



An Assessment of the Impact of External Debt on Economic Growth of Nigeria

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Abstract: *This study investigated the impact of external debt on economic growth in Nigeria. The traditional view considers that in the long run, external debt has a negative impact on economic growth while the Ricardian equivalence hypothesis implies the neutrality of external debt to growth. In Nigeria, external debt has been incurred mainly on the consideration that it should be used for investment purposes. The issue was empirically examined using the cointegration test and the error correction test for Nigeria over the period 1980 to 2012. Findings from this study supported the traditional view between external debt and growth. Also the study found the non-existence of debt overhang problem for Nigeria. It is recommended from the study that development activities in Nigeria be financed through increased export earnings spearheaded by an export-led growth strategy as well as investment in human resource as these can be the best alternative to external debt in the long run.*

Keywords: External debt, economic growth, debt overhang, investment.

1. Introduction

The concepts of external debt and economic growth have close relationship. External debt refers to packages that consist of a combination of financial, technical vis-à-vis managerial requirements emanating from outside the country, aimed at supporting economic growth and development and are repayable at determined future date in foreign currency. The need to enhance the economy through foreign borrowing particularly in the developing economies becomes fashionable. Todaro (1977) opined that foreign borrowing is a strategy of increasing the productive capacity of the economy over time and focusing at rising levels of national income and poverty reduction vis-à-vis economic growth.

Adam (2003) advocated that public expenditure on social services including education, health and related amenities contribute significantly to poverty reduction. Inadequate resources by government to meet the required quantity and quality of these amenities result in foreign borrowing. Continuous borrowing constitutes the external debt crisis that has escalated to undermine the economies of less developed countries.

High external indebtedness of developing countries has received increased attention from policymakers and public opinion around the world, as one of the main factors contributing to limit the development of numerous poor countries. Most of these countries have received very large amounts of loans over the past decades, often at highly concessional interest rates. It has become clear, however, that repayment of the remaining net present value of the obligations would not only be virtually impossible but would also be likely to severely constrain economic performance of the debtor countries. Also, high incidence of debt discourages inflows of capital but encourages capital flight. Inflow of capital leads to growth as this provides resources for investment, promotes increased productivity and economic growth through technological transfer and managerial skills. In view of the significant effect and inability for countries to attract capital and foreign investment flows, capital usually flows to places of highest returns which is determined by the countries growth prospects. In this circumstance, therefore, countries take to foreign borrowing which in turn encourages inflow of capital particularly in cases of high debt profile countries (HIDPC).

There seems to be a relationship between foreign borrowing and economic growth as demonstrated by Chowdhury (2004), Clements *et al* (2003), Shahnawaz Malik *et al* (2010), Ahmed and Shakur (2011). The growth-with-debt theory as popularized by Green and Khan (1944) supports this relationship. Since most developing countries are confronted with inadequate capital, the option could be to utilize foreign savings to augment the stock of capital over savings. In Nigeria, external debt has been incurred with the main aim of enhancing planned investment for economic development. The rising trend in securing financial resources through external borrowing has specially been steep since the early 1980s.

There seems to be a contention whether external public debt stimulates or retards economic growth. Some scholars found positive, some negative while others found no significance relationship between external debt and economic growth for different economic conditions and different countries. In Nigeria external debt to gross national income (GNI) ratio fluctuates from 14.63 to 4.21 between the periods 1980 to 2012. Debt service ratio reduced to 0.12 in 2012 from 1.88 in 1980, 4.60 in 2000 (CBN, 2012; WDI, 2012). If the rate of return from debt is higher than the service payment rate, it might be

beneficial for the country and vice versa. High current stock of external debt may act as future increase in tax to debt servicing. Debt may also affect the growth through crowding out. These include all factors through which debt financed fiscal policy adversely affect economic growth (Hyman, 2007). While it is easy to identify the undesirable effects of a huge external debt on economic growth, a proper diagnosis of the problem from its root cause is necessary to avoid treating the symptoms and leaving out the underlying cause itself. The main aim of this work is to assess the impact of external debt on economic growth of Nigeria.

2. Literature Review

2.1. Concept of External Debt

The concept of borrowing dates back to the biblical era. When the children of Israel were leaving Egypt, they borrowed whatever they needed from the Egyptians while leaving the land of their captivity. In the modern era, borrowings by countries occur as a result of inability to generate enough domestic savings to carry out productive activities. Such external borrowings by countries are meant to supplement the domestic saving and allow such countries to carry out productive activities (Ezeabesili, 2011). A country can also borrow in the short term, from external sources, to finance current account deficits arising from external disturbances in order to shore up external reserves position and strengthen external liquidity position in the future. Foreign borrowing is seen to be desirable and necessary to accelerate economic growth, provided they are channeled to increase the productive capacity of the economy.

Events in the past few years have led to increasing concerns about possible adverse consequences of the substantial accumulation of debt by sub-saharan African Countries. The experience of Mexico and Argentina, with debt overhang in the early 1980s has heightened this fear. Fears are often expressed that excessive external debt burdens will threaten financial stability with adverse consequences for the real economy, or that increase in debt will create political pressures that will make acceleration of inflation inevitable (Summers, 1986). The view persists however, that the build-up in debt, particularly in the developing economies will imperil the stability of the financial system according to some analysts. They argue that the heavy debt burdens have reduced the ability of financial institutions, borrowers and the economy at large to withstand recessions and other types of adversity. Debt is a contract, and the holder is obliged to fulfill the stated obligations along with accruing interest. Because of this obligation, the risk of compounded and period charges arising from debt-service defaults, and the income effect of debt service on economic growth, policy makers have enjoined to thoroughly evaluate each tranche of external borrowing in order to mitigate the associated risks.

The standard growth with debt practice, as noted by Hameed and Chandhary (2008), is that a country should borrow abroad as long as the capital acquired produced a rate of return that is higher than the cost of the foreign borrowing. In that event, the borrowing country is increasing its productive capacity and expanding output with the aid of foreign savings. The debt, if properly utilized is expected to help the debtor country's economies by producing a multiplier effect which leads to increase employment, adequate infrastructure base, a large export market, improved exchange rate and favourable terms of trade. Aluko and Arowolo (2010) observed that the case of Nigeria and other sub-Saharan African countries seem to be different because external debt has been badly expended and mismanaged. The debt service payment has also affected their macroeconomic performance

Prior to the \$18 billion debt cancellation granted to Nigeria in 2005 by the Paris club, the country had external debt of \$40 billion with over £30 billion of the amount being owed to Paris club alone (Semenitari, 2005). The history of Nigeria's huge debts can hardly be separated from its decades of misrule and the continued recklessness of its rulers. Nigeria's debt stock in 1971 was \$1 billion (Semenitari, 2005). By 1996, it had risen to \$33.4 billion, and rather than decrease, it has been on the increase, particularly with a regime of debt servicing and the insatiable desire of political leaders to obtain loans for the execution of dubious projects (Semenitari, 2005). Before the debt cancellation deal, Nigeria was to pay the sum of \$4.9 billion every year on debt servicing (Aluko and Arowolo, 2010). The effect of the Paris club debt cancellation was felt via the reduction of the exchange rate of Nigeria naira and the dollar from ₦130.6 per dollar in 2005 to ₦128.2 in 2006 and then ₦120.9 in 2006 (CBN, 2009)

However, the benefits of the debt cancellation which was expected to manifest after couple of years, was wiped out in 2009 by the global financial and economic crisis, which was precipitated in August 2007 by the collapse of the sub-prime lending market in the United States. The effect of the crisis on Nigeria's exchange was phenomenal as the Naira exchange rate vis-a-vis the Dollar rose astronomical from about N120/\$ in the last quarter of 2007 to more than ₦150/\$ (about 25% increase) in the third quarter of 2009 (CBN, 2009). The country's outstanding external debt increased from \$3,545 million in 2006 to \$3,654 million in 2007, and then to \$3,720m and \$3947m in 2008 and 2009 respectively (CBN, 2009). It is therefore imperative to examine the effect of external debt of the country on her economy for us to appreciate the need to avoid being back in the group of highly indebted nations.

2.2 Theoretical Literature

Early Perspectives on External Debt and Growth: The works of early development economists such as Domar (1957), Higgins (1959), Pearson (1969), Symonds (1970), Chenery (1966) and Strout (1966) provided a foundation for the development of a comprehensive theory of external debt and growth. They all shared a common view that the transfer of foreign resources (through loan, aids and grants) to less developed countries will help to transform their economies, characterized by low or zero growth rates, into economies capable of adequate and sustainable growth. Their contributions showed that the transfer of foreign resources to developing countries is necessary and serves to supplement domestic resource gaps with positive effects on growth. The consequence of the foregoing is that a strand of thought runs through the early contributions on external debt and economic growth that reasonable levels of borrowing by a developing country are likely to enhance its economic growth. Countries at early stages of development have small stocks of capital and are likely to have investment opportunities with rates of return higher than those in advanced economies. As long as borrowed funds are used for productive investment, growth should increase and allow for timely debt repayments. This explains the short-term positive relationship that exists between external debt and growth for countries that will glide through the debt cycle within reasonable time. The limitation of the early contributions is that the long-term effect of external debt on growth, which is the debt overhang, is not explained.

Fiscal Policy Sustainability and Debt Stabilization: The government budget constraint has a relationship among debt deficits, government spending and taxes. It gives the evolution of government debt as a function of spending and taxes. The constraint is expressed as the change in debt (the deficit) equal to the primary deficit plus interest payments on the debt. The primary deficit is the difference between government spending on goods and services, and taxes net of transfers. The government budget constraint plays a crucial role in analyzing the sustainability of fiscal policy and debt stabilization because both focus on the change in debt which is given by the constraint. The magnitude of the fiscal deficits run by a country raises the question as to whether certain fiscal positions are sustainable or not. A fiscal position is defined as sustainable if the present value of future fiscal surpluses that would be generated under prospective fiscal policies is sufficient to cover the existing stock of net debt (Lebow, 2004). Sustainability here implies that the debt will not rise as a share of GDP indefinitely, while policies that lead to constant debt ratios are often defined to be sustainable. The fiscal adjustment that leads the existing debt/GDP ratio to be maintained at current levels is by no means the optimal adjustment for a country to choose at any given moment. To avoid a further increase in debt in a particular year, the government must run a primary surplus equal to real interest payments on the existing debt. It must do so in following years as well: each year, the primary

surplus must be sufficient to cover interest payments, and thus leave the debt level unchanged. The consequence of this is that past deficits culminate in higher debt (Blanchard, 1997).

Debt Overhang Hypothesis: In the literature relating to the potential negative effect of a heavy external debt burden on growth, the dominant paradigm is the debt overhang hypothesis. This theory is based on the premise that if debt will exceed the country's repayment ability with some probability in the future, expected debt service is likely to be an increasing function of the country's output level. Thus, some of the returns from investing in the domestic economy are effectively taxed away by existing foreign creditors and investment by domestic and new foreign investor is discouraged. Debt servicing, including interest payments and repayments, may also be a real linkage from an indebted country. It takes large benefit from the domestic economy to transfer to the foreign economy. Therefore, the country foregoes some spectacular multiplier-accelerator effects. This decreases the domestic country's ability to grow its economy and raise its dependence on foreign debt (Metwally and Tamaschke, 1994).

Crowding-Out effect: Also debt flows affect economic performance: a reduction in current debt service increases the current level of investments, for any given level of future indebtedness. Since the HIPC's receive net positive resource transfers, the disincentive effect of a large debt burden might be mitigated and the debt service payments could be a critical constraint to economic growth. Some authors (Pattillo *et al* 2002, 2004) does not find evidence of a significant crowding-out effect, while others, (Chowdhury (2004), Clements *et al* (2003), Elbadawi *et al* (1997), found that both debt burden and debt service obligations squeeze investment and economic performance. Cohen (1993) rejected empirically the debt overhang hypothesis and supported the crowding out effect, whose magnitude was 0.35. Hansen (2004) estimated that debt service has a negative impact on investment (the point estimate was 0.33) and growth, while Presbitero (2005) found empirical evidence supporting the crowding out effect of investment due to the burden of debt service payments on the budget constraint (the point estimate ranged from 0.27 to 0.15). Clements *et al.* (2003) calculated that a reduction in debt service from 8.7% of GDP to 3% would increase public investment by 0.7% - 0.8%, and this augmented investment would translate in a per capita GDP growth increase of 0.1% - 0.2%.

Uncertainty: The stock of debt has another effect on economic performance, due to uncertainty associated with the level of external debt (i.e. high and volatile inflation, interest rates). Risk of default, rescheduling and arrears are likely to increase the volatility of future inflows and additional lending, while the access to capital markets depends on

the perceived sustainability (Gunning and Mash, 1998). The outcome is a situation in which domestic and foreign investors are likely to exercise the waiting option (Serven, 1996). Moreover, an unstable macroeconomic environment is likely to generate a misallocation of resources, may be due to short-termism, which reduces the efficiency and productivity of capital, leading to a slowdown of economic growth (Moss and Chiang, 2003).. The evidence of a direct link between debt and growth remains unclear, since econometric results lack robustness (Moss and Chiang, 2003).

Debt Laffer curve and Debt Sustainability: A very important deduction that can be made from the debt Laffer curve is that there is an optimal level of debt that a nation can sustain without having a debt overhang problem. This point is represented by the peak of the debt Laffer curve, in Annex 1, it also included a subsection which analyzes the conditions that surround the optimal level of debt stock, and the external debt sustainability.

External Debt Sustainability: A country can be said to achieve external debt sustainability if it can meet its current and future external debt service obligations in full, without recourse to debt rescheduling or the accumulation of arrears and without compromising growth (IMF 1995; 1996). Once the burden of current and future obligations is reduced to sustainable levels, it is possible to eliminate the disincentive effect of a heavy debt burden on investment and new capital inflows, thereby improving growth prospects. Some indicators for assessing external debt sustainability are: 1) the ratio of scheduled debt service to export of goods and services; 2) the external financing gap (after allowing for expected inflows in the form of grant receipts, loan disbursements, and any commercial capital flows; and 3) the ratio of the net present value (NPV) of the debt to export. According to Obadan (1999), a country's external debt position might generally be considered sustainable over the projection period if the following thresholds are not exceeded: (1) ratio of scheduled debt service to export of goods and services of 20-25 percent; (2) ratio of the NPV of debt to export of 200-250 percent. These are thresholds, which if exceeded, may signal imminent debt servicing difficulties.

2.3 Empirical Literature

The empirical evidence of external debt and economic growth abound. Krugman (1988), Sachs (1989), and Cohen (1993) observed that the rationale for a negative correlation between external debt and economic growth is related to the debt overhang effect. They also noted that a large debt burden squeezes investments, because returns are taxed away by foreign creditors. The uncertainty associated with the level of external public debt (i.e. risk of default, rescheduling and arrears) increases the volatility of future inflows, leading to a situation in which investors are likely to exercise the waiting option (Serven, 1997).

Some works done by Elbadawi, Ndulu and Ndung'u, (1997), Pattillo, Poirson and Ricci (2002, 2004), and Clements, Bhattacharya and Nguyen (2003) suggested that the debt growth relationship follows a bell-shaped curve since, beyond a certain debt ratio, the impact of the stock of external debt on growth becomes negative. Pattillo, Poirson and Ricci (2002) showed that the marginal impact of external debt on growth in developing countries becomes negative for values of the Net Present Value (NPV) of debt ranging between 5 and 50 per cent of GDP, depending on the estimation methodology. Clements, Bhattacharya and Nguyen (2003) estimated a similar growth model allowing for non-linearities in the effect of debt and found that the turning point of the "Debt-Laffer" curve was in correspondence of a NPV of debt to GDP ratio of about 20-25percent.

Moss and Chiang (2003) and Depetris and Kraay (2005) provided some evidence of debt overhang in low and middle income countries although inconclusive, because of the lack of robustness of econometric results. They showed that the debt overhang and the debt irrelevance zone differ according to countries' characteristics: countries with better institutions, better policies and easier market access exhibit higher thresholds than countries with worse conditions, for which the negative relation was generally less robust. Imbs and Ranciere (2005) used kernel estimators to test the presence of the Debt-Laffer curve in developing countries. Their results were consistent with a debt overhang effect starting when the NPV of external debt exceeds 40 per cent of GDP. The authors were able to show that, once fixed effects are considered, a smaller number of countries display a Debt-Laffer curve. Therefore, this non-linearity could be driven by some omitted time invariant control which jointly determines low growth and high debt. The estimation of a growth equation controlling for different time invariant institutional variables partially confirms this hypothesis.

Elbadawi et al (1997) and Pattillo et al (2001) considered the non-linear effect of debt on growth. They presented fixed and random effects panel estimation of a growth regression in which external debt entered both in a linear and quadratic form. They reported growth maximizing debt to GDP ratios were equal to 97 percent and 84 percent respectively.

Perotti (1999) demonstrated that low levels of debt or deficit were likely to generate positive effects of public expenditure shocks, while high levels of public debt led to negative effects. Similar results were obtained by Alfredo (2002) in a study that investigated the relationship among fiscal deficits, public debts, and economic growth in emerging markets. Giavazzi and Pagano (1990) studied the fiscal consolidations in Denmark and Ireland in the 1980s and showed that in these countries a cut in public deficit led to a sharp increase in private consumption. Borensztein (1990) tested the debt overhang effect empirically. Using data for the Philippines, he found that the debt

overhang hypothesis was largely valid. He found that debt overhang had an adverse effect on private investment.

Alfredo and Francisco (2004) explored the relationship between external debt and growth for a number of Latin American and Caribbean economies. The result of their study showed that lower total external debt levels were associated with higher growth rates, and that this negative relationship was driven by the incidence of public external debt levels, and not by private external debt levels.

Ndung'u (1998) examined the dynamic impact of external debt accumulation on private investment and growth in Africa. He argued that the external debt problem in Africa has led to an investment pause and has reduced growth performance substantially. To strengthen his argument, he used results from the empirical work of Elbadawi, et al. (1997) to show the dynamics of the problem and how a country moves from one side of the Laffer curve to the other and the effects on investment and growth.

Audu (2004) investigated the impact of external debt on economic growth and public investment in Nigeria. The results confirmed the operation of crowding out and import compression hypotheses in Nigeria. This means that debt-servicing pressure in the country has had a significant adverse effect on the growth process.

Ogunmuyiwa (2002), observed no significant causal relationship between External Debt and economic growth for lag length 2-4 in Nigeria for the period 1970-2007. Thus, it was affirmed that the variables were exogenous of one another. The findings stated that external debt was not a specific factor for determining the rate of economic growth or economic slowdown in Nigeria. Amin and Audu (2006) investigated the impact of external indebtedness on Nigeria's economic performance from 1970 to 2004 by employing the co-integrating modeling techniques. The results showed that debt servicing pressure in the country had a significant adverse effect on the growth process but that past debt accumulated related positively to economic growth which was a much unexpected result.

Adepoju et al (2007) reviewed the roles of debt management practices on sustainable economic growth and development with focus on Nigeria. The listed consequences include the external debt servicing encroaching on the resources available for development, encroaching on the resources available for poverty alteration, the debt overhang affects the inflow of foreign investments and it makes it hard to obtain new loans due to little confidence placed on ability to repay.

Adesola (2009) reviewed and analyzed the effects of external debt service payment practices on the economic growth and development in Nigeria from 1981 to 2004. The variables used in this study included the gross domestic product, the gross fixed capital formation and the annual debt service payments to each creditor. The data was analysed using the ordinary least squares multiple regression method. The results of the tests concluded that there was a significant relationship between gross fixed capital formation at current market prices and external debt services. It also showed that there was a significant relationship between gross domestic product at current market prices and external debt services. It was concluded from the paper that debt payments to the creditors affected the economic growth both positively and negatively.

Udoka and Anyingang (2010) sought to depict the relationship between external debt management policies and economic growth in Nigeria from 1970 to 2006. The design adopted was the ex-post facto research design which involved analyzing the data with the ordinary least square multiple regression technique. The results of their tests showed that an increase in gross domestic investment GDI will increase external debt. There was a positive relationship between exchange rate and acquisition of external debt in Nigeria. Also, there was a positive relationship between foreign debt and government fiscal expenditure in Nigeria and there was a positive relationship between the terms of trade and external debts in Nigeria. This led to the conclusion that GDP, exchange rate, fiscal deficit, London interbank offered rate and terms of trade were the major determinants of external debt in Nigeria.

Ezeabasili et al (2011) investigated the relationship between Nigeria's external debt and economic growth from 1975 to 2006. The Ordinary least squares two stage approach was used in deriving the short run coefficients after the unit root status and the existence of co-integration of the variables was established. Their pair-wise granger causality test revealed that unidirectional causality exists between external debt service payment and economic growth. Error correction estimates revealed that external debt has a negative relationship with economic growth in Nigeria. They gave definite figures that a 1percent in external debt resulted in a decrease of 0.027 percent in GDP and a 1percent increase in total debt service resulted in a 0.034 percent decrease in GDP. The empirical result indicated that there was a negative short-run relationship between economic growth and the present level of external debt in Nigeria. There also existed a negative short-run relationship between two lag levels of external debt service payment and economic growth.

Ogunmuyiwa (2011) examined whether external debt actually promoted economic growth in developing countries using Nigeria as a case study. The regression analysis employed

various econometric techniques like the augmented Dickey-Fuller test, Granger causality test, Johansen co-integration test and vector error correction method in analysing the time series data from 1970 to 2007. The results revealed that causality did not exist between external debt and economic growth as causation between external debt and economic growth was found to be weak and insignificant in Nigeria. The results led to the conclusion that since the causation between external debt and economic growth could not be established in the Nigerian context and therefore external debt could not be used to forecast improvement or slowdown in economic growth in Nigeria, neither could it predict changes in gross domestic product with the changes in economic development.

3. Materials and Methods

3.1 Research Design

To empirically examine the impact of external debt on economic growth in Nigeria this hypothesis was development, (H_0): There is no relationship between external debt and economic growth in Nigeria. The data collected were also subjected to these tests namely Unit Root, Granger causality, Co-integration, and Error Correction test. The ADF test was used to test whether the variables were non stationary (unit root). An Error Correction Mechanism was employed to ascertain the speed of adjustment from the short run equilibrium to the long run equilibrium state.

3.2 Model Specification

Based on Were (2001), the channels through which the indebtedness affects growth have been identified as: stock of external debt as a ratio of GDP which should stimulate growth; past debt accumulation (lagged debt-GNI ratio) which impacts negatively on growth; the debt-service ratio, which captures the crowding out effect. Besides these variables, the model also incorporated other policy, fundamental and shock variables. The model adopted is based on the work of Elbadawi *et al* (1996). The equations are specified below.

Economic Growth equation

$$GDP = (EXD, EXD_{t-1}, DSR, INV, TPEN, POP, RER, SCH, INF) \quad (1)$$

Where GDP= real GDP growth rate; EXD = stock of external debt to GNI ratio

EXD_{t-1} = stock of external debt to GNI ratio lagged by one period (reflect debt accumulation); DSR = the debt service as a ratio of export earnings (reflect the 'crowding-out' effect); INV= private investment as a ratio of GDP (captures the accelerator principle); SCH = primary school enrolment rate as a proxy for human capital development; INF = rate of inflation (reflects macro- economic stability); RER = movements in real exchange rate (reflects credibility of policies); POP= population; TPEN= trade openness. The macroeconomic policy variables were captured by inflation rate and by real exchange rate.

Investment equation

Interest rate as a variable is included in the investment equation to capture its effect on private investment. The investment equation is specified as:

$$INV = (EXD, EXD_{t-1}, DSR, TPEN, RER, SCH, INF, POP, INT, GDP) \quad (2)$$

where INT = Interest rate (Treasury bill rate). The other variables are as previously defined.

3.3. Estimation Technique

Time series statistics of the included variables was used in the estimation procedure in order to achieve the stated objectives of the study. Augmented Dickey Fuller (ADF) test was used to test for stationarity of the variables. Ordinary Least Square (OLS) method of regression was used to estimate the model to establish the relationship between the variables.

Unit Root Test: Most of the time series data showed the non stationarity in the level form but stationarity in their difference. Stationarity is tested using Augmented Dickey-Fuller (ADF) and Phillips-Perron unit root tests. The ADF test is estimated by the regression equation:

$$\Delta\gamma_t = \alpha_1 + \alpha_2 + \beta\gamma_{t-1} + \theta_i \sum_{i=1}^m \Delta\gamma x_{t-i} + \mu_t \quad (3)$$

Where γ is our variable of interest, Δ is the difference operator, t is the time trend, and μ is the white noise residual of zero mean and constant mean and constant variance. $(\alpha_1, \alpha_2, \beta_1, \dots, \beta_m)$ is a set of parameters to be estimated. The null hypothesis is that the variable under investigation has a unit root, against the alternative that it does not. If null hypothesis is rejected it means that the series is stationary. Phillips-Perron test use nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms.

Granger Causality Test: The Granger causality test is employed to examine the causal relationship between two variables. If the p values of the variable Y significantly contribute to forecast the value of another variable X , then Y has a Granger causal relationship with X and vice versa. The test is based on the equation below:

$$Y_t = \vartheta_0 + \sum_{z=1}^p \vartheta_z Y_{t-z} + \sum_{i=1}^q \gamma_i X_{t-i} + \mu_t \quad (4)$$

$$X_t = \varphi_0 + \sum_{z=1}^p \delta_z X_{t-z} + \sum_{i=1}^q \tau_i Y_{t-i} + \varepsilon_t \quad (5)$$

Where Y_t and X_t are the tested variables, μ_t and ε_t are the error terms, and t implies that the time period, z and i are the number of lags. The null hypothesis is $\gamma_i = \tau_i = 0$ for all i . In the alternative hypothesis that $\gamma_i \neq 0$ and $\tau_i \neq 0$ for at least some i if the coefficient γ_i are significant but τ_i are not significant, then X is Granger causal to Y . However, if both coefficients are significant, then causality runs both ways.

Co-integration Test: We employ vector autoregressive (VAR) based co-integration tests using the methodology developed in Johansen (1991, 1995). The purpose of co-integration tests is to determine whether the variables in our model are co-integrated or not. Co-integration will also be tested to determine the need of using a Error Correction model (hereafter ECM). The Johansen co-integration methodology can be briefly described as follows:

$$Y_t = Z + \sum_{i=1}^P \Pi_i Y_{t-i} + \varepsilon_t \quad (6)$$

where, z is a $(n \times 1)$ vector of deterministic variables, ε is a $(n \times 1)$ vector of white noise error terms and Π_i is a $(n \times n)$ matrix of coefficients. The ECM has co-integration relations built into the specification so that it restricts the long-run behaviour of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics.

Error Correction Mechanism (ECM): Although the model is in equilibrium in long run, it may not be in equilibrium in the short run. To rectify short run disequilibrium, error correction term is included in the model. ECM was first used by Sargam (1983) and later popularized by Engle and Granger to correct disequilibrium. The Granger representation theorem states that if two variables are co-integrated, then the relationship between the two can be expressed as ECM.

3.4. A priori Expectation

The stock of external debt as a ratio of GNI and past debt accumulation (lagged debt-GNI ratio) was expected to impact negatively on economic growth. The coefficient of real exchange rate and debt service rate is expected to be negative. Also, the coefficient of population growth is also expected to be negative while the coefficient of schooling rates and investment are predicted to be positive. Investment and education reflect the positive impact of physical and human capital accumulation respectively. Trade openness should be positive since it is posited to boost productivity through transfer of knowledge and efficiency gains. The coefficient of inflation is ambiguous and can take either negative or positive value.

3.5 Data and Sources

In this study variables used are real GDP growth rate; Interest rate (Treasury bill rate); stock of external debt to GNI ratio; stock of external debt to GNI ratio lagged by one period (reflect debt accumulation); and debt service as a ratio of export earnings (reflect the 'crowding-out' effect). In addition, we employed the following control variables; private investment as a ratio of GDP (captures the accelerator principle); trade openness; population; primary school enrolment rate as a proxy for human capital development; rate of inflation (reflects macro- economic stability); and movements in real exchange rate

(reflects credibility of policies). Data series of our variables were collected for the period 1980 to 2012. The data was obtained from the central bank of Nigeria Statistical Bulletin (2013) and the World Bank's world development indicators 2013.

3.6 Hypothesis Testing and Interpretation

We use the t-test to test the significance of regression co-efficient and the F-test to understand the significance of all independent variable to the dependent variable. This study utilizes significant level of 5%. Therefore if the p-value of the variable indicate less than 0.05 (5%), it means we reject H_0 and accept H_1 .

3.7 Diagnostic test

Gujarati (2004) asserted that a good model of ordinary least squares estimation should satisfy some basic econometric assumptions such as absence of correlation among independent variables, normally distributed residuals and the error term is constant. To satisfy some of these econometric criteria we used the Jarque Bera test for normality test, ARCH test to check for heteroscedasticity test, Durbin Watson test to check for autocorrelation and RESET and LM test to check for misspecification of our model.

4. Presentation of Results and Discussion of Findings

This section of data analysis shows the empirical evidence of the relationship between external debt and economic growth in Nigeria.

Table 4.1 shows the descriptive statistical analysis of GDP, external debt, investment, debt service ratio, trade openness, population growth rate, interest rate, inflation, primary school enrollment rate and exchange rate.

Table 4.1 Descriptive Statistics

Variable	Mean	Std.	Min. Value	Max. Value	Obs.
GDP	3.71	7.91	-13.12	33.73	33
EXD	69.82	52.56	2.158	161.71	33
INV	16.35	2.49	11.67	22.76	33
DSR	13.6	10.37	0.3	38.03	33
TPEN	56.04	16.92	23.6	88.47	33
POP	2.59	0.099	2.49	2.86	33
INT	11.78	5.09	3.71	26.9	33
INF	20.42	18.23	5.38	72.83	33
SCH	92.48	10.03	78.45	112.81	33
RER	173.77	152.77	58.152	638.54	33

Table 4.1 shows the summary statistics of variables used in the study. Primary school enrollment has the highest mean while real exchange rate has the highest standard deviation. Population growth has the lowest mean and standard deviation of 2.59 and 0.099 respectively. Also, real exchange rate has the highest maximum value while population growth has the most minimum value. Our total number of observation for the study is 33 covering the period 1980-2012.

Table 4.2. Correlation Matrix of Variable

	GDP	EXD	INV	DSR	TPEN	POP	INT	INF	SCH	RER
GDP	1									
EXD	-0.20	1								
INV	-0.02	-0.04	1							
DSR	-0.31	0.559	-0.14	1						
TPEN	0.28	-0.24	0.26	-0.72	1					
POP	0.04	-0.63	-0.06	-0.41	0.11	1				
INT	0.16	0.62	-0.16	0.09	0.27	-0.51	1			
INF	-0.08	0.57	-0.28	0.27	-0.11	-0.30	0.40	1		
SCH	-0.144	-0.18	-0.16	0.32	-0.56	-0.17	-0.21	-0.12	1	
RER	-0.33	-0.19	-0.08	0.46	-0.68	0.09	-0.49	-0.20	0.62	1

Table 4.2 illustrates the pair-wise bivariate correlation between GDP growth rate and the variables included in the analysis. As expected, larger debts, debt servicing and higher inflation are correlated with lower economic growth which instead is fostered by trade openness and population growth. In contrast with an a priori expectation, primary school enrollment, interest rate, exchange rate and investment are negatively correlated with GDP. All coefficients in our correlation matrix in absolute value ranged from 0.02 to 0.68. Also, we note a negative correlation between external debt and investment and a negative correlation between investment and interest rate as well as real exchange rate.

Table 4.3 Unit Root Test Result

Variable	Level		First Difference		Conclusion
	ADF	PP	ADF	PP	
GDP	-4.26***	-4.27***	-	-	I(0)
EXD	-1.015	-1.105	-5.18***	-5.18***	I(1)
INV	-4.44***	-4.40***	-	-	I(0)
DSR	-1.88	-1.8	-4.36***	-7.75***	I(1)
TPEN	-1.98**	-1.98	-7.84***	-8.31***	I(1)
POP	-4.51***	-2.53	-3.99***	-	I(1)
INT	-2.67	-2.68	-6.54***	-6.71***	I(1)
INF	-2.77*	-2.68*	-5.58***	-9.69***	I(1)
SCH	-2.92*	-1.41	-3.59***	-3.41**	I(1)

RER	-1.57	-1.68	-3.41**	-3.23**	I(1)
EXD	-1.02	-1.11	-5.09***	-5.09***	I(1)
C. value					
1%	-3.65	-3.65	-3.67	-3.66	
5%	-2.95	-2.95	-2.96	-2.96	
10%	-2.61	-2.61	-2.62	-2.61	

Source: Authors' Data analysis.

Note: The optimal lags according to Schwarz information critical (Maxlag =8) where *, **, and *** represent rejection of the null hypothesis at significance level of 10%, 5% and 1% respectively.

As required by standard econometrics of time series (see Enders, 2009), all of the variables were first tested whether they had unit roots respectively. The test was conducted for both levels and first difference by imposing intercept without trend and using the default lags selection based on Schwarz and Akaike info criterion. The results of the Augmented Dickey Fuller (ADF) and Phillip-Perron (PP) unit root tests are as presented in Table 4.3. At the level data, the series GDP and INV are stationary at the 1 percent level of significance. At the first difference data, all the variables under study are stationary. Their t-statistics values were much higher than the critical value at 5 percent level of significance. This implied that the series data were stationary at the first difference I(1) and the behavior of the variables varied around the mean value and invariant overtime (Enders,2009).

Table 4.4. Johansen Cointegration Test Results: Investment Model

Rank	Trace Statistic	Critical Value	Max. Eigen Stat	Critical Value
r=0*	579.58	239.23	141.19	64.5
r≤1*	438.39	197.31	109.62	58.43
r≤2*	328.76	159.52	104.05	52.36
r≤3*	224.71	125.61	79.17	46.23
r≤4*	148.53	95.75	56.18	40.07
r≤5*	92.34	69.81	46.96	33.87
r≤6	45.38	47.85	22.01	27.58
r≤7	23.36	29.79	19.04	21.13
r≤8	11.32	15.49	9.26	14.26
r≤9	2.05	3.84	2.05	3.84

Source: Authors' Data analysis. *- represents significance at the 5% level.

The cointegration test is used to examine the long run relationship between all variables. Table 4.4 shows the results of Johansen Co-integration test results of our investment model. The table shows that by using trace test and Max-eigen value test, six cointegrating equation are found at 5% level of significance. This implies the existence of long-run relationship between investment and variable used in the model. Hence we can proceed to estimate the error correction model.

Table 4.5. Johansen Cointegration Test Results: Economic Growth Model

Rank	Trace Statistic	Critical Value	Max. Stat.	Eigen Critical Value
$r=0^*$	433.75	297.37	139.05	58.43
$r\leq 1^*$	294.7	159.52	99.64	52.36
$r\leq 2^*$	195.06	125.61	56.08	46.23
$r\leq 3^*$	138.97	95.75	47.12	40.07
$r\leq 4^*$	91.85	69.81	37.79	33.87
$r\leq 5^*$	54.05	47.85	23.92	27.58
$r\leq 6^*$	30.12	29.79	16.82	21.18
$r\leq 7^*$	13.29	15.49	9.88	14.26
$r\leq 8^*$	3.9	3.84	3.9	3.84

Source: Authors' Computation, * represents significance at the 5% level.

Table 4.5 shows the result of Johansen cointegration test. The table illustrates that by using the trace test eight cointegrating equations are found, while by using the Max-eigen value test six cointegrating equations are found. We conclude that there is a long-run relationship between economic growth rate and variables used in the study.

Table 4.6. External Debt and Economic Growth: ECM Model

Dependent Variables: GDP and INV

Independent variable	GDP	INV
EXD	-0.058 (-0.71)	0.08*** -4.45
EXD _{t-1}	0.018 -0.27	-0.03 (-1.89)
INV	-0.17 (-0.33)	
DSR	0.13 -0.5	0.02 -0.36
SCH	0.039	0.059

	-0.13	-0.75
INF	-0.088	-0.027
	(-0.95)	(-1.16)
POP	46.72	4.05
	-0.88	-0.29
TPEN	-0.18	0.076
	(-1.50)	-2.24
RER	0.0019	0.0045
	-0.08	-0.699
ECM	-0.84***	-0.88***
	(-4.79)	(-4.10)
GDP		-0.037
		(-1.89)
INT		-0.36***
		(-3.47)
C	0.66	0.12
	-0.5	-0.35
R ²	0.6	0.76
F.Stat.	3.11**	5.59***
DW	2.001	1.92
JB	19.59***	0.4
RESET	1.79	0.34
ARCH Test	0.15	0.65
LM Test	0.82	0.067

Note: Acronym for variables are as earlier defined, where *, **, and *** represent rejection of the null hypothesis at significance level of 10%, 5% and 1% respectively

External Debt and Economic Growth (ECM Model): Most of the variables considered in other determination of economic growth have their hypothesized signs. The coefficient of external debt flows (EXD) conform to a priori expectation. A rise in external debt leads to decline in economic growth. This implied that even current debt flows deter economic growth in the short run. On the other hand, other coefficient of past debt accumulation (external debt lagged twice) was positive and did not conform to a priori expectation therefore implying the non existence of debt overhang problem as earlier postulated. The impact of other variables were as follows: Debt service rate, human capital development proxied by primary school evolvment rate, population, and exchange rate positively influence growth. Inflation rate deters economic growth. Similarly, investment and trade openness was found to have an unexpected negative impact on economic growth. The

lagged error correction term (ECM) was included in the model to capture the long-run dynamics between the cointegrating series and found to be statistically significant. The coefficient indicated that the speed of adjustment rate was 84 percent to correct the previous year's disequilibrium in the path of long run equilibrium growth. The R^2 of 0.60 showed that 60 percent of the variations in GDP were explained by the model. The F-statistic showed the variables were jointly significant at 5% level, the Durbin Watson (DW) statistics indicated the absence of auto correlation in the model. The RESET test and LM test showed that there was no misspecification in the model, the ARCH test indicated the model was free from heteroscedasticity problem. However, the normality test illustrated the model to be non-normally distributed.

External Debt and Investment (ECM Model): The results in Table 4.6 indicate that current external debt flow (EXD) stimulated private investment while past external debt flow deterred investment. These results were expected as well as the significance at 1% and 10% respectively. Foreign borrowing can help relieve resource shortages and if used productively will stimulate investments and therefore promote growth in the short run. A rise in current debt service rate positively affects private investment as shown by the positive coefficient. This implied the absence of “crowding-out” effect of debt service on private investment. The impact of other variables on private investment was as follows: Inflation discourages current private investment as denoted by its negative sign. This could imply that economic agents expect high level of inflation rate to persist thus discouraging current private investment. Similarly, high interest rate discourages private investment. It could be observed from its negative coefficient and is statistically significant at 1% level of significance. Human capital as captured by school enrolment and real exchange rate had a positive coefficient. Also trade openness had a positive sign as expected while unexpectedly, population growth had a positive coefficient as well.

Similarly to the growth equation, the ECM term lagged once had a negative sign. The model reported a speed of adjustment of around 88 percent, which was considered high. This implied that the deviations from the long-run equilibrium path were almost corrected in one period. Investors react fairly fast to changes in external resource flows. The R^2 OF 0.76 showed that 76 percent of the variation in private investment was explained by the explanatory variables. The Durbin Watson (DW) showed the absence of autocorrelation and the F-statistic indicated the variables to be jointly significant at 1 percent level. The normality test showed that our model was normally distributed, the RESET test and LM test showed no misspecification in our model while the ARCH test showed our model to be homoscedastic.

Robustness Check

For robustness of our error correction model estimates, an ordinary least square of the model was estimated for both economic growth and investment. The results of our estimation are presented in Table 4.7.

Table 4.7. External Debt and Economic Growth: OLS Estimation

Dependent variable: GDP and INV

Independent variables	GDP	INV
EXD	-0.051 (-0.76)	0.041 -1.58
EXD _{t-1}	-0.085 (-1.36)	-0.013 (-0.47)
INV	-0.42	(-0.79)
DSR	-0.03 (-0.14)	-0.0022 (-0.024)
TPEN	-0.18 -1.66	0.0081 -0.17
POP	114.45 (-2.35)	30.39 -1.46
INF	-0.047 -0.6	-0.016 (-0.51)
SCH	0.25 -0.95	0.103 -0.95
RER	0.028 -1.33	0.0063 -0.72
GDP		-0.071 (-0.83)
INT		-0.17 (-1.29)
C	11.45 -1.29	16.87*** -26.95
R ²	0.44	0.24
F.Stat.	1.85	0.65
DW	1.85	1.61
JB	10.55***	1.803
ARCH Test	0.33	1.96
RESET	0.57	1.84
LM Test	0.85	0.98

Note: Acronym for variables are as earlier defined, where *, **, and *** represent rejection of the null hypothesis at significance level of 10%, 5% and 1% respectively

OLS Estimation results for The Growth Equation: Most of the variables used showed the same sign as the ECM model with the exception being EXD_{t-1} that is the coefficient of past debt was negative as expected. These results confirmed the existence of debt overhang problem. Also, in line with a priori expectation, debt service ratio had a negative effect on economic growth unlike the ECM model. The R^2 showed that about 44 percent of the variation in GDP was explained by other explanatory variable, and this was less than what was obtained in our ECM model. The DW indicated absence of autocorrelation, the RESET and LM test showed our model is rid of heteroscedasticity. However, the model failed to pass its normality test. The F-statistics was insignificant.

OLS Estimation Results for The Investment Equation: The result obtained in our investment equation was mostly the same as our ECM model except for DSR. The coefficient of DSR showed a negative sign, implying that a rise in current debt service ratio negatively affected private investment. This showed evidence of crowding out effects of debt service on private investment contrary to our ECM model. The R^2 was quite low and indicated that about 24% of the variations in private investment was explained by the explanatory variables. The diagnostic test showed that our model was normally distributed and well specified as indicated by the RESET and LM test and homoscedastic. The DW showed the absence of autocorrelation. However, the F-statistics showed that the variables were jointly not significant in explaining the variation in the dependent variable (private investment).

5. Summary of Findings, Recommendations and Conclusion

The principal objective of this research was to identify the impact of external debt on economic growth in Nigeria. In summary key findings from the study are as follows;

- (i) The study found a negative relationship between external debt and economic growth in Nigeria. The coefficient of external debt flows was in tandem with a priori expectation. Increase in external debt leads to decrease in economic growth. This implies that even current debt flows daunt economic growth in the short run.
- (ii) The other coefficient of past debt accumulation (external debt lagged twice) was positive and failed to conform to a priori expectation, therefore, implying the non-existence of debt overhang problem.
- (iii) Also, increase in current debt service rate positively affected private investment as shown by the positive coefficient. This showed the absence of “crowding-out” effect of debt service on private investment.

- (iv) For the control variables, Debt service rate, human capital development, measured by primary school enrollment rate, population, and exchange rate positively influence growth. Also, Inflation, investment and trade openness were found to have negative impact on economic growth.
- (v) Furthermore, inflation discourages current private investment as indicated by its negative sign. Similarly, high interest rate discourages private investment as can be observed from its negative coefficient.
- (vi) Finally, the result for the robustness check showed that the result from our ordinary least square model was mostly the same as our error correction model.

5.2 Conclusion

This study analyzed the impact of external debt on economic growth in Nigeria for the period 1980 to 2012. The results revealed that external debt led to a decline in economic growth in Nigeria. This implied that current debt flows deterred economic growth in the short run. On the other hand, other coefficients of past debt accumulation (external debt lagged twice) were positive and did not conform to a priori expectation implying the non existence of debt overhang problem for Nigeria. Also, current external debt flow stimulated private investment while past external debt flow deterred investment. These results were expected as well as their significance at 1% and 10% levels, respectively. Foreign borrowing can help relieve resource shortages and if used productively will stimulate investments and therefore promote growth in the short run. A rise in current debt service rate positively affected private investment in Nigeria as shown by the positive coefficient. This implied the absence of “crowding-out” effect of debt service on private investment in Nigeria.

5.3 Recommendations

Proper macroeconomic management of the economy as a whole is important since it also determines the volume and servicing of external debt, as well as the credit rating. Availability of external finance should be consistent with a policy framework that is credibly maintained (fiscal stance, exchange rate policy, interest rate policy, pricing policy, etc.). It is important to create credibility including political will in order to spur investor confidence for both local and foreign investments. Development activities could also be financed through increased export earnings spearheaded by an export-led growth strategy. As part of broader strategy to assist the highly indebted poor countries (HIPC)s out of debt crisis, the international community should provide a conducive environment for exports from the low-income countries including Nigeria. Nigeria should also consider investment in human resource as this can be the best alternative to external debt in the long run. Optimal use and extraction of domestic mineral resources should be ensured to reduce import. Furthermore, Nigerian government should interfere in international market

of export and import to control foreign exchange reserve. To make the debt service optimum, the debt policy might be revised.

6. References

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