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Nigerian External Debt: Nigerian Experiences from 1960-2013

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Abstract: *The paper examined the impact of* Nigerian external debt: Nigerian experiences from 1960-2013*, using time series data from 1960 to 2013. The study employed secondary data such as Financial Reviews of Central Bank of Nigeria (CBN), and/or National Bureau of Statistics (NBS). The paper explored various econometrics and statistical analytical (.i.e., Eview 7.2) method to examine the relationship between NED and economic growth. The paper employed various diagnostic tests on Nigeria's time series data from 1960-2013. The entire tests rejected the null hypothesis and/or accepted the alternative hypothesis. From the empirical result findings, it was discovered that there is a significant relationship between NED and/or economic growth in Nigeria. The study recommended therefore that government should encourage domestic or private saving because absence or inadequate saving leads to debt or borrowing to finance the obligatory of its citizenries, formulation of fiscal policy or monetary policy to improve the standards of living of its citizenries, debt or loan stocks should be used on capital or mega projects, in order to generate employment opportunities not consumable goods (.i.e., ostensible goods). The former has direct relationship with economic growth or development, while the latter has an inverse relationship with economic growth or development of Nigeria.*

Keywords: *Fiscal Policy, Debts, Exchange Rate, Expenditure.*

1. INTRODUCTION

Debt is germane to economic development, in other words, debt is synonymous to borrowing. Debt becomes sine qua non to a country when the domestic or private saving could not match up with the trend of economic development (or productivity). Domestic saving vis-à-vis debt (being internal and external) facilitates the productive activities and/or scale of operation and/or economies of scale. The debt (being internal or external) is a macroeconomic variable which seeks to be redressed via the fiscal policy. Sometimes, the current account in the balance of payments assumes deficit arising from external shocks as it were experienced in the 21st century. In this scene, fiscal policy is in operative as such budget deficit is opted for by the government. This is done in way of deliberately reducing the sources of revenue and/or surging expenditure. When government has exhausted its available sources of revenue on public works, construction of capital or mega projects, etc., all these will result to the job creations, decline in the rate of poverty level, closing the gap between the poor and/or the rich. Besides, the government aggregate expenditure is essential in the sense that government invests in productive projects (.i.e., C + I +G), this raises the level of national income or output (Shuaib & Peter, 2010: 50).

Most emerging countries--such as—Nigeria have their National Plan and/or one of the objectives of the National Plan is to achieve economic development within the period of five years or more, but not exceeding ten years. However, the emerging countries are termed poor—when there is no or small capital base/formation *(*Shuaib, *loc.cit*, 50-51). Any countries who desire to opt for economic development without capital formation resorts to borrowing from either internal or external source (Jhingan, 2006; Shuaib & Peter, 2010: 44). Though, Foreign borrowing may highly beneficial providing the ingredients (or resources) necessary to promote economic growth and development, it has its costs. Over the decades, these costs have greatly outweighed the pros for many emerging

nations. The main cost associated with the accumulation of a large external debt is 'debt servicing' (Todaro & Smith, 2006: 682). The burden of external debt is enormous in the sense that it is contractually fixed charge on domestic real income and savings (*ibid.*). Debt-service payment must be made with foreign exchange. In other words, debt-service obligation can be met only through export earnings, curtailed imports, or further external borrowing. Significantly, debt-service obligations are met by its export earnings. In a situation where export earnings diminish, debt-servicing difficulties are likely to arise. This has been the experience of most of the heavily indebted less developing countries (Todaro & Smith, *loc.cit.,* 683-684; Shuaib & Peter, *op.cit,* 45-46).

Public debt is one of the means to financing government revenue, when the government expenditure is greater than its receipts (or budget deficits); hence, borrow from general public. Thus public debts as a source of government revenue are different from other sources of public revenue—such as—taxes, fees, etc., (Jhingan 2006; Shuaib & Peter, 2010).

The total of all federal government deficits forms the national debt. The size of the Nigeria's national debt has grown during 20th century. The total debts equaled about #4.23million and $10.41million in 2001. In 2002 the total debt and external reserves stood from #5,098million to #5,72million and $7,46million. In 2003, the total debt and external reserves escalated from #5,098 million to #5, 72 million and $7, 46 million. In 2004, the total debt and external reserves stood at #6, 26 million and $16,95million. In 2005, the total debt and external reserves were #4, 22 million and $28, 27 million. The decline in the external debt was resulting from the debt-relief of the Paris Club in 2006. From 2006 (.i.e., 451.5million) to 2011(.i.e., 896.8million) the debt owing to Paris Club and London Club and Promissory Notes was nil. But debt-owed to multilateral and others was increasing steadily. It is sufficed to speak that the Nigerian external debt profile started to rise again in 2012 (i.e., 1,026.9million) to 2013 (.i.e., 1,387.3million). The reason for this skying up in the external debt is resulting from inflationary pressure, dwindling in the export earnings, foreign exchange, and/or other macroeconomic variables (*ibid.,* 44).

Economists have unanimously agreed that external debt does have both direct and/or inverse relationship with economic growth and development. External debt has a direct relationship with economic growth and/or development, when the contracted debt is committed into capital or mega projects—such as—building of factories, construction of roads, generating of powers (electricity), building of railways, building of airports, public works, schools, Hospital, etc. the consequence will be to generate employment opportunities for the teeming gradaunds of various degrees, reducing poverty trap level, bridge the wide gap between the rich class and poor class in terms of income or national wealth distribution and/or avoid marginalization. Debt (borrowing) has an inverse relationship with economic growth and/or development, when the contracted debt is used to import consumable goods or shared among the government officials. This will compound or aggravate the sufferings or hardships of the citizenries of the nation. This is because of its long-run effect on the future generations that were absent in the periods of contracting the debts. Hitherto, the payment of amortization (liquidation of the principal) and/or accumulated interest rate (cost of servicing the debt) will ultimately incline in the incumbent future generations (Todaro & Smith, 2006; Shuaib, 2011).

The former is attributed to the developed nations—whose objective is to get the economy to the climax, in other words, to entrench the existing productive capacity of their economies. They advance Research and Development (R & D), innovations and transformations for 21st century. While the latter, is attributed to the emerging countries—such as Nigeria, whose objective of getting the economies grown has not been achieved, in other words, they still tarrying in the terrain of underdeveloped. Reasons are high corruption rate, inflationary pressure, foreign exchange rate, interest rate, high external debt ratio, balance of payment problem, etc., (Shuaib, *loc.cit.,* 30-40)

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 (Ezeabasili, Isu & Mojekwu, 2011).

The situation of debt-servicing is worsened in an economy—such as—Nigeria that depends on one product (or monoeconomy). Nigeria is a case study in the sense that it depends on crude oil, which does not have feasible prices. In 1980s for example, there was World crisis that affected in totality the economies of the World but worsened on monoeconomy and/or subsequently, it re-occurred in 2015, it results to borrowing in order to service existing debt obligations, and/or heightened her external debts. Though, alternative efforts were—such as: internal embargoes and/or limits on new loans;

rescheduling; restructuring; debt servicing and plea for debt forgiveness. The efforts were inactive and/or could not achieve the desired rate of economic growth (DMO, 2004; Todaro & Smith, 2006).

2. LITERATURE REVIEW

There are multiple empirical and/or theoretical works on the external debt and its components on the economic growth and/or development of developed and emerging countries. These similar works are available on the archives of schools and/or beyond.

The impacts of external debt on the economic growth and/or development, Ezeabasili, Isu & Mojekwu, (2011) investigated the relationship between Nigeria's external debt and economic growth, between 1975 and 2006. Econometric evidence revealed stationarity of the variables at their first difference while the Johansen cointegration approach also confirms the existence of one cointegrating relationship at the 1 percent and 5 percent level of significance. In addition, error correction estimates revealed that external debt has negative relationship with economic growth in Nigeria. For example, a one per cent increase in external debt resulted in a decrease of 0.027 per cent in Gross Domestic Product, while a 1 per cent increase in total debt service resulted to 0.034 per cent (decrease) in Gross Domestic Product. These relationships were both found to be significant at the ten per cent level. In addition, the Pairwise Granger Causality test revealed that uni-directional causality exists between external debt service payment and economic growth at the 10 percent level of significance. Also, external debt was found to granger cause external debt service payment at the 1 percent level of significance. Statistical interdependence was however found between external debt and economic growth. In order to ameliorate the negative influence of external debt on economic growth, debt accumulation for projects must be matched with the timing of repayment. Nigeria must be concerned about the absorptive capacity. Consideration about low debt to GDP, low debt service/GDP capacity ratios should guide future debt negotiations

Ezeabasili, *et. al.,* (as cited in Ajayi, 1991) opined that size of the external debt relative to the size of the economy is enormous and besides leading to capital flight, also discourages private investments. A significant number of countries in Sub-Saharan African (SSA) have in general adopted a development strategy which relies heavily on foreign financing, from both official and private sources. This, unfortunately, has meant that for many countries in the region, the shock of external debt has built-up over recent decades to a level that is viewed as unsustainable (Ajayi and Khan, 2000).

Osinubi, Dauda & Olaleru, (2006) confirmed the existence of debt Laffer and Non-linear effect of external debt on economic growth in Nigeria. Thus, heavily indebted countries in sub-Saharan Africa need to evolve creative strategies for bringing about debt reduction so that the high debt stock and associated crushing debt service burden would not impact too negatively on economic growth. Alfredo and Francisco, (2004) investigated the relationship between external debt and economic growth for some Latin American and Caribbean countries and found that lower total external debt levels were associated with higher growth rates. Audu (2004) found out that debt servicing has had significant adverse effect on the growth process in Nigeria. The study by Borensztein (1991) found for Philippines that the debt overhang had an adverse effect on private investment. Essien and Onwioduokit, (1998) adopted the Zeller Reformulation Error (ZRE) in variable type model, with the conclusion that the high debt burden has been the root cause of Nigeria's sluggish growth. Oyejide (1985) asserts that rapid economic growth presumes that public investment may often be necessary at a rate well in excess of public savings. Hence it may become necessary for government to resort to borrowing to supplement public savings and thus fill the resource gap. Debt becomes a good finance option to facilitate economic development process. However, Iyoha (1999) argued that high stock of debt can depress investment and lower the rate of economic growth.

According to the World Bank (1987-1988), the external indebtedness of African countries is an obstacle to the restoration of the countries needed growth. Also the empirical enquiry of Green & Villaneva (1991) covered twenty developing countries between 1975 and 1987. The authors observed that the ratio of debt to GDP and debt service ratio significantly and negatively affects private investment. On the contrary, Savvides, Kumar & McLambo, (1996) found that, while debt service had a negative but insignificant coefficient, indicating that the hypothesis of debt overhang effects could not be rejected. Deshpande (1997) also came out with similar result from his study of the experience of 13 severely indebted countries for the period 1971 – 1991, although during the first half of the period (1975 – 1983), there were some favourable time factors that showed a strong positive effect of external debt on investment.

Ascertaining the relationship between external debt, globalization, Foreign Direct Investment, capital formation, external reserve and/or economic growth, Shuaib, Ekeria and Ogedengbe, (2015) empirically examined the impact of globalization on the growth of Nigerian economy using times-series data from 1960 to 2010. The paper utilized secondary data and various econometrics and/or statistical packages analytical (View 7.2) method were explored to examine the link between the econometrics variables and their impact on the growth of Nigerian economy. The paper tested the stationarity, cointegration of Nigerian's time series data and used error correction mechanism to determine the long run and short run relationship among the variables examined. The results of the findings supported the Obadan's findings which proved that growth of external debt ratio as one of the variables of the model was an inversely related to economic growth in Nigeria. Shuaib (2011) examined the impact of Foreign Direct Investment (FDI) and trade on the economic growth of Nigeria. Taking into account the possible existence of endogeneity of Foreign Direct Investment modelling, and employed the Ordinary Least Square (OLS) techniques—through statistics Gretl packages in exploring the possible links between FDI, trade and economic growth in Nigeria. The results revealed that Foreign Direct Investment and trade have significant impact on the economic growth of Nigeria. Though the overall impact of Foreign Direct Investment and trade on economic growth may not be significant, but the components of Foreign Direct Investment and trade have a direct impact on the growth of the Nigeria economy during the period under review. Though the relationship between FDI, trade and economic growth was found to be statistically insignificant, but there still exist a direct relationship. Shuaib, Dania, Imoagene & Pogoson, (2015) examined the impact of Foreign Direct Investment (FDI) on the growth of the Nigerian economy, using time series data from 1981 to 2013. The paper explored various econometrics and statistical analytical (.i.e., Eview 7.2) method to examine the relationship between FDI and economic growth. The paper tested different diagnostic tests of Nigeria's time series data. The entire tests rejected the null hypothesis and accepted the alternative hypothesis. From the empirical result findings, it was discovered that there is a significant relationship between FDI and/or economic growth in Nigeria. The results corroborated with the Harrod-Domar model which proved that the growth rate of national income will directly be related to saving ratio and/or investment (i.e. the more an economy is able to save-and—invest-out of given GNP, the greater will be the growth of that GDP).

Shuaib & Dania, (2015) examined the capital formation: impact on the economic development of Nigeria, using time series data from 1960 to 2013. The paper applied Harrod –Domar model to Nigerian economic development model and tested if it has a significant relationship with Nigerian economy. The paper explored various econometrics and statistical analytical (.i.e., Eview 7.2) method to examine the relationship between capital formation and economic development. The paper tested the stationarity and/or different diagnostic tests of Nigeria's time series data. The entire tests rejected the null hypothesis and accepted the alternative hypothesis. From the empirical findings, it was discovered that there is a significant relationship between capital formation and/or economic development in Nigeria. The results corroborated with the Harrod-Domar model which proved that the growth rate of national income will directly be related to saving ratio and/or capital formation (i.e. the more an economy is able to save-and—invest-out of given GNP, the greater will be the growth of that GDP).

Ainabor, Shuaib and Kadiri, (2014) examined the impact of capital formation on the growth of Nigeria using time series data from 1960 to 2010. The paper explored various econometrics and statistical analytical method to examine the relationship between capital formation and economic growth. The paper tested the stationarity and co integration of Nigeria's time series data and used an error correction mechanism to determine the long-run relationship among the variables examined. The empirical study found that the data were stationary and co integrated and showed that there is a significant relationship between capital formation and economic growth in Nigeria. The result of the findings revealed that capital formation (domestic savings) has a direct relationship with economic growth.

Examining the relationship between external debt, macroeconomic variables, and economic growth, Obadan (1994) submitted that with the presence of large external debt burden also reducing investment activities. This is because the higher debt service payment associated with a large external debt reduces the funds available for investment. He furthered its importance as the center piece of the investment environment derive from the argument that a sustained exchange rate misalignment in

terms of overvaluation or undervaluation, is a major source of macroeconomic disequilibria which spells danger for investment.

Shuaib, Ekeria and Ogedengbe, (2014) examined the impact of exchange rate on the growth of the Nigerian economy using time series data from 1960 to 2010. The paper tested the stationarity—through unit root test (ADF), Vector Autoregressive Estimates (VARs), cointegration test, Granger-Causality test of Nigeria's time series data and used an error correction model through over-parameterization and parsimonious of model to determine the long-run relationship among the variables examined. It was discovered from the findings that the growth rate of national income was directly related to domestic investment and economic growth.

Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of fiscal policy on the growth of the Nigerian economy using time series data from 1960-2012. The paper tested the stationarity—through Group unit root test, and stationarity found at first differenced at 5% level of significance. Factor method, Goodness-of- fit summary, VARs and its properties were tested. Also, the Co-integration Technique and Pairwise-Granger Causality were employed in this study to test and determine the long-run relationship among the variables examined. The result of the findings revealed that fiscal policy has a direct relationship with economic growth.

Obadan (1994) also noted the high inflation rate reduces international competitiveness of exports, foreign exchange earnings and puts pressure on current account and exchange rates. In short, high inflation rates may be considered as indicator of macroeconomic instability and a country's inability to control macroeconomic policy, both to which contribute to an adverse investment climate.

Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of inflation rate on the economic growth in Nigeria. The study explored secondary data for the period of 1960 to 2012 and used E-view 7.2 statistical window in processing and analyzing the time series data. The empirical result of the test showed that for the periods, 1960-2012, there was no co-integrating relationship between Inflation and economic growth for Nigeria data. Furthermore, we examined the causality relationship that exists between the two variables by employing the Pairwise-Granger causality at two lag periods. The result of the findings revealed that inflation rate has an inverse relationship with economic growth.

Shuaib, Ekeria and Ogedengbe, (2015) examined balance of payments: Nigerian Experience: 1960-2012 using time series data from 1960-2012. The study explored secondary data from the Central Bank Statistical Bulletin for the period of 1960 to 2012 and used various econometric analyses and/or statistical analytical (E-view 7.2) method to examine the relationship between balance of payments and economic growth. The paper tested the stationary—through Group unit root test. The co-integration technique employed in this study is Engle and Granger, (1987) approach in assessing the co-integrating properties of variables, especially in a multivariate context to determine the long-run relationship among the variables examined. Further effort was made to check the causality relationship that exists between the two variables by employing the Pairwise-Granger causality at one lag period. The result of the findings revealed that balance of payments has an inverse relationship with economic growth.

Shuaib, Igbinosun and Ahmed, (2015) examined the impact of government agricultural expenditure on the growth of the Nigerian economy. The study employed secondary data sourced from National Bureau of Statistics, and Financial Review of Central Bank of Nigeria. The study employed E-view 7.2 statistical output as a window in exploring the possible links between government agricultural expenditure and economic growth. The results revealed that government agricultural expenditure has a direct relationship with economic growth which statistically significant at 5% level.

Shuaib, Ekeria and Ogedengbe, (2015) examined the impact of corruption on the growth of Nigerian economy using time series data from 1960 to 2012. The paper utilized secondary data and the paper explored various econometrics and/or statistical analytical (Eview 7.2) method to examine the relationship between corruption and economic growth. The paper explored unit root, Cointegration analysis to test for the Nigeria's time series data and used an error correction mechanism to determine the long-run relationship among the variables examined. From the results of the findings, it was discovered that corruption has an inverse relationship with growth of an economy.

The cases of debt accumulation in Nigeria have been attributed mainly to external and internal factors. The external factors include the impact of world oil price shocks, rising interest in rates, declining policies of trade and liberal lending policies of international commercial banks. The problems arising

from the external sector were exacerbated in most cases by internal factors mostly attributable to macroeconomic policy errors. Two of such errors were those associated with fiscal irresponsibility and exchange rate misalignment in Nigeria during the period (Ajayi, 1991) In addition, the burden of debt for a large number of Sub Sahara African countries threatens the prospect of success of adjustment programme being embarked upon.

3. MODEL SPECIFICATIONS

The econometric model of multiple regression analysis of Shuaib (2011) was modified for this paper with inclusion of few variables to test the relationship between the dependent and independent variables. The structural equation is designed as thus below:

$$RGDP = f (INV, EDR, ER, INFL, DSR, NEXCH, TD) \quad (1)$$

Mathematically, this structural equation may be specified in linear form as thus below:

$$RGDP = \alpha_0 + \alpha_1 INV \pm \alpha_2 EDR \pm \alpha_3 ER \pm \alpha_4 INFL \pm \alpha_5 DSR \pm \alpha_6 NEXCH \pm \alpha_7 TD + \mu \quad (2)$$

Where: RGDP = Real gross domestic product proxied for economic growth; INV = Investment; EDR = External debt; ER = External Reserve; INFL = Inflation; DSR = Debt Servicing Ratio; NEXCH = Nominal Exchange Rate; TD = Total Trade proxied for openness of the economy; μ = Error or stochastic term

For the purpose of this paper, the model is transformed into log-linear form. Which is expressed as thus below:

$$LogRGDP = \alpha_0 + \alpha_1 logINV \pm \alpha_2 logEDR \pm \alpha_3 logER \pm \alpha_4 logINFL \pm \alpha_5 logDRS \pm \alpha_6 logNEXCH \pm \alpha_8 logTD + \mu \quad (3)$$

Where: Log (RGDP) = Log of Real gross domestic product; Log (INV) = Log of Investment; Log (EDR) = Log of External debt; Log (ER) = log of external reserve; Log (INFL) = log of Inflation; Log (DSR) = Debt Servicing Ratio; Log (NEXCH) = Log of Nominal Exchange Rate; Log (TD) = Log of Total Trade; μ = white noise error term

The a priori expectations are as follows:

$\alpha_0 > 0$, $\alpha_1 > 0$, $\alpha_2 < 0$, $\alpha_3 < 0$, $\alpha_4 < 0$, $\alpha_5 > 0$, $\alpha_6 < 0$, $\alpha_7 < 0$, $\alpha_8 > 0$.

Where:

α_0= Intercept, α_1 = Coefficient of investment, α_2 = Coefficient of external debt, α_3 = Coefficient of External Rate, α_4 = Coefficient of Inflation, α_5 = Coefficient of Debt Servicing Ratio, α_6 = Coefficient of Nominal Exchange Rate, α_7 = Coefficient of Total Trade and μ = white noise error term.

The contribution of this study to knowledge is in terms of the estimation techniques employed and/or the data used which is extended to 2013. An attempt will be made to empirically examine the relationship between the Nigerian external debt on the economic growth of Nigeria Economy for the periods 1960 – 2013 under review. The equation was estimated using a variety of analytical tools, including, 3SLS method. The results are discussed below. The time series data used for the study covers the period 1981 and 2013. The study employed secondary data which are derived from various issues of CBN *Annual Report and Statement of Accounts (2013),* and CBN *Statistical Bulletin (2014).*

4. MODEL SUMMARY

The researcher choose to use system three-stage least squares (S3SLS) to analyze the time series data from 1960-2013. S3SLS is the two-stage least squares version of the SUR method. It is an appropriate technique when right-hand side variables are correlated with the error terms, and/or there is both heteroskedasticity, and contemporaneous correlation in the residuals. Since STSLS (S2SLS) is a single equation estimator that does not take account of the covariances between residuals, it is not, in general, fully efficient. 3SLS is a system method that estimates all of the coefficients of the model, then forms weights and re-estimates the model using the estimated weighting matrix. It should be viewed as the endogenous variable analogue to the SUR estimator described above.

In the appendix, table 1, the first two stages of 3SLS are the same as in TSLS. In the third stage, we apply feasible generalized least squares (FGLS) to the equations in the system in a manner analogous to the SUR estimator.

SUR uses the OLS residuals to obtain a consistent estimate of the cross-equation covariance matrix Σ. This covariance estimator is not, however, consistent if any of the right-hand side variables are endogenous. S3SLS uses the S2SLS residuals to obtain a consistent estimate of Σ.

From the table 1 in the appendix, all the nine coefficients associated AR are positive and/or the probability (*p-value*) of obtaining the values are statistically significant—since they are greater than zero and/or less than five (.i.e., $0 \leq 0.05$). From the above premise, it is lucidly clear that the null hypothesis is rejected and/or alternative hypothesis accepted. In other words, EDR has a direct relationship with Nigerian economic growth. The determinant residual covariance is 7.53E-08. In the tables, every variable was estimated with R-square, R-Adj Square and Durbin-Watson. Some of the R-square, R-Adj Square are low with negative sign and/or others are high with positive. D-W some show absence of autocorrelation or serial correlation and others show presence of autocorrelation or serial correlation.

4.1. Group Unit Root Summary

Table1 in appendix shows the summary of the Group unit root test using summary test (.i.e. Levin, Lin & Chu t*; Im, Pesaran and Shin W-stat; ADF-Fisher Chi-square; PP-Fisher Chi-square) with the lag length selection based on SIC: 0 to 1of the variables used for the empirical study. The group unit root test shows that; Real Gross Domestic Product (RGDP); Debt service ratio (DSR); External Debt Ratio (EDR); External Reserve (ER); Inflation rate (INFL); Investment (INV); Trade (TD) and/or Total government expenditure (TGEXP) were stationary at level at 5 percent level of significance respectively. The probability of obtaining the Group Unit Root is greater than 0 and less than 0.05 (.i.e., $0 \leq 0.05$) which means the null hypothesis has to be rejected—which says there is no significant relationship between external debt ratio and economic growth and the alternative hypothesis is to be accepted, which says there is significant relationship between external debt ratio and Nigerian economic growth.

4.2. Cointegration Test Results

Co-integration test is carried out in order to determine the long-run relationship between the dependent and independent variables when one or all of the variables is/are non-stationary at level which means they have number of stochastic trends in asymptotic distribution. Co-integration tests are conducted by using the reduced procedure developed by Engle and Granger, (1987). They noted that a linear combination of two or more 1(1) series may be stationary, or 1(0), on which case we say the series are cointegrated. Such linear combination defines a cointegrating equation with cointegrating vector of weights characterizing the long-run relationship between the variables. The Engle and Granger, (1987) test results are divided into three distinct sections. *First* portion as shown in table 2 displays the test specification and settings, along with the test values and corresponding *p*-values. *Second (*or the middle) section of the output displays the *estimated coefficients, standard error, t-statistics*, and *p-value* for the constant, even though they are not strictly speaking valid or intermediate results used in constructing the test statistic that may be of interest. The summary statistics portion is relatively familiar but does require a bit comment MacKinnon (1996). Most entries are self-explanatory, though a few deserve a bit of discussion-such as RHO S.E. and Residual Variance are the (possibly) d.f. corrected coefficient standard error of the regression. The long-run residual variance is the estimate of the long-run variance is the estimate of the long-run of the residual based on the estimated parametric model. The number of stochastic trends entry reports the value used to obtain the *p*-value.

Engle and Granger, (1987) procedure is used to determine the linear combination of two or more series and/or to identify a long-run relationship as shown in table 2 at appendix. The cointegration tests include Real Gross Domestic Product (RGDP); Debt Service Ratio (DSR); External Debt Ratio (EDR); External Reserve (ER); Foreign trade (FTD); Inflation rate (INFL), Investment rate (INV), and Total Government Expenditure (TGEXP). Which includes Automatic lag specification (lag = 0 based on Schwarz Info Criterion, maxlag = 1).

4.3. System Wald Test (SWT)

Having estimated both heteroskedasticity, and/or contemporaneous correlation in the residuals with the use of S3SLS.

The next stage of estimating residuals is the Wald test, which helps to measure the Chi-square value and/or its probability (*p-value*) and null hypothesis.

From table 3 in appendix, the Chi-square value is 148.3304 and/or the probability to obtain Chi-square value is greater than zero and/or less than five (.i.e., $0 \leq 0.05$). This states that null hypothesis has to be rejected and accepted the alternative hypothesis, which says that there are asymptotic normal distribution residuals in the model.

4.4. System Residual Normality Tests (SRNTs)

Residual Normality Tests enables the researcher to examine normal distribution of residual for the equation.

From table 4 in the appendix, the properties to be examined are: Joint Component, Skewness, chi-sq, df and probability as it appeared in the first part. The second part has the following properties: Joint Components, Kurtosis, Chi-sq, df, and probability. While the third part has the following properties: Joint Components, Jarque-Bera, Chi-sq, df, and probability.

From the table 4, it is seen that the Jarque-Bera statistic rejects the hypothesis (or null hypothesis) of normal distribution for the second equation but not for the other equations.

4.5. Variance Ratio Test on Cumulated log_rgdp_

The variance ratio test view allows the research to perform the Lo and Mackinlay variance ratio test to determine whether differences in series are uncorrelated, or follow a random walk or martingale property. In addition, Lo and Mackinlay (1988, 1989) variance test ratio enables for homoskedastic and heteroskedastic random walks using asymptotic normal distribution or wildbootsrap to evaluate statistical significance (*loc. cit*).

From the table 5 in the appendix, the researchers maintained that since the specified test is more than one test period, there are two sets of test results. The "Joint Tests" are the tests of the joint null hypothesis for all periods, while the "Individual Tests" are the variance ratio tests applied to individual periods. Here, the Chow-Denning maximum statistic of 9.473597 is associated with the period 4 individual test. The approximate *p*-value of 0.0000 is obtained using the studentized maximum modulus with infinite degrees of freedom so that we strongly reject the null of a random walk. The results are quite similar for the Wald test statistic for the joint hypotheses. The individual statistics generally reject the null hypothesis since all the period variance ratio statistic *p*-value is less than 0.05.

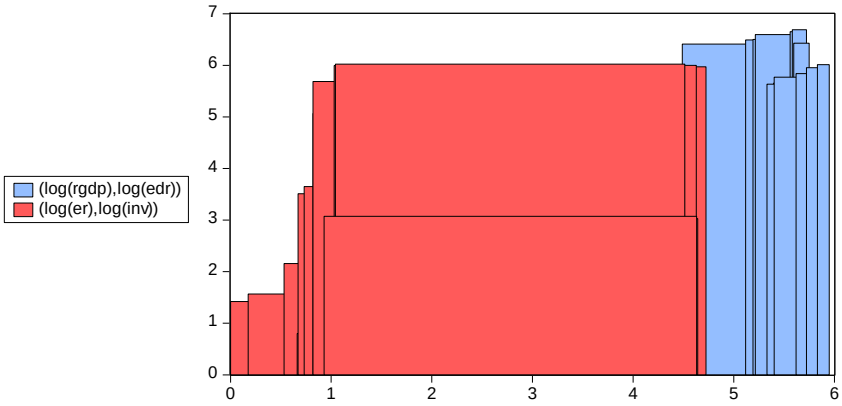
The bottom portion of the output shows the intermediate results for the variance ratio test calculations, including the estimated mean, individual variances, and number of observations used in each calculation.

4.6. Hypothesis Testing

In the Table 6 above, hypothesis test for mean, variance and median was conducted. The output is analyzed. The reported probability value is the *p*-value, or marginal significance level, against a two sided alternative. If this probability value is greater than 0 and less than the size of the test, say 0.05, we may reject the null hypothesis and accept the alternative hypothesis. Here, we strongly reject the null hypothesis for the two-sided test of equality. The probability value for a one-sided alternative is one half the *p*-value of the two sided test.

4.7. XY Bar (X-X-Y triplets)

Having estimated the time series data with several statistical tools, the researcher wishes to employ the use of graph to display the result as shown in diagram 1. XY bar graphs display the data in sets of three series as a vertical bar. For a given observation, the values in the first two series define a region along the horizontal axis, while the value in the third series defines the vertical height of the bar. While technically an observation graph since every data observation is plotted, this graph is primarily used to display summary results. For example, the XY bar is the underlying graph type used to display histograms



5. SUMMARY OF RESULT FINDINGS

The paper empirically examines the Nigerian external debt: Nigerian experiences from 1960-2013, using annual time series data from 1960 to 2013. The paper employs stochastic characteristics of each time series data by testing their covariance and residuals using Group unit root, cointegration Tests, System Wald Test (WT), System Residual Normality Tests, Variance Ratio Test (VRT), Hypothesis Testing (HT), and/or XY Bar (X-X-Y triplets).

From the various diagnostic tests carried out, it was revealed that all the null hypotheses were rejected (.i.e., there is no significant relationship between EDR and/or economic growth) and/or accepted all the alternative hypotheses (.i.e., there is significant relationship between EDR and/or economic growth). The results show that external debt is sine qua non in the train of economic growth and/or development. The burden of the debt might not be felt by the future generations when the debt is committed to capital or mega projects, which will generate employment opportunities and/or catastrophe to an economy when it is used on consumable goods or items.

The paper discovered that the EDR and/or its components (determinants) have significant relationship with the economic growth and development of Nigeria. Rejecting null hypotheses in the diagnostic tests corroborated the fact that indeed EDR has a direct relationship with Nigerian economic growth.

5.1. Recommendations

From the econometric study of the Nigerian external debt: Nigerian experiences from 1960-2013, the following recommendations are stated below:

- The inability of the domestic or private saving to meet up with ever increasing expenditures—leads to borrowing, therefore government should borrow (internally or externally) to finance its obligatory to its citizenries;
- Government formulate policies (such as—Fiscal policy or Monetary policy) to improve the standards of living of its citizenries;
- Government should enforce the use of budget deficit when there is economic recession (.i.e., high unemployment, etc) by reducing its anticipated revenue and/or sky up its expected expenditure, this means the external reserve is directed towards building of dams, constructing of roads network, etc, in so doing, jobs would have been created for the inhabitants of the nation;
- In the periods of inflationary pressure, government may use budget surplus or currency devaluation by deliberately reducing expenditure in the country or reducing the unit value of the domestic currency to unit value of foreign currency;
- Government should ensure that the debts or loan stocks are such that will be committed to capital or mega projects, which inadvertently will create job opportunities and/or lessen the debt burdens of the future generations, hence, marginal social benefits of the debt. This has direct relationship with economic development;
- Government should dissuade the attitude of committing the debts or loan stocks on consumable goods or commodities (.i.e., ostensible goods), this does not only deprive the future generations of the marginal social benefits (rather marginal social costs) of the debts and/or also has a drainage effect on the economy. In other words, it has an inverse relationship with economic development.

- Government should ensure that the macroeconomic variables are monitored, controlled and/or regulated most especially, foreign exchange rate.

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Appendices

Table 1

Group unit root test: Summary				
Series: LOG_RGDP_, LOG_DSR_, LOG_EDR_, LOG_ER_, LOG_INFL_,				
LOG_INV_, LOG_TD_, LOG_TGEXP_				
Date: 04/06/15 Time: 16:36				
Sample: 1960 2013				
Exogenous variables: Individual effects				
Newey-West fixed bandwidth and Parzen kernel				
Automatic lag length selection based on SIC: 0 to 1				
			Cross-	
Method	Statistic	Prob.**	sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.42768	0.0000	8	395
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-13.5676	0.0000	8	395
ADF - Fisher Chi-square	186.930	0.0000	8	395
PP - Fisher Chi-square	171.576	0.0000	8	398
** Probabilities for Fisher tests are computed using an asymptotic Chi				
-square distribution. All other tests assume asymptotic normality.				

Table 2

System: UNTITLED				
Estimation Method: Three-Stage Least Squares				
Date: 04/06/15 Time: 16:22				
Sample: 1970 2013				
Included observations: 45				
Total system (balanced) observations 352				
Stacked instruments: (RGDP(-1),*) (DSR(-1),*) (EDR(-1),*) (ER(-1),*) (INFL(				
-1),*) (INV(-1),*) (TD(-1),*) (TGEXP(-1),*)				
Iterate coefficients after one-step weighting matrix				
Convergence achieved after: 1 weight matrix, 4 total coef iterations				
	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	5.080988	0.648345	7.836856	0.0000
C(2)	0.892622	0.026581	33.58105	0.0000
C(3)	4.149689	0.724910	5.724419	0.0000
C(4)	4.942962	0.673811	7.335826	0.0000
C(5)	4.128614	0.453295	9.108004	0.0000
C(6)	1.147212	0.458121	2.504165	0.0127
C(7)	4.339514	0.762687	5.689774	0.0000
C(8)	5.400882	0.629554	8.578908	0.0000
C(9)	3.911423	0.838449	4.665067	0.0000
Determinant residual covariance		7.53E-08		
Equation: LOG_RGDP_ = C(1) + [AR(1)=C(2)]				
Eqn specific instruments: C LOG_RGDP_(-1)				
Observations: 44				
R-squared	0.616996	Mean dependent var		5.181276
Adjusted R-squared	0.607877	S.D. dependent var		0.754045
S.E. of regression	0.472181	Sum squared resid		9.364102
Durbin-Watson stat	1.142173			
Equation: LOG_DSR_ = C(3) + [AR(1)=C(2)]				
Eqn specific instruments: C LOG_DSR_(-1)				
Observations: 44				
R-squared	0.847723	Mean dependent var		3.969283
Adjusted R-squared	0.844098	S.D. dependent var		1.335311
S.E. of regression	0.527240	Sum squared resid		11.67525
Durbin-Watson stat	1.547745			
Equation: LOG_EDR_ = C(4) + [AR(1)=C(2)]				
Eqn specific instruments: C LOG_EDR_(-1)				

Observations: 44			
R-squared	0.894723	Mean dependent var	4.773461
Adjusted R-squared	0.892216	S.D. dependent var	1.492904
S.E. of regression	0.490127	Sum squared resid	10.08943
Durbin-Watson stat	1.104449		
Equation: LOG_ER_ = C(5) + [AR(1)=C(2)]			
Eqn specific instruments: C LOG_ER_(-1)			
Observations: 44			
R-squared	0.786175	Mean dependent var	3.648432
Adjusted R-squared	0.781084	S.D. dependent var	0.675065
S.E. of regression	0.315852	Sum squared resid	4.190035
Durbin-Watson stat	2.101977		
Equation: LOG_INFL_ = C(6) + [AR(1)=C(2)]			
Eqn specific instruments: C LOG_INFL_(-1)			
Observations: 44			
R-squared	-0.024879	Mean dependent var	1.160590
Adjusted R-squared	-0.049281	S.D. dependent var	0.325952
S.E. of regression	0.333887	Sum squared resid	4.682175
Durbin-Watson stat	2.109708		
Equation: LOG_INV_ = C(7) + [AR(1)=C(2)]			
Eqn specific instruments: C LOG_INV_(-1)			
Observations: 44			
R-squared	0.822318	Mean dependent var	4.065650
Adjusted R-squared	0.818087	S.D. dependent var	1.297092
S.E. of regression	0.553225	Sum squared resid	12.85445
Durbin-Watson stat	2.199832		
Equation: LOG_TD_ = C(8) + [AR(1)=C(2)]			
Eqn specific instruments: C LOG_TD_(-1)			
Observations: 44			
R-squared	0.863804	Mean dependent var	5.151603
Adjusted R-squared	0.860561	S.D. dependent var	1.221713
S.E. of regression	0.456206	Sum squared resid	8.741220
Durbin-Watson stat	1.901755		
Equation: LOG_TGEXP_ = C(9) + [AR(1)=C(2)]			
Eqn specific instruments: C LOG_TGEXP_(-1)			
Observations: 44			
R-squared	0.845749	Mean dependent var	3.430651
Adjusted R-squared	0.842076	S.D. dependent var	1.518598
S.E. of regression	0.603485	Sum squared resid	15.29615
Durbin-Watson stat	1.516144		

Table 3

Cointegration Test - Engle-Granger			
Date: 04/06/15 Time: 16:56			
Equation: UNTITLED			
Specification: LOG_RGDP_ LOG_DSR_ LOG_EDR_ LOG_ER_			
LOG_INFL_ LOG_INV_ LOG_TD_ LOG_TGEXP_ C			
Cointegrating equation deterministics: C			
Null hypothesis: Series are not cointegrated			
Automatic lag specification (lag=1 based on Akaike Info Criterion, maxlag=9)			
		Value	Prob.*
Engle-Granger tau-statistic		-2.627456	0.9717
Engle-Granger z-statistic		-16.18036	0.9033
*MacKinnon (1996) p-values.			
Intermediate Results:			
Rho - 1		-0.511964	
Rho S.E.		0.194852	
Residual variance		0.102405	
Long-run residual variance		0.055320	
Number of lags		1	

Number of observations		43		
Number of stochastic trends**		8		
**Number of stochastic trends in asymptotic distribution.				
Engle-Granger Test Equation:				
Dependent Variable: D(RESID)				
Method: Least Squares				
Date: 04/06/15 Time: 16:56				
Sample (adjusted): 1971 2013				
Included observations: 43 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.511964	0.194852	-2.627456	0.0120
D(RESID(-1))	-0.360566	0.243218	-1.482481	0.1459
R-squared	0.269982	Mean dependent var		-0.021140
Adjusted R-squared	0.252176	S.D. dependent var		0.370051
S.E. of regression	0.320008	Akaike info criterion		0.604455
Sum squared resid	4.198614	Schwarz criterion		0.686371
Log likelihood	-10.99578	Hannan-Quinn criter.		0.634663
Durbin-Watson stat	1.646847			

Table 4

Wald Test:			
System: Untitled			
Test Statistic	Value	df	Probability
Chi-square	63.02139	2	0.0000
Null Hypothesis: C(1)=0, C(4)=3*C(6)*C(9)			
Null Hypothesis Summary:			
Normalized Restriction (= 0)		Value	Std. Err.
C(1)		5.080988	0.648345
C(4) - 3*C(6)*C(9)		-8.518728	6.026754
Delta method computed using analytic derivatives.			

Table 5

System Residual Normality Tests				
Orthogonalization: Cholesky (Lutkepohl)				
Null Hypothesis: residuals are multivariate normal				
Date: 04/06/15 Time: 16:31				
Sample: 1970 2013				
Included observations: 45				
Component	Skewness	Chi-sq	df	Prob.
1	-5.250386	206.7492	1	0.0000
2	-0.193152	0.279807	1	0.5968
3	-0.326882	0.801388	1	0.3707
4	-0.263242	0.519723	1	0.4710
5	-0.623392	2.914633	1	0.0878
6	-3.795266	108.0304	1	0.0000
7	-4.736646	168.2686	1	0.0000
8	1.185027	10.53216	1	0.0012
Joint		498.0958	8	0.0000
Component	Kurtosis	Chi-sq	df	Prob.
1	33.90493	1790.839	1	0.0000
2	4.676110	5.267521	1	0.0217
3	5.223414	9.269189	1	0.0023
4	3.786930	1.161111	1	0.2812
5	3.659638	0.815855	1	0.3664
6	19.73828	525.3186	1	0.0000
7	29.52214	1318.920	1	0.0000
8	6.051338	17.45750	1	0.0000
Joint		3669.049	8	0.0000
Component	Jarque-Bera	df	Prob.	
1	1997.589	2	0.0000	

2	5.547328	2	0.0624	
3	10.07058	2	0.0065	
4	1.680834	2	0.4315	
5	3.730488	2	0.1549	
6	633.3489	2	0.0000	
7	1487.189	2	0.0000	
8	27.98966	2	0.0000	
Joint	4167.145	16	0.0000	

Table 6

Null Hypothesis: Cumulated LOG_RGDP_ is a martingale				
Date: 04/06/15 Time: 17:13				
Sample: 1960 2013				
Included observations: 54 (after adjustments)				
Heteroskedasticity robust standard error estimates				
User-specified lags: 2 4 8 16				
Test probabilities computed using wild bootstrap: dist=twopoint,				
reps=1000, rng=mt, seed=1946434505				
Joint Tests		Value	df	Probability
Max |z| (at period 16)		17.95360	54	0.0000
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.851200	0.160795	5.293703	0.0000
4	3.651439	0.296489	8.942778	0.0000
8	7.145381	0.453244	13.55866	0.0000
16	12.21443	0.624634	17.95360	0.0000
Test Details (Mean = 4.85932625274)				
Period	Variance	Var. Ratio	Obs.	
1	0.92631	--	54	
2	1.71479	1.85120	53	
4	3.38237	3.65144	51	
8	6.61884	7.14538	47	
16	11.3143	12.2144	39	

Table 7

Hypothesis Testing for LOG_RGDP_			
Date: 04/06/15 Time: 17:16			
Sample: 1960 2013			
Included observations: 54			
Test of Hypothesis: Mean = 6.000000			
Sample Mean = 4.859326			
Sample Std. Dev. = 0.962450			
Method		Value	Probability
t-statistic		-8.709237	0.0000
Test of Hypothesis: Variance = 4.000000			
Sample Variance = 0.926310			
Method		Value	Probability
Variance Ratio		12.27361	0.0000
Test of Hypothesis: Median = 2.000000			
Sample Median = 5.405689			
Method		Value	Probability
Sign (exact binomial)		54	0.0000
Sign (normal approximation)		7.212386	0.0000
Wilcoxon signed rank		6.388782	0.0000
van der Waerden (normal scores)		5.962325	0.0000
Median Test Summary			
Category	Count	Mean Rank	
Obs > 2.000000	54	27.5000000	
Obs < 2.000000	0	NA	
Obs = 2.000000	0		
Total	54		