



International Journal of Economics and Financial Research

ISSN(e): 2411-9407, ISSN(p): 2413-8533

Vol. 3, No. 8, pp: 119-129, 2017

URL: <http://arpgweb.com/?ic=journal&journal=5&info=aims>

An Error Correction Model Analysis of the Effect of Total External Debt on the Nigerian Economy (1980–2015)

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Abstract: This study used error correction model (ECM) to analyse the effect of total external debt (TED) on the Nigerian economy proxied by gross domestic product (GDP) during the period 1980-2015. The data such as TED and GDP were obtained from Central Bank of Nigeria (CBN) statistical bulletin. The result of the finding revealed that total external debt exerts negative and significant influence on GDP. This implies that, as total external debt increases, GDP also decreases and vice versa. Therefore, the researcher recommends that any external loan obtained by the government should be channelled to productive projects that yield high on returns on investment rather than allocating the fund to finance dead-weight debt, hence, engendering sustainable economic growth in the economy.

Keywords: GDP; TED; ADF; ECM.

1. Introduction

No economy in the world is self-sufficient and each economy aims at achieving economic growth and development. However, this is only possible if a country has adequate resources. Many governments resort to borrow so as to bridge their deficit gaps in the proposed spending and expected revenue in a fiscal period which comes many times as a result of inadequacy and insufficiency of resources (Adeniran *et al.*, 2016). Debt is any borrowed resource in use in organisation which must be paid back at its maturity period (Okpara and Iheanacho, 2016). Debt also constitutes that part of liability which the holder is obliged to liquidate.

Public debt or government borrowing is divided into two namely; internal and external debts. Internal debts are funds borrowed domestically while the external debts are funds sourced from international organisations. In order to aid improvement in welfare and promote economic growth, public investment is necessary at a rate of return which is in excess of public savings. Hence, government may resort to internal and/or external borrowing as a means of supplementing public savings to fill the resource gap (Okpara, 1997). Therefore, the debts sourced are expected to be serviced without impairing its developmental prospect. That is, the returns from the investments or projects need to be used to service the debt. In other words, debt is said to be sustainable, if the government while remaining solvent is able to service its debt obligation from investment returns.

In 1980, the Nigeria's total external debt increased from N1.9 billion to N17.3 billion in 1985. Between 1986 and 1994, the total external debts outstanding also rose from N41.45 billion to N648.81 billion respectively. With the adventure of debt relief of year 2005 from the Paris Club of creditors, the total external debt decreased drastically from N2,695.07 billion to N1,631.52 billion (about 65% fall) for 2005 and 2014 but also increased to N2106.17 billion in year 2015. The increase is as a result of change in government.

The severe increase in the level of total external debts has led to huge imbalances in fiscal deficits and budgetary constraints that have militated against the growth of the Nigerian economy. The resultant effect of this debt burden in Nigeria is the creation of some unfavourable circumstances such as crowding out of private investment, overhang effect, poor GDP growth etc. It is therefore imperative to analyse the effect of total external debt on the Nigerian economy within the study period using error correction model (ECM).

Therefore, the remaining sections of this paper include: section two deals on the review of related literature; section three is the methodological approach; section four focuses on the results and discussions while section five concludes the paper.

1.1. Theoretical Literature

Various theoretical contributions have been made by scholars in an attempt to explain the subject matter. These theories are of relevance to this study as they serve as building blocks to this research work. They include: the dual-gap theory (two-gap theory), debt-overhang theory, and crowding-out effect theory.

i. Two-gap theory

Chenery and Strout (1966) work has given rise to many subsequent studies either theoretical or empirical into specific cases of the “two-gap approach”. Scholars have also provided different formulations of the two-gap model. Diwan (1967) studied the two gap model based on a production function in which imports and capital are the major inputs. Cochrane (1972) argues that there are really two models in the Chenery-Strout model, namely a short and a long run one. Blomqvist (1976) makes an empirical study of the two-gap using cross section data of thirty three developing countries. Gersovitz (1982) again based on five Latin American countries attempts to estimate a version of the two-gap model. The Chenery-Strout model had also come under criticism. It can be concluded that despite minor criticisms of the two-gap model, it has proved to be a workable tool for identifying financial constraints on economic development. Various scholars have attempted to construct the two-gap model differently.

A simplified version was provided by Thirwall (1978) as thus:

If the economy is an open one, saving can be supplemented by external assistance. From national income accounting, we can establish that:

Income (Y) = consumption (C) + imports (M) + savings (S) and;

Output (O) = consumption (C) + exports (X) + investment (I)

and since income = output; then $C + M + S = C + X + I$

$$C - C + M - X = I - S$$

$$M - X = I - S$$

Then; $I - S = M - X$

The left hand side of equation (1) is the saving—investment gap, while the right hand side is the export – import gap. Harrod’s theory of growth specified that the relationship between growth and saving is given by the incremental capital-output ratio (**c**), which is the reciprocal of the productivity of capital (**p**). Letting **g** = rate of growth. **s** = saving ratio, $\mathbf{g} = \mathbf{s}/\mathbf{c}$, or $\mathbf{g} = \mathbf{sp}$. (2) Relationship between growth and imports of investment goods is given by the incremental output-import ratio (**m**).

Letting **i** = import ratio, then

$$\mathbf{g} = \mathbf{im} \tag{3}$$

If **p** and **m** are given, an increase in **g** requires an increase in **s** and **i**.

Let **gt** = target rate of growth, then the required saving ratio (**s**) to achieve **g** is:

$$\mathbf{sr} = \mathbf{gt}/\mathbf{p} \tag{4}$$

and the required import ratio (**ir**) is:

$$\mathbf{ir} = \mathbf{gt}/\mathbf{m} \tag{5}$$

Saving gap exists when $\mathbf{sr} - \mathbf{s} > 0$. Growth is constrained by investment. The availability of foreign exchange can supplement deficient domestic savings. If the required amount of imports to achieve the target rate of growth is greater than the maximum level of exports, there is then an export-import gap (or foreign exchange gap) equals to $\mathbf{ir} - \mathbf{i}$. Growth is said to be constrained by trade. Growth is restricted by the larger of these two gaps.

Suppose the saving-investment gap is the larger of the two gaps, foreign borrowing must be sufficient to meet the gap. The question then arises as to the size of the gap and what conditions would make the gap disappear.

ii. Debt-Overhang Theory

Debt-overhang occurs when a nation’s debt is more than its debt repayment ability. Several scholars have supported the theoretical case for debt overhang. Some of the studies include Krugman (1988), Warner (1992), Cohen (1993), and Sachs (1988). Others like Green and Villaneva (1991), Elbadawi *et al.* (1997), Fosu (2009), Pattillo *et al.* (2002), and Chowdhury (2001) reaffirm this by coming up with ample proof that backs the debt overhang phenomenon. Krugman (1988) explains debt overhang as one whereby the expected repayment amount of debt exceeds the actual amount at which it was contracted. Boreinsztein (1990) also sees debt overhang as one where the debtor nation benefits very little from the returns on additional investment due to huge debt service obligations.

The “debt overhang effect” comes into play when accumulated debt stock discourages investors from investing in the private sector for fear of heavy tax placed on them by government. This is known as tax disincentive. The tax disincentive here implies that because of the high debt and as such huge debt service payments, it is assumed that any future income accrued to potential investors would be taxed heavily by government so as to reduce the amount of debt service and this scares off the investors thereby leading to disinvestment in the overall economy and as such a fall in the rate of growth. In addition, Clements *et al.* (2003) state that external debt accumulation can promote investment up to a certain point where debt overhang sets in and the willingness of investors to provide capital starts to deteriorate.

Audu (2004) relates the concept of debt overhang to Nigeria's debt situation and stated that the debt service burden has prevented rapid growth and development and has worsened the social issues. Nigeria's expected debt service is seen to be increasing function of her output and as such resources that are to be used for developing the economy are indirectly taxed away by foreign creditors in form of debt service payments (Ekperiware and Oladeji, 2012). This has further increased uncertainty in the Nigerian economy which discourages foreign investors and also reduces the level of private investment in the economy. In those economies with heavy indebtedness like Nigeria, "debt overhang" is considered a leading cause of distortion and slowing down of economic growth (Bulow and Rogoff, 1990; Sachs, 1989). Economic growth slows down because these countries lose their pull on private investors.

iii. Crowding-out Theory

Cohen (1993) and Clements *et al.* (2003) observe that aside from the effect of high debt stock on investment, external debt can also affect growth through accumulated debt service payments which are likely to "crowd out" investment (private or public) in the economy. The crowding-out effect refers to a situation whereby a nation's revenue which is obtained from foreign exchange earnings is used to pay up debt service payments. This limits the resources available for use for the domestic economy as most of it is soaked up by external debt service burden which reduces the level of investment. Taylor (1993) Opines that the impact of debt servicing on growth is damaging as a result of debt-induced liquidity constraints which reduces government expenditure in the economy. These liquidity constraints arise as a result of debt service requirements which shift the focus from developing the domestic economy to repayments of the debt. Public expenditure on social infrastructure is reduced substantially and this affects the level of public investment in the economy.

Crowding out effects usually occur due to excessive real interest charges while the terms of trade of an overly indebted country become worsen while foreign credit markets may no longer be available. Claessens *et al.* (1996) identify the decline in investment as being the effect of a decrease in a country's available assets for financing investment and macroeconomics activities. Reduction in nation's capability of maintaining its debt resulting from the crowding out effect; and therefore, as it strives to meet some of its obligations, leaving little capital for domestic investment (Patenio and Agustina, 2007).

1.2. Need for External Borrowing

Generally the need for public borrowing arises from the recognized role of capital in the developmental process of any nation as capital accumulation improves productivity which in turn enhances economic growth. There is abundant proof in the existing body of literature to indicate that foreign borrowing aids the growth and development of a nation. Soludo (2003) was of the opinion that countries borrow for major reasons. The first is of macroeconomic intent that is to bring about increased investment and human capital development while the other is to reduce budget constraint by financing fiscal and balance of payment deficits. Furthermore Obadan (2004) stressed the fact that countries especially the less developed countries borrow to raise capital formation and investment which has been previously hampered by low level of domestic savings. Ultimately the reasons why countries borrow boils down to two major reasons which are to bridge the "savings-investment" gap and the "foreign exchange gap". Chenery and Strout (1966) pointed out that the main reason why countries borrow is to supplement the lack of savings and investment in that country. The dual-gap analysis justifies the need for external borrowing as an attempt in trying to bridge the savings-investment gap in a nation. For development to take place it requires a level of investment which is a function of domestic savings and the level of domestic savings is not sufficient enough to ensure that development take place Oloyede (2002). The second reason for borrowing from overseas is also to fill the foreign exchange (imports-exports) gap. For many developing countries like Nigeria the constant balance of payment deficit have not allowed for capital inflow which will bring about growth and development. Since the foreign exchange earnings required to finance this investment is insufficient external borrowing may be the only means of gaining access to the resources needed to achieve rapid economic growth.

Undoubtedly, external borrowing has the advantage of stimulating growth but the extent would be determined by the application of the acquired resources (Okolie, 2014). As a matter of fact, given the low level of capital formation in Nigeria, caused by the low level of income and the generally high incidence of poverty, the country has few prospects to source sufficient funds for development internally. It is generally expected that developing countries, facing scarcity of capital, will acquire external debt to supplement domestic saving (Aluko and Arowolo, 2010; Avramovic, 2010). Besides, external borrowing is preferable to domestic debt because the interest rates charged by

international financial institutions like International Monetary Fund (IMF) is about half to the one charged in the domestic market. However, whether or not external debt would be beneficial to the borrowing nation depends on whether the borrowed money is used in the productive segments of the economy or for consumption (Cohen, 2010; Kenon, 1990). The early contributors are of the view that reasonable levels of borrowing by a developing country are likely to enhance its economic growth. Such debts if properly use, can greatly benefit a developing country and not only do they contribute to its growth but they add up to the total resources available to an economy over a given period (Frankal and Dude, 1989; Ndekwe, 2008). Borrowing is desirable when it is used to finance investment that is expected to yield an adequate rate of return or to smoothen consumption in the face of an uneven aggregate supply since it can provide a level of economic welfare that could not otherwise be obtained. Debt financed investment

however need to be productive and well managed so that it can earn a rate of return higher than the cost of debt servicing. (Clements *et al.*, 2005; Ndekwe, 2008).

1.3. Nigeria's External Debt Problem: Causes and effects

Ahmed (1984) opines that the causes of debt problem relate to both the nature of the economy and the economic policies put in place by the government. He articulated that the developing economies like Nigeria are characterized by heavy dependence on one or few agricultural and mineral commodities and export trade is highly concentrated on the later. The manufacturing sector is mostly at the infant stage and relies heavily on imported inputs. He also stated that they are dependent on the developed countries for supply of other input and finance needed for economic development which makes them vulnerable to external shocks. Sogo-Temi (1999) states that the growing debt burden of developing economies like Nigeria is of two-fold. Firstly, developing countries have become over-dependent on external borrowing. Secondly, the difficulties they experience in servicing external debt due to huge debt service payments. Aluko and Arowolo (2010) points out that the major cause of the debt crisis situation in Nigeria is the fact that these foreign loans are not being used for developmental purposes.

Soludo (2003) posits that the underlying basic of external borrowing entails three phases of the debt cycle: in the first phase, debt grow in order to fill resource gaps, in the second phase, the country generates surplus resources but probably not enough surpluses to cover interest payments, while in the third phase it must generate enough surpluses to cover interest repayments and amortization. The peculiar experience of highly indebted countries is that they have been trapped in phases I and II for decades. These conditions have undermined the economic sovereignty and independence of many developing countries including Nigeria. Boyce and Ndikumana (2002) asserts that the inability of many Sub Sahara Africa (SSA) countries to meet their social needs and escape from debt is as a result of the fact that the borrowed funds have not been used productively. Instead of financing domestic investment in the key sectors, a substantial fraction of the borrowed funds was captured by African political elites and channeled abroad in the form of capital flight. In his reaction to the debt relief granted Nigeria, the former President Olusegun Obasanjo noted "...how did we get to the point where our debt burden became a challenge to peace, stability, growth and development? Without belabouring the point, we can identify political rascality, bad governance, abuse of office and power, corruption, mismanagement and waste, misplaced priorities, fiscal indiscipline, weak control, monitoring and evaluation mechanisms, and a community that was openly tolerant of corruption and other underhand and extra-legal methods of primitive accumulation" Debt Management Office (DMO) (2005).

The creditor nations have prescribed policies that are essentially anti-people, increased poverty, encouraged the tying of the economy of developing countries to that of global community, much to the detriment of the local people and to the benefit of their countries. Ajayi (2008); Bello and Obasaki (2009) states that SSA countries were plague by heavy external debt burden due to their inability to manage borrowed funds resulting from corruption, embezzlement and financial recklessness. They argue that the debt crisis, compounded by massive poverty and structural weaknesses of most of the economies of these countries made the attainment of rapid and sustainable growth and development difficult. In the case of Nigeria, mismanagement of the oil revenue during the oil boom era and high level of corruption in the handling of borrowed funds among others were responsible for her debt crises. In addition, a lot of white elephant projects were embarked upon for political reasons, these were later abandoned by successive governments after so much money would have been spent on them (Ajayi, 2008; Anyawu, 1986).

1.4. Nigeria External Debt Management Policies and Strategies

Several debt management policies and strategies have been proposed and applied in managing the external debts of the LDCs including Nigeria. The measures taken so far have been aimed at reducing the debt stock outstanding and increasing debt inflow, while embarking on economic reform to correct macroeconomic imbalances. The internal control measures adopted by Nigeria so far include, setting of limits on the volume of debt to be contracted; statutory provision of maximum level of borrowings; issuance of directives or guidelines by the Federal Government on foreign borrowings; placing of embargoes on new loans; refinancing of trade arrears; debt buy-back scheme; debt conversion; and debt rescheduling. These policies and strategies are explained below:

- a. **Statutory Provision of Maximum Level of Borrowings:** At independence, some form of regulatory framework was set in place to guide and monitor the inflow, usage and repayment of external debt incurred; the Promissory Notes Ordinance and the External Loans Act were enacted in 1960 and 1962, respectively (Central Bank of Nigeria (CBN), 1994). The former specifically established a Sinking Fund for loan redemption as at when due while the latter explicitly stipulated that external loans should be used for development programmes and for on-lending to regional government. Another of the regulatory frameworks put in place was the External Loans (Rehabilitation, Reconstruction and Development) Decree of 1970 which made provision for the maximum level of commitment by Nigeria. The Decree authorised the Federal Government to raise external loans not exceeding N1billion for the purpose of rehabilitation, reconstruction and development programmes. In 1978, the size of external loans that can be outstanding at any time was raised to N5 billion by External Loans Decree No. 30 of 1978 (International Monetary Fund, 1985). This was done because the old ceiling became inadequate to cater for the then developmental needs.

- b. Issuance of Directives by the Federal Government:** The 1980 external debt guideline stipulated some conditions for external borrowings by states governments, because under the Federal Constitution of Nigeria, only the federal government can borrow from external sources and state governments need to get a federal government guarantee before they can contract external loans. Among these conditions were the needs for states governments to demonstrate viability of projects to be financed possess acceptable debt service ratio and that the debt-servicing should not exceed 10 per cent of the state.s fiscal revenue. .Following the non-compliance with this guideline, the federal government placed a ceiling of N200 million on state governments and the use of Euro-dollar International Capital Market (ICM) borrowing to finance on-shore cost components of approved capital projects, [Uwatt \(1995\)](#). The austerity measures initiated between 1982 and 1984 by the federal government attempted to introduce measures that include embargo on new loans, a limit on debt service payments, counter-trade, and debt restructuring. Under the limits on debt service payment, a fix proportion of export earnings were set aside to meet debt service obligations. This was done in order to allow for sizable resources for internal development. For example, since 1980, the federal government set aside 30 per cent of export earnings for debt service, while states governments were directed to set aside 10 per cent of their income for foreign debt service.
- c. Embargo on New Loans:** This involves temporary stoppage of further external borrowings until the debt situation improves. It is aimed at preventing additional debt burden. The embargo on new external loans aimed at preventing accretion to the burden was applied in 1984 to governments' borrowings from abroad, certain exceptions were, however, granted in respect of on-going core projects. The embargo on sourcing new foreign loans was lifted in January 1999.
- d. Refinancing Programme:** Refinancing of short-term trade debts and commercial bank debts involves the procurement of a new loan contracted either from the same or new creditors by a debtor to pay off an existing debt ([International Monetary Fund, 1985](#)). It is aimed at shifting repayment forward and easing the medium-term foreign exchange liquidity squeeze. In July 1983, Nigeria undertook its first refinancing exercise when it successfully refinanced almost US\$2 billion worth of trade arrears on confirmed letters of credits outstanding as at July 1983. The arrears were refinanced at an interest rate of 1 per cent above the London Inter-Bank Offer Rate (LIBOR), with a repayment period of 30 months and a grace period of six months ([International Monetary Fund, 1990](#)). Another refinancing of arrears of uninsured, short-term trade debts outstanding as at December 1983 was contracted in 1984 worth \$3.2billion. Other refinancing agreements were contracted between 1984 and 1988. During this period, trade arrears amounting to over US\$4.8 billion were refinanced and covered with promissory notes. The amount was refinanced over a 22-year period with a two years grace period and at 5 per cent interest rate.
- e. Debt Buy-Back Scheme:** The debt buy-back scheme involves a situation where a substantial discount is offered to pay off an existing debt. Under this programme, Nigeria bought US\$3.4 billion or 62 per cent of the commercial debt owed the London Club of creditors at 60 per cent discount in February 1992, that is, \$1.4 billion paid to liquidate the commercial debt. Under the collateralisation option, the remaining 38 per cent of the commercial debts or the sum of US\$2.1 billion was collateralised as a 30-year par bonds with the London Club. It is expected that the yield on the bonds within the collateralised period should offset the collateralized amount ([International Monetary Fund, 1990](#)).
- f. Debt Rescheduling:** Rescheduling involves changing the maturity structure, interest spread and repayment period of a loan. The objective is to postpone payment of matured debt in order to correct the underlying economic fundamentals in order to expand the country's productive and export capacity. In 1986, commercial banks debt amounting to \$1.6 billion, due to the London Club was rescheduled to extend to 1996 with a four years grace period. Nigeria succeeded in November 1987 to reschedule arrears of commercial banks debts due to the London Club. The amount totalling US\$5.8 billion outstanding by end of 1987 was rescheduled. The amount was consolidated and rescheduled over a twenty years period including a three years grace period ([Central Bank of Nigeria \(CBN\), 1995](#); [International Monetary Fund, 1996](#)). Due to non-performance on the rescheduled debt, again in March 1989, Nigeria rescheduled its debt with the London Club. The annual debt service obligation to the London Club was reduced from US\$1.345 billion to US\$711 million. The high debt service obligation made it impossible for the country to meet its commitment and hence, it defaulted. Consequently, Nigeria approached the Club again for restructuring of the entire debt, the deal was closed on January 1992, in which the country bought back 62 per cent of the debt and issued collateralised par bonds for the remaining 38 per cent. So far the London Club debt has been reduced from \$5.8 billion to \$2.1 billion after the restructuring exercise ([International Monetary Fund, 1990;1995](#)). Of the \$2.1 billion debt left, the sum of \$2.05 billion was fully collateralised. Nigeria has also rescheduled or restructured debts due to the Paris Club and multilateral creditors.
- g. Debt Conversion Scheme:** In Nigeria, the Debt Conversion Programme (DCP) was established in July 1988 to complement the other debt management initiatives aimed at reducing the burden of private debts. The DCP involves the sale of an external debts instrument at a discount for domestic debt or for equity

participation in local enterprises. The programme is meant to reduce the external debt stock and lighten the debt service burden, encourage capital inflows including repatriation of flight capital, and assist the capitalisation of the private sector investment and the generation of employment opportunities. Eligible debt for conversion were initially limited to promissory notes but later expanded to cover other bank debts. As at December 1992, the total amount of external debt stock redeemed was US\$760.9 million. While, as at end of 1993, the amount redeemed was US\$800 million, it moved up to US\$813.43 as at end of 1994. A total of 423 applications worth \$3.48 billion were so far granted approval-in-principle at the end of 1998. In the period between 1989 and 1995, the programme was able to reduce the total debt stock by \$949.49 million.

The effect of the reduction was significant on the categories of debt affected. For instance, the promissory notes which had stood at \$4.58 billion as at the end of December 1989 were reduced to \$3.15 billion, while London Club debts reduction was \$236.25 million between 1989 and 1995. The total amount of debt actually redeemed from inception to 1998 stood at US\$1.285 billion. The other financial benefits derived from the scheme up to 1998, included total discount of US\$564.4 million and commission of US\$21.6 million (Central Bank of Nigeria (CBN), 1999). Some of the problems that hindered obtaining maximum benefit from the scheme were unstable and dual exchange rates, persistent depreciation of exchange rate, political instability, inflation and unstable prices of Nigerian debt instruments.

1.5. Empirical Literature

Different empirical studies are carried out since the onset of the debt crisis in the early 1980's. The result from the studies shows both positive and negative effect of total external debt on economic growth.

Sulaiman and Azeez (2012) carried out a study on the effect of external debt on the economic growth of Nigeria using annual time series data covering the period from 1970-2010. They employed Ordinary least squares (OLS), Augmented Dickey Fuller (ADF) unit root test, Johansen Co-integration test and error correction method and found that co-integration test shows long-run relationship amongst the variables and the error correction model revealed that external debt has contribute positively to the growth of the Nigerian economy.

Faraji and Makame (2013) investigated the impact of external debt on the economic growth of Tanzania using time series data on external debt and economic performance covering the period 1990-2010. They observed through the Johansen co-integration test that no long-run relationship exist between external debt and GDP. Moreso, their findings show that external debt and debt service have significant impact on GDP growth with the total external debt stock having a positive effect of about 0.36939 and debt service payment having a negative effect of about 28.517.

Safdari and Mehrizi (2011) used time series data covering the period 1974-2007 to analysed external debt and economic growth in Iran by observing the balance and long term relation of five variables (GDP, private investment, public investment, external debt and imports) and also employed the vector autoregressive model (VAR) technique of estimation. Their findings revealed that external debt has a negative effect on GDP.

Geiger (1990) used ARDL technique and analyze the impact of external debt stocks burden and economic growth rate for 9 South American countries for the period of 1974 to 1986 and concluded significant negative impact of debt burden on growth rate.

Malik *et al.* (2010) used the time series data applied ARDL technique of estimation to explore empirical relationship between the stock of external debts and economic growth in Pakistan, the research concluded that external borrowings and debt is negatively related to economic growth in context of Pakistan economy.

Muhammad *et al.* (2015) used ADF test to analyze the contribution of external debt to Pakistan's economic growth and their results found that there exist a negative relationship between external debt and economic growth of Pakistan.

Ajayi and Oke (2012) investigate the effect of the external debt burden on economic growth and development of Nigeria using OLS. Their finding indicates that external debt burden had an adverse effect on the national income and per capita income of the nation.

Siddiqui and Malik (2001) showed that the impact of foreign debt on economic growth is positive and statistically significant. The rise in debt servicing affects the level of contribution to investment, but other debt ratios indicate that contribution of investment rate in economic growth is unaffected.

Rashid and Muhammad (2014) studied the role of external debt on economic growth of Pakistan using OLS regression model and descriptive statistics over the time series data for 39 year. Their study revealed that gross capital formation (GCF) and external debt stock has significant positive effect on Pakistan GDP while gross domestic saving does not have significant impact on GDP of Pakistan.

Osuji and Ozurumba (2013) investigated the impact of external debt financing on economic development in Nigeria from 1969-2011 using Vector Error Correction Model (VECM) in which their result showed that London debt financing possessed positive impact on economic growth while Paris debt, Multilateral and Promissory note were inversely related to economic growth in Nigeria.

Frimpong and Oteng-Abayie (2006) results indicate that an increase in external debt inflows has a positive effect on GDP growth.

Adegbite *et al.* (2008) investigate the impact that Nigeria's huge external debt stock had on its economic growth between 1975 and 2005 using ordinary least squares (OLS) and generalised least squares (GLS). Their results find that external debt contributes positively to growth.

Qayyum and Haider (2012) used annual data for the period 1984 to 2008 has been taken from a panel of sixty developing countries. Empirical results indicate that external debt has adverse impact on the output growth.

Azam *et al.* (2013) study analyzes the impact of external debt on economic growth of Indonesia. The method of least squares is used for parameters estimation. The main finding of their study shows external debt has a negative impact on economic growth.

Babu *et al.* (2014) used annual data from 1970-2010 and found external debt expansion has a negative effect on economic growth of the EAC member countries. Zouhaier and Fatma (2014) used a dynamic panel data model on a sample of 19 developing countries during the period 1999-2011. Their results show that external debt negatively affects economic growth of countries. Zafar *et al.* (2015) also found that external debt has significant and negative impact on economic growth.

2. Materials and Methods

In this study, a systematic time series econometrics approach is used to analyse the effect of total external debt on economic growth of Nigeria during the period 1980-2015. For the purpose of arriving at a dependable and unbiased analysis, the researcher employed a secondary data obtained from Central Bank Nigeria (CBN) Statistical Bulletin. Such data includes; total external debt (TED) and gross domestic product (GDP). The Augmented Dickey Fuller (ADF) unit root test is used to verify the stationarity of the variables and Johansen (1989) cointegration approach to determine the number of cointegration equations between the variables. Error correction model (ECM) is also used to check the speed of adjustment from short-run to long-run equilibrium.

i. Model Specification

The independent variable is total external debt and the dependent variable is gross domestic product (GDP). The model is stated as follows:

$$GDP = F(TED) \dots\dots\dots(1)$$

Thus, the functional relationships between dependent and the independent variables in the study are stated as follows:

$$GDP = F(TED) + e_t \dots\dots\dots(2)$$

Hence, the mathematical form of the model is thus:

$$GDP = b_0 + b_1TED + e_t \dots\dots\dots(3)$$

Where:

GDP = Gross Domestic Product

TED = Total External Debt

b_1 = Estimator

b_0 = Constant

e_t = error term

The casual linkage from short-run adjustment of the individual variable is explored using parsimonious error correction model which is stated as thus:

$$D(GDP) = b_0 + b_1D(TED_{t-1}) + b_2ECT_{t-1} + e_t \dots\dots\dots(4)$$

Where:

ECT = Error Correction Term

ii. A Priori Expectation

From the equation above, GDP is a function of TED. That is, GDP is expected to be negatively related to TED. This implies that a decrease in TED will, all things being equal, lead to an increase in GDP. Hence, $b_1 < 0$.

3. Results and Discussion

The result of the ADF test as presented in table 1, appendix A, shows that the dependent variable (GDP) and the independent variable TED is integrated of the order, i.e. order one, lag one, 1(1), all at 5% level of significance. In other words, the variables are found to be stationary at first difference. Thus, the model follows integrating process. This conclusion is informed by the absolute values of ADF test statistics against their absolute critical values at 5%.

As a follow up to the unit root test, cointegration test was used to determine whether there exist any cointegrating vectors supporting the existence of long-run relationship between the dependent variable and independent variables. The result in table 2, appendix B, indicates the presence of 1 cointegrating equation at 5% level of significance for the GDP model and therefore confirms the existence of long-run equilibrium relationship between GDP and TED. All the conclusions are based on the values of trace statistics against their critical values at 5% significance level.

The satisfactory results obtained from unit root and cointegration tests motivated the estimation of an error correction model. From the parsimonious error correction model result, the explanatory variable (TED) explained 63% change in GDP, hence, the coefficient of determination is significantly high. The overall regression is significant and the error correction model (ECM) coefficient is low (13%), rightly signed and significant. This implies that about 13% deviation from the long-run equilibrium relationship between GDP and its determinant is corrected every one year (See table 3 in appendix C).

The result in table 3 revealed that TED at lag 5 has a negative and significant effect on GDP. This meets the 'a priori expectation' that increase in total external debt lead to decrease in GDP and vice versa. This contradicts the findings of some researchers such as Sulaiman and Azeez (2012), Adegbite *et al.* (2008), Rashid and Muhammad (2014), and Siddiqui and Malik (2001) who found that total external debt has a positive and significant effect on gross domestic product. But the result corroborates the findings of Safdari and Mehrizi (2011), Geiger (1990), Malik *et al.* (2010), Azam *et al.* (2013), Zouhaier and Fatma (2014), Muhammad *et al.* (2015), and Zafar *et al.* (2015) on the effect that TED and GDP are negatively and significantly related. The implication of this is that money borrowed externally by the Nigeria government is not channelled to the productive projects that have return on investment rather they are allocated to finance dead-weight debt. (i.e. expenditures on insurgency, recurrent expenditure, war etc.).

4. Conclusion

The thrust of this study is to analyse the effect of total external debt on the Nigerian economy proxied by GDP during the period 1980-2015 using error correction model (ECM). Analysis from the estimation suggests that TED at lag 5 is negatively and significantly related with GDP. This implies that, as TED increases, GDP also decreases and vice versa. Therefore, the researcher recommends that any external loan obtained by the state or nation should be channelled to productive projects like electricity, refineries, factories etc. that have returns on investment. This will engender sustainable economic growth in the economy.

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Appendix A

Table-1. Unit Root test result

Variable	ADF test statistics	5% critical value	Order of integration
D(GDP)	-4.037865	-2.951125	1(1)
D(TED)	-3.669712	-2.951125	1(1)

Source: Researcher's computation, 2017.

Appendix B

Table-2. Cointegration test result

Date: 06/10/17 Time: 02:11
 Sample (adjusted): 1982 2015
 Included observations: 34 after adjustments
 Trend assumption: No deterministic trend
 Series: GDP TED
 Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.238045	13.30029	12.32090	0.0342
At most 1	0.112474	4.056798	4.129906	0.0522

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Source: Researcher's computation, 2017.

Appendix C

Table-3. Parsimonious Results of GDP Model

Dependent Variable: D(GDP)

Method: Least Squares

Date: 06/10/17 Time: 13:32

Sample (adjusted): 1986 2015

Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.357076	0.211576	-1.687694	0.1056
D(TED)	-1.130336	1.149790	-0.983080	0.3363
D(TED(-1))	0.102129	1.140633	0.089537	0.9295
D(TED(-3))	0.719238	1.219883	0.589595	0.5615
D(TED(-4))	-1.687910	1.386281	-1.217581	0.2363
D(TED(-5))	-4.536794	1.450864	-3.126961	0.0049
ECM(-1)	-0.130386	0.041287	3.158014	0.0046
C	4418.898	988.9846	4.468116	0.0002
R-squared	0.631857	Mean dependent var	3133.679	
Adjusted R-squared	0.514721	S.D. dependent var	5804.217	
S.E. of regression	4043.332	Akaike info criterion	19.67070	
Sum squared resid	3.60E+08	Schwarz criterion	20.04436	
Log likelihood	-287.0606	Hannan-Quinn criter.	19.79024	
F-statistic	5.394203	Durbin-Watson stat	1.693070	
Prob(F-statistic)	0.001051			

Source: Researcher's computation, 2017.