

External Debt, Internal Debt and Economic Growth Bound in Nigeria using a Causality Approach

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Abstract: The study examined the causal nexus between external debt, domestic debt and economic growth in Nigeria between 1970 and 2009 using a Vector Autoregressive (VAR) and a Vector Error Correction (VEC) models. The variables used in the study were tested for stationarity using the Augmented Dickey Fuller and Philip Perron test. The result showed that the variables are stationary at first differencing. Co-integration test was also performed and the result revealed the absence of co-integration between domestic debt and economic growth while the result also revealed the presence of co-integration between external debt and economic growth. The co-integration results determined the appropriateness of methodological test for causality. The findings of the VAR model revealed that there is a bi-directional causality between domestic debt and economic growth while that of the VEC model revealed a unidirectional causality from economic growth to external debt in Nigeria. The study recommends that government should rely more on domestic debt in stimulating growth than on external debt.

Key words: Causality, economic growth, external debt, internal debt, VAR, VEC

INTRODUCTION

In the last few years there had been alarming signals on the rising level of Nigerian domestic debt, which in the absence of appropriate measures might result to a looming catastrophe. Since the Obasanjo administration succeeded in looping \$30 billion dollars debt off the Nigerian external debt, the country has become quite hopeful and relaxed about external borrowing. This has however, been the motivation that has led to the present Yar'dua's and Jonathan's administration to embark on a new external borrowing extravaganza, which seems to be a determined effort to take our external debt to its previous heights. Among the series of recent external debts are; twenty-three billion dollar (\$23b) sourced from Chinese banks to build three refineries and a petrol chemical complex, \$2.2b loan from African Development Bank in 2009 to execute 46 projects and \$915 m credit from the World Bank was just obtained as opined by Ogidan (2010).

In the light of the recurring high debt, the World Bank Managing Director in a communiqué warned Nigeria to check its rising domestic debt because it could be harmful to the growth of the domestic economy. This was further buttressed by Ogidan (2010) that aside from the needed checks on foreign debt it is important to focus on issues relating to debt servicing and debts accumulation within the boundaries of the country. Also, Nwankwo (2011) opined in an interactive session that

Nigerian domestic debt as attained 86.71% of the total debt as at 2011. He further emphasized that most of the internal debt was incurred through federal government bonds with maturity ranging from 3-20 years issued by DMO on a monthly basis. In the light of this escalating and disturbing domestic debt growth rate and given the priority of current government at making Nigeria one of the largest 20 economies in the world by the year 2020 in line with the vision 2020 objectives, it is important to investigate the effect of public debt on economic growth in Nigeria.

Apart from the above, there exist contrasting views in the literatures relating to whether foreign debt affects economic growth more than the domestic debt", or that both domestic debt and external debt influences a country economic growth. Some studies like Audu and Abula (2001) are of the view that it is only domestic debt that influences growth and not foreign debt and vice-versa. Thus, there is therefore the need to examine the individual and combined effect of internal and external debt in Nigeria, to enhance proper policy recommendation to the government.

LITERATURE REVIEW AND THEORETICAL FOUNDATION

This section reviews past studies on the relationship between public debt and economic growth in Nigeria.

Asogwa (2005) pinpoints that Nigeria is not the only country faced with this escalating level of government indebtedness, but when compared with other sub-Saharan region, that of Nigeria was seen to be larger than the others by the years. Gbosi (1998) stressed that borrowing from the domestic economy in order to finance its domestic expenditure due to oil price collapse has increased rapidly.

Further, Claessens *et al.* (1997) stipulated that the debtor can only share partially in any increase in output and export because a fraction of that increase will be used to service the external debt. His theory therefore implies that debt reduction (internal and external) will lead to increased investment and repayment capacity and as a result, the portion of the debt outstanding becomes more likely to be repaid.

Ajayi and Iyoha (1998) posited that the issue of debt and lack of growth are clearly interrelated. In his view, excessive stock of debt retards growth and hamper the socio-economic development of sub-Saharan African countries. The large debt stock and crushing debt service burden have now introduced a vicious circle to the analysis of the development problem of these developing countries because debt servicing in the face of inadequate foreign earning leads to severe import strangulation. Import strangulation hold back export growth thus perpetuating import shortages as observed by Ajisafe *et al.* (2006).

Fajana (1993) in his opinion sees nothing wrong with external debt but that the debt crisis emanates from mismanagement of such funds. To him, borrowing is desirable and also unavoidable because external borrowing is a first order condition for bridging the domestic gap; while the second order is that such funds should be invested in viable project whose rate of return is higher than that of the interest rate on the loan. Put together, he concluded by saying that for external debt to serve as an engine of growth it has to be properly managed and the resources it makes provides need to be prudently and efficiently utilized.

Ogwuma (1996) is of the view that debts arise from loans and credit procured by the residents of a country from the rest of the world that is meant for bridging the gap between saving and investment. He stipulated that when these resources are productively deployed and utilized, they do not constitute any drain on the future resources. He further buttressed that, to ensure sustainability of debt servicing, borrowing countries like Nigeria need to adopt efficient external debt management strategies, which entail carefully planned schedules of external debt acquisition, deployment and retirement.

Guidotti and Kamar (1991) studied the case of 15 emerging market countries and revealed that the ratio of domestic debt to GDP ratio went from 10% in 1981 to 16% in 1988 and remained more or less constant over the period and these important differences in the process has led to accumulation of domestic and external debt in these countries. However the increase in domestic debt was mainly due to new borrowing and that of external debt was due to accumulation of arrears. This suggests that if emerging market countries had not been shut down from the international capital market, they would have probably accumulated more external and less domestic debt. This view is however said to be consistent with the one put forward by Borensztein, Cowan, Eichengreen and Panzza (1999) who find that crisis play a key role for the development of the domestic bond market.

Jakob (2005) showed in his study that low income countries like Nigeria have a tradition in borrowing to finance huge capital projects like the debt procured by the government for its own use. He employed a cross-sectional survey of the role of domestic debt market in sub-Saharan African based on data set of 27 countries between (1980-2000) i.e., 20 years periods. He finds out that domestic markets in these countries are more generally small, involves short and medium term and a very narrow investor's base. It also pinpointed that there exist significant differences among the size, cost, and maturity structure of domestic debt markets in heavily indebted poor countries. He further discovered from his study that domestic interest rate payment present a significant burden to their budget despite much smaller domestic debt than foreign debt which in turn affects private investment and growth at large.

Asogwa (2005) in his study employed a more comprehensive technique in investigating the impact of domestic debt on economic growth. He concluded that, domestic debt in Nigeria has continued to suffer confidence crises as market participants have consistently shown greater unwillingness to hold longer maturities. Rather the government has only been able to issue more of short term debt instrument.

Studies across the Nigerian border like that of Pattillo *et al.* (2002) and Wijeweera *et al.* (2005) investigated the connection between public debt and economic growth by employing co-integration, error correction methodology and to determine both long and short run effect of the variables used, they discovered there exist a negative but insignificant impact of debt servicing on growth. In addition, the results also showed that high debt appears to reduce growth mainly by lowering the efficiency of investment rather than its

volume. Similarly, Oshadami (2006) in her study concluded that increase in the growth of domestic debt negatively affects economic growth.

Seetanah *et al.* (2007) and Hameed *et al.* (2008) also investigate the link between public debt and economic growth using Vector Error Correction model and production function for the time series respectively. In the results, it was discovered from both studies that debt servicing burden has a negative effect on productivity of labour and capital which ultimately negatively affects economic growth in both Mauritius and Pakistan respectively.

From the above it is observed that most of the studies focused on the relationship between public debt and economic growth on the one hand and between external debt and/or domestic debt and growth, on the other hand. However, this study failed to examine the issue of causality between these variables. This is important because causality enable us to have a comprehensive view of whether it is public debt that is enhancing growth or growth enhancing public debt. The study therefore wants to look at the direction of causation between public debt and economic growth in Nigeria from 1970 to 2009.

MATERIALS AND METHODS

Source of data: The data used in this study were sourced from the Central Bank of Nigeria publications such as annual bulletin and statement annual reports for various years, covering the sample period 1970 - 2009. Before the causality test, it is important to examine the properties of the variables of interest and afterwards the extent of co-integration between the variables of interest is examined.

Model specification and estimation: The objective of this study is basically to examine whether or not external and domestic debt causes economic growth in Nigeria. To achieve the above objective, the co-integration and granger causality test is utilized. Causality is said to be essential in econometrics analysis in the sense that it makes us to know whether a past change in one variable X has a corresponding impact on current variable Y or whether the relation works in the opposite direction. The primary model is specified as:

$$EXDT = f(Y) \tag{1}$$

$$INDT = f(Y) \tag{2}$$

Equation (1) for external debt-growth nexus is represented in a VAR model as:

$$EXDT_t = \alpha_1 + \sum_{i=1}^n b_{1i} EXDT_{t-i} + \sum_{i=1}^n b_{1t} Y_{t-i} + \epsilon_{1t} \tag{3}$$

$$Y_t = \alpha_2 + \sum_{i=1}^n b_{2i} Y_{t-i} + \sum_{i=1}^n b_{2t} EXDT_{t-i} + \epsilon_{2t} \tag{4}$$

While Eq. (2) for internal debt-growth nexus is represented in a VAR model as:

$$INDT_t = \alpha_3 + \sum_{i=1}^n b_{3i} INDT_{t-i} + \sum_{i=1}^n b_{3t} Y_{t-i} + \epsilon_{3t} \tag{5}$$

$$Y_t = \alpha_4 + \sum_{i=1}^n b_{4i} Y_{t-i} + \sum_{i=1}^n b_{4t} INDT_{t-i} + \epsilon_{4t} \tag{6}$$

where; $\alpha_1, \alpha_2, \alpha_3$ and α_4 are constants; $\epsilon_{1t}, \epsilon_{2t}, \epsilon_{3t}$ and ϵ_{4t} are the random disturbance and n is the number of optimal lag length, which is determined by the Schwarz Bayesian Criterion (SBC) and Akaike's Information Criterion (AIC).

RESULTS AND DISCUSSION

Analysis of variables: The study commence it empirical analysis by first ascertaining the unit roots of the time series to be used for analysis. This is important because most time series exhibit non-stationarity traits in their level form, which often poses a serious problem to econometric analysis and may therefore lead to spurious result if appropriate measures are not taken. To guard against spurious result, this study takes the step in checking the properties of the variables with the use of the Augmented Dickey-Fuller (ADF) test developed by Dickey and Fuller (1981) and the Phillip-Perron (PP) test developed by Phillips and Perron (1988). The results are presented in Table 1.

With respect to the ADF test on Table 1, all the variables were found to be non-stationary in their level but were stationary after first differencing (that is, the variables are integrated of order one), implying that the

Table 1: Unit root test result

| Augmented Dickey-Fuller (ADF) test | | | | Phillip-Perron (PP) test | | |
|------------------------------------|---------|----------------------|---------|--------------------------|----------------------|---------|
| Variables | Level | 1 st Diff | Remarks | Level | 1 st Diff | Remarks |
| lindt | -0.7041 | -3.6078** | I(1) | -0.6145 | -4.4773* | I(1) |
| lextdt | -1.7323 | -3.6102** | I(1) | -1.6396 | -4.6820* | I(1) |
| lgdp | -2.6304 | -4.3923* | I(1) | -2.5524 | -5.7712 | I(1) |

*: 1% and **: 5% significance level; lindt = Log of Domestic debt; lextdt = Log of external debt; lgdp = Log of gross domestic product

Table 2: Co-integration result between domestic debt and gross domestic product

| Eigenvalue | Likelihood ratio | 5% critical value | 1% critical value | Hypothesized No. of CE(s) |
|------------|------------------|-------------------|-------------------|---------------------------|
| 0.238989 | 13.06586 | 15.41 | 20.04 | None |
| 0.068288 | 2.687796 | 3.76 | 6.65 | At most 1 |

*(**): Denotes rejection of the hypothesis at 5% (1%) significance level

Table 3: Co-integration result between external debt and gross domestic product

| Eigenvalue | Likelihood ratio | 5% critical value | 1% critical value | Hypothesized No. of CE(s) |
|------------|------------------|-------------------|-------------------|---------------------------|
| 0.195629 | 12.84007 | 15.41 | 20.04 | None |
| 0.113259 | 4.567678 | 3.76 | 6.65 | At most 1 * |

*(**): Denotes rejection of the hypothesis at 5% (1%) significance level

variables are I(1) series. The result of the ADF test result is supported by the PP test result. However, the PP result showed a superior result when the values are compared.

The co-integration test: Preceding the unit root test is the co-integration test and given that our variables are I(1) series, the Johansen and Juselius (1990) co-integration test was applied to examine the long-run relationship between the variables. With respect to the co-integration between domestic debt and gross domestic product, the result of the co-integration test in Table 2 rejects the null hypothesis of at most one co-integrating variable at 5% critical value. LR rejects any co-integration at 5% significance level when compared with the critical values, which therefore implies that there is absence of co-integrating relationship between domestic debt and Gross Domestic Product (GDP). However, the result of the co-integration test in Table 3 between external debt and economic growth rejects the null hypothesis of at most one co-integrating variable at 1% critical value but accepted the null hypothesis at 5% critical value. Likelihood Ratio (LR) accepts co-integration at 5% significance level when compared with the critical values. Again, this implies the presence of co-integration between external debt and GDP.

Granger causality test: Although, the co-integration test indicated the absence (Table 2) or presence (Table 3) of long-run relationship between the variables, it does not indicate the direction of causality between the variables. To detect the extent of causation between the variables and to avoid biasness in model specification which could result in spurious estimates; the study made use of the unrestricted Vector Autoregressive (VAR) model to

determine the direction of causality between domestic debt and economic growth. This is because the co-integration result indicated the absence of co-integration between domestic debt and economic growth. However to determine the causality between external debt and economic growth this study made use of the of the Vector Error Correction (VEC) model which is derived from the vectors of co-integration. Engl and Granger (1987) and Shan and Morris (2002) stressed that the Vector Autoregressive (VAR) model is inappropriate in determining the extent of causality between variables when such variables are I(1) series and are co-integrated. This is because the simple F-statistics does not have a standard distribution (Jordaan and Eita, 2007). However, proper inference can only be obtained by analyzing the causality test via the vector error correction model (Yucel, 2009).

The causality result between domestic debt and economic growth is presented on Table 4 while the result between external debt and economic growth is presented on Table 5.

Table 4: Granger causality test result

| Panel A: H ₀ : Domestic debt does not granger cause economic growth | | | |
|--|-------------|--------|---------|
| Variables | Coefficient | S.E | t-stat |
| LDMDT | 0.0376 | 0.0222 | 42.2307 |
| LGDP | 0.1058 | 0.0382 | 2.7723 |
| C | -0.3511 | 0.2521 | -1.393 |
| Panel B: H ₀ : Economic growth does not granger cause domestic debt | | | |
| Variables | Coefficient | S.E | t-stat |
| LGDP | 0.8598 | 0.0819 | 10.494 |
| LDMDT | 0.0387 | 0.0477 | 0.8109 |
| C | 1.3596 | 0.5412 | 2.5038 |

*: Implies significance at one percent level

Table 5: Granger causality test between external debt and economic growth

| Dependent variables | LEXDT | LGDP | ECT _{t-1} (t-stat) |
|---------------------|-------------------|---------------------|-----------------------------|
| LEXDT | - | -119.0539 (-0.0617) | -0.0015 (-0.4586) |
| LGDP | -0.0084 (-0.0617) | - | -1.0253 (-4.1917) |

The models were estimated using a lag length of one based on the Schwarz Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) for both the unrestricted VAR model and the VEC model. Based on the result from Table 4, it could be observed that the t-stat values of domestic debt (*LDMDT*) on Panel A and economic growth (*LGDP*) on Panel B are 42.2307 and 10.4940, respectively; indicating that there is a bi-directional causality between domestic debt and economic growth. Thus the null hypothesis of no causality between domestic debt and economic growth is rejected. In other words, domestic debt can cause economic growth while economic growth can also cause domestic debt.

A cursory look at Table 5 shows that there is an automatic relationship between the dependent and Independent variables under consideration. It was further observed from Table 5 based on the t-value of the ECT_{t-1} at 1% significance level that there exists a unidirectional causality from economic growth to external debt, that is, economic growth causes external debt and not vice versa.

CONCLUSION

The main objective of this study is to specifically examine the causality between domestic debt and economic growth and between External Debt and economic growth in Nigeria from 1970-2009. In the study, stationarity test was performed using the ADF and PP test, which shows that the variables are of I(1) series. Co-integration test was also carried out to determine the long run relationship between the variables. The result between domestic debt and economic showed the absence of co-integration both at 5 and 1% significance level (Table 2). The absence of co-integrating equations prompt the use of unrestricted vector autoregressive model, which gives the result of the causality, presented in Table 4. With respect to the co-integrating result between external debt and economic growth (Table 3), it was observed that there exist co-integration at 5%. The presence of co-integration equation prompts the use of a vector error correction model in analyzing the causality test.

It was evident from the findings that there existed a bi-directional causality between internal debt and economic growth; this implied that both internal debt and economic growth leads to one another. However, the result of the causality between external debt and economic growth showed a unidirectional causality from economic growth to external debt and not vice versa, this

implied that it is economic growth that lead to external debt and not external debt leading to economic growth. This result showed that external debt has not contributed to the growth of the Nigerian economy rather domestic debt have contributed significantly to economic growth in Nigeria and in the same vein, economic growth can be a very significant factor or determinant of internal debt.

RECOMMENDATION

The policy implication of this result is that domestic debt rather than external debt will stimulate economic growth in Nigeria. This is because the repayment of the principal and interest on such internal debt is a re-investment into the domestic which would usually have a chain investment effect on the domestic economy. But with respect to external debt, more resources will be needed to repay and service the debt and this would impair the positive effect of this debt on economic growth. Thus government should rely more on domestic debt in stimulating growth rather than external debt.

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