Fiscal Policy and Growth of Real Economic Activities in Nigeria (1980-2016)

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Abstract

Several empirical studies have investigated the effect of fiscal policy on various macroeconomic variables such as inflation, debts, interest rates, unemployment and growth (GDP) for diverse economies, using variant methods. This paper examined the influence of fiscal policy on growth of real economic activities in Nigeria from 1980-2016, using 2010 as base year to adjust for price level. Secondary data sourced from Central Bank of Nigeria (CBN) (2016) were analysed. After verifying the stationarity property of the variables, Johansen cointegration test result revealed evidence of long run relationship among public revenues, expenditure, real GDP and inflation. The results from Vector Error Correction Method (VECM) showed that government expenditure positively and significantly impacted real economic activities' growth, but converse was the effect of public revenues on RGDP. The results, therefore, imply that government should cut tax to increase disposable income which has aptitude to enhance real aggregate production in Nigeria.

Keywords: Cointegration, Fiscal policy, Growth, Nigeria, Real economic activities, VECM.
JEL Classification: E31; O4.

Contents

1. Introduction

Instability of macroeconomic environment confronting economies all over the world is not a new phenomenon. However, in the past few decades, the challenge has worsened and begun to manifest itself in severe forms ranging from plunging purchasing powers, devastating unemployment rate, balance of payment disequilibrium and many more, particularly in developing countries of Asia, Latin-America and Africa. Most often, if not well managed, the conditions degenerate to recession such as financial recession of 2008-2009 as the case may be for all economies around the world. Several efforts at revamping these disorders have given birth to devising numerous monetary and fiscal policies by authorities.

In most of developing economies, Nigeria inclusive, fiscal policy relative to monetary policy is preferred by authorities to combat epileptic economic growth, fluctuating foreign exchange earnings, deteriorating unemployment rate, crazy poverty level and even unstable price regimes, among others. The preference is hinged on their belief in theoretical ideology of Neo-Keynesian economists which emphasizes efficacy of fiscal policy in stabilizing economic activities and most especially moving economy out of recession. Also, significance of fiscal policy resides in its connection with basic functions of government in term of allocation and redistribution of resources. Hence, not a few empirical studies have documented existence of association between fiscal policy and other macroeconomic variables for various economies (Ekpo, 1994; Ocran, 2011; Ogbole *et al.*, 2011).

In Nigeria, strategies to secure sustainable economic growth and stable price regime over time, following the perceived ineffectiveness of monetary policy to guarantee the objectives, have lent credence to desirability of fiscal policy. More importantly, discussion on the efficacy of fiscal policy as mechanisms for stimulating economic growth and achieving stable price regime has been unsettled, given the inconsistent results of empirical studies (Abu-Bader and Abu-Qarn, 2003; Ogbole *et al.*, 2011; Oyeleke and Orisadare, 2018). More importantly, attempts to secure sustainable economic growth over time and stable price regime aimed at engendering reduction of poverty level, following the perceived ineffectiveness of monetary policy to guarantee the objectives, have lent credence to desirability of fiscal policy in Nigeria. Therefore, the debate over the efficacy of fiscal policy in wielding positive influence on economic output of Nigeria is still ongoing. Also, the 2008/2009 global financial crisis which led to economic recession during the same period has made the discussion relevant in Nigeria.

Summary statistics of the variables follows this section, while the remaining part is divided into five sections. Next section presents the review of literature while section that follow deals with data and methodology. Section four is on model estimation and section five anchors discussion of results. Lastly, section six holds conclusion.

2. Descriptive Statistics of Variables

Jarque-Bera statistic tests normality of the residuals with the joint hypothesis that Skewness is 0 and Kurtosis is 3. Jarque-Bera's null hypothesis states that residuals in observations are normally distributed. When computed p-value of Jarque-Bera is low, null hypothesis that the residuals are normally distributed is rejected and otherwise when it high (Gujarati and Porter, 2009). From Table 1, Jarque-Bera probability statistics for other variables, except inflation (IFN), show that we could reject their null hypothesis of normal distribution, given their individual p-value of (0.022), (0.161), (0.001), and (0.041) respectively. Kurtosis statistics for all variables are not extremely high, signifying thin tails of generated distribution.

Table-1. Descriptive statistics of variables.

Statistics	TGE	RGDP	INF	TGR
Mean	1316.550	17956.69	39.32688	1076.796
Median	457.6650	4350.315	25.00820	396.2450
Maximum	5185.320	89043.62	145.7960	4031.830
Minimum	9.640000	144.8300	0.493799	5.820000
Std. dev.	1680.501	25929.83	43.86516	1349.642
Skewness	1.153373	1.476472	1.016894	1.038561
Kurtosis	2.869747	3.934800	2.875605	2.550797
Jarque-Bera	7.562230	13.59112	5.881673	6.397976
Probability	0.022797	0.001119	0.052822	0.040803
Sum	44762.71	610527.4	1337.114	36611.06
Sum Sq. dev.	93194736	2.22E+10	63497.02	60110579
Observations	34	34	34	34

3. Empirical Review

Since Keynes has emphasized importance of government spending in revamping economy during recession, a wide empirical studies have explored impact of fiscal policy on economic growth for different economies, using panel and time series data. Barro (1990) has documented association between public spending and economic growth. Also, Barro (1991) explores the association between public expenditure and GDP in a cross-country study of 98 countries from 1960–1985. Investigating influence of public spending on growth of Nigerian economy from 1970-2011, Maku (2015) uses Engel-Granger cointegration test and OLS method. Results reveals fiscal policy exerts sizable effect on GDP. Agu *et al.* (2015) examine effect of fiscal policy on Nigerian GDP from 1961-2010. Employing both descriptive and OLS methods, the findings show that public expenditure augments growth of GDP in Nigeria under the period review.

Ubesie (2016) explores impact of public financing on GDP of Nigeria with data from 1985-2015. Using different components of fiscal policy, results from OLS method indicates public revenues rather than expenditure wields enormous positive effect on Nigerian GDP. Employing panel data on G20 countries between 2000-2010, Hanusch et al. (2017) discover that public spending on innovation exerts more influence on economic growth rather than any other variables included in the study. On empirical association between fiscal policy and inflation, Afonso and Jalles (2017) investigates effect of fiscal policy on inflation dynamics on 54 countries from 1980-2013. The findings show a substantial positive association between fiscal policy adjustment and inflation variability.

Karagöz and Keskin (2016) using Bayesian Vector Autoregressive method, explore the impact of fiscal policy on macroeconomic variables in Turkey. The study finds that components of fiscal policy have no substantial effect on variables such as GDP, interest rates, external debts, inflation and stock market index. However, investigating whether fiscal policy propel economic growth in EU countries, Maşca et al. (2016) find that fiscal policy account for upward trend of economic activities in economies investigated. Abata et al. (2012) investigated the impact of fiscal policy on Nigerian economy and find that there is positive correlation between the variables.

4. Data and Methodology

Secondary data used in this study are sourced from CBN (2016). Data include total government revenue (TGR), total government expenditure (TGE), real gross domestic product (RGDP) and inflation rate (IFR). Inflation is chosen as control variable, given the rebase of the real economic activities of Nigeria in year 2010. Before, year 2010, Nigerian economy had been using 1990 general price level for real economic activity determination. This study follows Maku (2015) model, though with modifications, to examine influence of fiscal policy on growth of real economic activities in Nigeria. The production model is, therefore, given as:

$$RGDP = f(K, L) \tag{1}$$

Where RGDP is real economic activities in Nigeria, K represent capital and L stands for labour. In econometric form, while introducing TGE, TGR and IFR instead of capital and labour as production factors, and white noise disturbance term, Equation 1 is written as follow:

$$RGDP = \alpha_0 + \beta_1 TGE + \beta_2 TGR + \beta_3 IFR + \mu_t \tag{2}$$

Where μ_t is error term capturing the influence of unidentified variables. Stating Equation 2 in log form to address transformation since inflation is included among the variables, hence, the Equation 2 becomes:

$$lnRGDP = \alpha_0 + \beta_1 lnTGE + \beta_2 lnTGR + IFR + \mu_t \tag{3}$$

Using VAR method, Equation 3 could be written in Equation 4, given that policy implemented in previous years produce effect on the current economic activities as well, therefore a dynamic model:

$$\Delta X_t = \mu + \sum_{i=1}^{p-1} \Gamma_i \Delta X_{t-i} + \Pi Y_{t-p} + \varepsilon_t \tag{4}$$

Where Δ represents first difference operator, i stands for lag length and p is the maximum lag length distribution. Γ_i and Π the coefficients to be estimated.

Table-2. Unit root test results.

Variable	ADF		PP	
	Level	**First difference**	**Level**	**First difference**
IFR	1.14724	-3.47145***	2.9231	-3.71297*
LRGDP	1.2445	-3.3129*	4.4709	-3.0462**
LEXP	3.23419	-3.8085**	-1.3266	-7.2030*
LREV	-0.18744	-5.1589*	-0.31825	-5.2917*

Note: *, ** and *** denoted 1%, 5% and 10% significance levels respectively.

From Table 2, results of ADF test show that INF, lnRGDP, lnTGE and lnTGR are first difference variables at 1%, 5% and 10% level of significance respectively. Similarly, the results of PP also reveal that all variables are first difference variables at 1% and 5% levels of significance, suggesting that the variables are I(1) process. Since the variables have the same order of integration, i.e. first difference series, I(1), then Vector Autoregressive (VAR) method is applicable.

5. Cointegration

After stationarity properties and integrating orders of variables have been obtained, the next thing is to proceed to testing cointegration among the variables. Cointegration is performed to define if there is long run relationship among the variables. To achieve this, Johansen and Juselius (1990) cointegration technique is employed. Null hypothesis designates no cointegrating relationship, while alternative hypothesis denotes presence of equilibrium. If probability value of the calculated test is larger than 0.05, H_0 is not rejected and it is interpreted there is no cointegration relationship between the series. Table 2 presents the Johansen cointegration test results. It shows there are three cointegrating equations in the system, indicating evidence of long run relationship amongst the variables. Null hypothesis of no cointegrating among the variables is therefore rejected, using MacKinnon et al. (1999) p-values.

Table-3. Cointegration results (with a linear) where r is the number of co-integrating vectors.

Trace test	5%	Hyp.	Max-eng.	5%	Hyp.
120.4359	47.85613	r = 0*	71.13432	27.58434	r = 0*
49.30158	29.79707	r ≤ 1*	31.37470	21.13162	r ≤ 1*
17.92688	15.49471	r ≤ 2*	17.89042	14.26460	r ≤ 2*
0.036454	3.841466	r ≤ 3	0.036454	3.841466	r ≤ 3

Source: Authors computation, 2019.

6. Estimation Technique

As revealed in Table 1, unit root test results show integration of all variables is I (1), likewise Table 2 shows there exits three cointegrating equations among the variables. Thus, the study adopts vector error correction model (VECM) to estimate short run effect among real GDP, total government spending, total government revenue and inflation. VECM is general dynamic specification which applies lag of endogenous and the lag of contemporaneous exogenous variables simultaneously. It is restricted VAR technique of estimation which provides both contemporaneous and lagged information about short run dynamic effect of all variables as endogenous. It also indirectly presents long run relationship among variables. Therefore, VEC model is specified for three cointegrating equations as:

$$\Delta linRGDP = \beta_O + L_j \sum_{j=0}^{n} \Delta linRGDP_{(t-j)} + \Phi_j \sum_{j=0}^{n} \Delta linTGE_{(t-j)} + \omega_j \sum_{j=0}^{n} \Delta linTGR_{(t-j)}$$
$$+ \mu_j \sum_{j=0}^{n} \Delta IFR_{(t-j)} + \gamma ECM_{(-1)} \qquad (5)$$

$$\Delta linTGR = \psi_O + \Omega_j \sum_{j=0}^{n} \Delta linTGR_{(t-j)} + \delta_j \sum_{j=0}^{n} \Delta linRGDP_{(t-j)} + \zeta_j \sum_{j=0}^{n} \Delta linTGE_{(t-j)}$$
$$+ \eta_j \sum_{j=0}^{n} \Delta IFR_{(t-j)} + \phi ECM_{(-1)} \qquad (6)$$

$$\Delta linTGE = \Lambda_O + \theta_j \sum_{j=0}^{n} \Delta linTGE_{(t-j)} + \Theta_j \sum_{j=0}^{n} \Delta linRGDP_{(t-j)} + \vartheta_j \sum_{j=0}^{n} \Delta linTGR_{(t-j)}$$
$$+ \varpi_j \sum_{j=0}^{n} \Delta IFR_{(t-j)} + \pi ECM_{(-1)} \qquad (7)$$

Equations 5, 6 and 7 are specified in VEC models to analyse effect of fiscal policy on real growth of economic activities in Nigeria between 1980 and 2016. All the variables are as described above. ECM is the error correction term that measures the adjustment of the dependent variable back to equilibrium, in case of any distortion. γ, ϕ and π are the coefficients of error correction terms respectively.

7. Discussion of Results

From Table 4, in the short run, expenditure variable lagged by one year statistically significantly influenced the variation occurred to real GDP, given the t-statistic value (5.150). This empirical incidence is in consonance with Keynesian's postulation which encourages government to spend more for economy to grow, especially during recession. The result is consistent with findings of Medee and Nenbee (2011) and Maşca *et al.* (2016) for EU countries. Again, it is evident that the past two years' value of RGDP provides effect on the present value of itself. This is evident in the t-statistic value of RGDP lagged by 2. Similarly, government expenditure lagged by two years with t-statistic value (2.519) exerts positive and statistically significant influence on the current performance of government revenue in the economy of Nigeria. This implies that, to a reasonable extent, the previous government spending is enhancing present government revenue generation. The evidence suggests that government has been investing part of its expenditure in Nigeria.

Table-4. Vector error correction results.

Model \ Variable	Δ(lnRGDP)	Δ(lnTGE)	Δ(IFR)	Δ(lnTGR)
C	309.8227	270.9401*	0.933849	229.2935*
	[1.42607]	[6.20769]	[1.46745]	[3.69496]
Δ(lnRGDP(-2))	0.686527*	0.097022		0.115242*
	[4.87531]	[3.42960]		[2.86515]
Δ(lnTGE(-1))	4.517040*			-0.214520
	[5.15038]			[-0.85633]
Δ(lnTGE(-2))		1.102928*		0.847431*
		[4.66150]		[2.51910]
Δ(IFR(-1))	278.2362*		0.671954*	-4.610655
	[3.74595]		[3.08849]	[-0.21732]
Δ(IFR(-2))	-223.9109*	-53.14348*		
	[-2.69095]	[-3.17913]		
Δ(lnTGR(-1))	-5.825155*	-1.501392		-1.295405*
	[-5.32731]	[-6.83475]		[-4.14759]
Δ(lnTGR(-2))	-0.076379	-1.616278		-1.710994*
	[-0.05404]	[-5.69261]		[-4.23843]
ECM_{-1}	-0.017961	-0.017110*	7.20E-07	-0.013443*
	[-1.75227]	[-8.30916]	[0.02398]	[-4.59141]
R-squared	0.973407	0.853138	0.852241	0.644500
Adj. R-squared	0.962009	0.790197	0.788915	0.492143
F-statistic	85.40784	13.55458	13.45812	4.230194

Note: t statistics in parentheses. *, **and *** denotes significance at 10%, 5% and 1% level respectively.

Furthermore, immediate past year inflation rate positively and significantly impacts RGDP of Nigerian economy, given its t-statistic value (3.746), while two-year inflation value (-2.910) provides negative significant

effect on the economy. The implication of this result is that it takes two solid years before persistent rise in price level could reduce economic activities in Nigeria. This finding conforms with the theory that increased general price level discourages growth of output. In another development, total government revenue exerts negative but statistically significant effect on real gross domestic product in Nigeria, owing to its negative t-statistic value (-5.327). It could therefore be inferred that government revenue constitutes withdrawal from the economy, mopping up funds available for private investments in the economy. This finding is in tandem with the results of Cooray (2009); Ocran (2011) for South Africa, and Ebimobowei (2010). In summary, given the findings of this study, it is evident that fiscal policy influences the variability that occurred to real gross domestic product in Nigeria within the period under review.

8. Conclusion

This paper examined the relationship between fiscal policy and real aggregate output in Nigeria from 1980 to 2016. Having verified the stationarity property of the variables and discovered that all were I(1) process, equilibrium was established among the variables as well. Using vector error correction methodology (VECM), the findings revealed that fiscal expansion i.e. government expenditure supported the growth of aggregate output while government revenue as withdrawal clamped down on economy. Generally, the study found that fiscal policy exerted statistically significant effect, both positively and negatively on economic output in Nigeria during the period under review. The findings, therefore, are in consonance with the Keynesian theoretical argument that government revenue generated through taxes constitutes withdrawals from economy, while increase in government spending promotes economic activities, most especially during recession.

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