THE EFFECT OF DEBT OVERHANG AND MACRO ECONOMIC ADJUSTMENTS ON ECONOMIC GROWTH OF NIGERIA

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Abstract: The study examines the effect of debt overhang and macroeconomic adjustments on the economic growth of Nigeria. The debt overhang theory was adopted. The model built for the study proxy gross domestic product as the endogenous variable measuring economic growth as a function of debt overhang, inflation and exchange rate. Annual time series data was gathered from the Central Bank of Nigeria Statistical bulletin and Debt Management Office from 1970 to 2013. The econometric techniques of Ordinary Least Square (OLS), Augmented Dickey-Fuller (ADF) Unit Root test, Johansen Co-integration test and Error Correction Method (ECM) are employed in the empirical analysis. The co-integration test shows that a long-run equilibrium relationship exists among the variables. The ECM result indicates that there is both short and long-run equilibrium in the system. The coefficient of one-period lag residual is negative and insignificant which represent the long-run equilibrium. The coefficient of the ECM term is -0.274 that is, 27.4 per cent of the disequilibria of the previous period's shock adjust back to the current period long-run equilibrium. Macroeconomic variables like exchange rate, inflation and Investment are a critical component in the growth of the Real GDP, while debt servicing and debt overhang contributes negatively to the economy and therefore recommends that borrowing should be reduced and used for the productive purpose to allow for immediate repayment and prevent inconveniently and disrupting macroeconomic adjustment at any point in time. Furthermore, to achieve a long term solution to the debt

problem there must be the vigorous promotion of diversification that will provide sufficient fund which will prevent constant borrowing and promote growth and development. Also, the government should ensure economic and political stability and external debt should be acquired largely for economic reasons rather than social or political reasons.

1.   INTRODUCTION

Over the years, borrowing has been adopted as an economic tool by governments across the world to supplement for limited available resources at their disposal, for the execution of developmental projects. The efficacy of funds generated by the governments is usually characterized by its management and productivity. Krugman (1988) and Sachs (1989) stated that debt overhang exists when the country's debt service burden is so heavy that a large portion of the current output accrues to foreign lenders and consequently creates a disincentive to invest. Incessant borrowing leads to an unsustainable level of debt amounting to the debt crisis in the long run. Poor coordination and irregular sub-national borrowing has often resulted in excessive fiscal expansion, creating problems for overall macro-economic stability. The vast majority of high-debt countries have requested assistance from either the IMF or World Bank (Moss and Chiang, 2003).

The existence of debt overhang in a country hinders investment needed for economic growth as private investment is discouraged and public investment most times never financed through the debt. Also, a high debt service to GDP ratio results in insipid growth and development rates as the limited funds generated is diverted to servicing existing debt.

Nigeria is not exempted from the debt crisis that has characterized many nations around the world, particularly developing countries. The country's debt servicing potential was encouraged by its profit from the global oil trade. The debt of Nigeria has been majorly faulted especially during the military years but the Obasanjo administration as democratic president committed fruitful effort to the management of Nigeria debt by using restructuring and relief schemes to lighten Nigeria's debt and promoting growth. The financial achievement allowed the administration to further succeed in employment generation, investment, output level among others. It might therefore be wrong to claim debt increase is a phenomenon unique to military regime due to recent debt acquisition by democratic governments in the last one decade.

Sourcing for funds should not be mistaken for the reason behind economic instability. The inability to service the accruing debt becomes a major problem

causing national slow growth. As a matter of fact, given the low level of capital formation in Nigeria, caused by the low level of income, savings and the generally high incidence of poverty, the country has few prospects to source sufficient funds for development internally.

The current Nigerian government was introduced with a set of agenda aimed at developing the nation. However, the inherited debt position of the country has made it extremely difficult for the Nigerian government to meet its target. The position of the current account, investment, employment in Nigeria contributes to the slow rate of the government activities towards meeting its target and the government has blamed the financial constraint - debt overhang position- for its inability to operate at the optimal level.

The main objective of this study is to examine the extent of the debt overhang, macroeconomic adjustment on economic growth in Nigeria. Other objectives include: examining the effect of debt overhang on Nigeria's economic growth; analyzing the impact of debt servicing on economic growth in Nigeria and examining the Granger causality between growth and debt overhang and the long-run relationship of all the variables.

Just as borrowing is unavoidable in an economy especially the less developing countries, so is its devastating effect if not properly managed and utilized. Therefore, this study is relevant as it examines the relationship of debt overhang and macroeconomic adjustments on economic growth in Nigeria. One of the most discussed issues in the world is borrowing particularly because its effect is two-edged in attaining the set goals of the government of any economy. A rising debt tends to weaken the economy especially when the government borrows to cover a growing deficit. Incessant borrowing leads to an unsustainable level of debt amounting to the debt crisis in the long run. Poor coordination and irregular sub-national borrowing has often resulted in excessive fiscal expansion, creating problems for overall macro-economic stability.

Besides, this study will contribute to existing literature and assist researchers on the subject matter. This study will contribute immensely towards guiding the Nigerian government in policy formulation and implementation as it sets to achieve its target even with its financial situation.

2. REVIEW OF LITERATURE

2.1. Theoretical Review

Several theories abound in economics that focuses on the concept of debt and how it affects the growth of a nation. The classical theory of public debt espoused by the likes of Adam Smith and Jean Baptiste Say believes in the lesser role of government in economic regulation hence the minimal need for deficit financing.

The Keynesian school opposed the stance of classical believing that the economy is and cannot be self-regulating thereby a need for government intervention.

However, the Debt Overhang theory and Dual Gap theory appears more succinct and appropriate in modelling the effect of debt overhang on economic growth. Debt overhang theory is based on the premise that if the debt will exceed the country's repayment ability with some probability in the future, expected debt service is likely to be an increasing function of the country's output level. The expected rate of returns from productive investments will be low as the significant portion of subsequent economic progress will be consumed by creditors, which further reduce both domestic and foreign investments and eventually deter economic growth.

The dual gap analysis explained that growth is a function of investment and that such investment which requires domestic savings, is not sufficient to ensure that growth takes place. There must be the possibility of obtaining from abroad the amount that can be invested in any country identical with the amount saved. Thus, savings equals investment.

Also, the presence of insufficient domestic savings for investment in an economy necessitates borrowing to bridge the gap. If the available domestic saving falls short of the level necessary to achieve the target rate of growth, a savings-investment gap is said to exist on a similar note, if the maximum import requirement needed to achieve the growth target is greater than the maximum possible level of export, then there is an export-import or exchange gap.

2.2. Empirical Review

Savvides (1992) while trying to measure the impact of debt overhang on the country's economic performance used a Two-Stage Limited Dependent Variable model (2SLDV) procedure by cross-section time-series data from 43 Less Developing Countries (LDCs) encountering debt problem. The study concludes that debt overhang and decreasing foreign capital flows have a significant negative effect on investment rates.

Sene (2004), examines the relationship between external public debt and equilibrium real exchange rate in developing countries using an extension of the Obstfeld and Rogoff model. The findings show that debt overhang tends to appreciate the real exchange rate in the long run. Another author, Lin (1994), examines the steady-state effect of government debt on the real exchange rate within a two-country overlapping generations (OLG) model with production and came up with findings that indicate that an increase in government debt depreciates the real exchange rate of the country.

Ezenwa Chinelo examined the impact of the external debt stock and debt servicing on economic growth in Nigeria from 1981 to 2010. The result of the

analyses showed that rising external debt stock inhibits the pace of economic growth of Nigeria by increasing the cost of its servicing beyond the debt sustainability limit while external debt servicing was found not to impair economic growth. It was found that external debt stock rises rapidly due to accrued compound interest and loans secured for dubious projects.

3. METHODOLOGY

This study, therefore, adopts the dual-gap model and the debt overhang hypothesis as these theories postulate that a level of borrowing is a prerequisite for economic growth in countries with low savings such as Nigeria.

3.1. Model Specification

Sequel to the objective of this study and to capture the major influencing macroeconomic factors in the country under study, we specify a functional form model as follows:

$$RGDP = f (DOH, EXCH, INVST, INF, INTR)$$

The econometric function is written as follows;

$$logRGDP_t = \alpha_0 + \alpha_1\, DOH + \alpha_2\, EXCH + \alpha_3\, logINVST + \alpha_4 INF + \alpha_5\, logDOS + U_t$$

Where,

RGDP= real gross domestic product

DOH is debt overhang which is calculated as ratio of debt to GDP ratio

EXCH = exchange rate

INVST = Investment

INF = Inflation

DOS = debt servicing

α_0 = intercept

$\alpha_1 - \alpha_4$ are the parameters to be estimated

μ is the error term

A prior expectation

This study expects positive result from the investment while debt overhang, exchange rate, consumer price index and interest rate on loan are all expected to have negative signs on economic growth.

$$\alpha_1 < 0,\ \alpha_2 < 0,\ \alpha_3 > 0,\ \alpha_4 < 0,\ \alpha_5 < 0$$

3.2. Econometric Analysis and Interpretation of Results

3.2.1. Unit root test - Augmented Dickey-Fuller test

In time-series data, the presence of unit root implies that the time series is not stationary while the absence of unit root implies that the time series is stationary. The ADF tests were used to check for the stationarity of the variables in the model. The result of the unit root test is shown in the table below.

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test

Variables	Level	1st difference	Order of Integration
LRGDP	-1.284427	-5.873535*	I(1)
DOH	-0.978586	-4.444402*	I(1)
EXCH	-2.145157	-5.316802*	I(1)
INF	-1.599912	-5.602546*	I(1)
LINVST	-3.533420	-4.699596*	I(1)
LDOS	-2.247446	-7.194651*	I(1)

Source: Computed by Author (2016)

* Variable stationary at 1%, 5% and 10% critical values; ** Variables stationary at 5% and 10% critical values; *** Variables stationary at 10% critical values.

H_0 : There is unit root

H_1 : There is no unit root

Table 1 above shows the behaviour of the variables using the ADF unit root test statistics. The result shows that all the variables are also stationary at first difference. However, for the variables to be associated with one another statistically in the long run, they must be of the same order of integration, this is shown in the first difference unit root test where all the variables are stationary and are integrated of the order I(1). Hence, at this level, the null hypothesis (H_0) of unit root is thus rejected while the alternative hypothesis (H_1) of no unit root is accepted.

3.2.2. Engle-Granger Co-Integration Test

The variables used in this study were stationary after differencing the time series. The presence of non-stationarity at a level in the series suggests a questionable relationship in the short- run. They cannot generate an equilibrium relationship in the short run; they can only do so in the long-run if they co-integrate.

The Engle-Granger Co-integration test is carried out to test for the presence of the co-integrating equation of the series in the long-run. This test is carried out by obtaining the residuals from the static regression of the estimated model. The unit root test will be applied to check for the stationarity of the residual. It is

expected that the residual is stationary at a level to subject the model for further analysis.

Table 2: Residual unit root test

Variable	Statistic	Probability
Residual	-4.81355	-1.951687

Co-integration Hypothesis

H_0: There is co-integration

H_1: There is co-integration

The Engle-Granger provides that if the residual is stationary integrated of order zero, that is I(0) then, the variables that generated the residuals are said to be co-integrated. This supports the result from the table above. The residual of the model is stationary at the level. Therefore, there exists a long-run equilibrium relationship among the variables in the model.

Table 3: (Dependent Variable is RGDP)

Variables	Coefficient	Std. Error	T-Statistic	Prob. value
C	2.122547	0.958644	2.214114	0.036200
DOH	-0.001555	0.000598	-2.599948	0.015400
EXCH	0.008877	0.007595	1.168759	0.253500
INF	0.001936	0.007894	0.245272	0.808200
LDOS	-0.077690	0.208423	-0.372753	0.712500
LINVST	0.264537	0.291891	0.906288	0.373400
R Squared				0.899142
Adjusted R-squared				0.874936
F-statistic				37.14536
Prob(F-statistic)				0.000000
Mean dependent var				6.559544
S.D. dependent var				1.726197
Durbin- Waston stat				1.737465

Source: Author's Computation (2016)

3.3. Analysis and Economic Interpretation of the Co-integration result

The estimated equation of six variables shows RGDP which is a proxy for economic growth is a function of debt overhang, debt servicing, exchange rate, consumer price index and investment. It is expected that debt overhang, debt servicing, exchange rate and consumer price index have a negative relationship while

investment has a positive relationship with economic growth. The value of the regression coefficient of the debt overhang of -0.001555means an increase in debt overhang by 1 per cent will decrease RGDP by 0.15 per cent. This result with 0.01540 P-value and -2.599948 t- stats asserts that debt overhang has a significant relationship with economic growth.

Also, the debt servicing from the result shows a negative relationship between debt servicing and economic growth in Nigeria. This is supported by the value of the coefficient -0.077690. It implies that an increase in debt servicing by 1 per cent reduces RGDP by 7.76 per cent and is statistically insignificant. Similarly, the result shows that there is a positive relationship between the exchange rate and economic growth in Nigeria. This claim is shown the value of the coefficient 0.008877 implying that an increase in the exchange rate by 1% will increase economic growth by 0.88% but statistically insignificant.

The coefficient of determination (Adjusted R^2) 0.874936 shows that 87.5% of the total variation in the dependent variable (RGDP) has been explained by the independent variables (DOH, EXCH, INVST, INF, DOS). This shows the model is of good fit. The F-statistic shows the overall significance of the model. With the value 37.14536, the performance of the variable is reliable at 5% and it is significant with the probability value of 0.0000. The Durbin-Watson test 1.737465 shows that there is no serial correlation in the model.

3.4. Error Correction Model

Table 4: ECM Result

Variable	Level	1st difference	2nd difference	Order of Integration
ECM	-4.813555			I(0)

Source: Author's Computation (2016)

Test critical values:	1% level	-2.641672
	5% level	-1.952066
	10% level	-1.610400

Table 4 shows the error correction model (ECM), being the residual from the co-integration regression, was found to be stationary at a level, that is co-integrated at I(0). The residual is also statistically significant. We, therefore, reject the null hypothesis of the co-integration and conclude that the variables are co-integrated.

Table 5: Result of Short-Run Error Correction Model on Economic Growth

Dependent Variable: D(LRGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.163437	0.140336	-1.164612	0.255600
D(DOH)	-0.002640	0.000824	-3.205240	0.003800
D(EXCH)	0.022725	0.010668	2.130196	0.043600
D(INF)	-0.000892	0.006464	-0.137980	0.891400
D(LDOS)	0.214404	0.228317	0.939062	0.357100
D(LINVST)	0.867588	0.436815	1.986171	0.058500
ECM(-1)	-0.274116	0.189783	-1.444370	0.161600
R-squared				0.588778
Mean dependent var				0.178909
Adjusted R-squared				0.485972
S.D. dependent var				0.771286
F-statistic				5.727098
Prob(F-statistic)				0.000821
Durbin- Waston stat				1.779424

Source: Author's Computation (2016)

4. ANALYSIS AND ECONOMIC INTERPRETATION OF ERROR CORRECTION MODEL

Debt overhang (DOH) has a negative relationship with economic growth which implies that there is an inverse relationship between debt overhang and economic growth. This is supported by the negative coefficient of the variable of -0.002640. This indicates that an increase in debt overhang will reduce economic growth by 0.002% and it is statistically significant at 5% level of significance in the short run.

Also, the debt servicing from the result shows a positive relationship between debt servicing and economic growth in Nigeria. This is supported by the value of the coefficient 0.022725. It implies that an increase in debt servicing by 1 per cent increases RGDP by 2.275 per cent and is statistically significant at 5% level of significance. This implies that servicing debt by servicing debt would help in increasing the growth rate of the economy.

The coefficient of determination (Adjusted R^2) 0.588778 shows that 58.8% of the total variation in the dependent variable (RGDP) has been explained by the independent variables (DOH, EXCH, INVST, INF, DOS). This shows the model is of good fit. The F-statistic shows the overall significance of the model. With the value 5.727098, the performance of the variable is reliable at 5% and it is significant with the probability value of 0.0000. The Durbin-Watson test 1.779424 shows that there is no serial correlation in the model. The result of ECM as shown in the table above reveals that the coefficient of ECM(-1) is negative (-0.274116) as expected,

and as well statistically significant at 5% level of significance. This however implies that 27.41% of the disequilibrium in the short-run will be corrected in the long-run. This also means that for every disequilibrium in the model, 27.41% of it will be adjusted on yearly basis.

Heteroskedascity Test

Autocorrelation Hypothesis

H_0: There is the absence of serial correlation
H_1: There is the presence of serial correlation

Table 5: Heteroskedasticity Test: ARCH

F-statistic	0.712631	Prob. F(1,28)	0.4057
Obs*R-squared	0.744583	Prob. Chi-Square(1)	0.3882

The table above shows that we accept the null hypothesis and reject the alternate hypothesis since the probability value of the observed R^2 in the model 0.3882 is greater than 5%. We, therefore, conclude that there is the absence of serial correlation in the model or that the residuals are not serially correlated.

Multicollinearity Test

Variance inflation factors (VIF) measure how much the variance of the estimated regression coefficients are inflated as compared to when the predictor variables are not linearly related. Use to describe how much multicollinearity (correlation between predictors) exists in a regression analysis. Multicollinearity is problematic because it can increase the variance of the regression coefficients, making them unstable and difficult to interpret.

Table 6: Multicollinearity test

	Coefficient	Uncentered	Centred
Variable	Variance	VIF	VIF
C	0.019694	1.996552	NA
D(DOH)	6.78E-07	2.217895	2.217894
D(EXCH)	0.000114	2.413277	2.118714
D(INF)	4.18E-05	1.053495	1.053484
D(LDOS)	0.052129	1.540445	1.303643
D(LINVST)	0.190807	2.309147	1.457243
ECM(-1)	0.036017	1.097166	1.097160

Source: Author's Computation (2016)

None of the values of both un-centred and centered VIF for all the variables is above 5 but is in between 1 and 3. This result shows that the variables included in the ECM model are not highly correlated but moderately correlated. This result proves that the ECM model is free from multicollinearity problem.

Granger Causality Test

Pairwise Granger Causality Tests

Sample: 1981 – 2014

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
DOH does not Granger Cause LRGDP	32	0.27367	0.7627
LRGDP does not Granger Cause DOH	0.38391	0.6848	

The result of the table above shows that debt overhang (DOH) does not granger cause real economic growth (LRGDP) because the probability value is greater than 5% likewise, LRGDP does not granger cause DOH.

5.   CONCLUSION AND RECOMMENDATION

This research study examines the effect of debt overhang and macroeconomic adjustments on economic growth in Nigeria for 1981 and 2014 and has found that debt overhang is significant in depressing the state of the real GDP. Based on the findings of this study the following recommendations are made:

Since it has been discovered that the accumulating debt in Nigeria in time past is based on poor check and balances on the aspect of the fiscal authority, the government should in itself empowered the appropriate commission like the Debt Management Office (DMO) and Central Bank of Nigeria (CBN) with adequate power and authority to scrutinize, vet and approve with the approval of the Senate any loans a government be it at the federal or sub-federal level will be accessing.

The conditions under which the government obtain loans should be well negotiated particularly the external loans in other to prevent the transfer of huge debt burden on subsequent government which hinders growth in the long run. Research showed that the high debt values are not the exact amount borrowed by the government but as doubled and tripled in its value because of the accruing interest payment. The presence of debt overhang in Nigeria today is attributed to the failure of the past government to efficiently use the borrowed fund on income-yielding activities. The fluctuations in the income-generating channel, that is, crude oil has also created the need to borrow continuously to even finance the existing

debt and this has kept the nation in a vicious circle. So these funds should be used only for projects of the highest priority.

Lastly, a reasonable part of her annual foreign exchange earnings for debt servicing will help to accommodate the creditors' requirements. Nigeria has failed in its utilization of debt relief. This fund should be ploughed into other sectors of the economy which would help stimulate growth and development in the long run and this will eventually help the government in creating an enabling social-economic environment that will promote industrialization which will, in turn, stimulate investment.

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