

External Debt on Economic Growth in Nigeria Using the Dual Gap Model for the 1980-2015

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ABSTRACT: The study investigated the impact of external debt on economic growth in Nigeria using the Dual Gap model for the period 1980-2015. The techniques of Estimation employed in the study include Augmented Dickey Fuller (ADF) test, Granger Causality Test and Impulse response analysis. The results showed no causal relationship between external debt and economic growth in Nigeria. From the Impulse response analysis it was seen that External debt impacts negatively on economic growth, it was also observed that domestic savings and aggregate investment had no influence on economic growth. Consequently, the study recommends that, government should embark on prudent borrowing and should look inward for policies that will stimulate domestic savings and encourage aggregate investment.

KEYWORDS: External debt, Economic growth, Dual gap, Impulse response.

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I. INTRODUCTION

Universally, there exist no economy that is self-reliant, even autarky does not imply absence of trade in a nation and the rest of the world but rather an infinitesimal external trade relationship. HolisChenery et al (2005), illustrated the “two – gap” approach to economic development. The idea is that “Savings – gap” and “foreign exchange gap” are two separate and independent constraints on the attainment of a target rate of growth in LDCs. Obudah and Tombofa (2013) argues that the specific reasons why countries may borrow include, to be able to finance their reoccurring budget deficit as a means of deepening their financial markets, to enable them find the increasing government expenditures, to enhance their narrow revenue sources and low output productivity which results in poor resources so as to bridge the savings – investment gap.

1.3 Objectives of the study

The broad objectives of this study is to ascertain the impact of external debt burden on economic growth in Nigeria. The specific objectives are;

1. To determine if there is a causal relationship between external debt and economic growth in Nigeria.
2. To examine the effect of external debt shock on economic growth in Nigeria.

3. 1.5 Research Hypotheses

4. The hypotheses to be tested in the course of this study include.
5. H_{01} : There is no significant causal relationship between external debt and economic growth in Nigeria.
6. H_{02} : External debt shock dose not significantly affect economic growth in Nigeria.

II. CONCEPTUAL LITERATURE

The act of borrowing creates debts and this debt may be domestic or external. The focus of this study is on external debt which refers to that part of a nation’s debt that is owed to creditors outside the nation. Arnone et al (2005) defines external debt as that portion of a country’s debt that is acquired from foreign sources such as foreign corporations, government or financial institutions. According to (Ogbeifin, 2007), external debt arises as a result of the gap between domestic savings and investment. As the gap widens, debt accumulates and this makes the country to continually borrow increasing amounts in order to stay afloat.

The dual-gap theory is coined from a national income accounting identity which connotes that excess investment expenditure (investment-savings gap) is equivalent to the surplus of imports over exports (foreign exchange gap). It is shown below

Y = C + I + (X - M) (1)

Y - C = I + (X - M) (2)

But Y - C = S (3)

S = I + (X - M) (4)

S - I = X - M (5)

Equation (5) shows the two gaps.

EMPIRICAL LITERATURE

The motive behind external debt is to boost economic growth and development of an nation but as a result of future high debt service payments, it poses a serious threat to the economy of that nation. Economic researchers have therefore sought out to investigate the implication of external debt burden on the economies of debtor nations and have come up with diverse views.

Suliman et al (2012) carried out a study on the effect of external debt on the economic growth of Nigeria. Annual time series data covering the period from 1970-2015 was used. The empirical analysis was carried out using econometric techniques of Ordinary least squares (OLS), Augmented Dickey-Fuller unit root test, Johansen Co-integration test and error correction method. The co-integration test shows long-run relationship amongst the variables and findings from 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 1990-2015, it was observed through the Johansen co-integration test that no long-run relationship between external debt and GDP. However the findings show that external debt and debt service both have significant impact on GDP growth with the total external debt stock having a positive effect

Ejigayehu (2013) also analyzed the effect of external debt on the economic growth of eight selected heavily indebted African countries (Benin, Ethiopia, Mali, Madagascar, Mozambique, Senegal, Tanzania and Uganda) through the debt overhang and debt crowding out effect with ratio of external debt to gross national income as a proxy for debt overhang and debt service export ratio as a proxy for debt crowding out. Panel data covering the period 1991-2010 was used. The empirical investigation was carried out on a cross-sectional regression model with tests for stationarity using Augmented DickeyFuller tests, heteroskedasticity and ordinary regression. The concluding result from estimation showed that external debt affects economic growth through debt crowding out rather than debt overhang.

In their study on external debt relief and economic growth in Nigeria.

Ekperiware and Oladeji, (2012) examined the structural break relationship between external debt and economic growth in Nigeria. The study employed the se o quarterly time series data of external debt, external debt service and real GDP from 1980-2009. An empirical investigation was conducted using the chow test technique of estimation to determine the structural break effect of external debt on economic growth in Nigeria as a result of the 2005 Paris Club debt relief. The result of their findings revealed that the 2005 external debt relief caused a structural break effect in the relationship between external debt and economic growth. Based on these findings they concluded that the external debt relief made available resources for growth-enhancing projects.

III. METHODOLOGY

The aim of this paper is to examine the relationship between external debt and the growth of the Nigerian economy using the two gap model. This section consists of the research methodology which throws more light into the empirical investigation conducted.

Model Specification

The General basic model of VAR (p) has the following form

$y_t = \mu + \psi dD_t + A_1 y_{t-1} + \dots + A_p y_{t-p} + \mu_t$ (5)

Where y_t is the set of K time series variables $y_t = (y_t \dots y_{kt})'$, A_t 's are (K x K) coefficient matrices, μ is a vector of the deterministic term, D_t is a vector of nonstochastic variables and $\mu_t = (\mu_t \dots \mu_{kt})'$ is an unobservable error term. Although the model (1) is general enough to accommodate variables with stochastic trends,

it is not the most suitable type of model if interest centers on the cointegration relations is the vector error correction model (VECM) .

$$\Delta y_t = \Psi D_t + \Gamma_1 \Delta y_{t-1} + \dots + \Gamma_{p-1} \Delta y_{t-p+1} + \alpha u_{t-1} + u_t \dots \dots \dots (6)$$

Where $\alpha = (\alpha_1, \alpha_2, \dots, \alpha_k)$

In the VEC model, (attention focuses on the $(k \times 1)$ matrix of cointegrating vector β) u_{t-1} which quantify the long-run relationships between variables in the system, and the $(k \times 1)$ matrix of error - correction adjustment coefficients α , which denotes deviations from equilibrium (αu_{t-1}) to Δy_t for correction. The Γ_j ($j + 1, \dots, p - 1$) coefficients in (equation 6) estimates the short - run effects of shocks on Δy_t and therefor allow the short-run and long run responses to differ. The term αu_{t-1} is the only one that includes I (1) variables. Hence, αu_{t-1} must also be I (0). Thus, it contains the conintegrating relations.

Sims’s seminal work introduces unrestricted vector autoregression (VAR) that allows feedback and dynamic interrelationship across all the variables in the system and appears to be highly competitive with the large-scale macro-econometric models in forecasting and policy analysis (Sims, 1980). To provide an empirical insight into the external debt and economic growth inclination in Nigeria, a modified model used by Ayadi and Ayadi (2008) in analyzing the relationship between external debt management and economic growth in Nigeria is presented below.

$$GRRGDP = f(EDGR, INVTGR, LOGSAV, TBAL) \dots \dots \dots (7)$$

Our basic model of VAR (p) has the following form

$$y_t = \mu + A_1 y_{t-1} + \dots + A_p y_{t-p} + \mu_t \dots \dots \dots (8)$$

Where $y_t = (GRRGDP_t, EDGR_t, INVTGR_t, LOGSAV_t, TBAL_t)$ ’ is the set of 5 time series variables, A_j are (5×5) coefficient matrices, μ is vector of deterministic terms and $\mu_t = (\mu_{1t}, \dots, \mu_{5t})$ ’ is an unobservable error term.

Where;

- GRRGDP Growth rate of GDP
- EDGR External Debt Growth Rate
- INVTGR Growth Rate of Investment
- LOGSAV Natural logarithm of Domestic Savings
- TBAL Trade Balance

$$\Delta y_t = \Gamma_1 \Delta y_{t-1} + \dots + \Gamma_{p-1} \Delta y_{t-p+1} + \alpha u_{t-1} + u_t \dots \dots \dots (8)$$

Where $\alpha = (\alpha_1, \alpha_2, \dots, \alpha_5)$

Impulse Response Analyses

An impulse response function is created by converting the VAR model (1) to the vector moving average model of infinite order VMA (∞). It traces the effects of one standard deviation shock to one of the impulses u_t on current and future values of the endogenous variables y_t in the converted form. The impulses are usually correlated, so that they have a common component which cannot be associated with a specific variable.

A common method of dealing with this issue is to attribute all of the effects of any common component to one variable that comes first in the VMA(∞) model. More technically, the error terms are orthogonalized by Cholesky decomposition, so that the covariance matrix of the resulting impulses is diagonal. While this method is widely used, it is rather arbitrary, and changing the Cholesky ordering of the variables could dramatically change the impulse responses.

IV. EMPIRICAL RESULTS AND DISCUSSION

Unit Root Test.

Table 1. Unit root test.

SERIES	CRITICAL VALUE @ 5%	ADF T-STATISTIC	ORDER OF INTEGRATION
GRGDP	2.948404	-4.514049	I(0)
EDGR	2.986225	-4.842848	I(2)
INVTGR	-2.951125	-7.244553	I(1)
LOGSAV	-2.954021	-8.105252	I(1)
TBAL	-2.948404	-4.548510	I(0)

Source: Author’s Analysis

Table one presents the result of stationarity test using the Augmented Dickey-Fuller test of stationarity. The result indicated that the growth rate of GDP (GRGDP) and Trade Balance (TBAL) was integrated of order I(0) at 5 % level of significance meaning stationarity at level, while INVTGR and LOGSAV were stationary after

the first difference that is I(1). External Debt Growth Rate (EDGR) was stationary after the second difference that is I(2). The null hypothesis of non-stationary is rejected

Granger Causality Test

Table2: Result of Granger Causality Test

Pairwise Granger Causality Tests

Date: 02/04/18 Time: 22:25

Sample: 1980 2015

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
D((EDGR)) does not Granger Cause D(GRGDP) D(GRGDP) does not Granger Cause D((EDGR))	29	0.03099 1.25569	0.9695 0.3029
D(INVTGR) does not Granger Cause D(GRGDP) D(GRGDP) does not Granger Cause D(INVTGR)	33	0.54180 0.00557	0.5877 0.9944
D(LOGSAV) does not Granger Cause D(GRGDP) D(GRGDP) does not Granger Cause D(LOGSAV)	32	0.16779 0.34998	0.8464 0.7079
D(TBAL) does not Granger Cause D(GRGDP) D(GRGDP) does not Granger Cause D(TBAL)	33	0.18229 0.87067	0.8343 0.4297
D(INVTGR) does not Granger Cause D((EDGR)) D((EDGR)) does not Granger Cause D(INVTGR)	29	1.15769 1.79466	0.3311 0.1878
D(LOGSAV) does not Granger Cause D((EDGR)) D((EDGR)) does not Granger Cause D(LOGSAV)	28	0.15591 1.63277	0.8565 0.2172
D(TBAL) does not Granger Cause D((EDGR)) D((EDGR)) does not Granger Cause D(TBAL)	29	0.12467 1.40898	0.8834 0.2639
D(LOGSAV) does not Granger Cause D(INVTGR) D(INVTGR) does not Granger Cause D(LOGSAV)	32	0.78187 0.80568	0.4676 0.4572
D(TBAL) does not Granger Cause D(INVTGR) D(INVTGR) does not Granger Cause D(TBAL)	33	0.64303 0.63666	0.5333 0.5365
D(TBAL) does not Granger Cause D(LOGSAV) D(LOGSAV) does not Granger Cause D(TBAL)	32	0.78707 2.68144	0.4653 0.0867

Source: Author's Analysis

In order to examine whether one variable iscausally related to another, we use the Granger causality test on the variables. From the Granger test we observe that there is no causality among the variables therefor we do not reject the null hypothesis and conclude that there is no causal relationship between external debt and economic growth.

Impulse Response Functions for VAR Model

Impulse response traces out the behavior of our VAR system to a unit shock in the system. The X-axis gives the time horizon of the shock whereas the y- axis gives the direction and the concentration of the impulse.

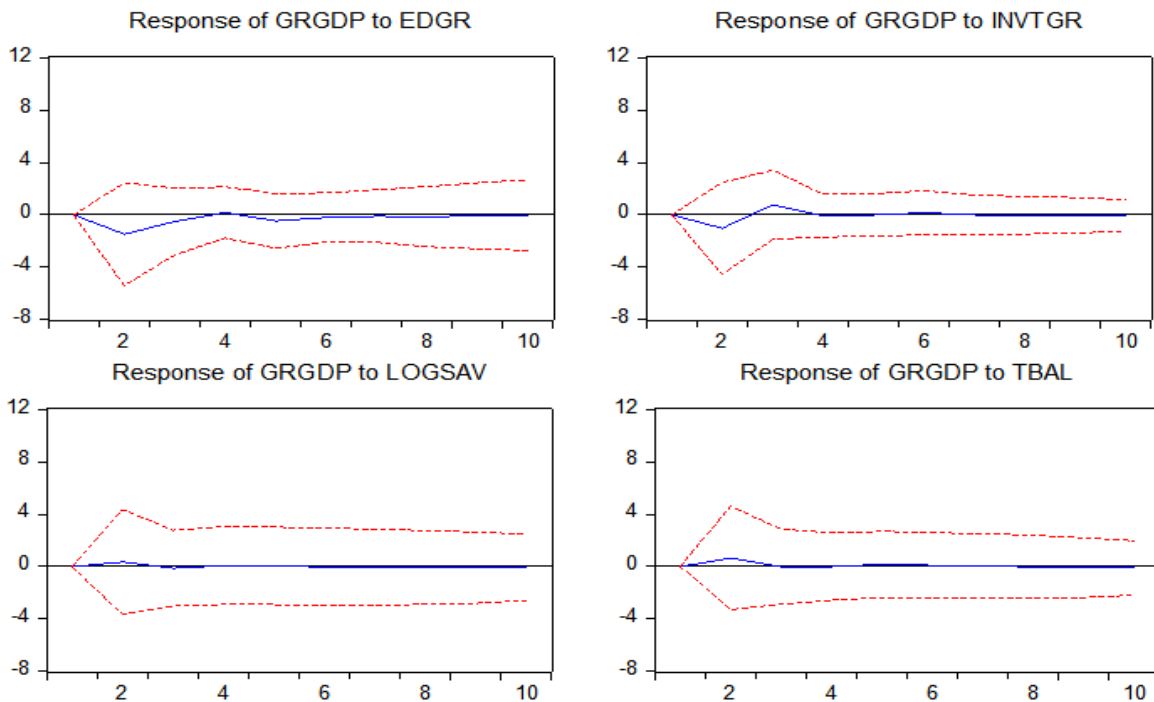


Figure 1. Impulse Response Function

Source: Author’s drawing , using Eviews 10.0

In figure 1, the response of growth rate of GDP to shocks of external debt rate was negative from the first period to the fourth period. Then from the seventh period to the tenth period there was a natural influence.

The responses of the growth rate of GDP to shocks from the growth rate of investments was negative from the first period to the third period , then the shocks in the third period was slightly positive , then from the fourth period to the tenth period the effect of the shock was natural. The responses of the growth rate of GDP to shocks from the log of domestic savings and trade balance was found to be natural.

The responses of the growth rate of GDP to shocks from growth rate of external debt had a negative impact both in the short run and long run , this is because the proceeds from external borrowing is not used for productive purposes

The growth rate of investments, domestic savings and trade balance had no impact on economic growth.

V. CONCLUSION AND RECOMMENDATIONS

This study investigated the impact of external debt and economic growth in Nigeria between 1980 and 2015, using the dual gap model. The empirical findings from the Granger causality test revealed that there is no causal relationship between growth rate of GDP and the growth rate of External debt. From the Impulse response analysis it was seen that External debt impacts negatively on economic growth, it was also observed that domestic savings and aggregate investment had no influence on economic growth.

The empirical findings in this study has proven a negative and unsound future for Nigeria’s economic growth, as long the external indebtedness perseveres.

The following recommendations are given;

- i) External debt should be played down for it cannot be relied on by the government for the promotion of economic growth because of its slowing down influence on economic growth.
- ii) Government should look inward for policies that will stimulate domestic savings and encourage aggregate investment

- iii) If government must borrow, it should be for productive and developmental projects that will boost economic growth rather than political squandering.

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