all economies, whether current or emerging. Keynesian theories suggest that when demand exceeds the economy's capacity, inflation occurs (Asmaw, 2019). International borrowing is gradually monetized when the government borrows to close its budget deficits and thereby affects inflation. High interest rates are more likely to occur in a nation with a high level of debt, contributing to monetary policies that reduce such rates. In the short term, the impact of such an expansionary policy will decrease interest rates but lead to higher interest rates, with inflation staying higher or unchanged over the long term (Choong, 2010).

Government debt-to-GDP ratios will, according to Ogunmuyiwa (2018), depress economic growth and have immediate effects on inflation and national solvency. Although both developed and emerging economies have a consistent and substantially similar relationship between public debt and growth, the relationship between public debt and inflation remains uncertain. In advanced economies, Reinhart and Rogoff (2018) established no structural relationship between inflation and high debt. Though; higher debt levels are associated with high inflation in emerging economies. 'Safe' debt-to -GDP ratios can be as low as 15 percent, depending on the default and inflation history of the country (Reinhart, Rogoff, & Savastano, 2013; Patillo, Poirson, & Ricci, 2018). The resulting effect of high levels of debt generates a high debt burden and, especially in developing countries, puts debt servicing at risk for economic stability (Sulaiman & Azeez, 2018).

In recent times, especially in the run-up to the debt forgiveness period, the issue of Nigeria's external debt has become important due to its burden and the amount needed to meet those debts, as well as its potential effect on the various economic operating sectors, particularly the banking sector and the economy's growth (Pattillo,

Ibrahim, David, Sunday, Safdari & Mehrizi, 2011). The external debt of Nigeria can be traced back to the pre-independence period (1958), when the World Bank borrowed some 28 million US dollars for railway construction. According to the Debt Management Office (2018), this volume of debt was considered to be small until 1978, when the International Capital Market raised the first loan, widely known as the Jumbo Loan, to more than \$1.0 billion. Between 1958 and 1977, the need for debt was very low.

However, due to the fall in oil prices, which contributed to a rise in external debt, the need for debt emerged in 1978. Decreasing oil prices had a negative effect on the revenue of the government. Therefore, the modification of the balance of payment issues and the financing of projects necessitated borrowing. The Debt Management Office (DMO) report, however, states that the debt stock of the country has steadily increased since 1977, from \$0.763 billion in 1977 to \$5.09 billion in 1978 and \$8.65 billion in 1980, an increase of more than 73.96 percent. This was subsequently raised to \$35.94 billion in 2004. However, thanks to debt relief in 2006, Nigeria was better balanced in terms of debt; an era in which a large part of its debt was offset, although this did not last for too long as debt figures soon started to show an upward trend. When state governments were allowed to enter into contract agreements on foreign loans, borrowing increased further. In order to revamp the economy and make the country more capable of meeting its debt, Nigeria had to follow the Structural Adjustment Program (SAP) sponsored by the World Bank / International Monetary Fund (IMF) in 1986 (Ayadi & Ayadi, 2018).

Following Nigeria's apparent debt overhang, Obasanjo led the government to intensive debt revocation in 2003-2007, leading to a reduction in foreign debt of up to USD 3.4 billion in 2007 (Adedoyin, Babalola, Otekunri & Adeoti, 2016) and N438.89 billion if converted into local currency (CBN Statistical Bulletin, 2018). Following the end of President Obasanjo's term, subsequent governments rapidly resumed borrowing to such an extent that the debt profile of Nigeria (including Multilateral, Bilateral, Euro Bond, Diaspora Bond, and others) began to rise again from N438.89 trillion in 2007; N523.25 trillion in 2008; N590.44 trillion in 2009; N689.84 trillion in 2010; N896.85 trillion in 2011; N1,026.90 trillion in 2012; N1,387.33 Billion in 2013; N1,631.50 Billion in 2014; N2,111.51 Billion in 2015; N3,478.91 Billion in 2016; N5,787.51 Billion in 2017 to N7,759.20 Billion in 2018 (CBN, 2018).

Owing to the persistent budget deficit, the unfavourable balance of payments and, most importantly, the imminent need for industrialization, external debt remains one of the major challenges facing low-income countries, such as Nigeria. Soludo (2018) argued that the two major issues that led to the acquisition of foreign loans are the negative rising rate of inflation and exchange rate depreciation. They have no alternative but to turn to the International Financial Institutions and bilateral loans as

low-income nations face this obstacle. Debt servicing becomes the order of the day when such loans are received by a nation and, if not well managed, economic development will initially be far-reaching in the process. The settlement of unsustainable foreign debts that hinder the growth of the most heavily indebted poor countries (HIPC)s has resulted, according to Udeh (2018), in a series of initiatives ranging from debt restructuring to full revocation. Bakare (2017) argued that it is not a matter of concern to borrow abroad to support economic growth and development, but the issue is the misappropriation of such borrowed funds, resulting in an economic crisis in turn.

Although the high debt profile does not necessarily indicate slow economic development, it is the failure of a nation to channel these borrowed funds into productive economic areas in order to achieve economic growth and meet its debt service obligations (Adesola, 2019). That this is a major issue facing the Nigerian economy is no exaggeration. The Nigerian economy's inability to meet its debt service requirements effectively put the country under a heavy debt service burden.

The resulting impact of this burden of debt service creates additional problems for the country, in particular the growing fiscal deficit.

In all sectors of the economy, the debt burden has led to a general decrease in production and productivity and to the deterioration of various macro-economic variables such as consumption, expenditure, etc. (Iweala, 2011). Furthermore, the continued increase in the foreign and domestic debts of Nigeria, the sharp decline in crude oil rates, the diminishing exchange rate of the naira to the dollar, and high interest rate charges have all aggravated the debt and debt servicing issues of Nigeria. It is against this backdrop that this paper aims to examine the effect of external debt on the economic growth of Nigeria.

Statement of the Problem

In developing countries, like Nigeria, hardly any nation is entirely debt-free and the external debt crisis has become one of the most serious problems. Debt has invariably become synonymous with underdevelopment, poverty, unemployment, and all this has led to low living standards. In particular, African countries and Nigeria's large government debt stocks have prevented countries from embarking on a higher volume of domestic investment that would lead to higher growth and development.

It is troubling to note that, despite the 2005 relief package, the World Bank rated Nigeria as the world's 87th most indebted country and 139th in terms of GDP per capita purchasing power parity and debt-service ratio (debt-to-export ratio) of 1.10 percent against the 20 percent foreign threshold (World Bank, 2019). Nigeria is the largest borrower nation in sub-Saharan Africa, according to Omotoye, Sharma, Ngassam and Eseonu (2017). The debt profile of Nigeria has followed an upward trend over the years as opposed to other sub-Saharan nations (Ayadi & Ayadi, 2018). The steady increase in the amount

of debt service payments poses a danger to the Nigerian economy's growth. For instance, \$3,781 billion was used in 2011, \$4,918 billion in 2012 and \$8,520 billion in 2018 to service debts. In 2014 and 2018, a total of \$5,500 billion and \$8,499 billion was paid out as debt service, while in the 2016 budget, N1.46 billion was budgeted for debt service (Oseni, 2019).

As a result, some unfavourable circumstances may be developed, such as weak growth in GDP, crowding out private investment, etc. (Iweala, 2018). In comparison to expectations that capital released from Paris and the London Club, as well as additional external debt, would add value to the economy by creating employment, promoting quality health care, growing capacity utilization, infrastructure growth, reducing inflation rates, increasing export revenues, reducing foreign exchange risk, all of these phenomena.

A developing country like Nigeria's inability to sustain adequate domestic capital to bridge its budget deficits requires its continued dependency on external sector financing, which is usually characterized by very strict conditions for lending, unfavourable fluctuations in foreign exchange and trends of repudiation causing debt overhangs. Therefore, the issue remains and revolves around the scenario of whether the nation's external debt stock could have contributed significantly to Nigeria's economic growth; whether the quantity of external debt services in aggregate terms and also to the various creditors could have led to an increase in the nation's GDP; and whether the external debt stock and its conditions of operation could have led to an increase in the nation's GDP.

In order to fill the gap created by previous studies, which were narrow in reach and did little to align the impact of the aggregate and different sources of external debt and their services on economic growth, exchange rates and inflation, the solution to this problem is crucial.

The economy is still not well diversified, so the balance of payments will still be negative, and the temptation, if that happens, is to borrow to cover the deficit. The problem with the discovery of oil is Nigeria's drift into a single market. Around 95 percent of foreign exchange earnings and 80 percent of discretionary revenues are generated by the oil industry. This persuaded the need for an empirical analysis of the impact of external debt on the economic growth rate (as measured by GDP growth) in Nigeria to launch this report.

Objectives of the Study

The broad objective of this study is to examine the impact of external debts on economic growth in Nigeria. The specific objectives are to:

- Examine the impact of external debt stock on economic growth in Nigeria.
- Assess the impact of external debt servicing on economic growth in Nigeria.
- Investigate the extent to which external debt interest has impacted on economic growth in Nigeria.

Research Hypotheses

In order to realize the objectives of the study the following hypotheses are raised and will be tested:

H01: External debt stock has no significant impact on economic growth in Nigeria.

H02: External debt servicing has no significant impact on economic growth in Nigeria.

H03: External debt interest has no significant impact on economic growth in Nigeria.

LITERATURE REVIEW

Conceptual Framework

External Debt

Debt that may be domestic or external is created by the act of borrowing. By the act of borrowing, debt is created. It is the capital or assets used in an organization that the shareholders don't contribute and does not belong to them in any way. This is an obligation expressed by a formal counterpart, financial or otherwise (Salau & Ogbayelu, 2017). Debt is characterized as a resource or liquid asset that is used in an organization without being contributed by the owner and does not belong to the organization in any other way, according to Bamidele and Joseph (2018). The Central Bank of Nigeria (2018) defined debt as a proportion of liabilities with different tenures, incurred in the past by government activities and scheduled to be fully repaid in the future by the government. National debt, also referred to as public debt, is the cumulative total of the financial commitments of the government arising from borrowing from its citizens, from foreign governments, or from international institutions such as the International Bank for Reconstruction and Development.

Debt is an indebtedness or accrued borrowing contractual obligation. Joshua (2015) said it was possible to classify a debt as private or public. Private debt refers to the financial obligations levied on individual enterprises and non-governmental organisations, while public debt can be considered to be financial obligations or liabilities incurred by the government in order to fund domestic investment by borrowing from within the economy and beyond the territorial boundaries of the country. In order to boost economic growth and ensure fiscal viability, Itsede (2019) argued that government borrowing is regarded as public debt and that government borrowing is used as a way of raising available resources. He went on to say that it is possible to carry out this act of borrowing internally or externally.

Debt was conceptualized by the National Account Scheme (2018) as all commitments requiring the debtor to pay or pay interest or principal to the creditor at a future date. As a consequence, all debt assets are liabilities, but certain liabilities are not debt, such as bonds, equity and financial derivatives. Debt can, in terms of the balance sheet, be considered a subset of liabilities. Liabilities are obligations which provide the units holding the corresponding financial claims with economic advantages. The criteria for determining responsibility as debt is that the debtor

owes the creditor future payments of interest and/or principal (International Monetary Fund, 2017). Generally, when, for different reasons, a nation or person borrows from a variety of sources and is unable to pay the loan when it is due for payment, the borrowed sums constitute debt. For the individual it becomes private debt, while for the nation it becomes public debt.

External debt is classified as foreign currency, food or service debt attributable to non-residents, according to the World Bank (2014). The financial obligation which binds one party (debtor country) to another (creditor country) is external debt. It usually applies to unpaid debt that is payable in currencies other than the debtor nation's currency.

External debt was defined by Yerima and Tahir (2020) as part of the debt of a country borrowed from foreign lenders, including commercial banks, governments or international financial institutions. Ogbefuna (2017) suggests that, as a result of the disparity between national savings and expenditure, foreign debt emerges. The debt piles up as the deficit widens, and this makes the nation have to borrow growing amounts to stay afloat.

External debt is defined as money borrowed from foreign lenders by a country for the purpose of this study. Interest on this debt must be paid in the currency in which the loan was made (Zaki, 2015). Thus, in order to obtain the currency, the borrowing country will conceivably need to sell its goods to the country of the lender. This means that the debt is typically purchased by a government from foreign governments or banks or from international institutions such as the International Monetary Fund and the World Bank.

There have been many individual attempts on the part of some economists and financial experts to determine the content of these debts, as well as some attempts by some international organizations. The total external debt is the amount of current actual, not potential, debts based on the inhabitants in a certain economy, in any time for non-inhabitants, which requires returning the payments from the part of the debtor in order to pay the interest and the original amount at a certain point, or temporal point in the future (International Monetary Fund, 2013).

In general, the Organisation of African Unity describes external debt over a period of time as a set of due financial obligations. This means that the central government or public body, guaranteed by the central government, or contracted by the private sector has contracted the obligations (Al-Mahdi, 2019). Researchers have embraced a definition of external debt in order to address the above-mentioned difficulties, which considers it as amounts borrowed by the national economy where the duration of the loan exceeds one or more years and the amounts are payable to the borrower through a payment in foreign currency or by the sale to the borrower of goods and services (Saleh, 2013).

The World Bank (2019) defines total external debt as 'debt attributable to foreign currency, goods or services repayable by non-residents. It is the amount of long-term

public, publicly guaranteed and private non-guaranteed debt and includes all debts with an initial maturity of one year or less and interest on long-term debt arrears (World Bank, 2019).

This study defines external debt as follows: money borrowed from foreign lenders by a country, including commercial banks, governments or international financial institutions, normally payable in the currency in which the loan was made, including interest.

External Debt Servicing

In general, debt servicing refers to the compelling need and duty on a borrower to pay the interest on a loan when and when due and also to effect redemption of the principal sum as it comes due and if a nation has the potential to redeem these obligations, there will be no accumulation of arrears and thus no cases of “debt overhang” the cripples economic growth.

It tests the extent to which the nation is able to maintain a sustainable debt stock that could make its conditions of service convenient in order to free up money for the growth of the vital sectors of the economy and to accentuate the well-being of its people (Karagol, 2017; and Ogunmuyiwa, 2018). As adopted by Desta (2015) and Adesola (2019), both the aggregated and disaggregated debt services to creditors have been designed to test their relationship with economic growth.

Abubakar (2019) has a broader viewpoint on debt servicing, as he claims that debt servicing entails interest servicing, redemption of unpaid loans, refinancing and debt rescheduling. The key essence of repayment is to postpone repayment in order to ease the squeeze of medium-term foreign exchange liquidity faced by debtors, while debt rescheduling is intended to prevent payment of maturing loans in order to enable some steps to be taken to expand the productive capacity of the nation.

Interest payment and principal repayment constitute a drain on the borrowing country's resources and the greater the debt stock, the greater the effect of debt servicing obligations that generate a strain on the resources of the nation. The pressure of debt servicing is calculated using some variables. Debt servicing tests the ability of a country to repay debt and its creditworthiness as a percentage of export receipts. The international threshold notes that when a country's debt servicing reaches 20% of its export earnings, its debt becomes unsustainable; debt servicing as a percentage of foreign exchange earnings is another important indicator of a country's indebtedness as it calculates the ratio of debt service to foreign exchange earnings; As this ratio goes up, the burden increases. Nagassan (2018) noted that the higher the debt service ratio, the lower the GDP would be, creating constraints on African nations' external debt servicing ability.

The DMO performs an annual debt sustainability analysis in cooperation with CBN, NPC (National Planning Commission), the Federation's budget office and the National Bureau of Statistics in an effort to retain debt

servicing capability at a tolerable rate. A 2010 estimate, for example, showed that Nigeria spent N958.62bn (\$6.39bn) on debt servicing between 2008 and 2009, while the federal government's borrowing cap for the country was set at N1.06tn in 2017, consisting of N639bn from domestic sources and N426bn from international sources (Amaefule, 2017).

Empirical Reviews

The motive behind external debt is to boost economic growth and any country's development, but as a result of potential high debt stocks, debt interest rates, and debt service payments, it poses a serious threat to the economy. Economic and financial researchers have also attempted to analyse the impact on the economies of debtor nations of external debt burdens and have come up with distinct views. There are several empirical studies on external debt and the relationship between economic growth in both developed and developing countries.

External debt interest was also found to have a significant but negative impact on economic growth in Nigeria within the period of study. This showed that borrowings made over the years has been mainly for consumption; and this could be attributed to the fact that bulk of such funds are been channelled to meeting recurrent (such as wages and salaries or consumption) expenditure needs of the country at the expense of productive investments that could stimulate economic growth. In line with this result, available statistics from NBS (2020) further showed that more than half of the revenues earned between 2017 and first half of 2020 went into debt servicing. NBS (2020) figures showed 54.05 percent and 96.96 percent of revenues earned in 2019 and first half of 2020 respectively went into debt servicing which significantly reduced the country's economic growth. The result indicates that the burden of external debt interest has had a detrimental impact on the revenue of the country and the capital income of the country needed for enhanced economic growth. The findings from this study agrees with Safdari and Mehrizi (2017) whose study showed that rising interest in foreign debt had a negative but significant effect on GDP.

METHODOLOGY

Research Design

This study followed the form of ex post-facto research. Ex-post-facto analysis is a systematic empirical study in which the researcher does not in any way track or influence independent variables because the study situation already occurs or has taken place. The purpose of the ex-post facto research design of the researcher is to identify aspects of the problem that are vital to a thorough analysis. Furthermore, the researcher has the potential to provide a clear view of the problem from other applicable sources with the ex-post-facto study design and to limit the scope of study on these significant issues. In this scenario, when carrying out the study, the researcher adopts a technique that leads to accurate

or almost comprehensive information. The analysis collected historical knowledge for the period 1986-2019. The thesis involves a time series analysis by implication.

Method of Data Collection

The data used in this research work consists secondary source data related to the study. Statistics from the Central Bank of Nigeria (CBN), journals, magazines, newspapers, the National Bureau of Statistics (NBS), the Internet and other similar publications provide the written sources from which such data can be collected. The research was limited to the 1986-2019 periods.

Technique for Data Analysis and Model Specification Descriptive Statistics

The study conducted the descriptive statistics of the variables on the mean, median, skewness, kurtosis, and standard deviation, maximum in value, minimum in value, Jarque-Bera Probability. The mean was used to establish the average of numbers; it is the calculated central value of a set of numbers and was used to represent the typical value of the variables. Therefore, it serves as a yardstick for all observations in the variables. The standard deviation is used to quantify the amount of variation or dispersion of a set of data values in the variables. Skewness is a measure of the asymmetry of the probability distribution of a real-valued random variable about its mean.

The skewness value can be positive or negative, or undefined and it is indicated as +1 and -1. Kurtosis is a statistical measure that is used to describe the distribution of observed data around the mean. Kurtosis is used in the statistical field to describes trends in charts and can be present in a chart with fat tails and a low, even distribution, as well as be present in a chart with skinny tails and a distribution concentrated towards the mean. The Jarque-Bera test is a test of whether sample data have the skewness and kurtosis matching a normal distribution. The decision rule is that if the probability value is more than 5% level of significance that implies that the variables have skewness and kurtosis matching a normal distribution.

Unit Root Test

In this study, unit root tests (pre-estimation diagnostics tests) was conducted to ascertain the stationarity of the data before carrying out the Autoregressive Distributed Lag (ARDL) cointegration test. The unit root tests are valid if the time series y_t is well characterized by an AR (1) with white noise errors. Many financial time series, however, have a more complicated dynamic structure than is captured by a simple AR (1) model. Said and Dickey (1984) augment the basic autoregressive unit root test to accommodate general ARMA (p, q) models with unknown orders and their test is referred to as the Augmented Dickey-Fuller (ADF) test. The ADF test tests the null hypothesis that a time series y_t is I (1) against the alternative that it is I (0), assuming that the dynamics in the data have an ARMA structure. The ADF test is based

on estimating the test regression:

$$y_t = \beta' D_t + \phi y_{t-1} + \sum_{j=1}^p \psi_j \Delta y_{t-j} + e_t \text{-----(1)}$$

Where: D_t is a vector of deterministic terms (constant, trend etc.). The p lagged difference terms, $\Delta y_{(t-j)}$, were used to approximate the ARMA structure of the errors, and the value of p was set so that the error, e_t is serially uncorrelated. The error term was also assumed to be homoskedastic. The specification of the deterministic terms depends on the assumed behaviour of y_t under the alternative hypothesis of trend stationarity. Under the null hypothesis, y_t is I (1) which implied that $\phi=1$. The ADF t-statistic and normalized bias statistic were based on the least square's estimates.

Co-integration Test

Co-integration is the statistical implication of the existence of long run relationship between the variables, which were individually non-stationary at their level form but stationary after first difference. The theory of Co integration was therefore used to study series that were non-stationary but a linear combination of which was stationary.

First of all, the series must be integrated of order (1) and if a linear combination of this collection is integrated of order (0), then the collection will be said to be Co-integrated. Also, if two or more series are individually integrated (in the time series sense) but some linear combination of them has a lower order of integration, then the series are said to be cointegrated. A common example is where the individual series are first-order integrated but some (cointegrating) vector of coefficients exists to form a stationary linear combination of them.

Autoregressive Distributed Lag (ARDL)

The study employed Autoregressive Distributed Lag (ARDL) bound testing framework (Pesaran and Shin 1995 and 1999, Pesaran et al. 1996) to estimate the long-run equilibrium relationship among the variables and the Error Correction Mechanism (ECM) in order to determine the impact of external debt on the economic growth. ARDL model is a model that has both lagged values of the dependent variables (autoregressive) and lagged values of the independent variables (distributed lag) as the explanatory variables. The ARDL cointegration is used to establish whether there is a long-run equilibrium relationship among the variables under review when the variables are integrated of both order zero I(0) and order one I(1).

The advantages of using the ARDL technique instead of the conventional Johansen and Juselius (1990) co integration approach are that while the latter estimates the long-run relationships within the context of a system of equations, the former employs only a single reduced form equation (Pesaran & Shin, 1995). In addition, the ARDL method avoids configuring a larger number of specifications in the standard cointegration test. These include decisions regarding the number of endogenous

and exogenous variables to be included and the treatment of deterministic elements. Furthermore, the ARDL approach allows the use of different optimal lags for the different variables, which is not possible in the standard cointegration test. Since time series data could be vulnerable to unit root problems, Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests are implemented on the series to avoid spurious regressions. Unit root tests are first conducted to determine the stationarity of the variables, which must be a combination of I(0) and I(1) series.

Model Specification

The mathematical specification of the implicit model that expresses the relationship between external debts and economic growth is expressed as:

$$GDP=f(EDS, EST, EDI)------(2)$$

Setting up equation (2) in a linear stochastic form (or econometric form) is expressed as:

$$GDP=\alpha_0+\alpha_1EDS+\alpha_2EST+\alpha_3EDI+\mu_t------(3)$$

The introduction of natural logs to equation (3) would be more efficient in estimating the parameters because of the following reasons:

- i. It helps convert and integrate different values (of a variable) into a common denominator.
- ii. It brings different units to a common base for measurement.
- iii. Logarithm ensures that the coefficients of the variables are effective in analysing macro-economic behaviour, since the coefficients are elasticities used to explain the response of a change in one variable with respect to another. On the strength of these, taking the natural logs of both sides of equation (3) will result in the following equation (4):

$$\log(GDP)=\alpha_0+\alpha_1\log(EDS)+\alpha_2\log(EST)+\alpha_3\log(EDI)+\mu_t------(4)$$

Where;

log = Natural Logarithms

GDP = Gross Domestic Product (proxy for economic growth)

EST = External Debt Stock

EDS = External Debt Servicing

EDI = External Debt Interest

α_0 = Intercept or autonomous parameter estimates for external debt

α_1 - α_3 = Coefficient of external debts on economic growth

= The white noise Error terms

Building equations (5) into an ARDL model, we have:

$$\Delta \log(GDP) = \alpha_0 + \sum_{i=1}^m \alpha_1^i \log(GDP)_{t-i} + \sum_{i=1}^m \alpha_2^i \log(EDS)_{t-i} + \sum_{i=1}^m \alpha_3^i \log(EST)_{t-i} + \sum_{i=1}^m \alpha_4^i \log(EDI)_{t-i} + \mu_t$$

Once a long-run association is established between the variables in equation (5) the study proceeded to examine the long-run effect and the short-run dynamics using unrestricted Error Correction Model (ECM) approach.

$$\Delta \log(GDP) = \alpha_0 + \alpha_1 \Delta \log(GDP)_{(t-1)} + \alpha_2 \Delta \log(EDS)_{(t-1)} + \alpha_3 \Delta \log(EST)_{(t-1)} + \alpha_4 \Delta \log(EDI)_{(t-1)} + \delta ECT_{(t-1)} + \mu_t \text{---}(6)$$

The ECT_{t-1} further captures the output evolution process by which agents adjust for prediction errors made in the last period. The general-to-specific modelling approach is adopted to derive a satisfactory parsimonious model for the external debts and economic growth in equation (6) which are data admissible, theory consistent and interpretable.

It would involve ‘testing down’ the general model by successively eliminating statistically insignificant regressors and imposing data acceptable restrictions on the parameters to obtain the final parsimonious dynamic equation.

Justification of the Model

The justification for the use of ARDL-ECM approaches is that the endogeneity problems and inability to test hypotheses on the limited coefficients in the long run are avoided. That is, it has superior statistical properties in small samples as it is relatively more efficient in small sample data sizes found mostly in studies on developing countries. More so, the long run and short run parameters of the model are estimated simultaneously; and it can be applied irrespective of whether the variables in the model are endogenous. Lastly, applying ARDL-ECM is helpful in data generating process through taking sufficient number of lags general-to-specific modelling framework.

Post-Estimation Diagnostic Tests

Normality test

The study investigated whether the variables followed the normal distribution. This study relied on the Jarque-Berra test where a null hypothesis of normality was tested against the alternative hypothesis of non-normal distribution. For normal distribution the JB statistic was expected to be statistically indifferent from zero.

H_0 : JB = 0 (normally distributed)

H_1 : JB = 0 (not normally distributed)

Rejection of the null for any of the variables would imply that the variables were not normally distributed and a logarithmic transformation was necessary.

Heteroscedasticity Test

One of the key assumptions of regression is that the variance of the errors is constant across observations. If the errors have constant variance, the errors are called homoscedastic. Typically, residuals are plotted to assess this assumption. Standard estimation methods are inefficient when the errors are heteroskedastic or have non-constant variance.

The study thus investigated whether the variance of the error term was constant. If the variance of the error term changes as the values of independent variable change then the assumption is violated. It is tested using the white test of statistics whereby we express the sum of errors as a function of independent variables in the model and regress it using the ordinary least square method. If there is no heteroscedasticity in the model, we expected that all the coefficients were equal to zero.

Autocorrelation Test

Serial or auto-correlation is a situation where the error terms for different time periods are correlated. This is a problem that affect the efficiency of the estimators such that the standard errors are distorted affecting the test statistic hence invalid significance test and conclusions (Gujarati, 2003). To test for autocorrelation the study shall use the Breusch -Godfrey test which is a joint test for autocorrelation that allows testing the autocorrelation of the error using several lags. The null hypothesis for the serial correlation test states that there is no serial correlation, while the alternative hypothesis states that the error terms are autocorrelated. A p-value less than the 5% level of significance shall indicate presence of serial correlation.

Specification Error Test (RESET) and Model Stability

To detect specification errors in a model which could have been mis-specified but nevertheless give desirable results, Ramsey and Alexander (1984) proposed Regression Specification Error Test (RESET) to establish departure from the classical linear regression assumptions will be conducted. This is a general test for omitted variable problem, correlation between the exogenous variables

and the residuals and incorrect functional relationship in a model. The specification errors could be due to measurement errors of the regressors and expressing the endogenous variable as a function of its past values in the model. The stability of the estimated coefficients over the sample period will also be examined by adopting the recursive residual test for structural stability. The Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Square of Recursive Residuals (CUSUMQ) obtained from a recursive estimation of the models will be plotted against the time horizon of the sample. These are compared with the bound critical values at specified significance level. If the plot of the CUSUM and CUSUMSQ remains within the boundaries of the 5 percent critical bound the null hypothesis that all coefficients are stable cannot be rejected. The results are therefore to be supported by the claim that the model is stable since the residuals is expected to lie within the dual standard error range.

RESULTS

Data Presentation And Analysis

Data Presentation

This section presents the data for the study, analyses and discusses the results, in line with the objectives and method of study.

Table 1: Data Presentation

Year	EST(₹ Billion)	EDS(₹ Billion)	EDI (%)	GDP Constant Basic Prices - Annual (₹ Billion)
1986	41.45	2502	2.64	202.44
1987	100.79	3574.6	2.59	249.44
1988	133.96	81407	2.51	320.33
1989	240.39	15577.7	2.32	419.20
1990	298.61	30855.8	2.4	499.68
1991	328.45	35334.3	2.56	596.04
1992	544.26	41327.9	1.86	909.80
1993	633.14	38266.4	1.82	1,259.07
1994	648.81	34722.8	2.18	1,762.81
1995	716.87	122446	1.67	2,895.20
1996	617.32	147048	1.67	3,779.13
1997	595.93	134685	3.86	4,111.64
1998	633.02	107395	3.76	4,588.99
1999	2,577.37	162054	3.9	5,307.36
2000	3,097.38	175204	3.8	6,897.48
2001	3,176.29	238146	1.98	8,134.14
2002	3,932.88	141389	2.25	11,332.25
2003	4,478.33	233943	1.45	13,301.56
2004	4,890.27	798850	1.2	17,321.30
2005	2,695.07	986550	1.54	22,269.98
2006	451.46	865540	4.7	28,662.47
2007	438.89	128600	3.8	32,995.38
2008	523.25	55190	2.8	39,157.88
2009	590.44	3587.4	3.2	44,285.56

2010	689.84	4643.3	4.9	54,612.26
2011	896.85	3272.7	3.8	62,980.40
2012	1,026.90	30455.9	1.9	71,713.94
2013	1,387.33	34953.1	2.2	80,092.56
2014	1,631.50	44249.6	1.4	89,043.62
2015	2,111.51	40333.2	1.2	94,144.96
2016	3,478.91	67245.5	1.6	101,489.49
2017	5,787.51	70609.4	4.7	113,711.63
2018	7,759.20	82729.4	6.8	127,736.83
2019	9,022.42	86861.4	1.8	144,210.49

Sources: CBN statistical Bulletin (2019); World Bank (2020)

Descriptive Statistics

Descriptive or summary statistics was performed on the data to have a glimpse and behaviour of the data used in the analysis. Hence, the results from the descriptive statistics are captured in Table 2.

From the descriptive statistics results in Table 2, it could be observed that among the external debt variables, EST has the highest mean value of 148516.1 billion. This was followed closely by EDS with a mean value of 1946.372

billion; EDI has a mean value of 2.72 percent; while GDP averaged 35029.27 billion between 1986 and 2019. The analysis was also fortified by the value of the skewness and kurtosis of all the variables involved in the model. All the four variables, GDP, EST, EDS and EDI were all found to be positively skewed as captured by their respective values as: 1.104611, 2.614965, 1.621217 and 1.168512.

Variables with value of kurtosis less than three are called

Table 2: Descriptive Statistics Results

Statistic	GDP	EST	EDS	EDI
Mean	35029.27	148516.1	1946.372	2.728235
Median	12316.91	68927.47	703.3515	2.360000
Std. Dev.	42866.26	241715.5	2248.783	1.283096
Skewness	1.104611	2.614965	1.621217	1.168512
Kurtosis	2.960295	8.603641	5.017746	4.168346
Jarque-Bera	6.916508	83.23337	20.66162	9.671174
Probability	0.031485	0.000000	0.000033	0.007942
Observations	34	34	34	34

Source: Authors Computation, 2022 (Eviews-10)

platykurtic (fat or short-tailed), and only GDP variable qualified for this during the study period as shown by the Kurtosis value of 2.960295. On the other hand, variables whose Kurtosis value is greater than three are called leptokurtic (slim or long tailed) and EST, EDS and EDI were found to be leptokurtic during the study period.

Jarque-Bera test which was used to measure or determine the normality assumption of the variable showed that all the four variables are not normally distributed as their probability values were found to be less than 5%. In summary, the descriptive statistics revealed that all the data sets are not normally distributed therefore it is insignificant.

Correlational Matrix Analysis

Correlation analysis was used to check the strength of relationship between variables and to check the fluctuation between the variables. The results from the correlation analysis were examined and interpreted in-line with the model specified, to test the strength of the relationship that exist among the variables of interest and was thus discussed accordingly.

The closer the correlation coefficient value is to one, the stronger the correlation and the closer the correlation coefficient is to zero, the weaker the correlation. The correlation result is presented in Table 3.

Table 3: Correlation Matrix Results

	GDP	EDS	EST	EDI
GDP	1			
EDS	-0.1394	1		
EST	0.6302	0.1828	1	
EDI	0.2010	-0.0677	0.1235	1

Source: Authors Computation, 2022 (Eviews-10)

From, Table 3 it could be seen that a negative correlation exists between GDP and EDS. This relationship was also found to be weak as indicated by the correlation coefficient value of -0.1394.

However, positive and strong correlation was found to exist between GDP and EDS. This was captured by the correlation coefficient value of 0.6302 among the two variables of interest.

Lastly, the correlation between GDP and EDI was found to be positive, but weak as indicated by the correlation coefficient value of 0.2010.

Therefore, among the three correlations of interest, the correlation between GDP and EDS was found to be the strongest; and in summary, this showed that external debts variables and GDP has weak degree of association.

Unit Root Test Results

Data from time series are generally described by a stochastic pattern that can be eliminated by differentiation. Therefore, the unit root test is a test of the stationary or non-stationary existence of the series data used in the model. This is to find out whether there is a spurious or nonsensical relationship between external debts and economic growth in Nigeria. The null hypothesis is that the variables are non-stationary, which means that the root unit is present. A variable is said to be non-stationary if, when its absolute value is taken into account, its test statistics are lower than its critical value at various levels of significance. Thus, as shown in Table 4, these study used or adopted Augmented Dickey-Fuller (ADF) techniques to test and verify the series unit root property and model stability.

Table 4: Summary of Unit Root Test Results

Variable	ADF Test Statistics				
	Levels	Critical Value	First Difference	Critical Value	Order of Integration
GDP	-1.953093	-3.557759	-4.199034**	-3.568379	I(1)
EST	-1.901178	-3.557759	-3.859369**	-3.557759	I(1)
EDS	-3.111784	-3.557759	-4.086778**	-3.557759	I(1)
EDI	-4.725113	-4.273277*	-5.541557	-3.562882	I(0)

Note: The tests include intercept with trend; * and **implies significant at 1% and 5%

Source: Authors Computation, 2022 (Eviews-10)

The result of the unit root test is presented as shown in Table 4 above. The result indicates that three of the four variables used in the model have unit root problem when considered at their level forms, but turned stationary after their first difference. We ascertained this when we compared the augmented dickey fuller (ADF) statistics of each variable with their corresponding critical values. From Table 4, it could be observed that only EDI was found to be stationary at levels, that is, it was found to be integrated at order zero $\{I(0)\}$ and at 1% levels of significance. However, GDP, EST and EDS were all found to be stationary at first difference; that is integrated at order one and at 5% level of significance. At this order of integration, their ADF test statistics, -4.199034, -3.859369, and -4.086778 were greater than the critical test statistics of (-3.568379, -3.557759, and -3.557759 at 5% significant level respectively.

However, despite that the variables are not stationary at levels; there is still the tendency that the linear combination of the variables will be meaningful. In other words, we expect a long run equilibrium relationship between dependent and independent variables despite the

presence of unit root. This was confirmed by subjecting the error term to unit root test which is known as ARDL bound test approach to co-integration test.

Lag Order Selection Criteria

The selection of the optimum or acceptable length of the lag is the first estimation in order to check whether enough lags have been included in the ARDL. This is necessary because too many lags could lead to the loss of degrees of freedom, whereas too few lags could lead to residue self-correlation as well as potential equation misspecification. Using Akaike Information Criteria (AIC), Hannan-Quinn Information Criterion (HIC), Schwartz Bayesian Criterion (SBC) or Final Predictor Error (FPE), the optimum lag period can be chosen. Using the Akaike Information Criterion (AIC), the optimum lag period was chosen for the ARDL model. The AIC was chosen over the others because it provides the most severe penalties for losing the degree of freedom; that is, it does not respond to the degree of freedom associated with more regressors entering the model that the updated R-square should have increased (Gujarati & Porter, 2009).

Table 5: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1093.87	NA	7.19e+26	73.19119	73.37801	73.25095
1	-927.166	277.8362	3.15e+22	63.14440	64.07854	63.44324
2	-913.558	19.05158	3.94e+22	63.30385	64.98529	63.84176
3	-884.533	32.89434	1.96e+22	62.43556	64.86430	63.21253
4	-839.821	38.75107*	4.15e+21*	60.52137*	63.69742*	61.53742*

Source: Authors Computation, 2022 (Eviews-10)

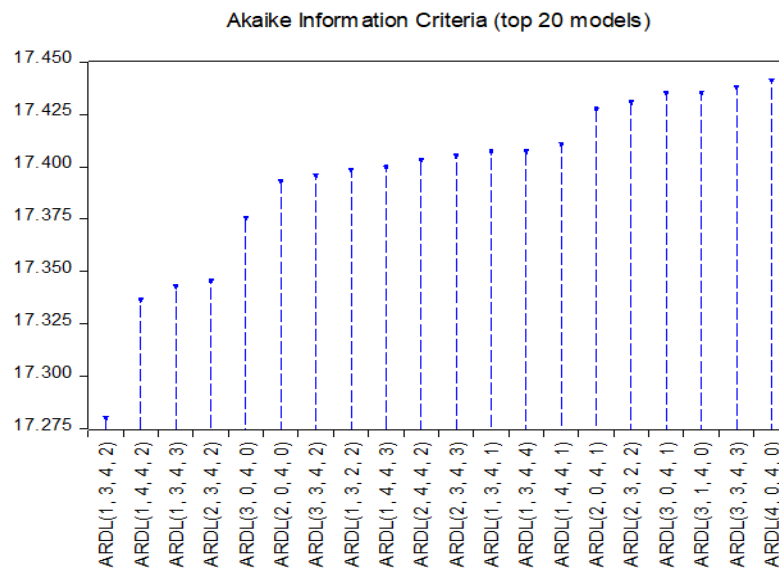


Figure 1: Lag selection criteria

Source: Authors Computation, 2022 (Eviews-10)

From the lag order selection criteria result presented in Table 5 and in Figure 1, it could be observed that most of the lag selection criterions recommended lag four (4). The study adopted and used the lag order of four (4)

which was recommended specifically by AIC.

Co-integration Results

Table 6 presents the result of ARDL bounds test for Co-integration for the model using the recommended lag by AIC. From the co-integration test captured in

Table 6: Bound Test-Co-integration Results

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.35074	10%	2.37	3.20
k	3	5%	2.79	3.67
		1%	3.65	4.66

Source: Authors Computation, 2022 (Eviews-10)

Table 6, it could be seen that F-statistic value of 4.35074 is greater than the lower (I(0)) and upper bound (I(1)) critical values of 2.79 and 3.67 respectively at the 5% significance level. It can therefore be inferred that the variables are co-integrated, and as such, there is a long-run equilibrium relationship between external debts and economic growth between 1986 and 2019. Thus, the null hypothesis of no long-run relationship is rejected at the 5% significance level.

Statistical Test of Hypotheses

The level of significance for the study was 5 percent (for the two-tailed test); as such the three hypotheses formulated in this study were tested using the Wald F-statistic test and as well its associated p-values.

The Decision Rule: The decision rule for accepting or rejecting the null hypothesis was that the hypothesis must be based on the Probability Value (PV). If the PV is less than 5% or 0.05 (that is, $PV < 0.05$), it implied that the

Table 7: ARDL Regression Result

Dependent Variable: DLOG(GDP)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(EST)	-0.03489	0.029446	-1.18469	0.2515
DLOG(EST(-1))	-0.07807	0.032567	-2.39703	0.0276
DLOG(EST(-2))	-0.09847	0.032619	-3.01869	0.0074
DLOG(EDS)	-0.02396	0.118581	-2.28948	0.0136
DLOG(EDS(-1))	-0.01638	0.115991	-2.02474	0.0191
DLOG(EDS(-2))	-0.01322	0.113035	-2.01442	0.0238
DLOG(EDS(-3))	-0.03296	0.113433	-2.4538	0.0246
D(EDI)	-0.02277	0.135213	-2.64654	0.0261
D(EDI(-3))	0.12675	0.359237	-2.35283	0.0333

ECT(-1)*	-0.08134	0.005181	-15.7031	0.0000
R-squared	0.6738	Akaike info criterion	-2.268939	
Adjusted R-squared	0.5701	Schwarz criterion	-1.895286	
F-statistic	4.35074	Hannan-Quinn criter.	-2.149404	
Prob(F-statistic)	0.00657	Durbin-Watson stat	1.814174	

Source: Authors Computation, 2022 (Eviews-10)

variable in question is statistically significant at 5% level; otherwise, it is not significant at that level.

The size of the error correction term (ECT) indicates the speed of adjustment of any disequilibrium towards a long run equilibrium state since the deviation from long run equilibrium is corrected gradually through a series of partial short-run adjustments. The Error Correction Term (ECT) parameter is negative, less than unity and significant at 5% level as expected. The ECT which restores the system back to equilibrium (if there is any form of disequilibrium in the system) validates that there exists a long run equilibrium relationship among the variables.

The value of the ECT is 8.134%, meaning that the system corrects (or adjusts to) equilibrium in the following year at speed of 8.134% which is quite very low. This implies that the adjustment process to equilibrium is slow because the lower the ECT value, the slower the adjustment process to equilibrium. The low speed of convergence reflects the inefficient utilization of borrowed funds over the years.

To show the explanatory power of the model and the

reliability of the estimates, the coefficient of determination (R-square) was used. It indicates how the model was reasonably fit in prediction. It showed that 67.38 percent changes in GDP were collectively due to EDS, EST and EDI, while 32.62 percent unaccounted variations were captured by the error term.

The F-statistic which is used to examine the overall significance of regression model equally showed that the results are significant. This was captured by the F-statistic value of 4.35074 and its associated probability value of 0.00657 that is found to be significant at 5% level.

The model also indicated that there is no autocorrelation among the variables as indicated by Durbin Watson (DW) statistic of 1.814174 (which fell within the acceptable range of 1.5 and 2.4). This showed that the estimates were unbiased and can be relied upon for policy decisions.

Test of Hypothesis One

H01: External debt stock has no significant impact on economic growth in Nigeria

The Wald-test in Table 4.8 indicated that the calculated

Table 8: Wald Test Results on External debt stock and Economic Growth in Nigeria

Test Statistic	Value	Df	Probability
F-statistic	4.108874	(3, 18)	0.04712
Chi-square	4.958741	4	0.04887

Source: Researchers Computation, 2022 (E-views 10)

F-value for the relationship between external debt stock and economic growth in Nigeria is 4.108874 and its probability value is 0.04712. Since the probability value is less than 0.05 at 5percent level of significance, it thus falls in the rejection region and hence, the first null hypothesis (H01) was rejected in favour of the alternative hypothesis.

The result thus showed that external debt stock has no significant impact on economic growth in Nigeria.

Test of Hypothesis Two

H02: External debt servicing has no significant impact on economic growth in Nigeria

Table 9: Wald Test Results on External Debt Servicing and Economic Growth in Nigeria

Test Statistic	Value	Df	Probability
F-statistic	5.525511	(4, 18)	0.00955
Chi-square	7.188437	4	0.00411

Source: Researchers Computation, 2022 (E-views 10)

The Wald-test in Table 4.9, indicated that the calculated F-statistic value for the relationship between external debt servicing and economic growth in Nigeria was found to be 5.525511 and its probability value was 0.00955. Since the probability value is less than 0.05 or 5percent level of significance (and fell in the rejection region), the second null hypothesis (H02) was rejected.

The study concludes that external debt servicing has a significant impact on economic growth in Nigeria between 1986 and 2019.

Test of Hypothesis Three

H03: External debt interest has no significant impact on economic growth in Nigeria

The Wald-test in Table 4.10, the indicated that the F-value for the relationship between external debt interest and economic growth in Nigeria was found to be 5.282247 with an associated probability value of 0.005691. Since the probability value is less than 0.05 or 5percent level of significance, the third null hypothesis (H03) was rejected. The study thus concludes that external debt interest

Table 10: Wald Test Results on External debt interest and Economic Growth in Nigeria

Test Statistic	Value	Df	Probability
F-statistic	5.282247	(2, 18)	0.005691
Chi-square	9.141499	4	0.001147

Source: Researchers Computation, 2022 (E-views 10)

has a significant impact on economic growth in Nigeria between 1986 and 2019.

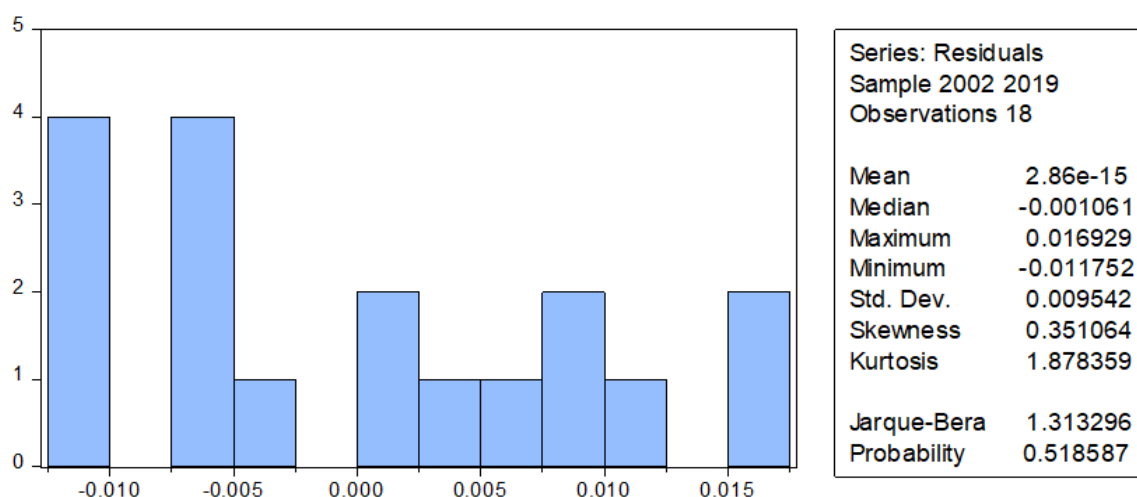
Diagnostic Analysis Tests

The study conducted various post estimation tests to ascertain the appropriateness and stability of the model as well as the robustness of the results. The models were tested for normality, heteroscedasticity, serial correlation and stability. Diagnostic checks are performed to validate the parameter evaluation of the outcomes achieved by the ARDL-ECM model. The decision rule for accepting the null hypothesis for any of these diagnostics tests is that the probability-value (p-value) of each has to be

greater than 0.05 or 5percent level of significance.

Normality Test

As part of exploratory data analysis, test for normality of distribution of the response variable was conducted. The residual normality test used in this study is the multivariate extension of the Jarque-Bera (1980) normality test which compares the third and fourth moments of the residuals to those from the normal distribution. One way of detecting misspecification problems is through observing the regression residuals. The Jarque-Bera test of normality is used in this study to test for normality and it is shown below:


Figure 2: Jarque- Bera Test of Normality

As shown in figure 2, the hypothesis of non-normality is accepted since the p-value of the Jarque-Bera statistics is greater than 0.05 (assuming 5 percent level of significance). From the figure above, the probability value is 0.518587, we therefore conclude that the residuals are normally distributed.

Multicollinearity Test Result

Multicollinearity is a post diagnostic test which is employed to detect the presence of linear relationships among the explanatory variables. If the explanatory variables are perfectly linearly correlated, that is, if the correlation co-efficient for these variables is equal to

unity, the parameters become indeterminate. In the situation, where other things being equal, an independent variable, which is very highly correlated with one or more other independent variables, will have a relatively higher standard error.

Therefore, to examine whether multicollinearity exists among the variables used in the study, Centered Variance Inflation Factor (CVIF) test was conducted. The decision rule is that a centered variance inflation factors greater than 10 indicates severe multicollinearity or otherwise (Patrick, Hagan & Attah-Obeng, 2013). Thus, the CVIF results obtained in Table 11 indicate that multicollinearity does not exist among the external debt variables because

Table 11: Multicollinearity Result

Variable	Variance	VIF	VIF
EDS	7095.726	17.30952	3.45957
EST	3965.518	10.21690	5.50018
EDI	6212.419	17.61656	6.16258

Source: Researcher's Computation Using Eviews-10 (2022)

the CVIF value for each of the variable is less than 10. Therefore, the result suggests that the current study does not have any problem of multicollinearity.

Serial LM Correlation and Correlogram Q-statistics Test

One of the basic assumptions in linear regression model is that the random error components or disturbances are identically and independently distributed. So, in a regression model it is assumed that the correlation

between the successive disturbances is zero. The Lagrange Multiplier (LM) test used in this study is a multivariate test statistic for residual serial correlation up to the specified lag order.

From the result in Table 12, the study accepts the null hypotheses that there is no serial correlation among the error terms used in the model. The probability F-value is 0.5874 and this is greater than 0.05, and thus implies there is no serial correlation among the variables.

In addition to Breusch-Godfrey Serial Correlation LM

Table 12: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.550098	Prob. F(2,16)	0.5874
Obs*R-squared	1.930147	Prob. Chi-Square(2)	0.3810

Source: Researchers Computation, 2021 (E-views 10)

Table 13: Correlogram Q-statistics (For Serial Correlation)

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob*
. * .	. * .	1	0.081	0.081	0.2146	0.643
.** .	.** .	2	-0.215	-0.223	1.7978	0.407
.** .	.** .	3	-0.243	-0.216	3.8933	0.273
. * .	. * .	4	-0.147	-0.179	4.6927	0.320
. * .	.** .	5	-0.098	-0.211	5.0599	0.409
. * .	. .	6	0.104	-0.028	5.4935	0.482
. * .	. .	7	0.182	0.037	6.8824	0.441
. .	. * .	8	-0.039	-0.135	6.9480	0.542
. .	. .	9	-0.051	-0.027	7.0648	0.630
. * .	. * .	10	-0.099	-0.114	7.5324	0.674
. .	. * .	11	-0.054	-0.081	7.6808	0.742
. .	. * .	12	-0.036	-0.113	7.7483	0.804
. .	. * .	13	0.061	-0.077	7.9561	0.846
. * .	. .	14	0.130	0.021	8.9700	0.833
. * .	. * .	15	0.158	0.127	10.575	0.782
. * .	. * .	16	-0.133	-0.145	11.790	0.758

Source: Researchers Computation, 2022 (E-views 10)

Test, the Correlogram Q-statistics further showed that the model is free from serial correlation. This was captured by all the probability values of the Q-statistics which were all found to be greater than 0.05 as shown in Table 13. This further confirms that the ARDL model result is not biased and could be used for policy making analysis.

Heteroskedasticity Test

This test is employed to find out if the error term exhibits constant variance. It can arise because of the presence of outliers, incorrect data transformation, incorrect functional form, and incorrect specification

of the regression model. The study also performed Heteroskedasticity Test to ascertain if the variance of the model is stable or not. The result is presented in Table 14. Based on the Heteroskedasticity Test in Table 14, the study accepts the null hypotheses that there is no Heteroskedasticity among the error terms used in the model. It could be observed that the probability F-value is 0.8931 and this is greater than 0.05. This implies there is no Heteroskedasticity among the variables.

Parameter Stability Test

To perform the stability tests, the Cumulative Sum

Table 14: Breusch-Pagan-Godfrey

F-statistic	0.478708	Prob. F(11,18)	0.8931
Obs*R-squared	6.789957	Prob. Chi-Square(11)	0.8158
Scaled explained SS	5.395555	Prob. Chi-Square(11)	0.9105

Source: Researchers Computation, 2022 (E-views 10)

(CUSUM) and the Cumulative Sum of Square (CUSUMSQ) tests are employed. The CUSUM and CUSUMSQ tests are meant to determine the appropriateness and the stability of the model. Put differently, the CUSUM and

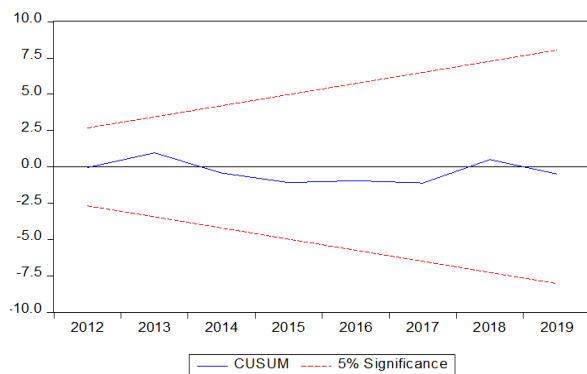


Figure 3: CUSUM Stability Tests

Source: Researchers Computation, 2021 (E-views 10)

The CUSUM test and Cumulative Sum of Squares results from figure 3 and 4 above indicates that there is no parameter instability as the cumulative sum did not go outside the area between the two critical lines. So, the parameters are said to be stable.

Ramsey RESET Test

Linearity Test also known as Ramsey's Regression Specification Error (RESET) Test is meant to ascertain whether the model is linear or it is correctly specified. The essence is to find out if there is a linear relationship

CUSUMSQ tests are used to show whether the model is stable and is suitable for making long run decision. The cumulative sum (CUSUM) stability tests (CUSUM and CUSUMSQ) are presented in figure 3 and figure 4.

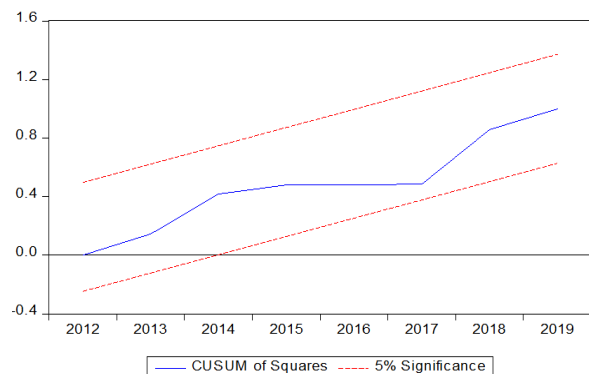


Figure 4: Cumulative Sum of Squares Recursive Residuals (CUSUMSQ)

Source: Researchers Computation, 2022 (E-views 10)

between the dependent variable and the independent variable(s). This is a general test for specification errors that may arise from omitted variables, incorrect functional forms and correlation between independent variables and error term.

Output from the Ramsey reset test reports the F-statistic and t-statistic for testing the hypothesis that the coefficients on the powers of fitted values from the regression are jointly zero. That is, they test whether the model is correctly specified.

The Ramsey Regression Specification Error Test

Table 15: RESET Result

	Value	Df	Probability
t-statistic	0.368502	17	0.7170
F-statistic	0.135794	(1, 17)	0.7170
F-test summary:			
	Sum of Sq.	Df	Mean Squares
Test SSR	0.000845	1	0.000845
Restricted SSR	0.106570	18	0.005921
Unrestricted SSR	0.105726	17	0.006219

Source: Researchers Computation, 2022 (E-views 10)

(RESET) specification error test captured in Table 15 showed that the model was well functionally specified as the p-value of the F-statistics (0.7170) was found to also be greater than 0.05.

DISCUSSION

Findings from the study showed that external debt stock has had a significant impact on economic growth in Nigeria, which supports the assumption that returns of external loans may contribute significantly to investment and growth. The a priori expectation is that debt would enhance economic growth in line with the postulate of Keynesian theory. The significant relationship between external debt stock and economic growth could be due

to good debt utilization and management as seen in Asian Tigers—Malaysia, Singapore, Indonesia and Taiwan. The finding from this study is contrary to the result of Matthew and Mordecai (2016) whose study showed that external debt stocks and external debt servicing have an insignificant negative relationship with Nigeria's economic performance. Their study showed that successive government has not been to work out modalities on how to minimize the amount of external debt it accumulates overtime. However, Nwannebuikwe, Ike and Onuka (2016) study showed that in the short term, external debt stock had a positive and significant relationship with Gross Domestic Product, but in the long term, a negative one. Ogiemudia and Ajao (2017) further showed that access to

foreign financing (which involves external borrowings by the government) has a significant influence on Nigeria's economic development.

However, the findings from the study showed that external debt servicing has a significant but negative impact on economic growth in Nigeria. The implication of this result is that the debt services crowd out public investment as it depletes government budget resources thereby reducing fund available for productive investment. This means that what the country is losing in the debt service could have been used to increase investment. Excessive debts servicing drains resources thus reducing funds available for development; and it is so in that Nigeria has to service its debt with attendant depletion of resources which may result in debt overhang and uncertainty. The result tends to support the finding as some developing countries have very low return from the loan following investment in non-productive activities and corrupt practices. This is in agreement with the findings of Adepoju, Salau and Obayelu (2017), whose study showed that Nigeria's economic growth has been adversely but significantly affected by rising external debt servicing. He found that Nigeria's lack of a long-term relationship between external debt service and economic growth indicates that a rise in external debt may lead to a drop in GDP. It therefore indicates, among other items, that the government should strengthen policies that will boost Nigeria's external debt management. Audu (2018) further confirmed that debt service burden of Nigeria had a major adverse effect on the growth process and has adversely affected public investment as well.

CONCLUSION

External debts are necessary to meet shortfall internal resources, and stimulate the economy. However, it must be properly utilized to avoid serious consequences. Borrowing is not the most important issue but the use to which the fund is deployed. One needs to recognize the fact that external debt only helps to exploit the potential of a country; it does not enhance it. They only guide therefore is that return on spending should exceed marginal cost of borrowing on the assumption that debt are paid.

The reviews from this study have however shown that Nigeria as a country has not actually benefited from the dividends accrued to external borrowing which supposedly is to bridge the saving-investment gap which in turn has the potential to induce economic growth. The study showed that, over the period under review, the effect of external debt on economic growth over the years has been poor, contributing minimally and insignificantly to Nigeria's Gross Domestic Product. Specifically, external debt servicing and external debt interest has shown to have an insignificant impact on economic growth in Nigeria. Debt service negates economic growth through reduction in amount of available capital. High external debt interests have led to the devaluation of the national currency, increase in job losses, and the weakness of the

productive sectors of the economy that are supposed to spur economic growth. All of these resulted in economic recession witnessed in the economy of Nigeria. Generally, the study has shown that external debt has significant but negative impact on economic growth in Nigeria. This suggests that the economy will continue to slump if the level of consistent borrowing is not checked and the money borrowed is not channelled away from consumption; and the adequate investment made in the productive sector. A reduction in debt service and interest would lead to an increase in investment for any given level of future indebtedness.

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