# DEBT AND ECONOMIC PERFORMANCE IN NIGERIA (1982 -2016)
## By

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*ABSTRACT:*

*The rising debt profile of Nigeria after the debt forgiveness of 2006 is at the centre of attention of policy makers and economic analysts especially in the face of Nigeria's economic malaise. Using Error Correction approach, we investigated the impact of debt on Nigeria's economic performance and the channels through which debt impacts macroeconomic performance in Nigeria. We affirmed the traditional relationship between debt and economic performance (the direct effect). We validated the overhang hypothesis and from our results, hypothesize a threshold point of just 0.1% suggesting that private investment has minimal tolerance for debt (the crowding out and overhang effect). This means that the foreign direct investment (FDI) component has been very reactive to the external debt level. Given the huge debt profile of Nigeria, efforts should therefore be increasingly directed towards encouraging private sector investment as the prime engine of economic growth.*

**Key words:** Debt, Economic Performance, Debt Overhang, Debt Laffer Curve , Error Correction Model

**JEL Classification:** F34, F43, O47

### Introduction

A major challenge facing the development in the third world has been a constraint of mobilizing adequate savings to finance investment (Nurkse, 1953; Chenery & Strout, 1966). Apart from savings mobilization challenge, these third world countries are beset with severe resource challenges. The Domar (1946) model which is the cornerstone of modern exogenous theories advocate incremental savings rate to achieve development (Domar, 1946). Building on the Domar model, Solow (1956) in his famous treatise, A contribution to the theory of economic growth postulated that a higher savings rate is needed to achieve higher levels of capital accumulation so as to achieve steady state development .The economies of the third world however are characterized by poor savings rate, low investment and productivity need external financing to bridge the deficit (Nurkse, 1953).

The majority of the vast Nigerian debt literature focused on analysing the effect of debt overhang on the economic performance and they acknowledge the importance of debt in the development process (Okolie, 2014; Adedoyin, Babalola, Otekunri & Adeoti,

2014), they fall short of addressing what should be the optimal level of debt. One is tempted to ask how does external debt impact on growth in Nigeria? Is there a non-linear relationship between external debt and growth? Is there a threshold limit of debt? Upon these questions this study aims to determine the nature of the relationship between external debt and growth; determine if a non-linear relationship exists between external debt and growth and to establish if there exist a non-linear relationship.

The rationale for undertaking the study lies in the fact that governments at all levels in Nigeria have continued to contract foreign loans mostly from international commercial banks on non-concessionary terms in which as at June 2017, Nigeria had contracted Multilateral Debts amounted to $9.67 billion, Non-Paris Club Bilateral Debts of $2.07 billion and commercial (Eurobond) accounted for $3.3 billion (Punch October 18, 2017). Literature focusing on Nigeria as the focal point have explored this relationship. Results have however been mixed; some have confirmed a negative relationship (Okolie, 2014) and some concluded that there is a positive relationship (Adedoyin et al., (2014). A probable reconciliation is that the relationship for Nigeria might follow a debt laffer trajectory: positive at low levels of debt because the debt bridges a severe resource constraint in the economy by supplying critical funds for development. However, at high levels of debt, the attendant debt service payment wipes out the net benefits achievable from the debt given the fact that majority of the new loans are at non-concessionary terms; at high debt interest rates compounding over short periods. Previous literature (Ogunmuyi, 2011) merely sought to determine the nature of this relationship and were content at simply establishing a deterministic relationship. The World Bank and IMF ratio of debt burdens to output is meant to indicate the extent of the debt crisis per country, there is certainly a no-fit-all size to the problems of poor countries given their immense diversity. Thus, there is a need to determine this optimal point for Nigeria by estimating a specific critical threshold by looking at Nigeria's external debt antecedent.

This study attempts to examine the relationship between debt and economic performance using data for the years 1982 to 2016. Debt used in the context of this research study refers to foreign debt from official sources - bilateral, multilateral as well as from international commercial banks and the international capital market.

## LITERATURE REVIEW
### Theoretical Review
Achieving a high savings rate or capital formation to start off sustainable growth has been the cornerstone of the most important growth theories. More specifically, the Solow (1956) model which encapsulated the neoclassical precepts to economic growth postulates that higher rates of capital accumulation can be achieved with incremental savings rate. An exogenous component labelled technological progress or factor

productivity was introduced into the model explaining the impact debt can play in the development process of countries of the third world which are trapped in a vicious circle of poverty implying more or less diminishing productivity to capital and labour. Thus, growth is explained in terms of an external or exogenous factor (Engel, 2010).

In Rostow (1960) linear stages of growth model, an increase in net investment to net national product ratio from less than five percent to over ten percent is a necessary condition for the take off stage to growth. According to Nurkse (1953) vicious circle of poverty, growth is constrained by low capital formation because income is too low and hence consumed without savings. A balanced growth strategy to escape the vicious circle involves simultaneous application of capital to different sectors of the economy. Unbalanced growth involves strategic investment in key or leading sectors of the economy. External borrowing can be viewed as alternative source of capital that can be used in financing gaps that exists in the expenditure pattern of developing economies (Eaton, 1993). Therefore, not all debt is bad for growth and investment. The theoretical argument for contracting debt is premised on the fact that once the rate of return of the debt is more than cost of the debt, the debt will be offset from the increased productivity generated by the debt thereby ensuring net positive returns to the economy. On the domestic front, certain level of debt is a precondition for a strong and healthy financial structure of an economy because it deepens of the financial markets (Gurley & Shaw, 1956). Also, additional debt from abroad at low debt levels could promote growth so long as the additional investment financed by the new borrowing enhances the country's productive capacity. Higher output, in turn, would make it easier for a country to service its debt (Clements et al, 2006).

### Theoretical Framework

Five channels are well established in literature through which external debt can have a negative spill over effect on the economy as a whole. On of the foremost channel is the debt overhang hypothesis (DOH). This hypothesis simply proposes that there will be an overhang when investors actually expects a rise in the tax rate due on returns to capital to service the debt and as such then reduces the level of investment for the purpose of avoiding greater taxes in the near future (Anyanwu, 1994; Krugman, 1988; Sachs, 1989).

Another hypothesis to consider is the crowding-out hypothesis and this states that the debt service attributable to government debt has the tendency to reduce public spending, both on social amenities like education, health and housing; this reduction is pivotal for economic growth (Essien, Agboegbulem, Mba & Onumonu, 2016) The debt service leading to decline in public investment will ultimately lead to decline in private spending since the two can be seen to be complimenting each other (Diaz-Alejandro, 1981; Taylor, 1983).

There is also another hypothesis that explains the effect of a very high debt burden on balance of payment account and this is otherwise called the Liquidity Constraint Hypothesis (LCH). From the hypothesis, various summation can be made; one of which is that economies with high debt burden needs more capital inflow of foreign exchange to service the debt and this is more important when the economy's currency is not internationally tradable. The implication of debt servicing on the economy will become more implicating when the nation's export is low as well as the foreign reserves (Essien et al., 2016). Other alternatives for such country will then be the devaluation or import restriction in order to attract foreign exchange (Serieux & Sammy, 2001).

The last establishes a channel through which debt affects economic growth and this is otherwise called Direct Effect of Debt Hypothesis (DEDH). Other hypotheses have linked debt-growth effect through investment. However debt could also have a direct effect on the level of economic performance and thus productivity is negatively affected (Fosu, 1999). According to Pattilo et al (2004), huge debt burden results in high level of uncertainties and thus biases investment towards short term instruments to the detriment of long-term investments. To this effect, investors will then decide to be reluctant to invest in projects with longer gestation periods because of higher uncertainty that characterizes the long-term.

There is also the Debt Laffer Curve theory that establishes a non linear relationship between debt and growth and states that there is an optimal level of debt that promotes growth. Beyond that threshold further debt accumulation impedes growth.

### Methodological Review

Ayadi and Ayadi (2008) examined the effect the large external debt stock will have on economic growth of Nigeria and South Africa. In addition, the authors examined the effect of servicing requirements on Nigeria and South Africa economies and adapted the Neoclassical Growth model by including the external sector, debt stock and other macroeconomic variables. The study employed the Ordinary Least Squares (OLS) and the Generalized Least Squares (GLS) in the analysis and the result revealed that debt contraction has some positive spill over effect on the economy. This result was further supported by the findings of Adegbite, Ayadi and Ayadi (2009). The work of Muhammad and Zaman (2014) provided an interesting result by adopting the Autoregrssive Distributed Lag Model (ARDL) in investigating the effects of external debt on the growth pattern of Pakistani economy within the periods of the years 1970 till 2009. The study developed a macroeconomic policy index using the principal component analysis (PCA) comprising of the the degree of openness, rate of inflation and budget deficit. The studies concluded that external debt has positive spill over effects on economic growth of Pakistani state.

Ugo et al (2014) used an instrumental variable approach in a panel analysis to consider if there is a causal relationship between public debt and economic growth of seventeen selected Organisation for Economic Co-operation and Development (OECD) countries. Part of the analysis included correcting for endogeneity, the influence of outliers and weak instrument problems and conducting robustness checks. Siti et al (2013) employed the ARDL bound test for cointegration analysis for a period of 19 years spanning 1991 through 2009 with the aim of investigating if there is a long run relationship between the external debt of Malaysia and her economic performance. The authors further employed a sub-period analysis by estimating their models on quarterly basis for the periods between 1991, the first quarter to 1997, the third quarter and then from 1998, the third quarter to 2009, the fourth quarter.

### Empirical Review

Okon et al (2017) examined the relationship between external debt and economic growth and the result from his study revealed that there is an inverse relationship between external debt and economic growth thereby negating the findings of Ayadi and Ayadi (2008). The evidence suggests that a unit increase in external debt leads to a fall in economic growth by 0.315629 units. Also, there is a direct relationship existing between external debt service and economic growth. The positive sign exhibited by the coefficient is against economic theory and contrary to the empirical study by Hameed, Ashraf and Chaudary (2008) which discovered that debt servicing is negatively related to economic growth implying that higher debt servicing engenders the growth of any economy and mentioned that the transmission mechanism being labour and capital. Imran et al (2017) made an attempt of providing a link between foreign direct investments and economic growth and also external debt and economic growth of developing economies. The authors findings revealed that foreign direct investment has a positive spill over effect on the growth of the economy compared to the effect of external debt. This was proven as a unit increase in foreign direct investment caused economic growth to occur by 4.03 against external debt effect of 2.13. the result however concluded from the Fully Modified OLS method employed that both foreign direct investment and external debt all have positive spill over effects on economic growth.

### Implications of Literature Review on the Current Study

As noted earlier, the overwhelming majority of the literature on debt where it is explored from the critical limit or threshold perspective focused on rich countries as seen in the works of Baum, Schaffer and Stillman, (2013); Cecchetti, Madhusudan and Zampolli (2011); Checherita-Westphal and Rother (2012); Reinhart and Rogoff (2010a,b). This study is an attempt to update the literature with respect to Nigeria.

### Methodology

This section contains the details of the methodology to achieve each of the stated objectives. The estimation technique employed is error correction model and this is simply because of the other of stationarity of the variables employed in which they are integrated to the order of one (I). Also, Augmented Dickey Fuller (ADF) technique is employed in testing for the stationarity of the variables.

### Model Specification:

This study specifies the following econometric models:

### Model 1

A neoclassical growth model is specified. This model which is adapted from Esther and Ayadi (2008) explores a linear relationship between output and debt burden indicators. It is in tandem with the first objective of this study which is to analyse the impact of debt indicators on output growth (debt overhang effect). The model is based on the following equation:

$$Yg_t = \beta_0 + \beta_1 EXPGRO_t + \beta_2\left(\frac{CAP}{GDP_t}\right) + \beta_3\left(\frac{DSERV}{GDP}_t\right) + \beta_4\left(\frac{EXDEBT}{GDP}_t\right) + \beta_5 SAV_t \quad (1)$$
$$+\beta_6 EXR_t + \beta_7 POP_t + \mu_t$$

Yg is the annual growth rate of the GDP. CAP/GDP is defined as the total investment-output ratio and EXPGRO is the annual growth rate of exports. DSERV/GDP is the ratio of debt service to GDP, and SAV is savings, EXR the exchange rate, EXDEBT/GDP is the size of external debt stock relative to GDP, and, $\mu_{it}$ is the random error terms assumed to have a zero mean and variance-covariance matrix, $\delta_1 I$.

### Model 2

The second model is based on variants of Elbadawi, Ndulu and Ndung'u (1999) model of external debt sustainability reformulated by Adegbite and Ayadi (2008) to capture balance of payments effects. The model has two variants and the versions of the model are:

i.
$$Yg_t = \Omega_0 + \Omega_1\left(\frac{EXDEBT}{GDP}\right)_t + \Omega_2\left(\frac{EXDEBT}{GDP}_t\right)^2 + \Omega_3\left(\frac{GCAPIT}{GDP}_t\right) + \Omega_4\left(\frac{DSERV}{EXPORT_t}\right)$$
$$+\Omega_5 TOT_t + \Omega_6 POP_t + \varepsilon_t \qquad (2)$$

ii.
$$\frac{PRIVCAP}{GDP} = \alpha_0 + \alpha_1\left(\frac{EXDEBT}{GDP}\right)_t + \alpha_2\left(\frac{EXDEBT}{GDP}_t\right)^2 + \alpha_3\left(\frac{GCAPIT}{GDP}_t\right) + \alpha_4\left(\frac{DSERV}{EXPORT_t}\right)$$
$$+\alpha_5 TOT_t + \alpha_6 POP_t + \nu_t \quad (3)$$

Where $Y_g$ measures the rate of output growth (DGDP/GDP) and TOT is the external shock (measured as terms of trade variability). GCAPIT/GDP is the public investment (measured as capital expenditure) to GDP while EXDEBT/GDP is the external debt to

GDP ratio and PRIVCAP/GDP is the ratio of private investment to GDP. DSERV/EXPORT is the debt service to exports and EXPGRO is export growth.

## PRESENTATION AND ANALYSIS OF DATA
### Trend Analysis
**Table 1: Selected Macroeconomic debt Indicators (Averages)**

| INDICATORS | Export growth rate | Debt service growth rate (% of Exports) | GDP growth rate | Debt growth rate (% of GDP) | Debt service growth rate (% of GDP) |
|---|---|---|---|---|---|
| 1982-1987 | -0.5 | 20.7 | -3.2 | 56.6 | 9.2 |
| 1988-1993 | 4.8 | 21.2 | 4.8 | 127.4 | 9.6 |
| 1994-1999 | 3.7 | 12.2 | 1.9 | 142.1 | 5.7 |
| 2000-2005 | 7.3 | 9.1 | 10.2 | 72.5 | 4.1 |
| 2006-2011 | 20.0 | 2.4 | 6.8 | 10.4 | 1.1 |
| 2011-2016 | -0.3 | 0.3 | 2.8 | 4.0 | 0.3 |

**Source: Author's Calculation from World Development Indicators (WDI) 2017**

**Table 2: Correlation Matrix of selected indicators**

| Debt Indicators | GDPGRO | DEBTGDP | DEBTSERVEXPORT | EXPORTGRO |
|---|---|---|---|---|
| GDPGRO | 1 | | | |
| DEBTGDP | -0.117412 | 1 | | |
| DEBTSERVX | -0.248557 | 0.581633 | 1 | |
| EXPORTGRO | 0.150259 | -0.114597 | -0.090933 | 1 |

**Source: Authors' Calculation from World Development Indicators (WDI) 2017**
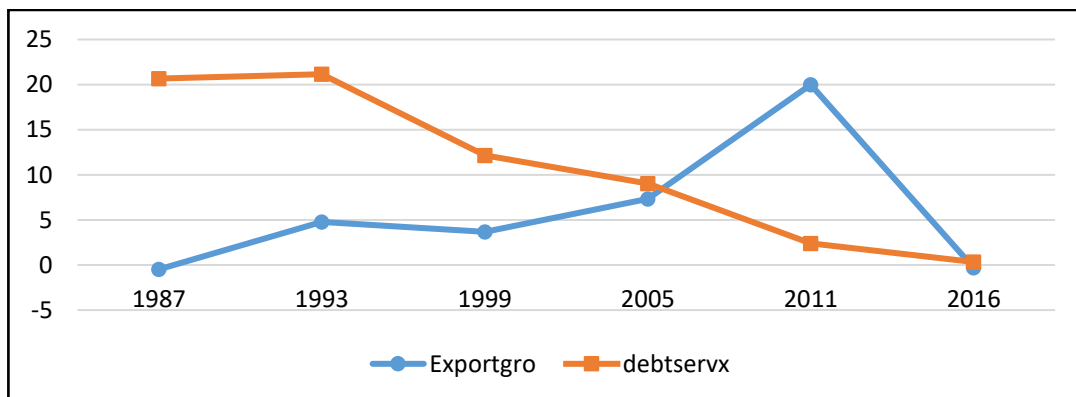


**Fig. 1: Five Years Average Annual Growth Rates of Export and Debt Service as a Percentage of Export**
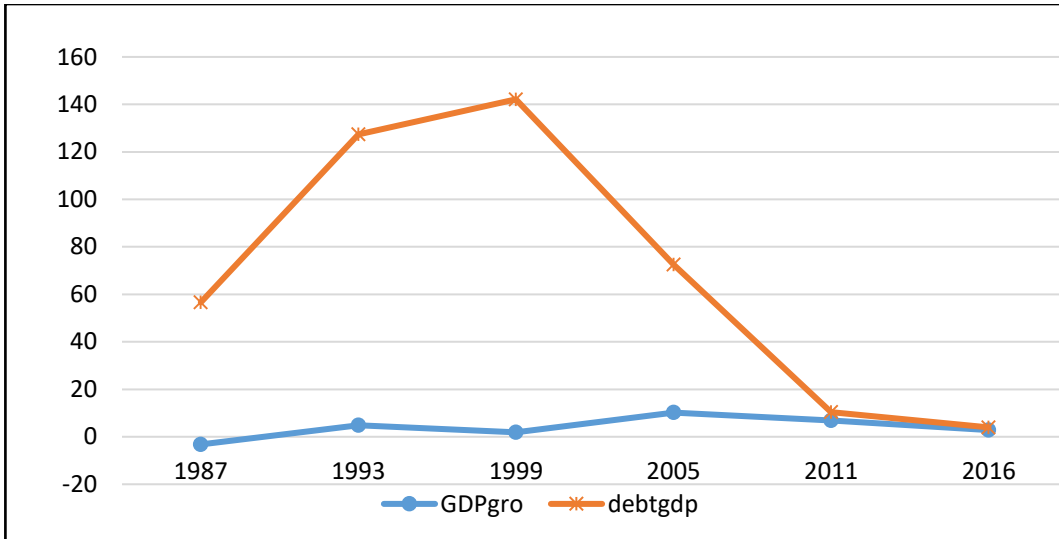
**fig. 2: Five Years Average Annual Growth Rates of GDP and Debt as a Percentage of GDP**

**Table 3: Descriptive Statistics of selected indicators**

|  | GDPGRO | DEBTGDP | DEBTSERVEXPORT | EXPORTGRO |
|---|---|---|---|---|
| Mean | 4.002187 | 70.80853 | 11.26986 | 5.998759 |
| Median | 4.279277 | 64.16125 | 10.98065 | 2.261426 |
| Maximum | 33.73578 | 228.3717 | 30.9904 | 60.21778 |
| Minimum | -10.7517 | 4.132155 | 0.253794 | -30.70184 |
| Std. Dev. | 7.158304 | 60.05069 | 9.358307 | 21.79496 |
| Skewness | 1.684671 | 0.703425 | 0.450427 | 0.658048 |
| Kurtosis | 10.09122 | 2.976555 | 2.15823 | 3.102108 |
| Jarque-Bera | 89.88847 | 2.887177 | 2.216832 | 2.541193 |
| Probability | 0.00000 | 0.236079 | 0.330081 | 0.280664 |
| Sum | 140.0765 | 2478.299 | 394.445 | 209.9566 |
| Sum Sq. Dev. | 1742.205 | 122606.9 | 2977.649 | 16150.69 |
| Observations | 35 | 35 | 35 | 35 |

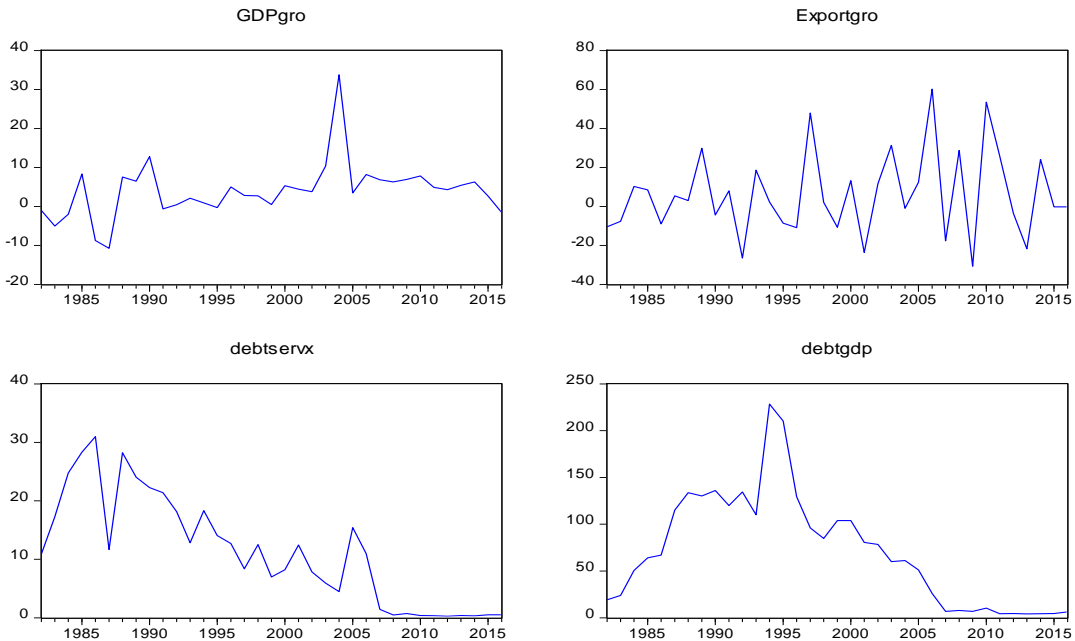**Source: Authors' Calculation from World Development Indicators (WDI) 2017**

**Fig. 3: Multiple Graphs of Selected Indicators**

**Table 4: Estimated Error Correction for Model (1)**

**Dependent variable: Δ(GDPGRO)**

| Regressors | Parameter Estimates | Prob. | t-Statistic |
|---|---|---|---|
| Δ(EXPORTGRO) | -0.328197 | 0.0017 | -5.38173 |
| Δ(EXPORTGRO(-1)) | 0.076819 | 0.1527 | 1.637249 |
| Δ(DEBTSERVGDP) | 2.932426 | 0.0040 | 4.523336 |
| Δ(DEBTSERVGDP(-1)) | 1.653069 | 0.0564 | 2.358526 |
| Δ(CAPITALGDP) | -0.618192 | 0.4016 | -0.90245 |
| Δ(CAPITALGDP(-1)) | 1.791716 | 0.0441 | 2.540472 |
| Δ(DEBTGDP) | -0.14792 | 0.0185 | -3.20543 |
| Δ(DEBTGDP(-1)) | -0.034886 | 0.3719 | -0.96471 |
| Δ(EXR) | -0.264134 | 0.0793 | -2.1104 |
| Δ(EXR(-1)) | 0.449075 | 0.0560 | 2.363173 |
| Δ(POP) | -189.7010 | 0.2243 | -1.35482 |
| Δ(POP(-1)) | 61.29023 | 0.7174 | 0.379485 |
| Δ(NETSAVINGSGDP) | 0.276001 | 0.2323 | 1.328676 |
| Δ(NETSAVINGSGDP(-1)) | -0.321916 | 0.1881 | -1.48505 |
| ECT(-1) | -1.742166 | 0.0003 | -7.58271 |
| R-squared | 0.870 | | |
| Adjusted R-squared | 0.740 | | |
| Durbin-Watson stat | 2.437 | | |
| Normality | 0.860 | | |
| Serial Correlation | 0.178 | | |
| Heteroscedasticity | 0.108 | | |

**Table 5: Estimated Error Correction for Model (2)**
**Dependent variable: Δ(GDPGRO)**

| Regressors | Parameter Estimates | Prob. | t-Statistic |
|---|---|---|---|
| Δ(DEBTGDP) | 0.093183 | 0.4234 | 0.817193 |
| Δ(DEBTGDP2) | -0.000347 | 0.3653 | -0.926393 |
| Δ(DEBTGDP2(-1)) | 0.000229 | 0.0589 | 2.003505 |
| Δ(DEBTSERVX) | -0.313263 | 0.0608 | -1.986966 |
| Δ(CAPEXGDP) | 1.496374 | 0.0834 | 1.822022 |
| Δ(CAPEXGDP(-1)) | 2.945376 | 0.0091 | 2.886563 |
| ECT(-1) | -1.398666 | 0.0000 | -7.85566 |
| R-squared | 0.750 | | |
| Adjusted R-squared | 0.690 | | |
| Durbin-Watson stat | 2.327 | | |
| **Diagnostic Statistics** | | | |
| Normality | 0.0002 | | |
| Serial Correlation | 0.0892 | | |
| Heteroscedasticity | 0.0564 | | |

**Table 6: Estimated Error Correction for Model (3)**
**Dependent variable: Δ(CAPITALGDP)**

| Regressors | Parameter Estimates | Prob. | t-Statistic |
|---|---|---|---|
| Δ(CAPITALGDP(-1)) | 0.542083 | 0.0002 | 4.718186 |
| Δ(POP) | -89.45156 | 0.0007 | -4.090359 |
| Δ(DEBTGDP) | -0.104398 | 0.0121 | -2.789389 |
| Δ(DEBTGDP(-1)) | 0.217091 | 0.0000 | 5.299161 |
| Δ(DEBTGDP2) | 0.000335 | 0.0136 | 2.733377 |
| Δ(DEBTGDP2(-1)) | -0.000676 | 0.0000 | -5.336796 |
| Δ(DEBTSERVX) | 0.049156 | 0.3961 | 0.869406 |
| ECT(-1) | -0.838553 | 0.0000 | -6.060976 |
| R-squared | 0.790 | | |
| Adjusted R-squared | 0.730 | | |
| Durbin-Watson stat | 2.261 | | |
| **Diagnostic Statistics** | | | |
| Normality | 0.2636 | | |
| Serial Correlation | 0.2103 | | |
| Heteroscedasticity | 0.3884 | | |

### Conclusion

In the linear model, the estimated result using ECM technique established a negative relationship between debt and growth. However, debt service bears a positive

relationship with growth and this might be attributed to the short run model. The apriori expectation is that the relationship will normalize over the long run. The speed of adjustment of the real GDP growth to the long run equilibrium path is fast. Specifically, a tremendous 174% of the disequilibrium errors that occurred in the previous year are corrected in the current year.

In the first non-linear model, also using ECM, debt was not significant and the debt service however bears the expected sign and is significant at 10% level of significance. The speed of adjustment of the real GDP growth to the long run equilibrium path is fast. Specifically, a whopping 139% of the disequilibrium errors that occurred in the previous year are corrected in the current year.

In the second non-linear model, the lagged values Debt-GDP percentage (DEBTGDP (-1))and that of its square (DEBTGDP2 (-1)) bears a positive and negative signs respectively which are consistent with the Laffer curve theory or non-linearity. Based on the coefficient of the square of Debt-GDP percentage (DEBTGDP2 (-1)), we specify a threshold limit of 0.1%. The speed of adjustment of the private investment growth to the long run equilibrium path is fast. Specifically, 83% of the disequilibrium errors that occurred in the previous year are corrected in the current year.

Apparently, the findings from this study suggest to policy makers the importance of limiting the volume of external debt as much as possible. To avoid debt overhang, concessionary debt appears the way to go. Moreover, debt should only be used for projects that have the highest positive net present values. Given that Nigeria's external debt is far in excess of the maximum specified from our estimation, there is need to alleviate the impact of debt on the private sector. Economic policies should be increasingly tailored towards empowering the private sector as the engine of growth of the economy. The result further shows that savings does not contribute to economic growth in Nigeria in the short run.

Essentially, the model only investigated the debt overhang, Laffer curve and the crowding out effects of debt. Due to the constraint imposed by resources, the study could not investigate if the liquidity constraint hypothesis (LCH) or import compression effect is another potent channel through which debt affects growth.

Conclusively, in this study, it was established that debt has a negative relationship with growth. Also, the study does not find evidence for non-linearity running directly from debt to growth. Rather, the Laffer curve theory operates through the private investment channel. In other words, this negative relationship does not affect growth directly but through private investment and it only appears at high levels of debt because when non-linearity was introduced into the model, the parameters bear signs consistent with a

Laffer curve; the unsquared coefficient positive and the squared coefficient negative. Furthermore, contrary to economic theory, debt service bears a positive relationship with growth. This is due to the short run model. Since the variables are cointegrated, we expect the relationship to normalize in the long run.

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