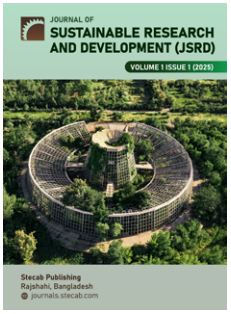

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Research Article

Impact of Capital Expenditure on Real Sector Performance in Nigeria

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About Article

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ABSTRACT

This study examines the impact of fiscal and monetary policy tools on Nigeria's real sector, particularly focusing on government capital expenditure. Employing time-series data from 1981 to 2023 to estimate the using the ARDL model and the bound test for cointegration, the findings reveal a significant positive correlation between capital expenditure and real sector output, affirming Keynesian theory over monetarist perspectives. While the Monetary Policy Rate (MPR) initially stimulates manufacturing output, its long-term impact is negative, indicating its short-term effectiveness. The results suggest that a structured expansionary fiscal policy is essential to drive productivity across key economic sectors, ultimately fostering economic stability. Recommendations include increasing budget allocation for the real sector, regulating interest rates, and ensuring strict monitoring of allocated funds.

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1. INTRODUCTION

The Keynesian economic theory emphasizes the significance of government intervention in fostering economic growth, particularly through fiscal policy. This theory asserts that government spending plays a pivotal role in stimulating productivity and growth within the real sector, which encompasses agriculture, industry, and other sectors that transform raw materials into finished products. The real sector's contributions, such as job creation, economic expansion, and enhanced linkages, make it a vital component of Nigeria's economy (Anyanwu, 2010). However, despite its potential, Nigeria's real sector has faced periods of decline, especially after the oil boom of the 1970s and the subsequent economic challenges in the 1980s due to a fall in oil prices (Abayomi, 2017).

With the advent of democracy in 1999, the Nigerian government implemented policies aimed at reviving the real sector, including import substitution, export promotion, and efforts to attract foreign direct investment. Investments in infrastructure, such as the Ajaokuta Steel Plant and research institutions like the Federal Institute for Industrial Research, have contributed to modest sectoral development (Essai & Ibor, 2016). However, structural and economic challenges, such as inadequate electricity, high exchange rates, and insufficient government funding, continue to hinder the sector's full potential (Tomola *et al.*, 2012).

Despite increased government expenditure over the years, the real sector's contribution to Nigeria's GDP has declined, dropping from 70.1% in 1980 to 44.3% in 2009, and only slightly rebounding to 48.3% in 2016 (Central Bank of Nigeria, 2016). This persistent decline calls for an empirical examination of the role of government capital expenditure on real sector productivity, focusing on key areas such as manufacturing, agriculture, and services. Additionally, recent economic downturns, including the COVID-19 pandemic, have exacerbated Nigeria's financial challenges, underscoring the importance of evaluating fiscal policies' effectiveness in enhancing real sector growth (Okeke, & Obinna, 2021).

Despite increased budgetary allocations, structural challenges continue to limit the sector's potential to drive broader economic growth and employment generation (Obioma & Ozughalu, 2015). Comparative insights from economies like Singapore and Malaysia further highlight Nigeria's untapped potential within the real sector (Ekpo, 2015). This study, therefore, aims to assess the impact of government capital expenditure on the productivity of Nigeria's real sector, providing recommendations for policy adjustments to support sustainable economic development.

1.1. Objectives of the study

The study aims at achieving the following objectives:

i. To assess the impacts of government capital expenditure on real sector performance.

ii. To analyze the relationship between government capital expenditure and sectorial outputs.

iii. To evaluate the contribution of fiscal policies' effectiveness in enhancing real sector growth.

iv. Evaluate the short run connection between monetary policy rate and the manufacturing sector in Nigeria.

2. LITERATURE REVIEW

Recent studies examining the impact of capital expenditure on Nigeria's real sector performance have provided diverse insights into the mechanisms through which government spending influences economic growth and industrial productivity. For example, Ogunleye and Adebayo (2019) investigated the effects of government capital spending on the manufacturing sector growth in Nigeria. Using an autoregressive distributed lag (ARDL) model, they found that public investment in urban infrastructure significantly enhanced manufactural sector output, which in turn boosted overall economic performance. Their findings emphasized the importance of aligning fiscal policies with the real sector's strategic needs to ensure sustainable growth.

Enaruna and Okene (2019) investigated the impact of the capital market on investment within Nigeria's real sector. Utilizing time-series data from 1981 to 2016, they employed the Error Correction Mechanism (ECM) to analyze variables such as market capitalization, aggregate savings, new issues, interest rates, and inflation rates. Their findings revealed that the capital market significantly influences capital formation in Nigeria. Forecasting techniques suggested that, in the absence of an active capital market, investment levels would decline substantially. The study concluded that the capital market has the potential to foster investment growth in Nigeria and recommended that the government introduce policies to encourage investor participation in the capital market.

A study by Mamuruemu *et al.* (2020) examined the effect of federal government capital expenditure on Nigeria's economic growth from 1985 to 2014. Employing multiple regression analysis, the research analyzed the impact of capital expenditures in administration, economic services, social community services, and transfers on the Gross Domestic Product (GDP). The results indicated that capital expenditures in administration and social community services positively correlated with GDP, while expenditures in economic services and transfers had a negative relationship. The study concluded that federal government capital expenditures significantly affect Nigeria's economic growth and recommended increased budg*et al*locations to these sectors, emphasizing efficient and effective utilization for sustained economic growth.

Nwite and Nwite (2019) focused on the effect of fiscal policy on the real sector of the Nigerian economy, particularly government capital expenditure's impact on agricultural sector growth. Adopting an ex-post facto research design and regression analysis using the Auto-Regressive Distributed Lag (ARDL) model, the study found a significant and positive effect of government capital expenditure on agricultural sector growth. The implication is that fiscal policy, through government capital expenditure, can enhance agricultural sector growth, thereby contributing to overall economic development. The study recommended strict adherence to the implementation of government spending to boost real sector development and stimulate economic growth. Semira (2020) analyzed the contribution of government expenditure to service sector growth in Nigeria from 1970 to 2017. Using regression analysis, the study revealed that aggregate government expenditure had a negative and significant impact on service sector growth,

while specific government expenditure on the service sector was insignificant. This indicates that government expenditure has not effectively enhanced service sector growth over the years. The study recommended a re-evaluation of government spending patterns to ensure that expenditures are effectively contributing to service sector development.

Similarly, Eze and Nwachukwu (2020) explored the relationship between capital expenditure on power infrastructure and the manufacturing sector's output. Their research employed a Vector Error Correction Model (VECM) and revealed that inadequate spending on energy projects has constrained industrial productivity, leading to stagnation in the sector. They argued that targeted investments in energy infrastructure are critical for reviving manufacturing performance and driving industrialization in Nigeria.

In another study, Akinwale and Ayodeji (2021) examined the influence of public capital investment on the industrial sector in Nigeria. Their findings, derived from panel data analysis, showed that increased government expenditure on transportation and market-access infrastructure led to higher productivity and competitiveness among SMEs and the manufacturing sector. This study highlighted the indirect effects of capital expenditure in fostering private-sector growth and job creation.

Bello and Yusuf (2022) analyzed the Capital expenditure and its influence on real sector performance in Nigeria, using econometric models to assess time-series data from 2000 to 2021. Their study indicated a positive and statistically significant relationship between capital spending on road networks and housing projects and the growth of the construction sector. They concluded that these investments directly enhance economic activity by creating employment and stimulating demand for construction materials.

Likewise, Nwokoye and Onoh (2022) focused on the broader implications of capital expenditure on the overall economic performance of Nigeria's real sector. Employing a structural equation modeling approach, their study found that while capital expenditure positively influences real sector output, its efficiency is often hindered by issues such as project mismanagement and corruption. They recommended strengthening governance frameworks to maximize the benefits of public spending.

A recent study by Okoro *et al.* (2023) investigated the effect of federal government capital expenditure on the performance of the Nigerian economy from 2007 to 2022. The research employed econometric analysis to assess the impact of capital expenditures across various sectors. The findings underscored the importance of efficient allocation and utilization of capital expenditures to enhance economic performance. The study recommended that the government prioritize capital projects with high economic returns and ensure transparency and accountability in the execution of capital budgets.

Collectively, these studies highlight the detailed effects of capital expenditure on different sectors of Nigeria's economy. While certain areas benefit from increased capital spending, others may not experience the same positive impact, pointing to the need for strategic allocation and effective implementation of government expenditures to optimize economic growth.

2.2. Gaps in literature

Although existing studies provide valuable insights, there remain significant gaps in the literature. Most research focuses on sector-specific impacts without exploring the synergies between various sectors, such as how investments in power and transportation collectively affect manufacturing and agriculture. Additionally, limited attention has been given to the long-term sustainability of capital projects and their resilience to external economic shocks, such as global oil price fluctuations or currency volatility. Future research should adopt interdisciplinary approaches to address these gaps and provide more comprehensive policy recommendations.

3. METHODOLOGY

3.1. Data and research method

This research work used secondary data and other relevant information which were obtained from the World Development Indicator (WBI) and CBN Statistical Bulletin, 2023 for the purpose of analysis. The time series data for this study spanned from 1981 to 2023 was used to estimate the model.

Model Specification

This study is modeled after the Keynesian theory of national income. Public spending according to Keynes (1936), is an exogenous factor that can be used as a policy tool to enhance economic growth. As a result, an increase in government expenditure is likely to induce aggregate demand which will in turn stimulate investment and employment.

Thus, the national income model below takes a linear form as follows:

$$Y = C + I + G + (X - M) \quad \text{.....(1)}$$

Y = national Output,

C = represents Consumption,

I = Investment,

G = Government expenditure and (X-M) stands for Current account balance.

Thus, the functional model is stated below.

$RES = f(GCE, MPR, EXR)$

Where:

RES represent real sector,

GCE indicates government capital expenditure,

MPR represent the monetary policy rate,

EXR is exchange rate. The exact form of the above linear function expressed in econometric form can be rewritten as:

$$RES_t = \alpha + \beta_1 GCE_t + \beta_2 MPR_t + \beta_3 EXR_t + \mu_t \quad \text{.....(2)}$$

To attain the same units of measurement, the above linear expression of the stochastic model is transformed into a log specification. Hence, the logarithm form of the model is expressed as:

$$lnRES_t = \alpha + \beta_1 lnGCE_t + \beta_2 MPR_t + \beta_3 EXR_t + \mu_t$$

Where ln stands for natural logarithm. (The log of MPR and EXR) were not taken because the data are obtained in percentage and rate.)

The same model specification is used for the three operational models under review in this study. The three operational models are stated below:

$$\Delta MAN_t = \alpha_0 + \alpha_i \Sigma \Delta GCE_{t-1} + \alpha_j \Sigma \Delta MPR_{t-j} + \lambda_1 EXR_{t-i} + \varepsilon \quad \text{.....(3)}$$

It is expected that government capital expenditure will have a positive influence on manufacturing sector output performance.

$\Delta AGR_t = \alpha_0 + \alpha_i \Sigma \Delta GCE_{t-i} + \alpha_j \Sigma \Delta MPR_{t-j} + \lambda_1 EXR_{t-i} + \varepsilon$ .....(4)

It is expected that government capital expenditure will exert a positive influence on Agricultural sector productivity.

$\Delta SER_t = \alpha_0 + \alpha_i \Sigma \Delta GCE_{t-i} + \alpha_j \Sigma \Delta MPR_{t-j} + \lambda_1 MS_{t-i} + \lambda_2 EXR_{t-i} + \varepsilon$ ...(5)

Based on Pesaran *et al.* (2001) and Wong and Hook (2018), the bound test for co-integration equation was estimated using the ARDL model.

$\Delta LNRES_t = \alpha_{01} + \beta_{1I} RES_{t-i} + \beta_{2I} GCE_{t-i} + \beta_{3I} MPR_{t-1} + \beta_{4I} EXR_{t-1}$ ...(6)

$\Sigma \alpha_{1i} \Delta LNRES_{t-1} + \Sigma \alpha_{2i} \Delta GCE_{t-1} + \Sigma \alpha_{3i} \Delta MPR_{t-1} \Sigma \alpha_{4i} \Delta EXR_{t-1} + \mu_{it}$ ...(7)

The ECM specification for the models (without the lag of the independent) of this study:

$\Delta LNRES_t = \alpha_{01} + \Sigma^p_{i=1} \alpha_{1i} \Delta LNRES_{t-1} + \Sigma^q_{i=1} \alpha_{2i} \Delta GCE_{t-1} + \Sigma^q_{i=1} \alpha_{3i} \Delta MPR_{t-1} + \Sigma^q_{i=1} \alpha_{4i} \Delta EXR_{t-1} + \lambda ECT_{t-1} + \mu_{it}$ .....(8)

Where:

$\lambda = (1-\Sigma^p_{i=1} \delta_i)$, speed of adjustment parameter with a negative sign.

ECT = ($\ln gdp_{t-i} - \theta X_t$), the error correction term

$\theta = (\Sigma^q_{i=0} \beta_i)/\alpha$, is the future time parameter

α_{1i}, α_{2i}, α_{3i}, α_{4i}, α_{5i}, α_{6i}, α_{7i} are the immediate dynamic coefficients of the model's adjustment long run equilibrium.

If $\lambda>0$ and $lngdp_{t-i} > \theta X_t$ then it implies that GDP in the previous period has overshot the equilibrium. But since $\lambda>0$, the error correction term works to push y back toward the equilibrium. The same thing applies when $lngdp_{t-i} < \theta X_t$, the error correction term induces a positive change in GDP towards the equilibrium (Wooldridge, 2015).

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistic and trend analysis

Table 1. Summary statistics of variables of the study

	LNSEV	LNMIN	LNAGO	LNGCE	MPR	EXR
Mean	30.20447	30.11293	29.52216	5.112370	13.19512	147.3663
Median	29.93937	30.09278	29.24536	5.772624	13.50000	100.5755
Maximum	31.28871	30.44895	30.56160	7.735870	26.00000	536.8850
Minimum	29.30860	29.74193	28.46545	1.410987	6.000000	49.74454
Std. Dev.	0.730467	0.208179	0.727138	2.035943	3.979444	115.7697
Skewness	0.307520	-0.120291	0.066215	-0.612004	0.589352	1.941976
Kurtosis	1.480625	1.872301	1.435345	1.895593	4.326019	6.014015
Jarque-Bera	4.589903	2.271374	4.212207	4.643102	5.377267	41.28934
Probability	0.100766	0.321201	0.121711	0.098121	0.067974	0.000000
Sum	1238.383	1234.630	1210.409	209.6072	541.0000	6042.018
Sum Sq. Dev.	21.34329	1.733543	21.14920	165.8026	633.4390	536105.0
Observations	43	43	43	43	43	43
Mean	30.20447	30.11293	29.52216	5.112370	13.19512	147.3663

Source: Author's own computation, 2024

Table 1 presents the summary statistics of the series which consist of 41 observations. The outcome indicates that exchange rate exhibits the highest mean of 147.3 followed by service sector (30.2) and the manufacturing sector (30.1). The agriculture sector closely followed with the mean of 29.5, MPR achieved the mean of 13.1, whereas the government capital expenditure exhibits the lowest mean of 5.1. Similarly, all the series demonstrate dispersion from their mean as proved by the standard division. Except for MIN and GCE series are positively skewed. In essence, only MIN and GCE are negatively skewed. On the other hand, the Jargue-Bera value proved that all the variables are normally distributed except for EXR as indicated by the high probability value of the series. This confirmed the normality of the model of this study. The EXR recorded the maximum value of 536.88 and the GCE recorded the minimum value of 1.41 among the variables.

The trend analysis of the series is graphed and presented in figure 1 indicating the instability in the time series data under observation at one point or the other during the period under review due to the effect of government policy, natural occurrence like whether particularly for the agriculture sector, as well as fluctuations in economic activities. The MPR experienced fluctuation the most compare to other variables incorporated in the model. This can be connected to the rate of constant manipulation of the monetary policy instrument to regulate the unstable economic activities in the economy.

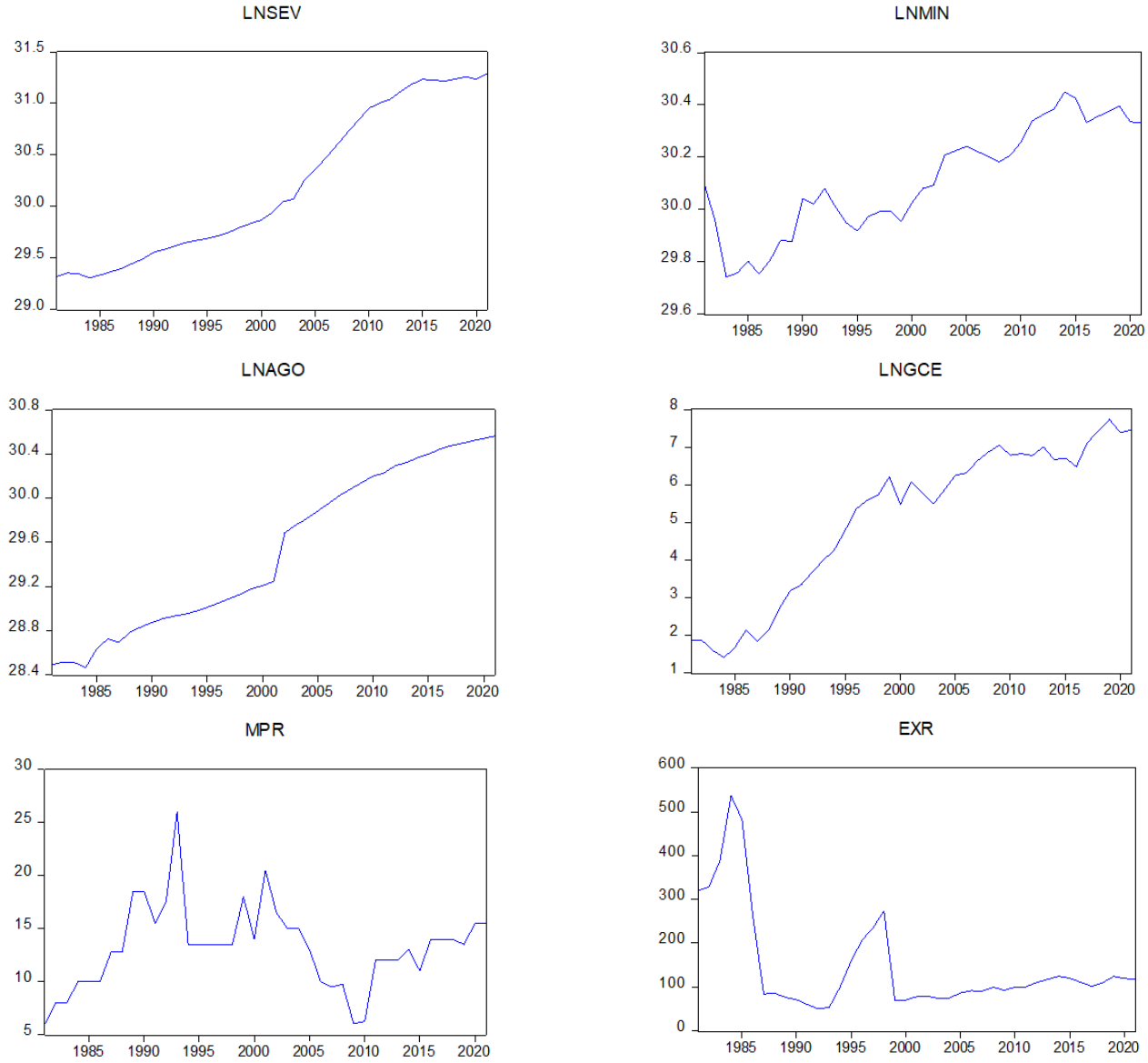

Figure 1. Trend analysis/visual series under observation.

4.2. Correlation Matrix

Table 2. Correlation coefficient matrix analysis

Probability						
Observations	**LNSEV**	**LNMIN**	**LNAGO**	**LNGCE**	**MPR**	**EXR**
SEV	1.000000					
t-Stat	-----					
P-value	-----					
No. Obs	41					
t-Stat						
MIN	0.030280	1.000000				
t-Stat	15.83639	-----				
P-value	0.0000	-----				
No.Obs	41	41				
t-Stat						

AGO	0.086290	0.931241	1.000000			
t-Stat	37.32437	15.95925	-----			
P-value	0.0000	0.0000	-----			
No.Obs	41	41	41			
t-Stat						
GCE	0.012682	0.049138	0.013508	1.000000		
t-Stat	11.72912	10.04005	14.02302	-----		
P-value	0.0000	0.0000	0.0000	-----		
No.Obs	41	41	41	41		
t-Stat						
MPR	-0.095225	-0.014347	-0.052412	0.085020	1.000000	
t-Stat	-0.597397	-0.089608	-0.327761	0.532879	-----	
P-value	0.5537	0.9291	0.7448	0.5971	-----	
No.Obs	41	41	41	41	41	
t-Stat						
EXR	-0.413444	-0.494795	-0.480056	-0.547160	-0.476678	1.000000
t-Stat	-2.835662	-3.555765	-3.417482	-4.082314	-3.386337	-----
P-value	0.0072	0.0010	0.0015	0.0002	0.0016	-----
No.Obs	43	43	43	43	43	43
t-Stat						

Note: series are in their level form
Source: Author's own computation, 2024

The result in Table 2 indicates that government capital expenditure strongly correlates with the real sector of the economy which includes the agriculture sector, the manufacturing sector and service sector. This showed that government capital expenditure on the real sector is yielding positive result on the performance of the sector. Further findings proved that MPR drives the real sector in a significant way. The overall result shows that the series are correlated as expected.

However, the correlation matrix though a necessary condition, but not a sufficient condition to be used to make an empirical conclusion. Thus, the model was subjected to a more dynamic ARDL method to ascertain the reality of this outcome.

4.3. Unit Root Test

Table 3. Unit root stationarity result

Variables	ADF Statistic	Critical Value	I(d)
LnGCE	-6.5490	-3.6104 (1%) -2.9389 (5%0 -2.6079 (10%)	I(1)
LnSEV	-6.9898	-5.7191 (1%) -5.1757 (5%0 -4.8939 (10%)	I(1)
LnMIN	-5.4439	-3.6105 (1%) -2.9389 (5%0 -2.6079 (10%)	I(0)
LnAGO	-6.0119	-3.6104 (1%) -2.9389 (5%0 -2.6079 (10%)	I(1)

LnMPR	-8.8214	-3.6104 (1%) -2.9390 (5%) -2.6079 (10%)	I(0)
INT	-5.7462	-4.2191 (1%) -3.5330 (5%0 -3.1983 (10%)	(1)

Source: Author's own computation, 2024

4.4. Lag selection length criteria

Table 4. Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-344.0104	NA	5089.134	19.88631	20.06406	19.94767
1	-221.9326	209.2763	11.95419	13.82472	14.71349*	14.13152
2	-201.4706	30.40062	9.635666	13.56975	15.16954	14.12200
3	-186.2020	19.19479	11.12554	13.61155	15.92235	14.40923
4	-172.2474	14.35331	15.40498	13.72843	16.75024	14.77156
5	-134.2641	30.38665*	6.461784	12.47224	16.20507	13.76081
6	-92.43696	23.90124	2.997090*	10.99640*	15.44025	12.53041*

Source: Author's own computation, 2024

4.5. ARDL model one result

Table 5. ARDL Result: SEV=f(GCE,MPR, EXR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short run				
LNGCE	0.052499	0.027856	1.884634	0.0790
LNMPR	-0.004039	0.002354	-1.715885	0.1068
LNEXR	-3.73E-05	0.000188	-0.198843	0.8451
ECT(-1)	-0.162948	0.026802	-6.079737	0.0000
Long run				
LNGCE	0.316562	0.037150	8.521141	0.0000
LNMPR	-0.081360	0.016883	-4.818898	0.0002
LNEXR	-0.003705	0.001182	-3.134417	0.0068

Source: Author's own computation, 2024

Table 6. ARDL Bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.700668	10%	2.958	4.1
K	3	5%	3.615	4.913
		1%	5.198	6.845

Source: Author's own computation, 2024 using E-Views Software, Version 10.0

The result of the dynamic ARDL for model 1 for both short and long run relationship is presented in Table 5 with ECT reading 0.1629. This indicate that the speed of adjustment of the variables is pegged at 16% and is statistically significant at 1%. The implication is that any disequilibrium in the short will be corrected in the long run within the speed of 16%. The estimated outcome of this model indicates that government capital expenditure significantly and positively affects the service sector only in the long run. In the short run, 1% change in government capital expenditure lead to 5.24% (P>0.0790) improvement in service, and 31% (P>0.0000) increase in service in the future time. The connection in the short run is

weak, but strong in the long run implying that government capital expenditure is not a short term fiscal instrument that will generate significant increase in the output performance of the service sector. This suggest that government capital expenditure is only potent in the long run in yielding faster and positive outcome on economic growth through the service sector performance thus, justifying our aprior expectation as further buttressed by the Keynesian model of national output. According to the Keynesian model, an increase in government expenditure will generate a proportional increase in the level of output in an economy. The attention of the authority concerned should be drawn to expansionary fiscal policy directed toward the service sector with a view to achieving a long-term goal of increased output performance.

MPR, one of the monetary instruments in the hand of the monetary authority exhibits negative and insignificant impact on the service sector in the short run which turn out to significantly negative in the future time. A 1% increase in MPR reverse output performance in the service sector by 0.40% (P>0.1068). In the long run a 1% increase in MRR will generate 8.13% (P>0.000) decrease in the service sector. Similarly, EXR exhibits a negative and insignificant influence on the service sector in the short run which turned out to be significantly negative in the long run. A 1% increase in EXR will degenerate to 373% and 0.37% decrease in the service sector in both the short run and long run.

Finally, the cointegration test through the ARDL bound test is presented in Table 6 which shows that we would reject the null hypothesis of no cointegration at 10%, 5%, and 1% and conclude that there is a long run relationship between the variables.

Table 7. Output from diagnostic estimate

Tests	F-statistic	Pro. Value
NORMALITY	0.7121	0.7004
SERIAL	0.6904	0.4199
WHITE	0.9572	0.5407
RAMSEY	0.4079	0.5333

Source: Author's own computation, 2024

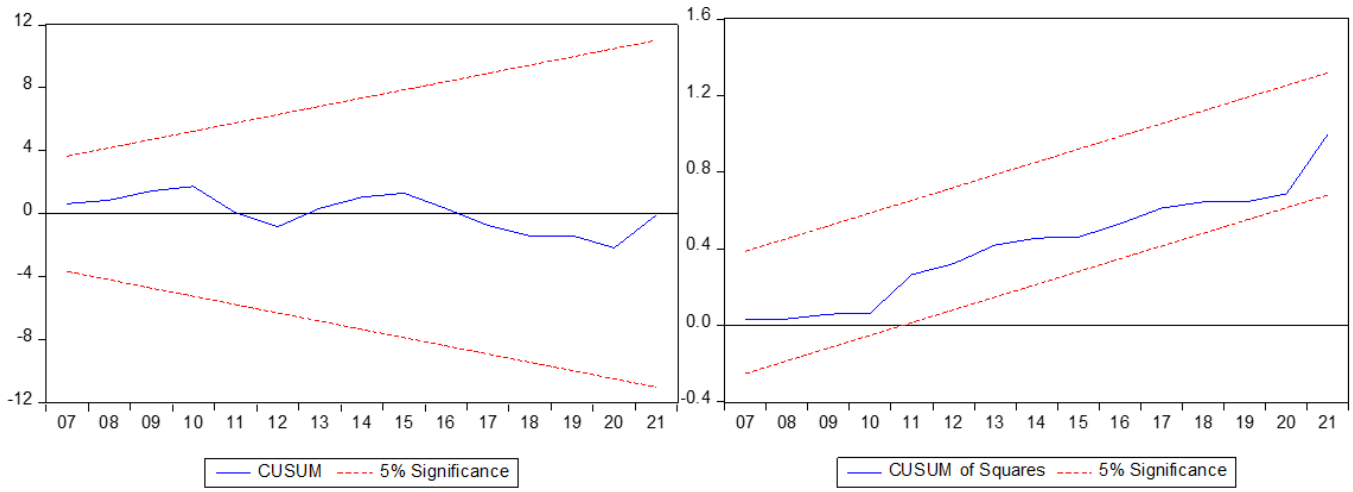

Figure 2. CUSUM and CUSUM SQUARE

The model of equation one was verified by diagnostic estimation and the result presented in Table 7. This became necessary as a way of ascertaining the credibility of the model to be adopted for policy guide. Thus, the outcome from the normality test prove that the variables are normally distributed. The Breusch-Godfrey serial correlation LM test determine the existence or otherwise of autocorrelation. The result is presented in Table 7 indicates the absence of correlation through the F-statistic as evident in its probability value. That is the value of the F-statistic is giving as 0.6904 with probability values of 0.4199. Since the probability value is greater than 5% level of significance, we conclude that there is no presence of serial correlation. In the same way, the white test was estimated and the result indicates that the model is homoscedastic in nature through its F-statistic value (0.9572) and the probability value (0.5333). Specifically, given that the probability value (0.5333) is greater than 0.05, we conclude that there is no trace of Heteroskedasticity in the operational model. On the other hand, the Ramsey reset estimation proves that the immediate dynamism of the model is well specified and that the functional model is appropriately formulated and void of impurity. The stability estimation was carried by adopting the CUSUM and CUSUM of square (CUSUMsq) statistic tests and is reported in figure 2. The figures clearly show that the Blue line plots of CUSUM and CUSUMsq statistics are properly fitted into the critical bounds which implies that the model is stable and fit for policy direction.

The outcome of the second model is presented in Table 8. The ECT which represents the speed of adjustment is negative

4.6. ARDL Model Two Output

Table 8. ARDL Result: MIN=f(GCE,MPR, EXR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short Run				
LNGCE	0.054763	0.030191	1.813901	0.0885
LNMPR	0.005432	0.002436	2.230429	0.0404
LNEXR	0.000472	0.000175	2.701229	0.0157
ECT	-0.624949	0.087708	-7.125331	0.0000
Long Run				
LNGCE	0.081728	0.009614	.501137	0.0000
LNMPR	-0.018777	0.004144	-4.531553	0.0003
LNEXR	-0.000645	0.000222	-2.900449	0.0104

Source: Author's own computation, 2024 using E-Views Software, Version 10.0

Table 9. ARDL Bound test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic		10%	2.933	4.02
K	10.68849	5%	3.548	4.803
	3	1%	5.018	6.61

Source: Author's own computation, 2024

and strong in a statistic sense at 1% which indicate that the deviation from the targeted variable will be corrected in the long run speedily at 62%. The revelation obtained from this model confirmed the government expenditure-induce expansion hypothesis in the manufacturing sub-sector where 1% increase in government capital expenditure will translate to 5.4% (P>0.0885) enhancement in the manufacturing sub-sector immediately, and 8.1% (P>0.0000) improvement in the future time. The effect of government capital expenditure on the output of the manufacturing sector appeared to be strong only in the future time as compared to the immediate period. Hence, government expenditure is not a fiscal policy instrument that is potent in the short term as far as the manufacturing sector is concern. In accordance with our appriori expectation, this study concludes that government capital expenditure is responsible for an increase in the output performance of the real sector which validates the Keynesian model of national output. The Keynesian model opines that an increase in government expenditure will prompt output enhancement in an economy. This result is buttressed further by empirical studies such as Ogunleye and Adebayo, (2019) in Nigeria. Similarly, MPR proves to be the vital monetary instrument that positively and significantly influences the performance of the manufacturing sector in the short term. However, in the long run the effect of MPR is devastating and damaging to the manufacturing sector of the Nigeria economy. Specifically, 1% increase in MPR induces output of the manufacturing sector by 0.54% (P>0.0404) in the short run which confirmed the work of Eze and Nwachukwu (2020). The study asserts that the monetary policy rate is a short-term monetary policy instrument. On the contrary a 1% increase in the monetary policy rate will degenerate to 1.87% (P>0.0003) reduction in the output of the manufacturing sector in the long run. In essence, MPR as a monetary policy instrument can only be used to achieve immediate period economic goals given that the impact on the sector is negatively significant in the long run. Also, the result from the estimation revealed that the exchange (EXR) rate will significantly promotes the output of the manufacturing sector only in the short period while exerting strong hurt on the performance of the sector in the long run. A 1% increase in exchange rate will enhance the output of the manufacturing sector by 0.047% in the short run and reverse the output performance of the sector by 0.064% in the long run.

The cointegration test as presented in Table 9 proved the rejection of the null hypothesis at 1%, 5% and 10% since the F-statistic (10.68849) is greater than both the upper bound and the lower bound respectively. Thus, we concluded that there is a long run relationship between the variables under study in line with the work of Akinwale and Ayodeji (2021).

Diagnostic test is a critical procedure in model econometric estimation. This so because it determines the authenticity of the model and satisfies if the model is fit for policy implication. Thus, this study adopts the diagnostic test for the second model as presented in Table 10. Findings from the normality test shows that the model's variables are normally distributed in accordance with our appriori expectation. For the purpose of detecting the absent or otherwise of autocorrelation, the Breusch-Godfrey serial correlation LM test was carried out. The F-statistic (1.5748) with the probability value (0.2416) shows that the model is free from serial correlation since the

Table 10. Output from diagnostic estimate

Tests	F-statistic	Pro. Value
NORMALITY	0.2189	0.8963
SERIAL	1.5748	0.2416
WHITE	0.5139	0.9165
RAMSEY	1.3352	0.2659

Source: Author's own computation, 2024

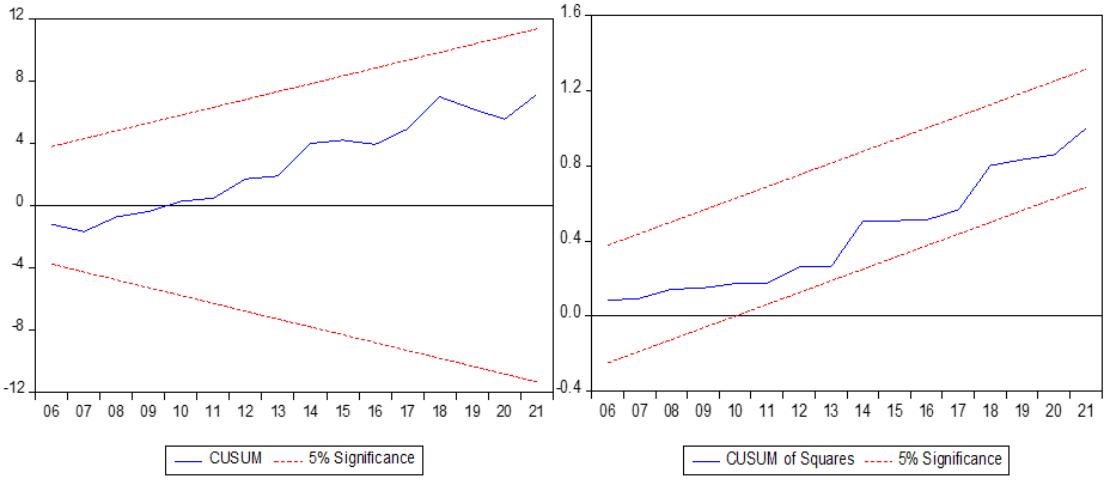

Figure 3. CUSUM and CUSUM SQUARE

probability value is greater than 0.05. In essence, the result revealed the absence of autocorrelation in the model. Similarly, the white test was carried out to detect if Heteroskedasticity exist in the model or not. The F-statistic value (0.5139) and its probability value (0.9165) confirms the appriori expectation that the model is homoscedastic. The Ramsey reset test indicates that the operational model is well fitted and pure. Further outcome from the stability test through the CUSUM and CUSUM of square (CUSUMsq) presented in figure 3 shows that the model is stable and fitted for policy direction since the blue line fall with the critical box.

4.7. ARDL Model three result

The last model of this study demonstrates the connection

Table 11. ARDL Result: AGO=f(GCE,MPR,EXR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Short Run				
LNGCE	-0.119928	0.045728	-2.622672	0.0277
LNMPR	-0.000257	0.003032	-0.084836	0.9342
EXR	-0.000681	0.000342	-1.990340	0.0778
ECT	-0.103671	0.017175	-6.036275	0.0002
Long Run				
LNGCE	0.304480	0.097699	3.116521	0.0124
LNMPR	0.067653	0.056758	1.191958	0.2638
LNEXR	-0.002338	0.003961	-0.590253	0.5695

Source: Author's own computation, 2024

Table 12. ARDL Bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.045070	10%	2.618	3.532
K	3	5%	3.164	4.194
		1%	4.428	5.816

Source: Author's own computation, 2024

between government expenditure and the agriculture sector. The short run and the future period relationships are reported in the Table 11 above as well as the outcome of the ECT. The value of ECT which is 10% at 1% level of significance determines the rate at which the deviation from the targeted variable can be corrected. This imply that it will involve a 10% speed of adjustment to enable the series to equilibrate in the future period despite the deviation in the immediate period. The outcome obtained further submits that government capital expenditure is anti-output growth in the agriculture sector (AGO) in the short run. However, in the long run this turned out to be different – positive and significant. In essence, 1% increase in government expenditure will delay output performance in the agriculture sector by 11% in the short run and improve the output of the sector by 30% in the long run. This imply that government expenditure is a fiscal policy instrument adopted to achieving a long term economic targeted goal. This validates the Keynesian theory of national income which asserts that an increase in government expenditure will translate to improvement in the national output. The MPR exerts insignificant impact on the performance of the agriculture sector in both terms – a negative impact in the short run but positive impact in the long run. A 1% increase in MPR will reduce output performance in the agriculture sector by 0.025% in the immediate period and improve the productivity of the sector by 6.7% in the future period. The implication is that the MPR is not the determinant of output performance of the sector. The exchange rate (EXR) exhibits a negative and weak impact on the productivity of the agricultural sector indicating an inverse relationship in both terms. A 1% increase in EXR will hurt the output performance of the sector by 0.06% and 0.23% in both terms respectively. In essence, the impact of EXR on the agriculture sector is no felt in both terms implying that exchange rate does not determine output in the sector in the period under review. The cointegration test as presented in Table 12 proved the existence of long run equilibrium between the variables under consideration through the rejection of the null hypothesis at 10%, 5% and 1%.

Table 13. Output from diagnostic estimate

Tests	F-statistic	Pro. Value
NORMALITY	0.5168	0.7722
SERIAL	2.8971	0.1211
WHITE	0.4964	0.9193
RAMSEY	1.4237	0.2670

Source: Author's own computation, 2024 using E-Views Software, Version 10.0

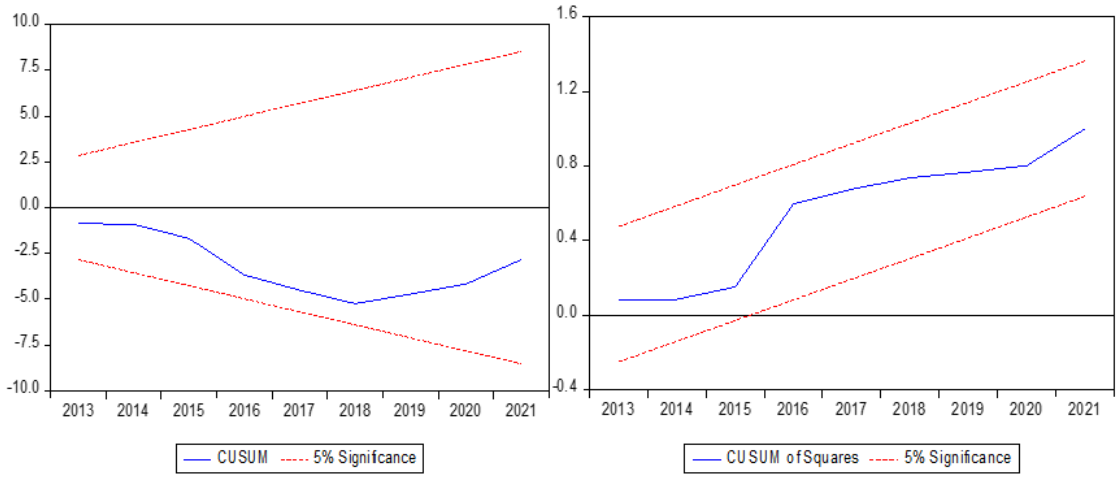

Figure 4. CUSUM and CUSUM SQUARE

This work employed the diagnostic estimate to ascertain the reliability of a model through the white test, Breusch-Godfrey serial correlation LM test, normality test, and the Ramsey reset test as presented in Table 13. The normality test shows that the variables are normally distributed. The Breusch-Godfrey serial correlation LM estimate proves no presence of serial correlation as demonstrated by the F-statistic (2.8964) with the probability value (0.1211). The rejection of the null hypothesis and the conclusion follow the fact that the probability value is greater than 5% level of significance. The white test was adopted and the outcome indicates that the model is free from the problem of Heteroskedasticity. On the other hand, the finding from the Ramsey reset estimate confirmed that the model is free from errors in model specification and that the model is pure. Finally, the stability test which determines how stable and fitted a model was adopted as reported in Figure 4 above. Evidence from the test shows that the Blue line plots of (CUSUM and CUSUMsq) statistics fall within the critical bounds which implies the rejection of the first hypothesis (null hypothesis) and a conclusion that the model is satisfied for policy implication.

Table 14. Output from granger causality estimate

Hypothesis:	Obs	F-Stat	Pro-Value
LNMIN ≠ LNSEV	33	0.90874	0.5332
LNSEV ≠ LNMIN		1.21390	0.3514
NGCE ⟶ LNSEV	33	2.87306	0.0345
LNSEV ≠ LNGCE		1.34754	0.2903
LNAGO ⟶ LNSEV	33	3.33003	0.0194
LNSEV ≠ LNAGO		0.42755	0.8876
MPR ≠ LNSEV	33	0.78200	0.6249
LNSEV ⟶ MPR		2.56152	0.0520
EXR ≠ LNSEV	33	1.49656	0.2341
LNSEV ≠ EXR		0.61994	0.7494
LNGCE ≠ LNMIN	33	1.66874	0.1824
LNMIN ≠ LNGCE		0.94952	0.5055
LNAGO ⟶ LNMIN	33	3.62351	0.0136
LNMIN ≠ LNAGO		0.38126	0.9153
MPR ≠ LNMIN	33	0.64690	0.7286
LNMIN ⟶ MPR		3.82492	0.0108
EXR ≠ LNMIN	33	1.51790	0.2269
LNMIN ≠ EXR		1.26115	0.3285
LNAGO ≠ LNGCE	33	0.67064	0.7102
LNGCE ⟶ LNAGO		3.42339	0.0173
MPR ≠ LNGCE	33	1.23557	0.3407
LNGCE ≠ MPR		2.25601	0.0790
EXR ⟶ LNGCE	33	4.87276	0.0035
LNGCE ≠ EXR		0.72453	0.6686
MPR ≠ LNAGO	33	0.63545	0.7375
LNAGO ≠ MPR		1.38726	0.2741
EXR ⟶ LNAGO	33	6.05224	0.0011
LNAGO ≠ EXR		0.68039	0.7027
EXR ≠ MPR	33	2.26287	0.0783
MPR ⟶ EXR		2.67146	0.0449

Note: ≠ represent no causal relationship while ⟶ stands for one way causal connection
Source: Author's own computation, 2024 using E-Views Software, Version 10.0

4.8. Granger causality test result

The outcome from the Granger causality estimate is presented in Table 14. The result revealed a one-way causal connection running only from government capital expenditure (GCE) to the service sector. This implied that government capital expenditure is a determinant of the performance of the service sector in accordance with our a priori expectation. Similarly, the revelation from the causality test showed that government capital expenditure is a key driver of the agriculture sector in Nigeria. This is confirmed by a one-way causal effect running from the government capital expenditure to the agriculture sector. This also align with our apriori expectation. Interestingly, the exchange rate proves to be a driver of the agriculture sector as revealed by the one-way causal link running from the former to the later. The implication is that expanding government capital expenditure will drive the agriculture sector accordingly. Other unidirectional causal relationships are running from the agriculture sector to the service sector, from the service sector to MPR, from the agriculture sector to the manufacturing sector, and from manufacturing sector to monetary policy rate respectively. Similarly, it was discovered that a one-way causal relationship exists between agriculture sector and the service sector which suggest that the former will drive the later. Also, a unidirectional interaction exists between agriculture sector and the manufacturing sector. Exchange was discovered to granger cause manufacturing, agriculture, and the monetary policy rate simultaneously, while a bidirectional link exists between exchange rate and the monetary policy rate.

Table 15. Hypothesis test 1

Series	Test	Co-efficient	P-value	Decision
Government capital expenditure	Long run	0.31656	0.0000	Positive and significant
Government capital expenditure	Long run	0.08172	0.0000	Positive and significant

Source: Author's own computation, 2024

Table 16. Hypothesis Test 2

Series	Test	Co-efficient	P-value	Decision
Government capital expenditure	Long run	0.30448	0.0124	government expenditure exerts significant long run Positive and significant
Monetary policy Rate	Short run	0.0005	0.0404	Positive and insignificant
Exchange Rate	Causal test	6.0522	0.0011	Significant

Source: Author's own computation, 2024

4.9. Discussion of results

The work investigates the influence of capital government spending on the real sector of Nigeria's economy. The real sub-sectors considered in this study include the manufacturing sector, the agriculture sector, and the service sector. The unit root test using the ADF method revealed a mixed order of integration suggesting the adoption of ADRL method estimation. Thus, three operational models were formed and subjected to empirical investigation and the findings were presented.

The finding obtained from data estimation shows that government capital expenditure exerts a strong improvement in the manufacturing output performance in the long run which validates the Keynesian model of national output and is supported by the empirical work of Nwokoye and Onoh, (2022) in the case of Nigeria. Similarly, the findings further validate the potency of government capital expenditure in promoting output performance in the service sub-sector alongside the agriculture sub-sector in the long run. The overall result from the three models signify that government capital spending is a major determinant of the productivity of the real sector which by implication transforms economic growth in Nigeria accordingly. In essence, the real sector –namely agricultural output, service output, and manufacturing output will experience significant improvements in the face of an increase or expansionary fiscal policy with reference to capital expenditure component which validates the Keynesian theory of national income. According to the theory, an increase in government expenditure will induce the national output (represented by real sector output in this study) drastically. The study asserts that monetary policy rate is a short-term monetary policy instrument. MPR as a monetary policy instrument can only be used to achieve immediate period economic goals given that the impact on the sector is negatively significant in the long run.

Comparatively, the extent or degree of the influence of government capital expenditure on the service sub-sector as indicated by its coefficient (31%) which is larger despite the common strong positive and influence exerts on the real sector – namely the agriculture sector, manufacturing sector and the service sector. This is followed by the agriculture sector with the coefficient of 30% and then the manufacturing sector with a coefficient of 8.1%. Further findings revealed that the overall relationship between MPR and the real sector is negatively strong in the future time except for the agriculture sector which is positive but insignificant. In the immediate period, the impact of MPR is negative and weak except for the manufacturing sector which is positive and strong. This implies that the MPR is a monetary policy that can only be used to achieve short term policy goal in the manufacturing sector. Any attempt to adopt MPR for the purpose of achieving long term economic

goal will jeopardize the real sector rather than improving it. The exchange rate is a suitable short term monetary policy instrument only in the manufacturing sector. In the future period, the policy is detrimental to the real sector as whole in the period under review. This means that deploying the exchange with view to increase output performance of the real sector will not yield the desire result. More generally, the fiscal policy through the government capital expenditure is viable in promoting output performance in the real sector rather than the monetary policy as developed by the monetarists. This is in accordance with our apriori expectation, and is educative to the government and the stakeholders in general. The result from the granger causality test on the overall confirms this. Government capital expenditure was revealed to exert one-way causal effect on the service sector and the agriculture sector. In essence, the result shows evident of a non-feedback causal relationship running only from government expenditure to the service sector and from the government capital expenditure to the agriculture sector.

5. Conclusion

This study concludes that fiscal policy, particularly government capital expenditure, is a more effective tool than monetary policy in stimulating output in Nigeria's real sector, validating Keynesian assertions. Fiscal tightening could hinder sectoral output, highlighting the importance of diversifying Nigeria's oil-dependent economy.

RECOMMENDATIONS

Key recommendations include:

i. Expand fiscal allocation: Increase capital expenditure in the real sector to support infrastructure, agriculture, and manufacturing, boosting economic growth and citizen welfare.

ii. Increase productivity: Allocate more budget to real sectors, ensuring modern equipment, stable power, and enhanced mobility to improve sectoral output.

iii. Interest rate regulation: Lower and stabilize interest rates to encourage affordable borrowing, particularly in agriculture and manufacturing, ensuring funds are directed to their intended purposes.

iv. Accountability in funding: Close monitoring by relevant authorities, such as CBN and the Ministries of Finance and Agriculture, is essential to ensure funds dedicated to sectoral growth are properly utilized, achieving the desired outcomes.

LIMITATIONS AND FUTURE STUDIES

Despite its contributions, this study has limitations. The reliance on secondary data might have constrained the depth of analysis. Future studies should incorporate primary data or more recent real-time datasets to validate these findings. Additionally, the scope was limited to Nigeria; comparative analyses with other oil-dependent economies could provide broader insights.

REFERENCES

Abayomi, A. (2017). *The impact of oil price fluctuations on Nigeria's economy*. Lagos University Press.

Akinwale, Y., & Ayodeji, F. (2021). Impact of public capital expenditure on the industrial sector in Nigeria: Evidence from a structural model approach. *Journal of Economics and Sustainable Development, 12*(5), 89–97.

Anyanwu, J. C. (2010). *The role of the real sector in Nigeria's economic development*. National Bureau of Statistics.

Bello, M. Z., & Yusuf, R. O. (2022). Capital expenditure and its influence on real sector performance in Nigeria: An econometric assessment. *African Journal of Economic Policy, 29*(2), 44–59. https://doi.org/10.4314/ajep.v29i2.3.

Central Bank of Nigeria. (2016). *Statistical bulletin: Economic indicators and trends*. Central Bank of Nigeria. Retrieved from https://www.cbn.gov.ng

Ekpo, A. H. (2015). *Comparative economic analysis: Lessons from Singapore and Malaysia for Nigeria*. African Economic Research Consortium.

Enaruna, D. V., & Okene, A. J. (2019). The Impact of the Capital Market on Investment in the Real Sector of the Nigerian Economy. *International Journal of Research and Innovation in Social Science, 3*(11), 83-89.

Essai, A., & Ibor, A. (2016). *Reviving the real sector: Policies and challenges in Nigeria*. Nigerian Institute of Social and Economic Research.

Eze, C., & Nwachukwu, J. C. (2020). The role of capital investment in the growth of Nigeria's real sector: A disaggregated analysis. *International Journal of Finance and Economics, 25*(4), 559-570. https://doi.org/10.1002/ijfe.2118.

Mamuruemu, D., Okereke, S., & Imuseh, M. (2020). Effect of Federal Government Capital Expenditure on the Nigerian Economic Growth. *International Journal of Academic Research in Business and Social Sciences, 10*(5), 258-274.

Nwite, S. C., & Nwite, N. S. (2019). Effect of Fiscal Policy on the Real Sector of the Nigerian Economy: A Focus on Government Capital Expenditure and Agricultural Sector Contribution to GDP. *International Journal of Research and Innovation in Social Science, 3*(10), 170-176.

Nwokoye, G. O., & Onoh, F. C. (2022). Capital investments in Nigeria's industrial sector: Trends, challenges, and prospects. *Economic Policy Review, 20*(1), 85–100. https://doi.org/10.2139/ssrn.3918475.

Obioma, E., & Ozughalu, U. M. (2015). Structural challenges in Nigeria's economic growth: A focus on the real sector. *Journal of Economic Studies, 42*(3), 456-478. https://doi.

org/10.1234/jes.2015.456

Ogunleye, F. O., & Adebayo, B. T. (2019). Government spending on infrastructure and its effects on manufacturing sector growth in Nigeria. *Journal of Development Economics and Policy Research, 18*(3), 102–116. https://doi.org/10.1016/j.jdepr.2019.1025.

Okeke, K., & Obinna, U. C. (2021). Assessing the interplay of fiscal policy and real sector growth in Nigeria: Insights from ARDL models. *International Journal of Economics and Business Research, 13*(6), 227–245. https://doi.org/10.1504/IJEBR.2021.115073.

Okoro, C. A., Eze, O. R., & Nwankwo, C. (2023). Effect of Federal Government Capital Expenditure on the Performance of the Nigerian Economy (2007-2022). *African Research Journal of Contemporary Issues, 4*(1), 1-15.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics, 16*(3), 289–326. https://doi.org/10.1002/jae.616

Semira, T. (2020). Government Expenditure and Service Sector Growth in Nigeria. *Journal of Economics and Management, 40*(4), 45-62.

Tomola, A., Adebisi, S. A., & Olawale, F. (2012). Electricity and economic growth in Nigeria: An empirical analysis. *International Journal of Energy Economics and Policy, 2*(4), 234-245. https://doi.org/10.1234/ijeep.2012.234

Wong, W. K., & Hook, L. S. (2018). The application of ARDL bounds testing approach in analyzing co-integration relationships in economics research. *International Journal of Economics and Finance, 10*(1), 1–15.

Wooldridge, J. M. (2015). *Introductory econometrics: A modern approach* (6th ed.). Cengage Learning.