Assessment of the effect of external debt overhang on economic growth in Nigeria

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Abstract
External borrowing can be a viable option for achieving economic growth in Nigeria that is characterized by the exigencies that can enhance the welfare of her citizens if optimally utilized. However, there are arguments over what account for the low performance of external loans and the break experienced of debt overhang and the crowding effect on the economy. To fill the gaps, the author adopts error correction mechanism and linked data from the Central Bank of Nigeria on various issue to test the hypotheses. The results revealed that exchange rate at lag three and inflation rate lagged by one-year period met their a priori expectations as their coefficient are negatively signed implying that increase in the two variables reduces economic growth in Nigeria. The results also indicate direct relationship between foreign exchange earnings arising from external debt-export ratio, income emanating from external debt-income ratio and economic growth implying that these would have been optimally utilized for investment driven in the economy, hence the result is so. By implication, the study concludes that the outcome enhances economic growth. Based on the results, the study recommends exchange rate stability, tolerable and a well-managed inflation rate (single digit rate) as these could stimulate investment necessary for economic growth in Nigeria.

Keywords: Economic Growth, Error correction, External debt over hang, Hypothesis, Mechanism, Nigeria

1. Introduction

The fact remained is that, every government across the globe desires economic growth for the reason of improvement in welfare of every citizen and also to enhance the developmental goals. In their quest to achieve the growth objective, government decides to formulate various policies in order to provide enabling environment for domestic and foreign investors. In addition to this, government can as well undertake investment which to a greater extend dictated by the amount of foreign exchange earnings. However, external debt represents loans obtained from the external creditors over the years which have not been paid to the creditors. The growth of the economy is necessary in terms of gross domestic product to be able to service the loan.

However, for the reason of development coupled with the scarcity of capital, a developing country like Nigeria decides to acquire capital from the foreign creditors to fill the saving-investment (S-I) gap or export-import gap which occurred from the fall in export relative to import.

Hunt (2019) noted that increase in savings and investments can lead to economic growth of any nation, while Sachs (2017) equally argued that growth will not occur unless capital stock rises to a certain threshold (about 20 to 25 per cent of GDP). The truth is that as capital rises, investment as well as the output rise just like a vicious circle. At a certain level say 16 per cent and above of GDP, the rise in capital as well as savings will be enough to guarantee self-sustaining growth in the economy. Foreign financing remained a method available to

the developing country like Nigeria to achieve economic growth, therefore, the national economic structures need to be adapted to account for the flow of resources, debt repayment (Wahiba, 2018). External financing is considered as a means to ensuring sustainable development instead of utilizing local resources that are not enough for the reason of "export-import gap" (dual-gap) theory (Eggbetunde, 2017). External debts imply borrowing from external economy. Therefore, is regarded as debt that is completely obtained from outside the country and do not often time translate into a burden when the obtained loans are optimally utilized on investment purpose.

Taking a look at the above, there is virtually no nation that is wholly debt free. What often come to mind is that, is external borrowing worthwhile or harmful to the nation's economic growth or should the country embark on external borrowing? There appears to be no viable answers to the raised questions because opinions are divided in the view of various scholars. On the other hand, if these questions are put to the ordinary Nigerian citizens, the answer might be that, it is harmful to the economy. We cannot apply the basis of sympathy of these opinion for the reason of historical debt antecedent in Nigeria couple with the harmful effects on the well-being of the people.

Basically, foreign borrowing as put in place by Thirwall (1999) has been noted as supplement to domestic savings in order to bridge the investment-savings gap thereby achieving faster economic growth. The idea of savings-investments (S-I) and export-import (X-M) – foreign exchange gap indicates that external borrowing can as well be viewed as a supplement to foreign exchange earnings for quicker economic growth rate. The gap between the foreign exchange earnings, the domestic investment-savings gap and that the domestic and foreign resources are not always substitutable, hence foreign loans is necessary in order to fill the gap.

Ndekwu 2021 stated that the issue of debt has become dreadful to many developing countries. Though, debt provides the dynamic part of monetary economy and considered relevant in economic growth, its structure, growth and burden are causing much concern to many economies. Some researchers, in their studies revealed that external debt has become burden in the Nigerian economy from 1980s. For example, Ndekwu 2021, in his study, he found out that the ratio of external debt to export indicates 271.1 per cent in 2015, 277 per cent in 2016, 268 per cent in 2017 and 298 per cent in 2018.

Therefore, the study posits some certain questions in order to appreciate the enormity of the external issue in the Nigerian economy. The first question is that, does external debt warrant debt overhang effect on Nigerian economy? Can external debt service payment crowd-out economic growth in Nigeria? What other variables that can warrant economic growth in the Nigerian economy? These questions remained the basis of the objective of this research study. The rest of this study is structured as follows: section two is the literature review, section three focuses on the methodology, while section four addresses the results and discussion, the section five deals with conclusion and recommendations.

2. Literature Review
Theoretical Literature
The Import-Export (M-X) Gap Theory

The dual gap model is characterized by import-export gap (M-X). Given the analysis, we can assume that M-X denotes exports fall short relative to imports. Therefore, the foreign assistance that is needed in order to bridge the foreign exchange (import-export) gap is however stated below:

$$F_0 = M_0 - X_0 + Y_0 m_a - Y_0 X_a = Y_0(m_a - X_a)$$
.... (1)

Where, M_0 denotes the imports in the base period, X_0 represents exports in the base period, Y_0 accounts for income in the base period, m_a is the average imports coefficient and X_a is the average export coefficient.

By implication, if imports in a given year 't' equals

$$X_t = X_a Y_0 + m^1(Y_t - Y_0) \ldots\ldots\ldots\ldots\ldots(2)$$

And export in year 't' is equal to:

$$X_t = X_a Y_0 + X^1(Y_t - Y_0) \ldots\ldots\ldots\ldots (3)$$

Where m^1 stands for the marginal import coefficient, X^1 is the marginal export coefficient and $Y_t = \frac{I_t}{C_r}$, then we can say that the foreign borrowing requirements at time 't' for us to achieve the needed growth rate therefor becomes:

$$F_t = m_a Y_0 + m^1(Y_t - Y_0) - X_a Y_0 + X^1(Y_t - Y_0) \ldots\ldots\ldots (4)$$

Now taking the difference between equation (1) and (2), we have

$$F_t - F_0 = \Delta M - \Delta X \ldots\ldots\ldots\ldots (5)$$

This implies that a rise in the external assistance finances the difference between imports and exports. Supposed, there is a decline in the level of assistance over the period, that is

$F_e > F_0$, there exist $X^1 > m^1$ ii which must be greater than m^1

However, the study establishes an alternative approach that can express the minimum import needed for growth in the economy as a proportion of investment needed, by this equation (2) becomes:

$$M_t = m_t I_t = m_t Y_t C_r \ldots\ldots\ldots\ldots (6)$$

Where m_t represents the different between imports and investment coefficient. By and large, it is established that:

$F_t = M_t - X_t$ which gives

$$Y_t m_t C_r = X_t + F_t \ldots\ldots\ldots\ldots\ldots(7)$$

By extension, the trade limited growth rate is therefore given as

$$R = \frac{1}{m_t C_r}\left\{\frac{X_t}{Y_t} + \frac{F_t}{Y_t}\right\} \ldots\ldots\ldots (8)$$

Therefore, the import-export gap becomes less restrictive over the period, provided that export rises at a faster rate when compare to the national income ($X^1 > X_a$,

and this is possible if more of capital goods are produced within the domestic economy. By this contention, M-X gap will disappear and the trade-limited growth fails to exist anymore, at this time, exports rise to a level that is sufficient to guarantee import requirements for the growth target.

In a simplified form, the dual-gap model as investigated by Obadan (1991) employed the national income accounting which revealed that an excess of investment (I) expenditure over the domestic savings (S) is congruent to surplus of imports (M) over exports (X), that is

$$S - I \equiv X - M \ldots\ldots\ldots\ldots\ldots\ldots(9)$$

The equation (9) above indicates that savings gap (S-I) is congruent to export-import (X-M). An excess of imports over exports means excess of resources in the domestic economy over the resources supplied. By this, external borrowing is therefore determined by the rate of investment needed to achieve economic growth vis-a-vis the available domestic savings.

Empirical Literature

External borrowing is an integral part of government finance and debt is an accumulated value of past deficits (Rosen, 1999). However, the question that concerns many countries is whether external borrowing promotes economic growth or it hinders growth. Researchers do not have consensus on this, given in the literature.

Persson (2019) examined the effect of external debt on economic growth in eight indebted African counties using panel data technique. The results revealed that the impact of external debt on the economic growth is statistically significant in terms of crowding out effect for the eight countries selected. The result also revealed in terms of debt overhang, external debt was not statistically significant in influencing economic growth in these selected countries.

Quattri and Fosu (2019) examined the impact of external debt-servicing constraint as well as external assistance on

government expenditure in sub-Saharan African countries. The findings shown that the debt effect is substantially lower than existing estimates of the pre-Heavily Indebted Poor Countries (HIPC). The results also show negative for the education expenditure.

Saad (2020) investigated the causality between economic growth, export and external debt servicing in Lebanon for the period covering 1970 to 2018. The results revealed that both short-run and long-run relationship exist among the variables. There is also bi-directional granger causality between the gross domestic product and external debt to export, from export to economic growth and also from exchange rate to economic growth.

Saddique and Selvanathan (2021) empirically examined the impact of external debt burden on the gross domestic product in the HIPC covering the period 1970 to 2019. The findings indicate that in the short-run and the long-run, there exist a reduction in debt stock which had significant increase on growth performance of the indebted countries.

Kasidi and Said (2020) examined the impact of external debt on the economic growth of Tanzania within the period of 19980 to 2018. The results had it that external debt servicing positively affect economic growth in Tanzania. Descriptive statistic was also used and the results revealed significant impact of external debt service on the economic growth.

Dogruel (2020) investigated the Foreign Debt Dynamics in middle income countries. In the analysis, ten-year moving average was used and the standard deviation of the annual growth rate of per capita income was taken as indicator for economic growth. The results also show significant effect of external debt on growth in the selected countries.

Hasan (2019) examined the extent in which external debt affect economic growth in Nigeria beginning from 1985 to 2015 using the auto-regressive distribution lag. The results obtained revealed that external debt at lag two and the interest rate lagged by three-year period and inflation rate returned negatively signed implying that external debt and interest rate did not enhance the growth of the Nigerian economy for the period of study. The study recommended the need for optimal utilization of external loans obtained from the foreign creditors as this could guarantee increase in output returns on any investment

Mohd-Daud and Halim-Ahmad (2021) examined the impact of external debt on economic growth in Malaysia. The growth model was tested by using the Autoregressive Distributed Lag. In addition, the existence of threshold effect in order to examined the estimate of the optimal level of external debt was conducted. The results shown accumulation of external debt is associated with increase in economic growth in Malaysia. Therefore, increase in external indebtedness beyond the threshold indicates inverse relationship with the Malaysia economy.

Getinet and Ersumo (2020) examined the impact of external debt service on economic growth in Ethiopia beginning from 1983 to 2018 by using the ARDL approach. The results revealed the existence of long-run equilibrium relationship between external debt service and the gross domestic product in Ethiopia economy. The study recommends increase in investment and optimal utilization of the loans obtained for possible debt repayment in the Ethiopia economy.

3. Methodology
Sources of Data
The data used in this study is annual time series obtained from the Central Bank of Nigeria (CBN) statistical bulletin of various issues 2017 and 2021. Sectoral gross domestic product (GDP) external debt-income ratio ($\frac{D}{GDP}$), external debt-export ratio ($\frac{D}{X}$), exchange rate (EXR) and inflation rate (INF) are the variables used in the

cause of the study and the time series data cover the period beginning from 1980 to 2021.

Theoretical Framework and Model Specification

The model we shall consider in this study is the behavioral equation that involves debt overhang effect of external debt and economic growth. The equation is growth (output) type. The output type is adapted from the Import-Export (M-X) Gap Theory which hypotheses that growth of output can be determine when export rises at a faster rate when compare to the national income ($X^1 > X_a$ and this is possible if more of capital goods are produced within the domestic economy. Some of the modifications is associated with Dogruel (2020) having examined the impact of external debt on economic growth in Malaysia. The reviewed study had it that the poor growth performance of many highly indebted developing countries can be attributed to disincentive effect of their external debt burden tagged to debt

overhang. Dogruel (2020) suggest that debt overhang effect is expected to be particularly strong when considering economic growth. Hence output model is specified below:

$$GDP_t = f\{(\frac{D}{GDP})_t, (\frac{D}{X})_t, \text{EXR, INF}\} \ldots. (1)$$

Where GDP represents National Income, $\frac{D}{GDP}$ denotes external debt-income ratio, $\frac{D}{X}$ stands for external debt-export ratio, EXR stands for exchange rate and INF is the inflation rate.

The summary equation of the model (1) above is however presented below as:

$$GDP_t = \varphi_0 + \varphi_1(\frac{D}{GDP})_t + \varphi_2(\frac{D}{X})_t + \varphi_3 EXR_t + \varphi_4 INF_t + \delta_t \ldots\ldots\ldots\ldots (2)$$

δ_t equal to the error term

The priori expectation is that: $\varphi_1 \rightarrow \varphi_4 < 0$ Therefore, the present author adopts error correction mechanism to test hypotheses as having found out that the variables are integrated at first difference when ADF and Philip-Peron (PP) test statistics were applied.

4. Results and Discussion

 Unit Root Analysis

Table 1: Unit Root Test Results

Variables	At Levels		At First Diff.	
	ADF	Philip-Peron (PP)	ADF	Philip-Peron (PP)
$\frac{D}{GDP}$	-1.2830	-0.5114	-3.6632	-5.8204
$\frac{D}{X}$	-2.15 01	-1.4461	-6.2311	-6.4233
EXR	-0.71 12	-0.0869	-5.1131	-5.0113
INF	-0.9622	-2.8042	-4.3312	-5.4006

The Test critical value at the 5% level: ADF = -2.9422 & Philip-Peron = -2.9771
Source: Author's Regression Output

The study employs the use of Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) test statistic to ascertain stationarity as well as their robustness. The ADF test statistic was used to examined the characteristics of the data sample, constant and trend. In line with the same school of thought, the PP technique was also used for the reason

being that it will help to modifies the ratio of the coefficient so that the serial correlation will not affect the asymptotic distribution of the test statistic. By so doing, the study found out that the results for the ADF and Philip-Peron (PP) indicate similar trend as the variables are stationary at first difference and thus integrated at order one.

Lag Length Selection
Table 2: Lag Length Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2570.352	NA	2.42e+22	112.7521	132.8242	112.2303
1	-2264.334	441.8211	3.35e+25	105.1332	103.5055	104.2021
2	-2401.421	127.7501	6.72e+27	102.2621	112.4402	118.2230
3	-2241.791	93.1250*	2.24e+26*	113.5510*	114.4421*	106.2310*

 *Indicates lag order selected by the criterion
Source: Author's Computation from the estimated output

The table 2 above indicates the results of the lag length selection criteria. The study used annual time series data to determine the lag length. The maximum lag is 3 as revealed by the final prediction error (FPE) denoting the minimum value.

Johansen Multivariate Co-Integration Test Results
Table 3

Null Hypothesis	Test Statistic	Critical at 0.05	Hypothesized N0of CE(s)
r = 0*	123.21	86.02	None**
r ≤ 1*	109.21	46.03	At most**
r ≤ 2*	92.31	41.02	At most 2**
r ≤ 3*	79.41	22.11	At most 3**
r ≤ 4*	22.04	12.253	At most 4*

*(**) represents the rejection of the hypothesis at 0.05 and 0.01 level of significant
The maximum Engel value test results indicate 3 co-integrating equation at the 0.05 level of significant
Source: Computed by the author using E-view 9.0

From table 3 above, the maximum Engel value indicates 3 co-integrating vectors among the variables since the hypothesis of non-co-integrating vector (r = 0) is however rejected. The number of co-integrating vectors as indicated by 'r' is at least three showing long-run equilibrium relationship among the variables.

Long Run Results with Dependent Variable GDP
   Table4

Variable	Coefficient	Std. Error	t statistics	Probability
C	-3.358927	0.810762	-1.048228.	0.0387
$\dfrac{D}{GDP}$	0.078253	0.026044	0.540443	0.0331
$\dfrac{D}{X}$	0.053006	0.276201	1.868441	0.0094
EXR	0.034144	0.218608	2.060120	0.0058
INF	-2.710087	2.720985	-1.005633	0.0612

Source**:** Computed by the Authors

From table 4 above, the results of the long-run show that INF is inversely related to gross domestic product (GDP) and this is in line with the a priori expectation, however, the coefficient of EXR exhibits direct relationship with the GDP which is contrary to the a priori prediction. The coefficients of that of $\frac{D}{GDP}$, and $\frac{D}{X}$ are positively related to the gross domestic product thereby conforming the a priori expectation.

The Parsimonious Error Correction Estimates with GDP as Dependent Variable
Table 5:

Variables	Coefficient	Std. Error	t. Statistics	Probability
C	0.1338	0.1486	0.9004	0.3780
D[$\frac{D}{GDP}(-2)$]	0.3270	0.1224	2.6715	0.0252
D[$\frac{D}{X}(-1)$]	0.1161	0.0421	2.7577	0.0302
D[EXR(-3)]	-0.1525	0.0446	3.4193	0.0437
D[INF(-1)]	-0.2112	0.0533	-3.9625	0.0318
ECM (-1)	-0.8150	0.2150	-3.7907	0.0215
R-Squared Adj. R-Square F-statistic Prob(F-sta.) DW Stat.	0.8543 0.8413 40313232 0.0000 1.9423			

Source: Computed by the Authors

The results for the parsimonious error correction estimate of GDP for the entire sample period of 1980 to 2021 reported in table 5 show good fit estimates; whereby the value of coefficient of determination (R^2) indicates 85 per cent of the variations in the gross domestic product as explained with the set of the explanatory variables used in the study. This result was further confirmed by the adjusted coefficient of determination with a value of 0.84 indicating 84 per cent of the variation in GDP is caused by the set of independent variables in the estimated model. The F-statistic which measures the joint significant of the regressors in the model is statistically significant at the 5 per cent level.

The results also indicate that exchange rate [EXR(-3)] at lagged three and inflation rate [INF(-1)] lagged by one-year period had the expected sign and statistically significant at

the 5 per cent level. Though, the coefficient of exchange rate lagged three [EXR(-3)], and inflation rate lagged one [INF(-1)] are inversely related to gross domestic product (GDP), the findings are in line with the expected economic prediction The reason for that remained the fact that exchange rate

and inflation rate must have been properly managed during period of study. The findings conform with that of Hasan (2019) who examined the impact of external debt on the growth of Nigerian economy where he found out that inflation rate being one of the variables that is inversely signed.
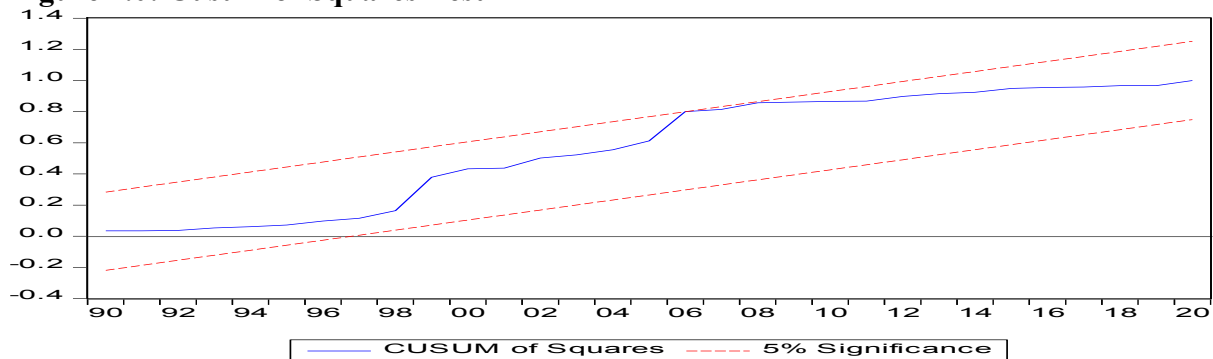
However, the external debt-income ratio at lag two [$\frac{D}{GDP}(-2)$] and external debt-export ratio lagged by one year period exhibit direct relationship coefficient to the gross domestic product, but this is contrary to the expected outcome. The reason for this might not be far from the fact that the

remaining foreign exchange earnings arising from external debt-export ratio and also the remaining income as a result of external debt-income ratio may have been properly utilized for investment driven in the economy, hence the outcome enhances the economic growth in Nigeria. This result is consistent with the findings particularly that of Dogruel (2020) who investigated the impact of Foreign Debt Dynamics in the middle east countries where the findings exhibit significant impact on the growth of the selected countries.

The value of Durbin-Watson (DW) statistic obtained in this study which is used to ascertain the existence of serial correlation is 1.94. This implies absence of serial correlation because the closer the DW value is to 2.0 the better the evidence of the absence of serial correlation. It also shows

that the rule of thumb of DW is equal to 2.0 being the case of no auto-correlation is fulfilled because 1.9423 being the value for DW can be approximated to 2.0. With this, we reject the null hypothesis of serial autocorrelation in the model. Therefore, parameter estimates from our model are stable, consistent and efficient.

The coefficient and the t-statistic of the error correction mechanism (ECM) are negative and statistically significant at the 5 per cent critical level. The ECM values of -0.82 approximately, shows that the short-run model will adjust back to the long-run relationships at the speed of 82per cent. More-also, the significance of the ECM is an indication and a confirmation of the existence of a long run equilibrium relationship between the gross domestic product and its determinants in the study.

Stability Test

Figure 1.0: Cusum of Squares Test

The stability test is performed using Cusum of Squares test as shown in figure 1.0 above. The existence of parameter instability is established if the Cusum of squares goes outside the area between the critical bound (dotted bound) lines. It is estimated at 5 per cent critical level. From figure 1.0 above, it can be inferred that the model at 5 per cent level of significance provides stability.

5. Conclusion and Recommendations

The study examined the relationship between the gross domestic product and some selected macroeconomic variables such as external debt-income ratio, external

debt-export ratio, exchange rate and inflation rate. The study employed Augmented-Dickey Fuller and Phillip-Peron unit root test statistic to ascertain stationarity of the time series data. All the variables were found stationary at first difference and the study applied the error correction mechanism approach. The evidence revealed that exchange rate and inflation rate lagged by three-year and one-year period respectively demonstrate inverse relationship coefficient as against the gross domestic product. In addition, the results also revealed that the remaining foreign exchange earnings arising from external debt-export ratio and also that of

income emanating from external debt-income ratio were properly utilized for investment driven in the economy, hence the outcome enhances economic growth in Nigeria.

On the basis of this, the study concludes that external debt-income ratio, external debt-export ratio enhanced economic growth in Nigeria.

Therefore, the following recommendation become relevant:

i.   The monetary authority (Central Bank of Nigeria) should as much as possible formulate policies that can allow stability in the Exchange rate as this is considered vital for investment drive.

ii.   The government should have price control when need arises in order to fight inflationary pressure in the economy

iii.   The government should set up more robust and debt management strategies to address the problems of debt mismanagement.

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