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Original Research Article

Does Fiscal Policy Stimulate Gross Fixed Capital Formation in an Emerging Economics? the Nigerian Experience

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Abstract

The study investigates whether fiscal policy stimulate gross fixed capital formation in an emerging economy: The Nigerian experience using secondary data sourced from the Central Bank of Nigeria statistical Bulletin, 2021 spanning the period of 1988-2021. The Augmented Dickey Fuller and Phillip-Perron unit root test is employed to check the distributional characteristics of the series. The study observed that all series are integrated at I(0) and I(1).Hence, the ARDL Bound test is used to check the existence of long-run relationship, revealing evidence of no long-run relationship. The autoregressive estimate test detects the presence of positive autocorrelation in private investment. Demonstrating that the lagged of gross fixed capital formation significantly impact on current gross fixed capital formation in Nigeria. Precisely, gross recurrent expenditure (GRE) has a negative significant effect on private investment. While, gross capital expenditure (GCE), total government revenue (GR), and government budget deficit (GBD) are all insignificant. The VAR granger causality test revealed a unidirectional causality running from gross recurrent expenditure (GRE) to private investment and from private investment to gross capital expenditure. The result of the variance decomposition revealed that variance of private investment (PI) in the short-run is explained by its own innovation. While declining in the medium and long-run. Furthermore, the variance of fiscal policies such as: gross capital expenditure (GCE), gross recurrent expenditure (GRE), total government revenue (GR), and government budget deficit (GBD) decompose into their own variances in the short-term, medium-term and long-term. Amplifying that contribution from private investment innovations are relatively small. Therefore, attention should be drawn to increasing private investment through favourable economic policies.

Keywords: Fiscal Policy, Autoregressive, Gross Fixed Capital Formation, Private Investment.

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INTRODUCTION

Peter, (2014) asserted that a primary catalyst for growth and sustained development in every economy is the efficient and effective deployment of private resources (private investment). This is supported by empirical studies indicating that growth driven by the private sector has a more significant impact on the economy than growth led by the public sector (Laopodis, 2021; Karagol, 2014). This is primarily ascribed to the higher efficiency typically observed in the private sector compared to the public sector. Recently, there has been a transition in emphasis, particularly in developing countries, from public sector to private sector-led growth strategies that prioritize market forces in the economy, diminish public sector involvement in production, and redefine the public sector's role in the development process based on the principle that public resources should support rather than supplant private sector investment (Hermes and Lensink, 2011).

The focus on private sector-driven growth began in the early 1980s, as numerous emerging nations faced significant economic stagnation (Kajimbwa, 2014). Nigeria experienced significant economic decline during the oil glut of the 1980s, with per capita GDP decreasing from $1,100 to $340. Additionally, as international crude oil prices continued to decline, the price fell to approximately $40 per barrel in the first quarter of 2016, compared to $120 per barrel in the third quarter of 2014 (Kajimbwa, 2014). Prices then rose to slightly above $60 in 2017 before plummeting to below $30 in 2020 due to the COVID-19 pandemic. Therefore, there is a necessity to alter the strategy by transitioning to the cultivation of the private sector.

Private investment is seen as a fundamental component for attaining sustained economic growth. Private investment can facilitate the exploitation of untapped resources, generate employment, and increase the number of firms, hence enhancing individuals' income. The national output of products and services ultimately increases, hence enhancing the country's economy. Notwithstanding the significance of private investment in accelerating economic growth, the average private investment as a proportion of GDP remains relatively low.

According to Keynesian theory, a stagnant economy can be revitalized by enabling the government to borrow from the private sector and subsequently distribute resources to the private sector via diverse expenditure initiatives. Consequently, elevated levels of government consumption are likely to enhance employment and promote investment through multiplier effects on aggregate demand. Consequently, government expenditure, especially of a recurrent character, could positively influence economic growth supporting the documentation of Dantama *et al.,* (2017). While, the proponents of classical economics contend that fiscal policy does not have a direct impact on real output (gross domestic product) in the long term. Nonetheless, Keynesian economists assert that fiscal policy can influence the output level.

Moreover, various scholars have conducted empirical investigations on the influence of fiscal policy instruments on the performance of macroeconomic variables. Nonetheless, their presentations have had inconsistent outcomes and contradictory empirical evidence (Dantama *et al.,* 2017; Awode, 2019; Omojolaibi *et al.,* 2021: & Omitogun, 2018). On this background the seek to contribute to the empirical literature on fiscal policy and gross fixed capital formation in Nigeria to address the ambiguous of which fiscal elements are key catalysts of driving private investment vis-visa economic growth.

2.2 Theoretical Framework

The research utilized the Endogenous Growth Model, which posits that internal variables, including economic policy, human capital, and innovation, drive economic growth rather than external forces. Fadare (2010) subsequently asserted that long-term economic growth is contingent upon endogenous variables. The endogenous growth model posits that human capital development stimulates economic growth by fostering the introduction and advancement of technologies and more efficient production methods.

2.3 Empirical Review

Dantama *et al.,* (2017) examined the long run impact of fiscal deficit on private investment employing annual time series data for the period between 1980 and 2014. The modelling approach incorporates the ADF and PP for the test of unit root, Johansen co-integration test and error correction model (ECM) were also employed. The findings shown that a unit increase in fiscal deficit, government revenue and exchange rate crowd in private investment while a unit increase in government expenditure crowd out private investment in the long run. The study suggests that government expenditure should be utilise to improve critical infrastructure that have direct effect on the level of investment and adequate monitoring is needed to avoid leakages.

While, Awode (2019) also examined fiscal management and private investment in Nigeria for the period between 1987 and 2015 using time series data based on ARDL. The results showed that inflation, capital expenditure, indirect tax and non-tax revenue had positive and significant effects on private investment while domestic credit to private sector had negative but significant effect on private investment. Conclusively, the study documents a crowding relationship between capital expenditure and private investment, while indirect tax revenue has significant and non-distortionary relationship with private investment. The suggests that to stimulate capital investment, the tax system should be structure toward enhancing private sector investment.

Omojolaibi *et al.,* (2021) employed fixed effects model for panel data on OLS method to investigate nexus between fiscal policy and private investment West African countries. The study findings show the existence of a significant crowding effect of government capital expenditure and tax revenue while non-tax revenue showed a crowding out effect. Recurrent expenditure and external debt also showed crowding out effect but these were insignificant. The accelerator effect of output growth was also found to be insignificant across the countries over the time period. The study suggests for concerted efforts from these countries to channel funds towards capital projects and also restructure their tax systems to prevent the negative effects of public debt on private investment.

Omitogun, (2018) investigated the effect of dis-aggregated government expenditure on private investment in Nigeria using annual data. The estimation technique employed includes pre- and post- estimation, descriptive statistics, correlation matrix, unit root test and econometric estimation using the auto-regression distribution lag (ARDL) method. Government capital expenditure was estimated marginally, while recurrent expenditure was estimated in terms of elasticity as the variable showed strict long tail to the right. The study observed in general that the effect of government expenditure on private investment depends on its composition as some were found to crowd out private investment while some crowd in private investment implying that not all government expenditure is channeled as to attract private investment in the economy. The study recommends for policy makers to consider the existence of private investors in expenditure plans

3.0 METHODOLOGY

3.1 Model Specification

The study investigates the interdependence of fiscal policy and gross capital formation (GCF) in Nigeria for the period of 1988 to 2021. The following equation shows the general functional form of the study.

$PI=\int(GCE, GRE, GR\ GBD)$…… (1)

The above functional form is transformed into econometrics form through the introduction of stochastic term and respective coefficients.

$PI_t = \beta_0 + \beta_1 GCE_t + \beta_2 GRE_t + \beta_3 GR_t + \beta_4 GBD_t + \varepsilon_t$……..(2)

Where PI represent Private Investment, GCE denotes capital expenditure, GRE represent recurrent expenditure, GR represent government revenue, and GBD represent budget deficit. The beta coefficients signify the relationship (elasticities). The ε_t in the equation represent disturbance terms, t represent time period (1, 2, 3, ……..t).

3.2 METHOD OF DATA ANALYSIS

3.2.1 Stationarity Test (Unit Root Test)

The study employed the Augmented dickey Fuller test from Dickey and Fuller (1979) and the Phillip and Perron test from the Phillip-Perron (1992). The Augmented Dickey Fuller is given by the following formula:

$\Delta Y_t = \beta_0 + \delta_1 Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots\ldots \gamma_p \Delta Y_{t-p} + e_t$……...…(3)

Where:Y={PI, $GCE, GRE, GR\ GBD$} are set of variables under investigation. Δ denote the differentiating operators, $\beta_0, \Delta, \gamma_1, \gamma_2, \gamma_P$ denote estimated parameters. Under the H_0: δ=0 (indicating $that\ Y_t$ has a stochastic trend, meaning it is non-stationary) with the H_1: δ≠0 (indicating that Y_t is stationary). A time trend (t) can be added to Eq. 3 if Y_t is a stationary around a deterministic linear process. Therefore, Eq.3 can be rewrite as follows:

$\Delta Y_t = \beta_0 + \alpha t + \delta_1 Y_{t-1} + \gamma_1 \Delta Y_{t-1} + \gamma_2 \Delta Y_{t-2} + \ldots\ldots\ldots \gamma_p \Delta Y_{t-p} + e_t$……..(4)

Where:

$\alpha\ represent\ a\ coefficient\ of\ a\ time\ trend, whereas, t\ denote\ a\ time\ trend$

Whereas, Phillip-Perron unit root test helps to estimates the non-augmented Dickey-Fuller test in both linear and deterministic process shown in Eq.7 and 8 respectively by modifying the t-ratio of the δ coefficient to account for serial correlation that might affect the asymptotic distribution of their respective test statistics.

3.2.2 Cointegration Test

If the stationarity test(ADF and PP) unit root test confirmed the absence of unit root. Meaning some of the variables are integrated at I(0), 1(1), I(2) or a combination. Then there is evident to check whether the variables are cointegrated. The study procced with the test of cointegration using the autoregressive distributed lag (ARDL) bound test estimation techniques proposed by Pesaran, Shin and Smith (2001) that accommodates regressors that are integrated at 1(0), 1(1) or both against the conventional the cointegration test of Engle and Granger (1987), Johannsen and Juselius (1990) and Gregory and Hansen (1996) based on the requirement that all variables in the econometric model should be integrated of the same order which is a major challenge when dealing with time series. The ARDL bound estimation technique of cointegration has high power over other techniques because of its permissibility and suitability of different optimal lag and small sample size as against others estimation techniques with large sample size requirement.

The formula ARDL Model (p,n) for estimating cointegration is express as follows:

$PI_t=\beta_0+\sum_{i=1}^{p}\beta_1 PI_{t-i}+\sum_{i=0}^{n}\beta_2 GCE_{t-i}+\sum_{i=0}^{n}\beta_3 GRE_{t-i}+\sum_{i=0}^{n}\beta_4 GR_{t-i}+\sum_{i=0}^{n}\beta_5 GBD_{t-i}+u_i$ … (5)

The ARDL bound test of cointegration has two critical values under the null hypothesis of no long-run relationship (cointegration). the decision rule is that, if the F-Statistics is greater than the upper bound of the critical values at a given level of significant, then the null hypothesis of no-cointegration is rejected, hence the existence of long-run relationship. On the contrary, if the F-Statistics is lower than the critical values at their respective significant level, then the null hypothesis of cointegration is accepted, and hence the presence of no long-run relationship (no-cointegration). However, if the F-statistics is greater or equal to the lower bound and lesser or equal to the upper bound, then there is inconclusive result of no long-run relationship. If the variables are not cointegrated, then the unrestricted VAR model is appropriate, otherwise the vector error correction model is suitable for the estimation of the speed of adjustment from short-run disequilibrium to long-run equilibrium.

3.2.3 VAR Model

The study adopts the Johannsen vector autoregressive (VAR) model of Johannsen and Juselius (1990, 1992) where structural relationship can be evaluated simultaneously without prior limitation on the cointegration features earlier proposed by Sim (1980). The VAR model is basically used to analyse the dynamic impact of random disturbances (shocks) on the system of variables. The VAR also have the advantage of interaction restriction, hence is suited for estimating variable channels of interaction and operation. The VAR model has the ability of incorporating the lagged residuals (u_{t-1}) into the current regression model (Y_t). Peseran and Shin (2001) elaborated that the VAR model allow series that are integrated at I(1) or I(0) or mixture of both. The Unrestricted VAR has the potential to model all the variables as endogenous that eliminates unnecessary a priori distinction between the exogenous

and endogenous variables. Therefore, providing the opportunity for testing casual effects and any features of endogeneity within the VAR framework. Furthermore, for each endogenous variable there is set of explanatory variables that include its own lags and lags of all the other variable within the model under the VAR estimation technique, hence testing for dynamic effect. In the unrestricted form, all the variables in the system are treated symmetrically in the sense that they have precisely the same set of regressors.

Given a multivariate time series, Y consisting of n variables that is characterised by a VAR model of an order less-than or equal to k. the VAR specification can be presented below:

$Y_t = A_1 Y_{t-1} + \ldots\ldots\ldots + A_p Y_{t-p} + Bx_t + e_t$ ……..…(11)

Given a multivariate time series, X consisting of n variables that is characterised by a VAR model of an order less-than or equal to k. The unrestricted VAR model can be specified below as:

$Y_t = A_1 Y_{t-1} + \ldots\ldots\ldots + A_p Y_{t-p} + Bx_t + e_t$ ……..…(12)

Where Y_t is a k vector of endogenous variables, x_t is a d vector of exogenous variables, A_1; ……. A_p and B are matrices of coefficients to be estimated, and e_t is a vector of innovation that may be contemporaneously correlated with each other but are uncorrelated with their own lagged values and uncorrelated with all, of the right-hand side variables.

3.2.4 The Optimal lag Order Selection in the VAR Model

The VAR model requires the determination of an explicit lag length to ensure that the residuals are white noise but maintaining the precision of estimates. The first basic procedures used in choosing the appropriate lag length is the Akaike information criteria (AIC), proposed by (1974), follows; Schwarz (1978) information criterion (SIC) by Hannan and Quinn (1979), and the new information criterion developed by Hacker and Hatemi-J (2001) which is a combination of Schwarz (1978) and Hannan and Quinn (1979).

Given a multivariate time series, X consisting of n variables that is characterised by a VAR model of an order less-than or equal to k. The chosen lag length is the one that minimize the following.

$AIC(n) = In\ del \sum_n + (2d^2 n)/T$ ……(13)

SIC= In (det Ω_j) + $j\frac{n^2 In\, T}{T}$, j= 0; …….. k ……(14)

HQC= In (det Ω_j) + $j\frac{2n^2 In\,(InT)}{T}$, j= 0; …….. k……..…..(15)

Where Ω_j is the maximum likelihood estimate of the variance-covariance matrix Ω when the lag order used in estimation is j. T is the sample size. The aim is to estimate k_l by the j that minimizes the above criterion.

3.2.5 The Variance Decomposition

Sim (1980) proposed two standard types of tests in the VAR estimation technique. These are the General impulse response function and the variance decomposition. The general impulse response function (GIRF) is also widely documented in academic literature in the examination of dynamic relationship parameters within the VAR framework (Pesaran and Shin, 1998), gear toward determining the time path of the predictory variables within a VAR model to ascertain the shock from all of the explanatory variables. The impulse response function traces the effects of a shock to one endogenous variable to the other variable in the VAR. i.e its trace the effect of a particular shock to a specific innovation. On the other hands, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR. This study will concentrate on latter i.e. variance decomposition.

3.2.6 VAR Granger Causality

Following the objective to ascertain whether private domestic investment granger causes the public expenditure in Nigeria, the study employed the VAR granger causality test to investigate whether there is causal relationship among the variables to determine the direction of their dynamic relationship. The granger causality test from the multivariate model can be estimated from the following equation.

$PI_t = b_0 + b_1 GCE_{t-1} + a_1 GRE_{t-1} + a_2 GR_{t-1} + a_3 GBD_{t-1} + u_{1t}$ ……..…….. (16)

$GCE_t = b_0 + b_1 PI_{t-1} + a_1 GRE_{t-1} + a_2 GR_{t-1} + a_3 GBD_{t-1} + u_{1t}$ ……..…….. (17)

$GRE_t = b_0 + b_1 PI_{t-1} + a_1 GCE_{t-1} + a_2 GR_{t-1} + a_3 GBD_{t-1} + u_{1t}$ ……..…….. (18)

$GR_t = b_0 + b_1 PI_{t-1} + a_1 GCE_{t-1} + a_2 GRE_{t-1} + a_3 GBD_{t-1} + u_{1t}$ ……..…….. (19)

$GBD_t = b_0 + b_1 PI_{t-1} + a_1 GCE_{t-1} + a_2 GRE_{t-1} + a_3 GR_{t-1} + u_{1t}$ ……..…….. (20)

Under the null hypothesis (H_0) of no granger causality

4.1 Data Analysis and Interpretation

Table 1: Descriptive Summary and Correlation Matrix

Panel A: Descriptive Summary					
	PI	**GCE**	**GRE**	**GR**	**GBD**
Mean	28.137	3.133	4.503	15.481	-0.154
Median	26.115	2.394	4.213	15.296	-0.895
Maximum	53.122	9.384	7.756	27.636	8.760
Minimum	14.159	0.625	3.023	5.534	-8.560
Std. Dev.	11.722	2.120	1.081	5.960	4.244
Skewness	0.429	1.062	1.048	0.241	0.201
Kurtosis	1.980	3.690	4.043	2.453	2.141
Jarque-Bera	2.221	6.228	6.847	0.665	1.126
Probability	0.329	0.044	0.033	0.717	0.570
N	34	34	34	34	34
Panel B: Correlation Matrix					
PI	1				
GCE	0.778*	1			
GRE	0.242	-0.061	1		
GR	0.312	0.284	0.455**	1	
GBD	-0.115	-0.107	-0.035	0.383**	1

*' **' denote significant at 1%, 5%, 10% significance level respectively.

Table 2 ADF and PP Unit Root Test

Variables	**ADF**				**PP**				**Order of Integratio**
	Level		**First Difference**		**Level**		**First Difference**		
	Trend and Intercept		**Trend and intercept**		**Trend and Intercept**		**Trend and Intercept**		
	F-Stat	**Prob**	**F-Stat**	**Prob**	**F-Stat**	**Prob**	**F-Stat**	**Prob**	
PI	0.201	0.997	-4.038	0.019**	0.288	0.998	-4.054	0.018**	**I(1)**
GCE	-3.070	0.132	-8.410	0.000*	-3.106	0.124	-8.106	0.000*	**I(1)**
GRE	-4.402	0.008*	-8.008	0.000	-4.399	0.008*	-10.711	0.000	**I(0)**
GR	-2.495	0.380	-5.698	0.000*	-2.380	0.381	-10.383	0.000	**I(1)**
GBD	-5.081	0.002*	-9.212	0.000	-5.066	0.002*	-25.180	0.000	**I(0)**

Note: critical value for 1%, 5% and 10% at level are -4.310, -3.574, and -3.222 for both ADF and PP respectively. While critical value for 1%, 5%, and 10% at first difference are -4.324, -3.581, and -3.225 for both ADF and PP unit root respectively. *' **' denote significant at 1%, and 5% significance level respectively.

Table 3: ARDL Bound Test of Cointegration

Model	**Dynamic Model**	**F-Stat**	**Remark**
PI(GCE, GRE, GR, GBD)	(1, 0, 1, 0, 0)	3.398	No cointegration

Source: Author Computation, 2021

Note: 2.45, 2.86, 3.74 denote 10%, 5% and 1% significance level for I(0) bound, While 3.52, 4.01, and 5.06 denote 10%, 5%, and 1% significance level for I(1) bound.

Table 4: VAR Lag Selection Test

Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**	**Recommended Lag**
0	-336.221	NA	65280.04	25.277	25.516	25.347	No
1	-273.579	97.443*	4170.138*	22.487	23.927*	22.916*	Yes
2	-254.498	22.615	8001.268	22.926	25.566	23.711	No
3	-216.118	31.273	5630.031	21.935*	25.774	23.076	No

* indicates lag order selected by the criterion. Where LR: sequential modified LR test statistic (each test at 5% level), FPE denote Final prediction error, AIC represent Akaike information criterion, SC denote Schwarz information criterion and HQ represent Hannan-Quinn information criterion

Table 5: Vector Autoregression Estimates

	PI	GCE	GRE	GR	GBD
PI(-1)	0.973**	0.103***	0.020	-0.087	-0.094
GCE(-1)	-0.286	0.363	-0.111	1.315	0.274
GRE(-1)	-1.167***	-0.227	-0.196	1.963	0.644
GR(-1)	-0.077	-0.043	0.132**	0.465***	0.140
GBD(-1)	0.123	0.075	-0.123**	0.052	-0.092
C	7.228**	0.706	3.078**	-2.574	-3.475
R-squared	0.960	0.717	0.403	0.608	0.076
Adj. R-squared	0.951	0.655	0.274	0.523	-0.125
F-statistic	109.156	11.640	3.110	7.144	0.376
Residual Diagnostic Test	Prob				
Serial Correlation LM(-1)	0.728				
Normality Test (Jarque-Bera)	0.385				

Source: Author Computation, 2021

*' **' *** denote significant at 1%, 5%, 10% significance level respectively

Table 6: Variance Decomposition

Table 7 Variance Decomposition						
Variance Decomposition of GCF:						
Period	**S.E.**	**PI**	**GCE**	**GRE**	**GR**	**GBD**
1	2.423	100.000	0.000	0.000	0.000	0.000
5	5.872	71.947	0.502	19.041	3.422	5.089
10	7.186	64.221	1.993	22.193	6.671	4.922
Variance Decomposition of GCE:						
Period	S.E.	PI	GCE	GRE	GR	GBD
1	1.252	0.997	99.003	0.000	0.000	0.000
5	1.711	15.967	64.322	11.671	2.303	5.737
10	1.858	20.273	55.462	14.400	4.339	5.527
Variance Decomposition of GRE:						
Period	S.E.	PI	GCE	GRE	GR	GBD
1	0.931	1.411	24.833	73.756	0.000	0.000
5	1.134	1.428	17.644	53.443	8.486	18.999
10	1.147	2.677	17.491	52.644	8.438	18.750
Variance Decomposition of GR:						
Period	S.E.	PI	GCE	GRE	GR	GBD
1	4.175	5.782	0.125	7.561	86.532	0.000
5	5.771	5.347	8.402	19.919	65.234	1.098
10	5.978	9.084	8.371	19.819	61.122	1.605
Variance Decomposition of GBD:						
Period	S.E.	PI	GCE	GRE	GR	GBD
1	4.580	4.342	0.108	6.455	20.328	68.767
5	4.758	4.759	0.685	9.498	20.589	64.469
10	4.765	4.787	0.805	9.503	20.615	64.291

Source: Author Computation, 2021.

Table 7: VAR Granger Causality Test

Panel A: PI= $\int(GCE, GRE, GR\ GBD)$					**Direction of Causality**	**Nature of causality**
Variables	GCE	GRE	GR	GBD		
PI	0.478	0.039**	0.471	0.330	GRE ⇒ PI	Unidirectional Causality
Panel B: GCE = $\int(PI, GRE, GR, GBD)$						
Variables	PI	GRE	GR	GBD		
GCE	0.004*	0.438	0.440	0.250	PI ⇒ GCE	Unidirectional Causality
Panel C: GRE= $\int(PI, GCE, GR, GBD)$						
Variables	PI	GCE	GR	GBD		
GRE	0.463	0.472	0.001*	0.012**	GR, GBD ⇒ GRE	Unidirectional Causality
Panel D: GR= $\int(PI, GCE, GRE, GBD)$						

Variables	PI	GCE	GRE	GBD		
GR	0.4740	0.0579	0.044**	0.8107	GRE ⟺ GR	Bidirectional Causality
Panel E: GBD= $\int(PI, GCE, GRE, GR)$						
Variables	PI	GCE	GRE	GR		
GBD	0.477	0.718	0.547	0.489	⇓	No Causality

*' **' denote significant at 1%, 5%, 10% significance level respectively.

4.3 DISCUSSION OF FINDINGS

Table 1 shows the descriptive summary and correlation matrix for the selected variables. The normality test (Jarque-Bera probability) revealed that GCF, GR, and GBD are all greater than 5% level of significance with the exception of GCE and GRE with a significance value less than 5% level of significance. The implication is that private investment (PI), total government revenue (GR), and GBD are all normally distributed while, the reverse is the case for GCE and GRE. In addition, the skewness for all parameters are greater than zero (0), indicating that these variables are all skewed to the right.

While, Panel B of Table 1 further shows that gross capital expenditure (GCE) and private investment (PI) have positive and significant correlation, while private investment (PI) has weak positive correlation with GRE and GR, and weak negative correlation with GBD. Another interesting result is also observed from the correlation between GR and GRE. The implication is that an increase in gross revenue leads to an increase in gross recurrent expenditure. The correlation between gross revenue and budget deficit/surplus is also positive and significant. Revealing that when gross revenue increases the country will experience a budget surplus and vice-versa. In summary, the result rejects the presence of multicollinearity problem among the variables under investigation.

The ADF and Phillip-Perron (PP) test of unit root was conducted to shows the distributional characteristics of the variables under investigation. Table 2 shows that all variables are stationary at first difference at trend and intercept at 5% level of significance for both the ADF and Phillip-Perron (PP) unit root test with the exception of GRE and GBD at level for trend and intercept.

Following the stationarity nature of the series in table 2, the study procced with ARDL bound test of cointegration to investigate the existence of long-run relationship among variables as proposed by Pesaran, Shin and Smith (2001) which accommodates regressors that are integrated at 1(0), 1(1) or both against the conventional cointegration test of Engle and Granger (1987), Johannsen and Juselius (1990). The generalized model shows no evidence of cointegration as F-statistic of 3.398 is lesser than 1% I(0) bound of 3.74 and lesser than the respective I(I) bound of 5.06. Therefore, study fails to reject the null hypothesis of no co-integration. Therefore, the study proceeds to estimate the unrestricted VAR model to identify their structural relationship. In order to choose the lag structure of the unrestricted VAR. The study conducted the VAR lag selection test based on five different lag selection criteria (sequential modified LR test Statistics, Final Prediction Error, Akaike Information criterion, Schwarz information criterion, and Hannan-Quinn information criterion) for lag lengths between 0-3 to identify the most preferable lag lengths. The sequential modified LR test Statistics, Final Prediction Error, Schwarz information criterion, and Hannan-Quinn information criterion proposed lagged 1. While, Akaike Information criterion proposed lag 3. The proposed lag length of the majority criterion agrees with econometrics proposition for resolving the problem of lost of degree of freedom that may arise from few numbers of observations.

Table 5 show the multivariate structural VAR result. The study observed a positive autocorrelation in private investment and GR. The implication is that lagged of private investment (PI) and gross revenue (GR) has positive impact on their current performance. The lagged of gross recurrent expenditure (GRE(-1)) has a negative significant impact on the gross capital formation. On the other hand, lagged of private investment (PI(-1)) as a positive significant impact on gross capital expenditure (GCE). The implication is that accumulated capital funds are directed toward capital projects in the context of Nigeria. Another interesting result is observed from the lagged of gross revenue and gross budget deficit/surplus on gross recurrent expenditure. The positive and negative significant impact of the lagged of gross revenue (GR(-1)) and gross budget deficit/surplus (GBD(-1)) on gross recurrent expenditure respectively; indicating that an increase revenue generation in the last fiscal year will transcend in an increase in government recurrent expenditure while a budget deficit will lead to a decrease gross recurrent expenditure.

To ascertain the reliability of the structural VAR model, the residual diagnostic test was conducted employing the serial correlation LM test and normality test (Jarque-Bera). The estimate proved that the residuals are normally distributed and there is no problem of serial correlation.

The VAR granger causality test is employed to check the interdependence of the parameters under investigation (Table 6). The study finds a unidirectional granger causality running from gross recurrent expenditure (GRE) to private investment (PI), and from

private investment (PI) to gross capital expenditure (GCE), and from gross budget deficit (GBD) to gross recurrent expenditure (GRE). The study further finds significant evidence of bidirectional granger causality running between gross revenue (GR) and gross recurrent expenditure (GRE). These results support the VAR result (Table 5).

The study conducted the variance decomposition to assess the dynamic contribution of each variable random innovation in the overall VAR model. The variance decomposition of private investment (PI), GCE, GRE, GR, and GBD are displayed in Tables 7. It is clearly seen that 100% of the variation in private investment (PI) is explained by its own innovation in the short-term while private investment (PI) account for 71.95% in the medium and 64.22% in the long-term of its own innovation. Revealing that the contribution of GCE, GRE, and total government revenue (GR) to private investment (PI) are paltry with an increasing overtime except GBD which peak in the medium-term and decrease in the long-term. While, the variance of GCE, GRE, GR, and GBD decompose into their own variances in the short-term, medium-term and long-term (99.003, 73.756, 86.532, and 68.767), (64.322, 53.443, 65.234, and 64.469), and (55.462, 52.644, 61.122, and 64.291) respectively. The contribution from other innovations are relatively small (See Table 7).

5.2 Conclusion and Implication of the Study

The empirical investigation whether fiscal policies stimulate gross fixed capital formation in emerging economy was examined using annual data from Central Bank of Nigeria (CBN) statistical Bulletin, 2022. The VAR identified a positive autocorrelation in private investment. The implication is that lagged of private investment (PI) has positive impact on their current behaviour of private investment in Nigeria. The study further evidences the presence of negative autocorrelation. The positive and negative significant impact of the lagged of gross revenue (GR(-1)) and gross budget deficit/surplus (GBD(-1)) on gross recurrent expenditure respectively; indicating that an increase revenue generation in the last fiscal year will transcend in an increase in government recurrent expenditure while a budget deficit will lead to a decrease gross recurrent expenditure.

The study further recorded a unidirectional granger causality running from gross recurrent expenditure (GRE) to private investment (PI), and from private investment (PI) to gross capital expenditure (GCE), and from gross budget deficit (GBD) to gross recurrent expenditure (GRE). The study further finds a significant evidence of bidirectional granger causality running between gross revenue (GR) and gross recurrent expenditure (GRE). These results support the VAR result (Table 5).

The study concludes that 100% of the variation in private investment (PI) is explained by its own innovation in the short-term while private investment (PI) account for 71.95% in the medium and 64.22% in the long-term of its own innovation. Simplifying the contribution of gross capital expenditure (GCE), gross recurrent expenditure (GRE), and total government revenue (GR) to private investment (PI) are paltry with an increasing overtime except government budget deficit (GBD) which peak in the medium-term and decrease in the long-term. While, the variance of fiscal policies such as: gross capital expenditure (GCE), gross recurrent expenditure (GRE), total government revenue(GR), and government budget deficit (GBD) decompose into their own variances in the short-term, medium-term and long-term. Amplifying that contribution from private investment innovations are relatively small.

5.3 Limitations of the Study

The result of this study is confronted with some limitations: Firstly, the study employed annual data, rather than monthly and quarterly as the later might product a close view on the management of fiscal policies on gross fixed capital formation as against on the yearly basis. The study concentrates only on the time period spanning 1988 to 2021 as expansion of the scope to date might produce a better update on the effect of fiscal policies on gross fixed capital formation.

5.4 Areas of Further Study

The study encourages researchers to revisit the literature using different variables, frequency of data, and different method of data analysis.

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