

## **Determinants and Sustainability of External Debt in a Deregulated Economy: A Cointegration Analysis from Nigeria (1986-2010)**

**Imimole, Benedict PhD**  
Department of Economics  
Faculty of Social Sciences  
Ambrose Ali University  
Ekpoma  
Nigeria

**Imoughele Lawrence Ehikioya**  
Main Library  
Ambrose Alli University  
Ekpoma  
Nigeria

**Okhuese, Matthew Asin**  
Consultant  
Emiola Publishers Limited  
Ogbomosho  
Oyo state  
Nigeria

### **Abstract**

*The relatively high level of Nigeria's external indebtedness, and rising debt burden which has serious implications on the country's development and debt sustainability in terms of ability to pay has led to continued deterioration in Nigeria's economic performance. This study examines the extent to which Nigeria's external debt relates to indices of ability to pay in order to ascertain the sustainability of it and to identify the main determinants of her external indebtedness for the period 1986 to 2010. Based on available data and the use of statistical methods, we observed that Nigeria's external debt is not sustainable in terms of willingness and ability to pay, and that the country's external debt is characterised by capital flight as a results of external debt accumulation which is evident in the ratio of the country's reserves to external debt. Using theoretical framework that justifies the demand for external borrowing by developing countries and relying on error correction mechanism and the Johansen cointegration test, we estimated our model after conducting stationarity test, using the Augmented Dickey-Fuller test. The result from cointegration test showed presence of long run relationship between external debt and the explanatory variables. The study also found that the main determinants of Nigeria's external debt are gross domestic product, debt service and exchange rate. To reduce the adverse effects of external debt on the Nigerian economy and make it sustainable the study recommends that an analysis of the economic and social profitability of all external debt financial projects be carried out to ensure that the returns would be in excess of the interest and principal repayment. The aim is to prevent the deadweight effect of external debt on the economy and make it sustainable. The study also recommends that Government should ensure that external finance be used only for projects of highest priority and productivity and adequate machinery should be put in place by all sectors of government to arrest corruption and penalize those who divert and embezzle public funds. This will help to reduce the rising profile of Nigeria's external debt.*

**Keywords:** External Debt, Debt Burden, Debt Weight, Sustainability, Economic Growth

## **Introduction**

Nigeria's overall economic performance since independence in 1960 has been decidedly unimpressive. Despite the colossal amount of foreign exchange derived mainly from its oil and gas resources, economic growth has been weak and the incidence of poverty has increased. The objective of every sovereign nation like Nigeria is to improve the standard of living of its citizenry and promote economic growth and development of the country. Due to vicious circle of poverty, the scarcity of resources and the law of comparative advantage, countries depend on each other to foster economic growth and achieve sustainable economic development.

Imimole and Imoughele (2010) noted that the resources that could bring about an optimal level of economic development in many developing countries like Nigeria are in short supply. This is because their economies are plagued with problems associated with low domestic savings, low tax revenue, low productivity and limited foreign exchange earnings. As a result of this, developing countries inevitably resort to public debt finance to bridge the gap between the resources available to them and what is required for their advancement. This has necessitated the intervention of the governments in the economy through the provision of the required huge capital outlay necessary for large-scale production in heavy industries and for the provision of other infrastructure. Government interventions in Nigeria were made possible by the oil boom of the early 1970s when Nigeria earned unprecedented amount of foreign exchange from the export of crude oil (Sikkam, 1998). Government expenditure had since then grown to an unimaginable proportion, but the oil glut that followed resulted in government revenue declining significantly (Akor, 2001). However, as oil boom declined in the 1980s, priority of government did not change in terms of provision of electricity, good road, hospital, schools and other social amenities to her citizenry. As governments were reluctant in reducing the bloated expenditures that resulted during the oil boom, they were forced to seek alternative means of financing their expenditures. Governments thus resorted to fiscal deficits. Abubakar (2010) revealed that the drive by government to finance deficit budgets has resulted in the development of external debt.

Soludo (2003) opined that countries borrow for two broad reasons: macroeconomic reasons [higher investment, higher consumption (education and health)] or to finance transitory balance of payments deficits [to lower nominal interest rates abroad, lack of domestic long-term credit, or to circumvent hard budget constraints]. This implies that economy indulges in debt to boost economic growth and reduce poverty. He is also of the opinion that once an initial stock of debt grows to a certain threshold, servicing them becomes a burden, and countries find themselves on the wrong side of inability to service the debt which will lead to crowding out investment and growth. This seems to be the position of Nigeria today because investment, which will accordingly result to high-speed growth with a positive effect on poverty, is moving sporadically in both positive and negative directions (Tajudeen, 2012). Menbere (2009) asserted that the causes of the external indebtedness of developing countries like Nigeria and their subsequent failure to meet contractual international debt obligations is as a result of poverty and other factors such as the change in the global economic policy, oil price shocks, the deterioration in developing countries' terms of trade, irresponsible and corrupt governments, etc.

Nigeria has started again to mount up debt. The magnitude of the debt and increasing debt services (amortizations and interest payments) have become of great concern to the Nigerian government. The government in its continuous effort to solve the external debt problem embarked on measure such as debt conversion, debt rescheduling, debt services, debt restructure, debt buy back, debt cancellations e.t.c. This notwithstanding, Nigeria has remained one of the heavily indebted countries of the world, and has not enjoyed impressive economic growth as she continues to pay huge interest on her indebtedness (Uniamikogbo, 1991).

With the above perception in mind, it has become imperative to ask the following questions: What is the trend and structure of Nigeria's external debt? To what extent has the Nigerian government related external debt to indices of ability to pay to know the sustainability of it and what are the determinants of Nigeria's external indebtedness? Answering these questions form the basis of this study. The rest of the study is divided into the following sections. Section 2 is literature review, sections 3 is the magnitude and severity of Nigeria external debt, section 4 is theoretical framework and research methods of the study, section 5 is data analysis and presentation of results and section 6 is summary, conclusion and policy recommendations.

### **Literature Review**

Debt is derived from Latin word “debere” meaning to owe. Debt has been conceptualised as resources of money used in an organisation which is not contributed by its owners and does not in any other way belong to the shareholders. Okoh (2005) noted that there are two types of debts: domestic debt and external debt. Ayanwu (1999) asserts that when government borrows, the debt is public debt. Public debts may be domestic (internal) or external. Domestic debt is debt incurred by government through borrowing from within the country, while external debt refers to the portion of a country's debt that was borrowed from foreign lenders including commercial banks, governments or international financial institutions. These loans, including interest, must usually be paid in the currency in which the loan was made. In order to earn the needed currency, the borrowing country may sell and export goods to the lender's country (Obadan, 2004). However, Udoka and Anyingang (2012) classified Debts into two i.e. productive debt and dead weight debt. According to them, when a loan is obtained to enable the state or nation to purchase some sort of assets, the debt is said to be productive e.g. money borrowed for acquiring factories, electricity, refineries etc. However, debt undertaken to finance wars and expenses on current expenditures are dead weight debts. When a country obtains a loan from abroad, it means that the country can import from abroad goods and services to the value of the loan without at the same time having to export anything in exchange. When capital and interest have to be repaid, the same country will have to get the burden of exporting goods and service without receiving any imports in exchange. Internal loans do not have the type of burden of exchange of goods and services. These two types of debt, however, require that the borrowers' future savings must cover the interest and principal payment (debt servicing).

Debt burden is the cost of servicing debt and debt crisis occurs when debtor are unable to pay the interest and redemption due to their debts. Black (2002) noted that this occur when the debts are large, and interest rise or the economy slumps. The international debt crisis of the 1980s occurred when several countries of less developed countries (LDCs) had difficulties in meeting their debt obligations. Cholifihani (2008) revealed that increase in external debt create problems since whenever a country has debt accumulation, a high proportion of public expenditure and foreign exchange earnings are absorbed by the debt burden with heavy opportunity costs. Furthermore, external debt may have negative effects on investment financing through debt overhang and credit-rating among investors in the international market (Eduardo, 1989; Cholifihani, 2008). Similarly, external debt service (in contrast to the total debt stock) can also potentially affect growth by crowding out private investment or changing the composition of public spending.

Awan, Asghar and Rehman (2011) asserted that investment and growth are depressed in case of debt accumulation. They concluded that external debt slows down economic growth more as compared to domestic debt. They also asserted that the reason behind this could be that debt service is paid in foreign currency and the value of debtor currency is weak as compared to the creditor countries' currency. They therefore concluded that external debt slows down the economy much more than domestic debt. This indicates that there is need for effective domestic and external debt management policies and that debt should be utilized in a manner that it would adds value to the economy.

Asley (2002) opined that high level of external debt in developing countries negatively impact on their trade capacities and performance. Debt overhang affects economic reforms and stable monetary policies, export promotion and a reduction in certain trade barrier that will make the economy more market friendly and this enhances trade performance. Furthermore, debt decreases a government ability to invest in producing and marketing exports, building infrastructure, and establishing a skilled labour force.

Ajayi and Oke (2012) investigated the effect of the external debt burden on economic growth and development of Nigeria. They adopted the Ordinary Least Square (OLS) regression technique on secondary data and on variable like National Income, Debt Service Payment, External Reserves, Interest rate among others. The finding indicated that external debt burden had an adverse effect on the nation's income, per capital income of the nation and high level of external debt led to devaluation of the nation's currency, increase in retrenchment of workers, continuous industrial strike and poor educational system and this led to the economy of Nigeria getting depressed.

They suggested that debt service obligation should not be allowed to rise than foreign exchange earnings and that the loan contracted should be invested in profitable ventures, which will generate a reasonable amount of money for debt repayment.

Ezike and Mojekwu (2012) opined that the major issue that aggravated the Nigeria debt problem is that some of the debt service obligations were in the form of contingent liabilities resulting from Government guarantee of private sector trade transaction that had to be taken on board without adequate planning, due to mismanagement, wide-scale corruption and default by private sector operators, obligations fell on the Federal Government as explicit contingent liabilities in those instances where it had guaranteed the loan.

Audu (2004) studied the impact of external debt on economic growth and public investment in Nigeria. His study concluded that debt servicing pressure in Nigeria has had a significant adverse effect on the growth process of the country. He added that Nigeria frequently diverts resources to take care of pressing debt service obligations instead of being allocated to the development of infrastructures that would improve the wellbeing of the citizenry. Osinubi and Olaleru (2006) examined how the use of budget deficits as an instrument of stabilization leads to the accumulation of external debt with the attending effects on growth in Nigeria between 1970 and 2003. Their study concluded that if debt-financed budget deficits are operated in order to stabilize the debt ratio at the optimum sustainable level, debt overhang problems would be avoided and the benefits of external borrowing would be maximized.

Sachs and Larrain (1999) and Alfaidi (2002) explain the general key factors of debt accumulation. They divided these factors into two sets: external and internal. External factors include high interest rate, while the trade balance and exchange rate policies are among the internal factors also tendency toward investment to stimulate economic and social development, inefficient utilization of loans, capital flight, and Balance of Payment (BOP) deficit are the main internal factors. External factors include high interest rates charged and the decrease of oil and other raw materials prices. Countries accumulate debt whenever they run a budget deficit. The standard debt accumulation equation states that the change in stock of debt is equal to the budget deficit.

Batool and Zulfiqar (2012) appraised the determinants of External Debt in Pakistan. They noted that external debt is considered to be one of the symbols of an ailing economy. The reasons why financially weak countries have to take external debt are crystal clear, but what determines their debts is a matter that makes the position of one country different from the other. Economic freedom of a country is eclipsed by the clutches of external debt. They revealed that Pakistan is one of the countries that is under the stronghold of external debt by employing OLS regression technique on time series data for the period 1973-2010. The main determinants of the external debt considered are consumption, private investment, public investment, remittances, lending rate and a dummy variable for democracy. The findings indicated that consumption and private investment have positive and significant effects on external debt. Whereas Public investment and remittances show negative but significant relationship with external debt, Lending rate and democracy have positive but insignificant effects on external debt. They conclude that external debt is harmful for an economy so it should be minimized or avoided.

Alshara, Khateeb, and Maitah (1991) evaluated the size and composition of Jordan external public debt and its effect on some macroeconomic variables such as private consumption, public consumption, gross investment, gross tax revenues, direct tax revenues, indirect tax revenues, imports, Gross National Product (GNP), and disposable income. They reported that external loans positively affect consumption, investment, imports and GNP. Also Bader and Magableh (2009) noted that the high public debt in Jordan, along with its servicing burden, is clearly hindering the government's efforts to achieve higher and sustained economic growth rates. They investigated the determinants of public debt in order to determine the key players in public debt accumulation in the country. In the study, It was found that real exchange rate, the financial position of the government and the size of foreign aids significantly affect the outstanding balance of external debt, but real exchange rate is the most effective among all explanatory variables. They noted that significant effect of exchange rate is expected, especially after the depreciation of the exchange rate due to Jordan economic crisis of 1988. The study also shows that the increase in savings gap plays a key role in domestic debt accumulation since the government resorts to borrow to finance it.

Kinuthia (2013) studied the determinants of external debt, employing the Ordinary Least Squares (OLS) estimation technique.

The study revealed that while social sector spending has a major influence on external debt in the long run, foreign exchange earnings had significant influence in the long-run, and high costs of borrowing affected external debt in both the short and long-run.

The study also indicated critical areas of assessment in determining public debt management and recommends that further study be carried out on external debt management strategies as well as on the determination of appropriate debt structure in order to attain manageable and sustainable debt.

Tiruneh (2004) employed panel data and finds that poverty, debt servicing, foreign exchange gap, capital flight and income instability are the main causes of external debts of developing countries during 1980s and 1990s. He points out that sluggish economic growth, income instability, reliance on external loans to finance import bills and past debt service payments are responsible for their indebtedness. Kemal (2001) revealed that balance of payments and fiscal deficit are major determinants of foreign indebtedness. He pointed out that in financing deficits, borrowed fund adds fuel to the debt burden. Bilquees (2003) concluded that exchange rate changes, primary budget deficits, and interest rate are responsible for debt accumulation.

Folorunso and Falade (2013) examined the relationship between Fiscal Deficit and Public Debt in Nigeria. The public debt was disaggregated into domestic and external debt with a view to analyzing the causal relationship and relative effect of both categories of debt on fiscal deficit. Bi-directional relationship was confirmed between fiscal balance and public debt as well as its domestic component, while causality only run from external debt to fiscal balance in the country. Both domestic and external debt portends positive effect on fiscal deficit in Nigeria. The study showed that domestic debt has greater impact on fiscal deficit than external debt. Income growth was found as the key factor influencing fiscal deficit in Nigeria both in short and long run. The study concluded that high record of public debt in the country is attributed to high level of fiscal deficits experienced in the country while the level of fiscal deficit was also not insulated from the level of public debt. They advocated that the Nigerian government should consider appropriate mix of domestic debt and external debt as a means of financing budget deficit.

Tokunbo, Risikat and Oladele (2010) asserted that the necessity for governments to borrow in order to finance deficit budgets has led to the development of external debt in Nigeria. The study examined how the use of budget deficits as an instrument of stabilization leads to the accumulation of external debt with the attending effects on the growth of Nigeria economy between 1970 and 2003. The finding confirmed the existence of the debt Laffer curve and the nonlinear effects of external debt on growth. The study concluded that if debt-financed budget deficits are operated in order to stabilize the debt ratio at the optimum sustainable level, debt overhang problems would be avoided and the benefits of external borrowing would be maximized.

Uniamikogbo (1991) examined the extent to which Nigeria's interest payment on external debt relates to indices of ability to pay in terms of receipts from export of goods and services and per capital income. The study revealed that earnings from export and per capital income had a significant impact on interest payment on Nigeria's external debt while changes in per capital income have no robust effect on interest payment. He concluded that Nigeria has ability to pay her interest rate on external debts because of the enormous receipts from the export of goods and services and the nature of external debts which is purely dominated by the private lending creditors.

### ***The Magnitude and Severity of Nigeria External Debt***

Udoka and Anyingang (2012) affirmed that the origin of Nigeria's external debts dates back to 1958 when the sum of US \$28 million was contracted for railway construction. Between 1958 and 1977, the level of foreign debt was minimal, as debt contracted during the period were the confessionals debts from bilateral and multilateral sources with longer repayment periods and lower interest rates constituting about 78.5 percent of the total debt stock. From 1978, following the collapse of oil prices, which exerted considerable pressure on government finances, it became necessary to borrow for balance of payments support and project financing. This led to the promulgation of Decree No 30 of 1978 that limits external loans the Federal Government can generate to 5 Billion Naira.

The Nigerian economy is characterised by heavy dependence on oil, low manufacturing capacity utilization of industry, high dependence of manufacturing sector on imported inputs, technology and finance needed for economic development. This has resulted in both internal and external imbalances.

Unaimikogbo (1991) noted that Nigeria's external debts results from the dwindling foreign exchange receipts arising from the glut in the world oil market, decline in the Official Development Assistance (ODA), deterioration in the terms of trade coupled with the protectionist measures of developed countries, low level of domestic savings, high propensity to consume foreign goods and services, natural disaster, inappropriate monetary and fiscal policies of government, the procurement of loans to finance projects that would originally have been financed from internal revenue and the reduction of the country's ability to service its existing foreign debts.

A number of debt ratios and macroeconomic aggregates are commonly used to assess foreign debt burden and sustainability of indebted countries. The magnitude and severity of Nigeria's external debt problem is demonstrated by movements in certain debt ratios, which this section of the study will examine.

Nigeria external debt outstanding from 1986 to 2010 is shown in appendix I. The total external debt outstanding as at 1986 was ₦41452 million and continuous to rise till 2005 with a corresponding value of ₦2695072.2 million. The continuous increase in profile of Nigeria external debt is attributed to shift of debt from the traditional concessional bilateral and multilateral sources to market sources (i.e. the Jumbo loan from the Euro Dollar market). The value decrease to ₦451461.70 million as a result of debt conciliation by the Paris club and further reduced to ₦431079.85 million and soared to ₦689845.3 million in 2005, 2007 and 2010 respectively.

The average external debt growth rate under the study period was 27.86% while the maximum value was 307.16% in 1999 while the least was -83.25 in 2006. The trend also recorded a negative value in 1996, 1997, 2005 and 2007 with a corresponding value of -13.89%, -3.4%, -44.89% and -4.51% respectively as shown in appendix I.

The ratio of external debt to gross domestic product measures the extent to which total domestic output can be deployed to wipe out outstanding external debt obligations. A high or increasing ratio will indicate problems of external debt management. From appendix I, the ratio for Nigeria external debt to gross domestic product was 59.95% in 1986 and increased to 96.31% in 1988. Recovered a precarious value in 1989, 1990, 1991, 1992 and 1993 with a corresponding value of 110.88%, 111.61%, 105.23%, 102.19%, and 92.58% respectively this indicate high debt burden to the nation. For instance, the highest during this period was about 111.61% in 1990 while the least value was 2.03% in 2008. Low value was recorded for the period 2005 to 2010 with an average of 2.26% as shown in the table. The good performance of the ratio may be attributed to good debt management strategies put in place by the monetary authority to manage the external debt and payment of arrears. However, the average value for the period of study was 54.4% which implies that external debt create high debt burden on the Nigerian economy which reduced her financing towards improving the infrastructure of the country, balance of payments support, among others reduced her economic growth.

The debt service ratio which relates total external debt service payments to the exports of goods and services increased for Nigeria between 1986 and 1991. As at 1986 the ratio was 18.29% and rose to 29.61% in 1988 and further decreased to 21.73% in 1991. The ratio decrease to 9.44% in 1992 and soared to 37.06% in 1993 while 1994 recorded 24% in 1995. The ratio was less than 10% between 1996 and 2002, but grew to a peak of about 11% in 2003. It declined to 5.44% and 2.57% in 2005 and 2007 respectively, but rose again to 3.77% in 2010. The average debt burden ratio for the period under investigation was 11.61% which implies that Nigeria ability to service her debt obligations and credit-worthiness was in doubt during these periods when this ratio was high.

The ratio of external debt outstanding to export indicates the extent to which total exports of goods and services can be used to liquidate external debt outstanding. As shown in appendix II, the ratio for Nigeria which averaged 175.8 % with a maximum value of 464.68% in 1986 and the least 4.85% in 2008. The average value of the period of study indicates increasing debt burden, the World Bank Benchmark is 150 per cent which was exceeded by the average value. This implies that Nigeria external debt is unsustainable. This finding is consistent with Adam (2005) who reported that Nigeria external debt is unsustainable. The ratio of debt stock to government revenue average 197.17% with a maximum value of 485.41% in 1988 while the least value was 6.27% in 2008. The trend is shown in appendix II. The average value exceeded the benchmark of 250 per cent set by heavily indebted poor countries (HIPC) this implies that Nigeria external debt is unsustainable.

The external reserves to external debt ratio measure the extent to which external reserves could be drawn down to liquidate external debt commitments. The lower the ratio, the more perilous the external debt situation. A higher ratio close to 100% is usually preferred. However, Nigeria ratio was less than 100% between 1986 and 2004 with an average value of 48.90% as shown in appendix II.

The average value indicate Nigeria external debt is unsustainable but between 2005 to 2010 was sustainable with an average value of 948.37% the sustainability during this period is as a results of debt cancellation in 2005.

The Ratio of Reserves to Broad Money Measure the potential impact of a loss of confidence in the domestic currency, leading to capital flight by residents. Particularly useful if the banking sector is weak and/or credibility of the exchange rate regime remains to be established. Nigeria ratio average 80.85% for the study period. This implies that the Nigerian economy is characterized by capital flight as a result of external debt accumulation. The tread is shown in appendix II. The conclusion that can be drawn from the ratios is that the government has problem servicing its external debt burden which make it unsustainable. And also there are huge arrears on the debt servicing which led to capital flight and reduced the nation economic performance.

***Theoretical Framework and Research Methodology***

**Theoretical Framework**

The theoretical framework that justifies the need for external borrowing by developing countries according to Dornbusch (1984), McFadden, et al (1985) and Mebere (2009) links the increase in gross external debt to (current account deficit - direct and long-term portfolio capital inflows) + (official reserve increases + other private capital outflows). The model begins by summarizing the determinants of the current account (CA) balance, where CA is the difference between items that generate foreign exchange and those that require foreign-exchange expenditure.

$$CA = X - M - ILF - OTP.....(1)$$

Where

X = export

M =imports

ILF = interest paid on loans from foreigners

OTP = other net factors payments and transfers to foreigners.

$$CA = \Delta NIR + \Delta BF - \Delta LF - FDI.....(2)$$

Eq. (2) is another way of writing the current account surplus of equation (1). This time, the current account is the difference between changes in the international reserves ( $\Delta NIR$ ) and foreign bonds placed domestically ( $\Delta BF$ ), and an increase in loans from foreigners ( $\Delta LF$ ) and foreign direct investment (FDI). Then, the change in loans from foreigners ( $\Delta LF$ ) is basically the difference between new foreign loans (N) and payments of foreign loan principal (PLF). Then, demand for new foreign loans (NFL) would be:

$$NFL = PLF + ILF + \Delta NIR + \Delta BF - FDI + OTP - X + M.....(3)$$

Eq. (3) implies that the demand for new foreign loans is an increasing function of payments of foreign loan principal due (PLF); interest paid on loans from foreigners (ILF);  $\Delta NIR$ ;  $\Delta BF$ ; OTP; and imports; and a decreasing function of exports (X) and foreign direct investment (FDI).

Now, the sum of interest (ILF) and principal (PLF) payments paid is nothing other than total debt service paid (DSP). The DSP is also nothing else other than the difference between total debt service due (DSD), which incorporates also past arrears outstanding and current arrears (A). Substituting these relationships into equation (3), we found equation (4), which represents the demand for new foreign loans.

$$NFL + A = DSD + \Delta NIR + \Delta BF - FDI + OTP - X + M.....(4)$$

Mebere (2009) postulated that the assumption followed here is that countries prefer to protect their reputation by rolling over their external debt rather than by arrears. This gives an equation for a one period –ahead ex ante demand for new loans, which satisfies:

$$NL_D = DSDe + \Delta NIRE + \Delta BFe - FDIe + OTPe - Xe + Me \dots \dots \dots (5)$$

Where,  $NL_D$  stands for new loan demanded, and the superscripts e stands for expectations and other variables are as defined above. From eq. (5) it implies that the demand for external borrowing is an increasing function of total debt service (DSD), the change in international reserves, the change in foreign bonds placed domestically (which partly reflects capital flight), net transfers to foreigners, and imports of goods and services. In contrast, capital inflows in the form of foreign direct investment and export revenues reduce the demand for external borrowing.

**Methodology**

Since the main focus of this study is to have a better understanding of the determinants of external debt in Nigeria, the method of data analysis employed is both descriptive and analytical. The descriptive tools used include graphs, tables and percentages. The analytical tools used are the Error Correction Mechanism (ECM) and the Johansen Cointegration Test. To ensure that spurious regression results do not arise, the unit root test was also conducted.

**Model Specification**

The objective of this study is basically to examine the determinants of external indebtedness in Nigeria. To achieve the above stated objective, we developed a macro - econometric model of the form below to capture the interrelationships between external debt and the various economic aggregates in line with the theoretical framework and literature reviewed.

$$EXD/GDP = f (TOT, EDS/EXP, OPEN, FD, GDP, GRGDP, FDI, EXR) \dots \dots \dots (6)$$

Re-writing the above functional relationship in a more specific form, we have

$$EXD / GDP = \beta_0 + \beta_1 TOT + \beta_2 EDS / EXP + \beta_3 OPEN + \beta_4 BD / GDP + \beta_5 GDP + \beta_6 FDI + \beta_7 EXR + U_t \dots \dots \dots (7)$$

The Error-Correction Model (ECM) arising from the above expression takes the following form:

Where,

$$\Delta EXD / GDP_t = \alpha_0 + \sum_{i=1}^n \beta_i \Delta TOT_{t-1} + \sum_{i=1}^n \beta_i \Delta EDS / EXP_{t-1} + \sum_{i=1}^n \beta_i \Delta OPEN_{t-1} + \sum_{i=1}^n \beta_i \Delta BD / GDP_{t-1} + \sum_{i=1}^n \beta_i \Delta FDI_{t-1} + \sum_{i=1}^n \beta_i \Delta LGDP_{t-1} + \sum_{i=1}^n \beta_i \Delta LEXR_{t-1} + U_t \dots \dots \dots (8)$$

- EXD/GDP = Ratio of External Debt to Gross Domestic Product
- TOT = Terms of Trade
- EDS/EXP = Ratio of External Debt Services To Export
- OPEN = Openness of the Economy
- BD/GDP = Budget Deficit as a percentage of GDP
- GDP = Gross Domestic Product
- FDI = Foreign Direct Investment
- EXR= Exchange Rate.
- $U_t$ = Error Term

## Data Analysis and Presentation of Result

### Unit Root Test

Granger and Newbold (1974), Granger (1986), have demonstrated that regression coefficients with non-stationary variables will produce spurious and misleading results. To get over this problem, we tested for stationarity of the series using the conventional method of Augmented Dickey Fuller (ADF) test. The results of this test are presented in Table 1 below.

**Table 1: Unit Root Test**

Variable	ADF calculated value in Level	ADF calculated value at 1st Difference	McKinnon 5% Critical value	Order of Integration
EXD/GDP	-0.1086	-3.4484	-2.9969	1(1)
TOT	-0.8868	-9.3018	-2.9969	1(1)
EDS/EXP	-2.0015	-5.9922	-2.9969	1(1)
OPEN	-3.6654	-	-2.9907	1(0)
BD/GDP	-2.8588	-6.2998	-2.9969	1(1)
GDP	-2.3416	-4.1287	-2.9969	1(1)
FDI	-1.3226	-3.6617	-2.9969	1(1)
EXR	-2.2532	-4.9583	-2.9969	1(1)

Sources: Authors' calculation.

In Table 1 above, external debt as a percentage of GDP, terms of trade, ratio of external debt services to export, budget deficit as a percentage of GDP, gross domestic product, foreign direct investment and exchange rate are stationary at first difference, since the ADF value of each of the variables at first difference is greater than the McKinnon 5% critical values, while openness of the economy (OPEN) is stationary in level.

### Johansen Cointegration Test Result

The result of Johansen cointegration test is shown in Table 2 below. The result shows that there exist two (2) cointegrating equations at 5% level of significance. This is because the likelihood ratio is greater than critical values at 5%. This shows that there is long run relationship between external debt and all the explanatory variables. The result indicates that, in the long run; the dependent variables can be efficiently anticipated using the specified independent variables. Thus, error correction model can be estimated.

**Table 2: Conintegration Test**

Date: Sample: 1986 2010 Included observation: 24 Series: EXD/GDP, TOT, EDS/EXP, OPEN, BD/GDP, GDP, FDI, EXR Lag interval: 1to 1				
Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.849097	151.6777	124.24	133.57	None **
0.836687	106.2908	94.15	103.18	At most 1 **
0.644587	62.80083	68.52	76.07	At most 2
0.560201	37.97343	47.21	54.46	At most 3
0.445022	18.25892	29.68	35.65	At most 4
0.137974	4.127068	15.41	20.04	At most 5
0.023218	0.563791	3.76	6.65	At most 6

(\*\*) denotes rejection of the hypothesis at 5% (1%) significance level

L.R. test indicates 2 cointegrating equation(s) at 5% significance level

Sources: Authors computation.

### Presentation of Regression Result

The result of error correction model is presented in Table 3 below.

**Table 3: Parsimonious Error-Correction Model (DLEXD/GDP) by OLS**

Regressor	Coefficient	Std Error	T-statistic	Probability.
C	-0.080	0.077	-1.035	0.317
D(LTOT)	-0.110	0.138	0.664	0.517
D (LEDS/EXP)	0.437	0.181	2.093	0.054
D (LOPEN(-1))	-0.094	0.326	-0.565	0.580
D(LBD/GDP)	0.052	0.014	0.264	0.796
D(LGDP(-1))	-2.786	0.528	-3.997	0.001
D(LFDI)	-0.125	0.391	-0.660	0.519
D(LEXR)	0.811	0.279	4.845	0.000
ECM(-1)	-0.320	0.192	-1.841	0.085

$$R^2 = 0.660$$

$$R^{-2} = 0.478$$

$$F - \text{Statistic} = 3.634$$

$$\text{Prob} (F - \text{Statistic}) = 0.015$$

$$\text{D.W Statistic} = 1.670$$

Sources: Author computation.

### Interpretation of Result

In the result, there exist a negative but insignificant relationship between terms of trade and ratio of external debt to gross domestic product (external debts). One percent increase in terms of trade leads to about 0.110 percent decreases in Nigeria external debt. The implication of this is that, demand for Nigeria's exported goods is price inelastic. Thus, improvement in terms of trade will reduce debt burden problems. In fact, Nigeria's main exports include low value added and primary goods. These goods are not only price inelastic, but the world prices of these commodities are steadily declining for so many years and they are subjected to sharp fluctuations. The non-significance of the variable shows that terms of trade for Nigeria has deteriorated for so many years, and this has worsened her foreign debt situation. This findings conform to Awan , Asghar and Rehman (2011) which reported negative relationship between terms of trade and external debt. They also revealed that emergence of trade deficit had been increasing over time and was also responsible for the accumulation of external debt in Pakistan.

The result also shows that the ratio of external debt services to export (debt services) is a significant determinant of external debt in Nigeria. One percent increase in external debt services leads to about 0.437 percent increase in external indebtedness. The implication of this result is that the higher the ability and wiliness of a country to service her debts, the higher the external debts.

Budget deficit was also found to have a positive but insignificant relationship with Nigeria's external debt. As reported in the Table 2 above, the coefficients of change in budget deficit is positive and insignificantly different from zero. This result indicates that increase in budget deficit has the capacity to increase Nigeria's indebtedness. The result conforms to Alfaidi (2002) and Awan , Asghar and Rehman (2011), which clearly indicates that budget deficit has direct and insignificant effect on external public debt. Bader and Magableh (2009) observed that the chronic government deficit has two effects. It does not only decrease the government's ability to repay the debt service of the outstanding loans but also creates additional demand for new public loans.

The result also shows that the coefficient of gross domestic product is negative and significantly different from zero. This shows that gross domestic product is a significant determinant of Nigeria's external debt. One percent increase in gross domestic product, other things being equal, leads to about 2.786 percent decrease in the external debt. This is consistent with theoretical expectation in the sense that an increase in domestic production of goods and services will reduce the demand for external debt.

The result reveals that there exist inverse but insignificant relationships between foreign direct investment and external debt.

Thus, a one percent increase in FDI leads to about 0.125 percent decreases in Nigeria's external debt. The implication of this is that, increase in foreign capital inflow in form of FDI will decrease the demand for external debt. The non-robustness of this variable is as results of capital flight that characterised Nigeria FDI.

The result also indicates that exchange rate has a positive and significant effect on external debt in Nigeria. The result shows that one percent increase in exchange rate leads to about 0.811 percent increase in external debt in Nigeria when other factors are held constant. The implication of this finding is that continuous depreciation of Nigeria's exchange rate has led to the accumulation of her external debt. This finding conforms to the result of Bader and Magableh (2009) in Jordan. They reported that exchange rate has direct and significant effect on external debt.

The coefficient of ECM is negative (-0.320) and significant at 10% percent critical level. This shows that about 32 percent disequilibria in the external debt in the previous year are corrected for in the current year. The significance of the ECM is an indication and a confirmation of the existence of a long run equilibrium relationship between external debt and its determinants used in this study. The weak robustness of the error correction mechanism further buttresses the unsustainability of external debt in the Nigerian economy that only 32 percent is corrected in the previous year.

The coefficient of determinations  $R^2$  is 0.660. This indicates that about 66 percent of the total variations in external debt are explained by the variations in included independent variables. This shows that our model explains large proportion of variations in external debt in Nigeria.

The F-statistic shows overall significance of the model. It was found to be significant at 5% level, as the probability value of (0.015) has shown. We, therefore, reject the null hypothesis that the model is not significant in explaining variation in external debt.

The Durbin Watson test of autocorrelation shows absence of serial autocorrelation. This is because the calculated value of D.W (1.670) falls between lower critical level (DU) and 2 at 1% significant level. Where DU= 1.61. With this result we reject the hypothesis that there is presence of serial autocorrelation in our model. Therefore, parameter estimates from our model are stable, consistent and efficient.

### ***Summary, Conclusion and Policy Recommendations***

Nigeria external debt crisis can be related to exogenous and endogenous factors such as the nature of the economy, economic policies formulated by government, the heavy dependence on oil, the dwindling foreign exchange reserves, inconsistency of macroeconomic policies, e.t.c. This study has investigated the determinants of public external debt and its sustainability (indices of ability and willingness to pay) in the Nigerian economy for the period which spanned between 1986 and 2010.

Based on available data and the use of statistical method, we observed that Nigeria external debt is not sustainable in terms of wiliness and ability to pay, it was equally observed that the country's external debt is characterised by capital flight as a results of external debt accumulation which is evident in the ratio of the Country's reserves to external debt.

Using the theoretical framework that justifies the need for external borrowing by developing countries according to Dornbusch (1984), McFadden, et. al (1985) and Mebere (2009) and relying on error correction mechanism to estimate the external debt and its determinants after conducting stationarity and cointegration test. The result from cointegration test showed presence of long run relationship between external debt and its determinants. The major findings of the study are summarized below:

- I. The study found that there exist a negative but insignificant relationship between terms of trade and ratio of external debt to gross domestic product (external debts). The implication of this finding is that demand for Nigeria exported goods is price inelastic. This result conform to Awan , Asghar and Rehman (2011) in Pakistan.
- II. It was also found that the ratio of external debt services to export (debt services) is a significant determinant of external debt in Nigeria. The implication of this result is that the higher the ability and wiliness of a country to services her debts, the higher the external debt worthiness.

- III. Budget deficit was also found to have a positive but insignificant relationship with external debt in Nigeria. This result indicates that increase in budget deficit can lead to Nigeria's indebtedness. The result conforms to Alfaidi (2002) and Awan, Asghar and Rehman (2011), which clearly shows that budget deficit has direct and insignificant effect on external public debt
- IV. The study also found out that gross domestic product is a significant determinant of external indebtedness in Nigeria. This is consistent with theoretical expectation in the sense that an increase in domestic production of goods and services will reduce the demand for external debt.
- V. The result reveals that there exist negative but insignificant relationships between foreign direct investment and external debts. The non-robust of this variable is as results of capital flight that characterised Nigeria FDI.
- VI. Exchange rate was also found to have a positive and significant effect on Nigeria's external indebtedness. The implication of this finding is that continuous depreciation of Nigeria's exchange rate leads to the accumulation of her external indebtedness. This finding conforms to the result of Bader and Magableh (2009) in Jordan.

Conclusively, the general lesson that emerges from this study is that there is continuous rise in the external debt profile in Nigeria and the debt is not sustainable in terms of ability to pay the principal and service it. Also the main determinants of Nigeria's external public debt are gross domestic product, debt services and exchange rate.

To reduce the adverse effect of external debt on the economy and make it sustainable, the study makes the following policy recommendations.

- I. An analysis of the economic and social profitability of all external debt financial projects must be carried out to ensure that the returns would be in excess of the interest and capital repayment. The aim will be to prevent the deadweight effect of external debt on the economy and make it sustainable.
- II. The use of external borrowed fund for government project must be closely monitored in order to ensure that they are applied efficiently and effectively on productive venture which are self-liquidating.
- III. Government should restructure its revenue base to finance fiscal deficit expansion rather than embarking on external borrowing. This can be achieved by improving its revenue sources and efficient pursuit of tax reforms which will help to minimized tax avoidance and invasion.
- IV. Foreign investors should try to make Nigeria an export platform, where export commodities could be manufactured for established international market; this will help to strengthen Nigeria's terms of trade and improvement in terms of trade will reduce debt burden problems.
- V. For openness to reduce the debt burden, Nigeria has to take appropriate macroeconomic steps to boost its exports. Nigeria needs to, inter alia, increase export competitiveness, improve and strengthen trade infrastructures, diversify exports from primary goods to value-added goods, support the technological content of exports, foster infant industries by providing financing, and enhance overall productivity and competitiveness.
- VI. Since exchange rate is under the control of monetary authority in Nigeria, efforts must be made to ensure exchange rate stability in order to stem inflationary tendencies and improve the purchasing power of the naira. This will help to reduce external debt burden on Nigeria.
- VII. Government should ensure that external finance should be used only for projects of high priority and productivity. This is so because gross domestic product has an inverse and significant impact on Nigeria's external debt.
- VIII. Nigeria should have a sound debt management strategy, as foreign loans, beyond certain limits, are harmful rather than helpful towards achieving sustainable economic growth.
- IX. Finally, adequate machinery should be put in place by all sectors of government to arrest corruption and penalize those who divert and embezzle public funds. This will help to reduce the rising profile of external debt in Nigeria.

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**Appendix 1: Magnitude of External Debts in Nigeria (1986 – 2010)**

years	External debt (#;M)	% change of External debt	Gross Domestic product at current basic price (#;M)	% change in Gross Domestic product at current basic price	External debt/ Gross Domestic product (%)
1986	41452.4	-	69147		59.94823
1987	100789.1	143.1442	105222.8	52.1726178	95.78637
1988	133956.3	32.90753	139085.3	32.1817135	96.31233
1989	240393.7	79.45681	216797.5	55.8737696	110.884
1990	298614.4	24.2189	267550	23.4100947	111.6107
1991	328453.8	9.992619	312139.7	16.6659316	105.2265
1992	544264.1	65.70492	532613.8	70.6331492	102.1874
1993	633144.4	16.33036	683869.8	28.3988135	92.58259
1994	648813	2.474728	899863.2	31.5839945	72.10129
1995	716865.6	10.48878	1933212	114.833988	37.08158
1996	617320	-13.8862	2702719	39.8045843	22.8407
1997	595931.9	-3.46467	2801973	3.67237586	21.2683
1998	633017	6.223043	2708430	-3.338469	23.3721
1999	2577374	307.1572	3194015	17.9286524	80.69387
2000	3097384	20.17594	4582127	43.4597834	67.59708
2001	3176291	2.54754	4725086	3.11992662	67.22187
2002	3932885	23.82004	6912381	46.2911151	56.89624
2003	4478329	13.86881	8487032	22.7801535	52.76673
2004	4890270	9.198526	11411067	34.4529748	42.8555
2005	2695072	-44.8891	14572239	27.7026855	18.49456
2006	451461.7	-83.2486	18564595	27.3969978	2.431842
2007	431079.9	-4.51464	20657318	11.2726564	2.086814
2008	493180.2	14.40577	24296329	17.6160865	2.029855
2009	590441.1	19.72116	24794239	2.04932194	2.381364
2010	689845.3	16.83559	29205783	17.7926171	2.362016

**Appendix: Some Indicators of External Debt Burden (1986 – 2010) (%)**

Years	Debt Serves/ Export	External Debt/ Export	External Debt /Government Revenue	External Reserve /External Debt	External Reserved/ Broad Money
1986	18.29014	464.6817	329.097	8.654264	13.09758
1987	12.94095	331.9733	397.1108	4.606947	13.79168
1988	29.61805	429.4462	485.407	2.44311	7.201151
1989	22.89706	414.6778	446.2445	5.597942	28.59866
1990	21.67908	271.749	304.3905	11.7051	50.90566
1991	21.73391	270.2536	325.2288	13.47209	50.57109
1992	9.435387	264.7048	285.7731	2.570903	10.83971
1993	37.06246	289.4108	328.4465	10.62089	33.88043
1994	23.97385	314.8673	321.3365	4.694095	11.40906
1995	5.370829	75.40704	155.8447	5.626327	12.65302
1996	4.050839	47.14009	117.8998	28.23655	47.06836
1997	5.519997	47.99467	102.2513	43.99806	61.01452
1998	8.564734	84.19384	136.5412	35.813	43.12901
1999	2.594126	216.7737	271.5347	35.76178	131.7237
2000	6.735182	159.1893	162.4934	36.47898	109.0548
2001	8.32013	170.0412	142.3325	27.43517	66.22397
2002	9.391893	225.4865	227.0931	24.09583	59.24755
2003	11.77214	145.029	173.9092	51.86841	117.0082
2004	8.310408	106.246	124.7359	76.82343	165.9698
2005	5.436438	37.19119	48.58174	20.24605	19.38456
2006	3.403561	6.163568	7.568382	1201.781	134.6999
2007	2.571675	5.187634	7.542163	1404.767	104.2315
2008	3.751418	4.853424	6.269301	1424.197	76.62252
2009	3.013145	7.065747	12.18763	1073.708	588.9768
2010	3.765565	6.25098	9.445185	1021.261	63.84379