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EXTERNAL DEBT AND PUBLIC EXPENDITURE NEXUS IN NIGERIA

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Abstract
This study empirically examined external debt and public expenditure nexus in Nigeria using Autoregressive-Distributed Lag (ARDL) model covering the period 1985-2021. Estimated results indicated that external debt service payment and economic growth have positive and significant relationship with public expenditure. In contrast the results also revealed that exchange rate and interest rate have negative and significant impact on total government expenditure. The study recommends that effective mechanism should be put in place to ensure that new borrowing is judiciously utilized and government should strive to finance budget deficit by improving its revenue sources.

Keywords: ARDL, External Debt Service, Nigeria, Public Expenditure.

1. Introduction

Sustainable economic growth is a major concern for any sovereign nation most especially the less developed countries (LDCs) which are characterized by small capital structure due to small quantity of domestic savings and investment (Adepoju, Salau & Obayelu, 2007). It is predicted that these LDCs when encountering a shortage of capital would utilize external debt to augment domestic savings (Aluko & Arowolo, 2010; Safdari & Mehrizi, 2011; Sulaiman & Azeez, 2012).

External borrowing is a means of bridging domestic savings gap especially in times of falling government revenues from internal sources. If revenues are inadequate to fund expenditures, there will be a need to borrow (Bulus, 2020). The growth enhancing feature of external debt has important policy implications for economic growth. Economic growth requires expenditure in education, social welfare and health (Owusu-Nantwi & Erickson, 2016). Karazijienė (2015) opined that budget deficit led most countries to external debt. Awan & Qasim (2020) described debt servicing as the money which is mandatory for the repayment of interest and principal owed to creditors.

External debt may be an economic boost but when its aggregation gets to a specific threshold, a reasonable volume of government expenditure and foreign exchange earnings are used to service the debt with sizeable opportunity costs even for future generations. Thus, external debt is a crucial source of finance usually used in increasing domestic sources of funds so as to support the development process and other needs of a country. However excessive external debt may breed harmful effects to the sustainable economic growth and poverty reduction which developing nations seek (Ogunmuyiwa, 2011).

Figure 1. External Debt Service Payment (EDSP) and Public Expenditure (TEXP) trends in Nigeria (1985-2021). Source: Central Bank of Nigeria Statistical Bulletin and World Bank Database (2022).

Figure 1 above, showed that both EDSP and TEXP moderately trended upward from 1985 to 1997 but in 2001 and 2002 EDSP was US$2.5 billion and US$1.8 billion trending above TEXP which was US$915 million and US$844 million respectively. It can also be seen that from 2003 to 2016 TEXP was significantly trending above EDSP a situation which Onuoha and Okoye, (2020) attributed to general election, fight against insurgency and the introduction of social schemes such as Npower etc. while from 2018 to 2021 both EDSP and TEXP were on the rise which might be because of Covid-19 pandemic and constant need of social amenities and medical facilities.

As expected, there was correlation between public expenditure and external debt service payment in the economy given that increase in deficit spending by government would lead to an increase in the quantity of debt servicing. External debt service payment reduces funds and increases the cost of capital, thereby causing government to abandon investment projects in the economy. Similarly, if government spends more than her receipts (deficit), her decision to borrow funds to finance the deficit will in most cases result to crowding out of private investments and deadweight loss on future taxation.

The multiplier effect of public spending has not matched the impact of external debt in the economy which necessitates further increase in taxes and places burden on current/future generations (Idenyi, et, al., 2016).

Debt service burden creates additional problems for the nation particularly the increasing fiscal deficit which is driven by higher levels of debt servicing, thereby posing grave threat to the Nigeria's economy as large chunk of the nation's earnings are being used to service debt (Were, 2001).

Fosu, 2009 also notes that excessive debt service payment shifts expenditure away from health, educational and social sectors which obscure the motive behind external borrowing and as a result the nation get drowned in a pool of debt service payment which limits public spending due to high interest payment on external debt.

Nigeria's inability to optimally utilize external borrowings productively and ensure effective servicing of such debt hampers the benefits derivable from borrowed capital resources. External debt service payment becomes a self-sustaining tool of insufficiency worsening, and a hindrance on development (Audu, 2004).

In view of the above, it can be observed that external debt service has a negative impact on public expenditure. It is relevant therefore, to precisely understand the dynamic relationship existing between external debt service and public expenditure in Nigeria from the period 1985 - 2021.

2. Literature Review

2.1 Empirical Review

The role of external debt in bridging financial resource gap in developed and less-developed countries cannot be exaggerated (Ncanywa & Masoga, 2018). However, there are varying positions amongst scholars on the effect of external debt on public expenditure.

Some scholars opines that debt-financed deficit increases the level of public expenditure. These authors' argument rely on the premise that higher debt creates a fictitious perception amongst nationals that the cost of public expenditure have become cheaper, thus, they will increase their demand for such expenditures, leading to an expansion in public expenditure (Buchanan & Wagner, 1977; Iiyambo & Kaulihowa, 2020). A number of empirical studies appear to support this view (See Eboigbe & Idolor., 2013, Idenyi, Ogonna & Ifeyinwa., 2016, Uguru., 2016, Seluc & Evren., 2017, Solarin., 2017, Ajah & Jacob 2021, Abu et al., 2022; Del Monte & Pennacchio, 2020; Fagge & Ibrahim, 2018; Ouattara, 2006; Ukwueze, 2015).

On the contrary, debates on the implication of growing external debt service underline the adverse effect of external debt on public spending, where researchers argued that huge debt service tends to generate large diminution in public expenditure and/or adjustments in components of public expenditure such as spending on education and health, among others (See Cashel-Cordo & Craig, 1990; Taylor, 1993; Fosu, 2007, Fosu, 2010; Mahdavi, 2004; Ncanywa & Masoga, 2018; Ndour, 2017; Picarelli et al., 2019; Shabbir & Yasin, 2015; Ibrahim & Suleiman., 2015; Quattri & Fosu, 2012). The decline in public expenditure is attributed to debt-induced liquidity constraints and the need to ensure continuous servicing of accumulated debts because expenditure cuts are more quickly applicable rather than revenue generation when implementing fiscal austerity as a deficit reducing strategy. Moreover, the decline in public expenditure to the disincentive which higher debt stock creates for further indebtedness (Lora and Olivera, 2006).

Besides the opposing views on the impact of external debt servicing on public expenditure, other authors including Shonchoy (2010) and Ndour (2017) emphasized the possible outcome of external debt service on public expenditure to be non-linear, this group of authors believe that after a certain ceiling the consecutive rise in the stock of external debt servicing would lead to decrease in public expenditure, an argument that aligns with the debt overhang hypothesis of Krugman (1988) asserted that public expenditure tends to decrease given an increase in debt service beyond certain threshold.

This study is hinged on the view that external debt service on public expenditure relationship is non-linear. Soludo (2003) argued that when stock of debt grows beyond a threshold, it servicing becomes burdensome, consequently push out investment and growth.

3. Methodology

3.1 Data and Source

Secondary time series data obtained from World Bank database and Central Bank of Nigeria (CBN) Statistical Bulletin (2022) was utilized for this study. The ARDL model used in this study was estimated using data on total government expenditure (TEXP) and some macroeconomic indicators which include: external debt service payment (EDSP), real gross domestic product (RGDP), interest rate (INTR) and exchange rate (EXCR).

3.2 Model Specification

The model specifies that total government expenditure (TEXP) is significantly influenced by external debt service payment (EDSP), real gross domestic product (RGDP), interest rate (INTR) and exchange rate (EXCR).The study also adopts the model of Ibrahim and Sulaiman (2015) in their work "Effects of Debt Servicing Crowd-Out on Federal Government Expenditures in Nigeria". The model takes the form:

$$TEXP = EDSP, RGDP, INTR \quad \ldots\ldots (1)$$

Equation 1 was modified by adding exchange rate (EXCR) while the remaining variables are considered useful for this study which examined the nexus between external debt and public expenditure in Nigeria. Exchange rate was added because its behavior influences external debt service payment (Onuoha and Okoye, 2020). The modified model is therefore presented in equation 2.

$$TEXP_t = f(EDSP_t, RGDP_t, EXCR_t, INTR_t) \quad \ldots\ldots(2)$$

Where EXCR stands for exchange rate.

Equation 2 is presented in an econometric form as follows:

$$TEXP_t = \beta_0 + \beta_1 EDSPt + \beta_2 RGDP_t + \beta_3 EXCR_t + \beta_4 INTR_t + \mu_t \quad \ldots\ldots(3)$$

The logarithmic form of equation 3 is as follows:

$$\ln TEXP_t = \beta_0 + \beta_1 \ln EDSP_t + \beta_2 \ln RGDP_{t_t} + \beta_3 EXCR_{t_t} + \beta_4 INTR_t + \mu_t \quad \ldots\ldots(4)$$

Where: lnTEXP is the natural log of total government expenditure; lnEDSP is the natural log of external debt service payment; lnRGDP is the natural log of economic growth; EXCR is exchange rate; INTR is interest rate; $_t$ stands for the time trend and μ_t is the residual or error term.

3.3 Method of Data Analysis

Augmented Dickey Fuller (ADF) and Philips & Perron (PP) unit root test were used to determine the order of integration of the variables used for the study to identify the appropriate methodology and avoid spurious regression.

ARDL model proposed by Pesaran et al. (2001) was used to analyze the dynamic relationship between the variables of the study. The model is therefore specified in unrestricted error correction form to test for cointegration relationship in equation 5.

$$\ln TEXP = \beta_o + \sum_{i=0}^{k} \theta_1 \ln \Delta TEXP_{t-i} + \sum_{i=0}^{k} \theta_2 \ln \Delta EDSP_{t-i} + \sum_{i=0}^{k} \theta_3 \ln \Delta RGDP_{t-i} + \sum_{i=0}^{k} \theta_4 \Delta EXCR_{t-i} + \sum_{i=0}^{k} \theta_5 \Delta INTR_{t-i} +$$
$$\beta_1 \ln TEXP_{t-i} + \beta_2 \ln EDSP_{t-i} + \beta_3 \ln RGDP_{t-i} + \beta_4 EXCR_{t-i} + \beta_5 INTR_{t-i} + \mu_t \quad \ldots\ldots [5]$$

To determine the existence of long-run cointegrating relationship between the variables, the null hypothesis of no cointegration would be compared against the alternative using the F-statistic, when the F-statistic surpasses the upper bound, we reject the null hypothesis and conclude that cointegration exists. But if the statistic falls short of the lower bound, we cannot reject the null hypothesis; and if the statistic falls between the two bounds, a conclusion cannot be made (Pesaran et al., 2001)). After discovering the evidence of cointegration, the long-run model would be estimated and is specified as:

$$lnTEXP_t = \beta_0 + \sum_{i=0}^{k} \beta_1 lnTEXP_{t-i} + \sum_{i=0}^{k} \beta_2 lnEDSP_{t-i} + \sum_{i=0}^{k} \beta_3 lnRGDP_{t-i} +$$
$$\sum_{i=0}^{k} \beta_4 EXCR_{t-i} + \sum_{i=0}^{k} \beta_5 INTR_{t-i} + \mu_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots [6]$$

Sequel to the existence of long run relationship, the error correction model for the estimation of the short run relationship is specified as:

$$ln\Delta TEXP_t = \theta_0 + \sum_{i=0}^{k} \theta_1 ln\Delta TEXP_{t-i} + \sum_{i=0}^{k} \theta_2 ln\Delta EDSP_{t-i} + \sum_{i=0}^{k} \theta_3 ln\Delta RGDP_{t-i} +$$

$$\sum_{i=0}^{k} \theta_4 \, \Delta EXCR_{t-i} + \sum_{i=0}^{k} \theta_5 \, \Delta INTR_{t-i} + \lambda ECT_{t-i} + \mu_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ [7]$$

Where the ECT in Equation [7] is defined as:

$$ECT_t = lnTEXP_t - \beta_0 - \sum_{i=0}^{k} \beta_1 \, lnEDSP_{t-i} - \sum_{i=0}^{k} \beta_2 \, lnRGDP_{t-i} - \sum_{i=0}^{k} \beta_3 \, EXCR_{t-i} -$$

$$\sum_{i=0}^{k} \beta_4 \, INTR_{t-i} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ [8]$$

Finally, diagnostic test of serial correlation, heteroscedasticity, normality, functional form, Cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for stability were conducted.

4. Results and Discussion

Unit root test results are presented on table 1

Table 1: *Unit Root Test Result Using Augmented Dickey Fuller (ADF) & Philip Perron (PP)*

	ADF Test Statistics				PP Test Statistics			
	Constant		Trend		Constant		Trend	
Variable	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**
lnTEXPt	-2.414 (0.146)	-7.976 (0.000)***	-1.632 (0.759)	-2.600 (0.282)	-2.587 (0.104)	-1.490 (0.814)	-7.617 (0.000)***	-9.998 (0.000)***
lnRGDPt	-0.608 (0.856)	-3.954 (0.004)**	-2.069 (0.542)	-3.897 (0.022)**	-0.302 (0.914)	-3.870 (0.005)**	-1.584 (0.779)	-3.806 (0.028)**
lnEDSPt	-1.186 (0.669)	-6.612 (0.000)***	-2.325 (0.410)	-6.508 (0.000)***	-1.090 (0.709)	-6.642 (0.000) ***	-2.397 (0.374)	-6.534 (0.000)***
EXCRt	2.410 (0.999)	-0.039 (0.994)	-3.859 (0.005)**	-4.446 (0.006)***	2.725 (1.000)	-3.758 (0.007)***	-0.112 (0.992)	-4.290 (0.008)***
INTRt	-2.679 (0.087)*	-6.459 (0.000)***	-4.469 (0.006)***	-6.849 (0.000)***	-2.757 (0.074)*	-6.459 (0.000)***	-3.171 (0.106)	-6.890 (0.000)***

Note***, ** and * Denotes 1%,5% and 10% significance level respectively

Source: Author's computation using EViews9.

From table 1, it can be observed that EXCR and INTR were stationarity at level I(0) while lnTEXP, lnRDGP

and lnEDSP were stationarity at first difference I(1). It is thus established that the series were integrated at level and at first order which justifies the use of ARDL as the estimation approach for this study.

Having testing for cointegration, the optimal lag length in the VAR is essential to ensure dynamic stability and is suitable for testing estimates in the model. Lag length selection criteria result is presented on table 2:

Table 2: Optimal Lag Selection Test Result

Lg	LogL	LR	FPE	AIC	SC	HQ
0	-312.7	NA	290.5	19.86	20.08	19.93
1	-145.6	271.6*	0.041	10.97	12.35*	11.43
2	-119.7	33.98	0.044	10.92	13.43	11.75
3	-86.17	33.54	0.036	10.38	14.05	11.60
4	-62.20	16.48	0.087	10.45	15.25	12.04
5	26.18	33.14	0.011*	6.48*	12.44	8.462

Note. * indicate lag order selected by the criterion. LR = sequential modified LR test statistic; FPE = Final prediction error, AIC = Akaike information criteria, SC = Schwarz information criteria, HQ = Hannan-Quinn information criteria, LogL = log likelihood, LR = likelihood ratio

Source: Author's computation using EViews9

From Table 2, LogL did not suggest any lag, while LR, SC suggested the use of lag 1, FPE, AIC and HQ suggested the use of lag 5.Therefore, lag 5 was selected for further estimations of the model.

The determination of the long run relationship among the variables was done using bounds test. Result of the ARDL bound test is presented on table 3 below

Table 3: Bounds Test Result

				Bounds critical values	
Model	F-stats	K	Level of Significance	I(0)	I(1)
($lnTEXP_t$,$lnRGDP_t$,$lnEDSP_t$,$EXCR_t$,$INTR_t$)	**4.37**	4	10%	2.45	3.52
			5%	**2.86**	**4.01**
			2.5%	3.25	4.49
			1%	3.74	5.06

The Critical values are obtained from Narayan (2005) table case III. The boldness indicates the level of significance at which the F-statistic exceeds the upper bound. I(0)= lower bound, I(1)= upper bound.

Source: Author's computation using EViews9

Result from table 3 above indicate the presence of co-integrating relationships among the variables. This is because the calculated F-statistics of 4.37, is higher than lower critical values of 2.86 and upper critical values 4.01 at 5% significance level. Therefore, it can be concluded that there is a long run relationship amongst the variables in the model.

The long-run model is estimated and the results is presented on table 4

Table 4: Long run Estimated Result

Dependent variable, lnTEXP			
Regressors	**Coefficient**	**T-ratio**	**(P-values)**
LNEDSP	1.886	8.641	0.000***
LNRGDP	1.438	2.990	0.024**
EXCR	-0.016	-5.666	0.001***
INTR	-0.272	-4.163	0.005***

Note: * **, **and* Denotes 1%,5% and 10% significance level respectively.

Source: Author's computation using EViews9

Result from table 4 indicated that external debt service payment and real gross domestic product positively and significantly impact on total government expenditure in Nigeria at 1% and 5%, given the p-value of 0.000 and 0.024 respectively. To be specific, a 1% increase in external debt service payment and real gross domestic product will increase total government expenditure by 1.886% and 1.438%. This finding corresponds with the finding of other researchers such as Abu et. al., 2010; Ahaisibwe, 2018; Fagge and Ibrahim, 2018; Ncanywa and Masoga, 2018; Ooattara, 2006; Ukwueze, 2015, Dandan, 2011; Yilgor, et al., 2012; Oni, and Ozemhoka, 2014; Onuoha and Okoye, 2020 while inconsistent with the finding of other researchers such as Aregbeyen and Akpan, 2013; Shabbir and Yasin, 2015; Picarelli et. al., 2019.

Exchange rate and interest rate depicted negative and significant relationship on total government expenditure at 1% level of significance, given the p-value of 0.001 and 0.005 respectively. To be specific, a 1% increase in exchange rate and interest rate will decrease total government expenditure by 0.016% and 0.272%. This finding is inconsistent with the finding of other researchers such as Penati, 1985; Monacelli and Perotti, 2006; Wen-Ya and Hsueh-Fang, 2003.

After establishing the long-run coefficient, the short-run model is estimated and the result is presented in table 5

Table 5: *Short run coefficients and error- correction term test result*

Dependent variable, lnTEXP			
Regressors	**Coefficient**	**T. statistics**	**P-value**
D(LNEDSP)	0.008	0.074	0.943
D(LNEDSP(-1))	-0.325	-2.606	0.040**
D(LNEDSP*(-2))	-0.503	-3.512	0.012**
D(LNEDSP(-3))	-0.646	-2.714	0.034**
D(LNEDSP(-4))	-0.292	-2.187	0.071*
D(LNRGDP)	-3.787	-1.789	0.123
D(LNRGDP(-1))	-0.051	-0.027	0.979
D(LNRGDP(-2))	-0.974	-0.614	0.561
D(LNRGDP(-3))	-0.360	-0.147	0.887
D(LNRGDP(-4))	-2.233	-1.720	0.136

D(EXCR)	-0.003	-1.431	0.202
D(EXCR(-1))	-0.003	-1.174	0.284
D(EXCR(-2))	0.001	0.560	0.595
D(EXCR(-3))	0.008	1.951	0.098*
D(EXCR(-4))	0.004	1.566	0.168
D(INTR)	0.006	0.328	0.753
D(INTR(-1))	0.061	2.974	0.024**
D(INTR(-2))	0.066	2.251	0.065*
D(INTR(-3))	0.042	2.490	0.047**
D(INTR(-4))	0.059	2.396	0.053*
CointEq(-1)	-1.023	-3.931	0.007**

Note: * **, **and* Denotes 1%,5% and 10% significance level respectively

Source: Author's computation using EViews9

Result from table 5 reveals that debt service payment at one, two, three years lagged indicate a negative and significant impact on total government expenditure at 5%, given the p-value of 0.040, 0.012 and 0.034 respectively. To be specific, a 1% increase in external debt service payment will decrease total government expenditure by 0.325% 0.503% and 0.646% while interest rate at lag one and three shows a positive and significant impact on total government expenditure at 5%, given the p-value of 0.024 and 0.047 respectively. To be specific, a 1% increase in interest rate will increase total government expenditure 0.061% and 0.042%. This implies that an increase in government expenditure triggers the interest rate downward which in turn affects the economy positively. This finding is in line with the finding of other researchers such as Wen-Ya and Hsueh-Fang, (2003).

Exchange rate at lag three has a positive and significant impact on total government expenditure at 10%, similarly interest rate at lag two and four shows a positive and significant impact with total government expenditure at 10%, given the p-value of 0.066 and 0.059 respectively. This finding is in line with the finding of other researchers such as (Penati, 1985; Monacelli and Perotti, 2006).

The ECT is found to satisfy all the three necessary conditions mentioned in section three. It provide additional evidence to support each variable's relationship in the long run model. In absolute terms, the ECT coefficient -1.023 indicates the convergence towards the long run equilibrium at 102% yearly. Results of the diagnostic tests are presented on table 6

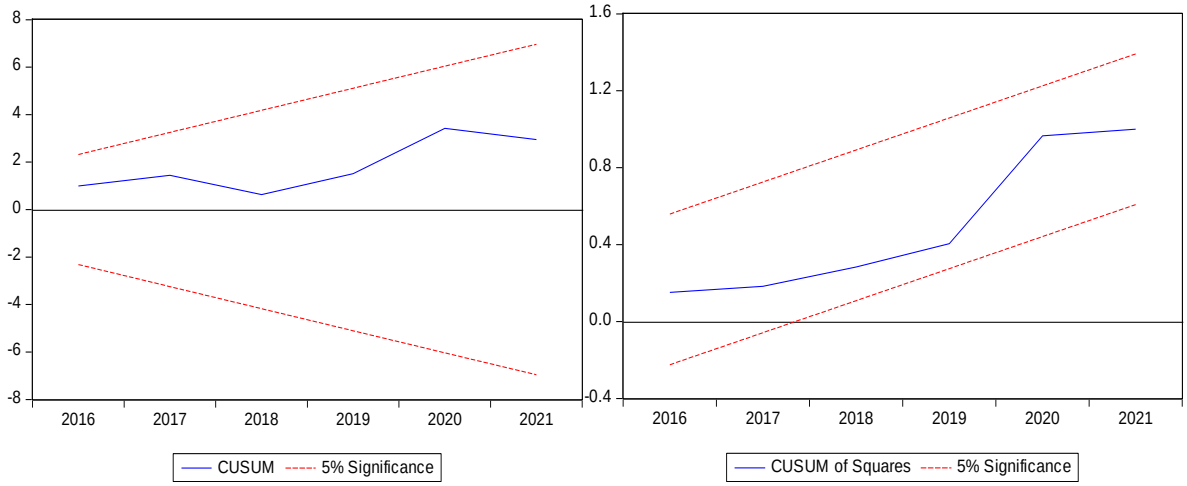
Table 6: Diagnostic Test results

Test Statistics	F Version	P- value
A. Serial Correlation	F(5,1) = 0.271	0.100
B. Ramsey Reset	F(1,5) = 2.421	0.180
C. Normality	0.434	0.804
D. Heteroskedasticity	F(25,6) = 0.697	0.491

Source: Author's computation using EViews9

Table 6 revealed that the model is absolve from serial correlation, ramsey reset, normality error and heteroscedasticity given the p-values 0.100; 0.180; 0.804 and 0.491 respectively. As such, this model could produce

reliable results.



Source: Author's computation using EViews9

Figure. 2 show that the residuals lie within the critical bounds at 5% level of significance under both CUSUM and CUSUMSQ respectively, implying strong stability in the estimated model

5. Conclusion and Recommendations

The objective of the study is to determine the link between external debt service payment and public expenditure in Nigeria, unit root test was conducted to determine the stationarity among the variables of the study. The study also tested for cointegration after selecting optimum lags using the ARDL bound cointegration technique. ARDL approach was used to obtain the short-run and long-run estimates.

The long run result shows that economic growth and external debt service payment has a positive and significant impact on total government expenditure in Nigeria while the coefficient of exchange rate and interest rate depicts a negative and significant relationship with total government expenditure.

The following recommendations were made from the findings thus:

Government should draw up guidelines to limit the growth of future external debt. In this regard, prudent borrowing should be ensured i.e. borrowing to finance top priority projects which rate of return is greater than cost of borrowing. Furthermore, government should formulate manufacturing and export oriented policies that will improve the nations export base as well as reduce its level of deficit financing, development projects could be financed through increased export earnings rather than resolving into borrowing.

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