ISSN No:-2456-2165

Government Fiscal Policy and Firms' Productivity in Nigeria

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Abstract:- The goal of national budget to impact on the economy, create conducive business climate and to achieve various types of economic, social and regulatory objectives remains an illusion in the light of rising general price level and unemployment rate. This study investigated the nexus between fiscal policy and productivity of firms in Nigeria. Time series data covering a period 1981-2019 were sourced from the CBN Statistical Bulletin on relevant variables. Pre-analysis tests of unit roots and co-integration were conducted. Post estimation test (CUSUM) indicated that the model does not suffer from serial correlation or heteroscedasticity; the residuals are normally distributed and the model is structurally stable. All the post estimation tests' results suggest that the short-run and long-run estimates from the estimated Autoregressive Distributed Lag useful for forecasting and disentangle long-run relationship from short-run dynamics model are valid and reliable. The estimated long-run equation shows that Government Capital Expenditure (GCE) and Government Recurrent Expenditure (GRE) have positive significant impacts on firms' productivity (FTO) in Nigeria while Non-oil Revenue (NOR) exerts negative significant impact on FTO. However, Public Debt (PD) was found to have positive but insignificant impact on FTO. Hence, the study recommended that government should focus on investing on infrastructures and consider a friendly tax regimes with a view to enhancing firms' productivity and employments.

Keywords:- *Fiscal Policy; Government Expenditure; Autoregressive Distributed Lag (ARDL); Firms' productivity*
JEL Classification: C22; EC62; H50, H60; O11.

I. INTRODUCTION

The role of fiscal policy on output and capacity utilization of business firms in Nigeria has been a growing concern inspite of government policies aimed at improving the growth of Nigerian economy (Adebayo, 2010; Peter & Simeon, 2011; Loto, 2012). Performance of firm, among others, is linked to profitability (Selvam *et al.*, 2016; Taouab & Issor, 2019; Ogebe *et al.*, 2013). Profit function, however, is a mathematical relationship between a firm's total profit and output. Firm's output is therefore critical to the determination of profit. Fiscal policy is expected to stimulate firms and serves as a catalyst for economic transformation and diversification.

Successful firms operate and perform to survive in competitive business environment as important determinant of economic, social, and political development for most developing countries (Taouab & Issor, 2019). Fiscal policy impacts on solutions to major macroeconomic goals which include to: control inflation and maintain a ralative price stability consistent with high rate of employment; maintain a healthy balance of payment positions in order to uphold the external value of the national currency; enhance rapid growth and development; and to ensure stability in exchange rate (Yaqoob, *et al*. 2019). In spite of the recent years' recorded growth rate, the country witnessed unprecedented rates of crime, banditry and kidnapping. The growth was below expectations due to various factors among which were high level of unemployment, uptick in inflation due to increased food prices following border protection measures as well as increasing public debt and slow pace of crude oil price recovery in the global market (See CBN, 2019).

Three major strands of literature establishes the relationship between fiscal policy measures and growth of the economy. The neoclassicals see government operations as inherently bureaucratic and inefficient and therefore stifle rather than promote economic growth. They believe high level of public expenditure especially if financed by debt, leads to inefficiency and lower level of output (Abu & Abdullahi, 2010; Bergh & Henrekson, 2011). In contrast, the Keynesians view an increase in government activities especially in autonomous government expenditure as a growth booster. The theoretical foundation centres around the propositions that the government intervention in economic activity will ensure efficiency in resource allocation, regulation of markets, stabilization of economy, and harmonization of social conflicts (Lopez et al. 2010). In the Ricardian perspective, fiscal policy has a neutral effect on the economy as the leakages through revenue mobilization is reinjected into the economy through government spending. It is believed that fiscal deficits are a useful device for neutralizing the impact of revenue shocks or for meeting the requirements of lumpy expenditures, the financing of which through taxes may be spread over a period of time.

The theoretical linkage of most previous studies' models were either poorly constructed or not established For instance, Osinowo (2015) and Agu, Okwo, Ugwunta and Idike (2015) used only government expenditure as variable to ascertain the effect of fiscal policy on growth, as against the norm in the literature that only one fiscal variable may not sufficiently capture the effect of fiscal policy (Fu, Taylor & Yucel, 2003; Ocran, 2009). With the mixed empirical findings of positive, negative and at times, neutral effect of

fiscal policy on the growth of economy, and of course, the manifest dearth of literature, this study becomes apt to further holistic approach to methodological as well as empirical strands to analyzing the effect of fiscal policy on firms' productivity. It broadly examines the nexus between fiscal policy and productivity of firms in Nigeria, with the specific objectives to: ascertain the relationship between government capital expenditure and productivity of firms in Nigeria; evaluate the effect of recurrent expenditures firms' performance in Nigeria; assess the impact of non-oil revenue on performance of firms in Nigeria; and to determine the influence of government debts on performance of firms in Nigeria.

II. MATERIALS AND METHODS

The empirical analysis of this study included the preliminary analysis, estimation and post estimation. It used growth rate of real firms' total output (*FTO*) as proxy for productivity of firms, the dependent variable for the model. The explanatory variables government capital expenditure (*GCE*), government recurrent expenditure (*GRE*), non-oil revenue (*NOR*) and public debt (*PD*) are employed as measures for fiscal policy. The model of this study theoretically toes the line of Mankiw (2000) while it empirically follows the work of Eze and Ogiji (2013), with modifications.

The functional form of the model is specified as follows:

$$FTO_t = f(GCE_t, GRE_t, NOR_t, PD_t)$$

Hence, the specific ARDL model for this study is expressed as follows:

$$FTO_t = \theta + \sum_{i=1}^{p} \alpha_i FTO_{t-i} + \sum_{i=0}^{q_1} \beta_{1i} GCE_{t-i} + \sum_{i=0}^{q_2} \beta_{2i} GRE_{t-i} + \sum_{i=0}^{q_3} \beta_{3i} NOR_{t-i} + \sum_{i=0}^{q_4} \beta_{4i} PD_{t-i} + \varepsilon_t \quad (1)$$

where p, q_1, q_2, q_3 and q_4, are the respective maximum lags of the dependent variable (*FTO*) and the explanatory variables (*GCE*, *GRE*, *NOR*, *PD*) while α_i, β_{1i}, β_{2i}, β_{3i}, and β_{4i} are the respective coefficients associated with the explanatory variables at the respective lags, and ϵ_t being the error term.

The ARDL Error Correction Model (ECM) specification is given as:

$$\Delta FTO_t = \theta + \sum_{i=1}^{p} \alpha_i \Delta FTO_{t-i} + \sum_{i=1}^{q_1} \beta_{1i} \Delta GCE_{t-i} + \sum_{i=1}^{q_2} \beta_{2i} \Delta GRE_{t-i} + \sum_{i=1}^{q_3} \beta_{3i} \Delta NOR_{t-i} + \sum_{i=1}^{q_4} \beta_{4i} \Delta PD_{t-i} + \emptyset ECM_{t-i} + \epsilon_t \quad (2)$$

In equation (2), the coefficient ($\emptyset$) of the ECM term called the speed of adjustment is expected to be negative in order to restore the model to equilibrium, *i.e.* $\emptyset < 0$.

The long run form of the ARDL is specified as follows:

$$FTO_t = \emptyset_0 + \emptyset_1 GCE_t + \emptyset_2 GRE_t + \emptyset_3 NOR_t + \emptyset_4 PD_t \quad (3)$$

where $\psi_1 > 0, \psi_2 > 0, \psi_3 > 0, \psi_4 0$

III. DATA ANALYSIS AND RESULTS

This section presents the results of the empirical analysis involving descriptive analysis, unit root test analysis, co-integration test, estimation, and post estimation tests.

Table 1 presents the results of the summary statistics of the variables under study in ₦' Billions. The standard deviations of *GCE* and *GRE* are ₦528.30 billion and ₦1856.97 billion respectively. This suggests that there seem to be more consistency in government capital expenditure (*GCE*) given the lower standard deviation, than in government recurrent expenditure (*GRE*); the Jarque-Bera statistics for the sampled period 1981 – 2019 indicate that all the series are not normally distributed since the p-values of their Jarque-Bera statistics are less than 5% level of significance.

Table 1: Descriptive Statistics (1981 – 2019)

Statistics	Variables:				
	FTO	**GCE**	**GRE**	**NOR**	**PD**
Mean	27908.28	473.9900	1433.398	1039.707	4573.126
Median	5922.110	309.0200	461.6000	314.4800	2608.528
Maximum	132684.4	2289.000	6997.390	4725.600	23295.07
Minimum	129.6400	4.100000	4.750000	2.980000	13.52380
Std. Dev.	38085.23	528.3003	1856.968	1351.774	5876.219
Skewness	1.291655	1.406542	1.282924	1.174475	1.765196
Kurtosis	3.441152	5.032604	3.723099	3.124705	5.480082
Jarque-Bera	11.16068	19.57300	11.54797	8.991322	30.24852
Probability	0.003771	0.000056	0.003107	0.011157	0.000000
Observations	39	39	39	39	39

***Source**: Author's computation using E-views*

➢ *Unit Root Tests*

Table 2: Unit Root Tests Results (1981 – 2019)

Variable	Test form	ADF- Statistics			Order of integration
		Constant	Constant & Trend	None	
FTO	***Level***	-0.9917	-0.9002	0.9850	***I(1)***
	1st Difference	-3.2435**	-3.3752*	0.1451	
GCE	***Level***	-0.7734	-1.4346	2.3452	***I(1)***
	1st Difference	-6.3238***	-6.2787***	-2.8195***	
GRE	***Level***	-1.5343	-0.6405	3.5219	***I(1)***
	1st Difference	-8.3099***	-8.5582***	-0.8571	
NOR	***Level***	-1.0138	-1.9124	2.5243	***I(1)***
	1st Difference	-7.5836***	-4.3638***	-0.7317	
PD	***Level***	-2.6444*	-2.0489	3.3830	***I(0)***

Source*: Author's computation using E-views*
*Note: ***, ** and * indicate statistical significance at 1%, 5% and 10% respectively*

Table 2 presents the result of the unit root test using the Augmented Dickey Fuller (ADF) Test. It shows that the series viz. public debt (*PD*) is stationary at level, *i.e.* it is *I(0)* process, while firms' total output (*FTO*), government capital expenditure (*GCE*), government recurrent expenditure (*GRE*) and non-oil revenue (*NOR*) are integrated of order one *i.e.* they are *I(1)* series. Thus, the combinations of *I(0)* and *I(1)*) orders of integration of the variables justify the use of bounds co-integration test to examine the existence of long-run relationship among the variables and the regressors.

➢ *ARDL Bounds Test to Co-integration*

Table 3: Result Bounds Test to Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	15.87113	10%	2.2	3.09
		5%	2.56	3.49
		1%	3.29	4.37

Source*: Author's computation using E-views*

Table 3 indicates that the F-statistic (15.8711) exceeds upper bounds of the critical values at the various levels of significance. Thus, there is evidence of long run relationship among all the variables.

Table 4: Estimated ARDL short run coefficients

Dependent Variable: D(LGFTO)				
ARDL Error Correction Regression				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(GCE)	-0.001687	0.029064	-0.058027	0.9543
D(GCE(-1))	-0.068451	0.032040	-2.136442	0.0446**
D(GCE(-2))	-0.070145	0.029675	-2.363744	0.0278**
D(GRE)	0.020720	0.034188	0.606045	0.5510
D(GRE(-1))	-0.549447	0.077071	-7.129073	0.0000***
D(GRE(-2))	-0.263712	0.068050	-3.875286	0.0009***
D(NOR)	-0.108494	0.041008	-2.645702	0.0151**
D(NOR(-1))	0.243924	0.031808	7.668677	0.0000***
D(NOR(-2))	0.097244	0.029387	3.309052	0.0033***
ECT	-0.259811	0.023928	-10.85817	0.0000***

R-squared	0.852868			
Adjusted R-squared	0.801938			

***Source**: Author's computation using E-views*
*Note: *** and ** indicate statistical significance at 1%, 5% and 10% respectively*

Table 4 presents the result of short run form (error correction model) of the ARDL. The coefficient (-0.2598) of the ECT (error correction term or speed of adjustment) is negative and statistically significant at 1% level of significance suggesting that *FTO* adjusts to *GCE, GRE, NOR* and *PD* in the long run. Thus, about 25.98% of the disequilibrium in the previous periods has fallen back to equilibrium in the current period. Therefore, equilibrium has been restored among the variables. In addition, the explanatory power (adjusted R-squared) of the model is quite higher (80.19%) and thus suggests that *GCE, GRE, NOR* and *PD* are good predictors of *FTO* in the short-run.

Table 5: Estimated ARDL long run coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GCE	0.515419	0.249480	2.065971	0.0514*
GRE	2.316336	0.716109	3.234614	0.0040***
NOR	-1.971723	0.998664	-1.974361	0.0616*
PD	0.331551	0.194813	1.701891	0.1035
C	1.884454	0.881065	2.138837	0.0444**

***Source**: Author's computation using E-views*
*Note: ***, ** and * indicate statistical significance at 1%, 5% and 10% respectively*

Table 5 presents the result of the estimated long run form of the ARDL for the given sample period. The estimated long-run equation shows government capital expenditure (*GCE*) and government recurrent expenditure (*GRE*) have positive significant impacts on firms' productivity (*FTO*) in Nigeria while non-oil revenue (*NOR*) exerts negative significant impact on *FTO*. Therefore, one per cent rise (fall) in each of *GCE* and *GRE* will on average, lead to a rise (fall) in *FTO* by about 0.515% and 2.316% respectively while a one per cent fall (rise) in *NOR* will on average, result in about 1.972% increase (decrease) in *FTO*. Thus, firms' productivity is government capital expenditure (*GCE*) inelastic while it is government recurrent expenditure (*GRE*) and non-oil revenue (*NOR*) elastic. However, public debt (*PD*) was found to have positive but insignificant impact on *FTO*. Nevertheless, *FTO* is *PD* inelastic since a one percent rise (fall) in *PD* on average leads to 0.332% rise (fall) in *FTO*. Overall, the results established a relationship between fiscal policy and productivity of firms in Nigeria and is congruent with the empirical literature (Peter & Simeon, 2011; Lotto, 2012; Osinowo, 2015; Taouab & Issor, 2019)

- *Post Estimation tests (Residual Diagnostics)*

The post estimation tests include serial correlation test, Heteroscedasticity test, normality test and stability test (CUSUM test).

Table 6: Results of Post Estimation tests

Serial correlation test:		
F-statistic	0.0972	(0.9079)
LM Statistic	0.3645	(0.8334)
Heteroscedasticity test:		
F-statistic	1.346493	(0.2615)
LM Statistic	17.02929	(0.2546)
Normality Test:		
Jarque-Bera	1.1329	(0.5675)

***Source**: Authors' computation using E-views*
Note: the values in the parentheses () are p-values of the respective statistics

Table 6 presents the results of tests of serial correlation, heteroscedasticity and the normality. For the serial correlation test, since the p-values (0.9079 and 0.8334 respectively) of both the F-statistic (0.09716) and LM statistic (0.3645) are greater than 10% level of significance, the null hypothesis of no serial correlation is therefore accepted. Thus, the model estimated does not suffer from serial correlation for the given sample period.

The result of the heteroscedasticity test suggests acceptance of the null hypothesis of homoscedasticity (i.e. absence of heteroscedasticity) since the p-values - 0.2615 and 0.2546 respectively – for the F-statistic and LM statistic are greater than 10%

level of significance (statistically insignificant). Thus, the model estimated does not suffer from heteroscedasticity for the considered sample period.

Similarly, the normal test result revealed that the residuals of the estimated model are normally distributed as the p-value of the Jarque-Bera statistic (1.1329) is greater than 10% level of significance (statistically insignificant).

However, the CUSUM test result is presented as figure 1 below:

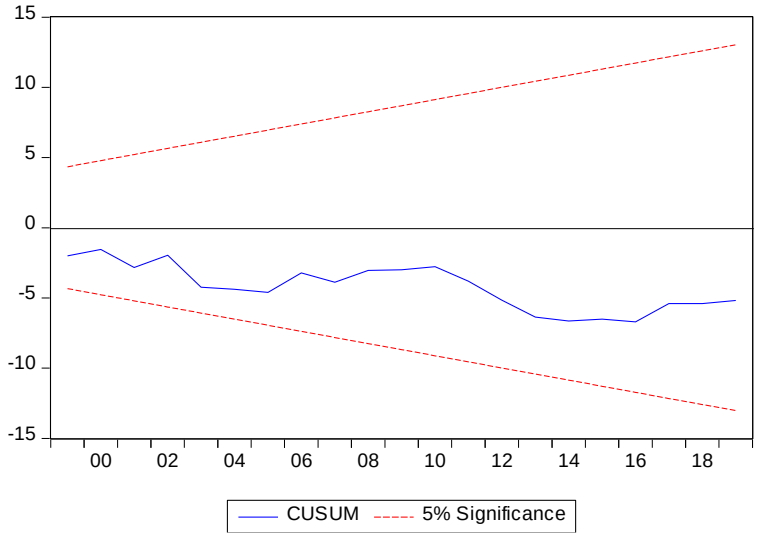

Fig 1: Plot of Cumulative Sum (CUSUM) of Recursive Residuals

Figure 1 presents the result of the test of stability using CUSUM criterion. Since the plot remains within the critical bounds at 5% level of significance, the model is structurally stable. Thus, the estimated ARDL parameters are stable and appropriate for long run decision making.

Therefore, all the post estimation test results suggest that the short-run and long-run estimates from the estimated ARDL model are valid and reliable.

IV. CONCLUSION

This study examines the effect of fiscal policy variables namely government capital expenditure (*GCE*), recurrent expenditure (*GRE*), non-oil revenue (*NOR*) and public debts (*PD*) on firms' productivity proxied as firms' total output (*FTO*). Time series data covering the 1981-2019 period on the variables were analyzed using descriptive statistics, unit root test, co-integration test, ARDL and CUSUM test. The pre-analysis test indicated that all series except public debt (*PD)* which was stationary at level I(*0*), were integrated of order one I(*1*). The ARDL Error Correction Regression indicated that *GCE*, *GRE*, *NOR* and *PD* are good predictors of *FTO* in the short-run. The estimated long-run equation shows that government capital expenditure (GCE) and government recurrent expenditure (GRE) have positive significant impacts on firms' productivity (FTO) in Nigeria while non-oil revenue (NOR) exerts negative significant impact on FTO. However, public debt (PD) was found to have positive but insignificant impact on FTO.

In the like manner, post estimation test (CUSUM) indicated that the model does not suffer from serial correlation or heteroscedasticity; the residuals are normally distributed and the model is structurally stable. All the post estimation tests' results suggest that the short-run and long-run estimates from the estimated ARDL model are valid and reliable. Overall, the study is congruent with some previous studies. Thus, it recommends that government should focus on investing on infrastructures and consider a friendly tax regimes with a view to enhancing firms' productivity and employments. It calls for a more inclusive fiscal policy stance in Nigeria. The government should consider investment driven expenditures as well spending in productive sectors.

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