

Government Expenditure and Manufacturing Sector Performance in Nigeria: A Co-integration Approach

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Abstract: This study examined the relationship between Government expenditure and Manufacturing sector performance in Nigeria from 1980 to 2024. Major variables engaged in the study are manufacturing sector output, exchange rate, government capital expenditure and government recurrent expenditure. Data were sourced from the Central Bank of Nigeria (CBN) Statistical bulletin and the analysis employed the Descriptive test, Augmented Dickey Fuller (ADF), Unit root test, Co-integration and the Error correction mechanism model to ensure data stationarity of short-run connections. The Error correction Mechanism (ECM) result of -0.764674 or 76 % indicate the speed of adjustment from the long run to its short dynamics. Results also discovered that R^2 is 0.549022 (54 %) meaning that the independent variables explains 54 % of the variations in the dependent variable. The study therefore conclude that government capital expenditure, recurrent expenditure and exchange rate have significant effect on manufacturing output. Built on the findings, the ensuing recommendations emphasized that authorities should continue to invest in infrastructure and projects that stimulate economic activities in the manufacturing sector. Again, policy makers should prudently manage and scrutinize recurrent spending. Finally, government should consider implementing policies that gives incentives to workers and enhance their motivation through non-monetary benefits which can contribute to improved productivity.

Keywords: government, expenditure, manufacturing, exchange rate, infrastructure

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INTRODUCTION

Background to the study

In Nigeria, government expenditure disproportionately favors recurrent costs over capital projects. While capital spending consistently boosts manufacturing sector output, recurrent expenditure often yields negative or insignificant effects. Strategic investment in infrastructure remains essential for driving long-term industrial growth in the country [1]. The development of the manufacturing sector is vital for economic

growth and development, not only in Nigeria but also globally . Governments worldwide implement industrialization policies to promote this sector's growth. Theoretical perspectives vary, with proponents of Keynesian and endogenous theories advocating planned government expenditure as a tool for sustained growth. Conversely, classical and neoclassical theories view governments as bureaucratic and less efficient, hindering economic growth [2], [3]. Beyond these arguments, Ricardian economists suggest that growth and development can occur without government expenditure, highlighting challenges in altering citizens' consumption patterns despite government injections into the economy [4]. In Nigeria, government expenditure, particularly on assets and investment goods like healthcare, education, infrastructure, and manufacturing, plays a significant role in economic output and the capacity utilization of the manufacturing sector [5]. Nevertheless, Nigeria's manufacturing sector faces challenges, including declining productivity rates and employment generation due to factors such as inadequate electricity supply, smuggling of foreign products, trade liberalization, and insufficient government investment in infrastructure [6]. Despite various government policies aimed at improving industrial production and capacity utilization, the manufacturing sector's contribution to the economy remains insignificant compared to the oil sector[7]. Previous studies in Nigeria have focused on the impact of total public expenditure on manufacturing output and economic growth, yielding conflicting findings [8]. The lack of disaggregated analysis of government expenditure components contributes to this controversy. Since a peak of 7.83% in 1982, the contribution of manufacturing as a share of total economic output in Nigeria generally declined [9]. Many factors have contributed to the variation in sector share through time, many of which show both the vulnerability of manufacturing to global economic pressures, as well as the impacts that policy changes can have in reshaping the sector [10]. Prior to the oil boom of the 1970's, manufacturing contributed approximately 14% to Nigeria's economic output . Consequently, increased revenues from oil caused the sector's relative gross domestic product (GDP) share to decline; growth persisted albeit at a slower rate [11]. The recession caused by the fall in oil prices in the early 1980's triggered policy attention to turn back to the manufacturing sector, with steel production gaining prime focus . Prior to this, the Nigerian Enterprises Promotion Decrees of 1972 and 1977 had switched the majority firm ownership from foreign to Nigerian, restricting foreign capital inflows. The lack of affordability of imported goods, combined with the absence of foreign capital and technology, encouraged domestic production of basic commodities such as soap and salt [12]. Alongside, price manipulation through export and import subsidies encouraged the importation of intermediary inputs and thus the expansion of assembly based industry . A brief spike in manufacturing output was observed in the early 1980's so that it contributed to 7.83% of total economic output. Nonetheless, the price manipulation discouraged domestic manufacture of inputs, as well as the investment in the infrastructure and human capital required to do so in the future and this share soon began to decline [13]. In 1987 import bans on raw materials were imposed under the World Bank Structural Adjustment Programmes (SAPs), encouraging import substitution. Intermediary input manufacturers were able to produce competitively again, and there were fewer plant closures [14]. This, combined with the Privatization and Commercialization Act of 1988, encouraged a higher degree of efficiency to be achieved in the manufacturing sector [15]. A slight increase in the share of manufacturing in economic output of 0.62% points was observed from 1986-1988 . Throughout the 1990s and 2000's, Nigeria continued to rely heavily on the export of oil, allowing manufacture to remain in decline. Firms were not export orientated, and lacked efficiency, causing competitive companies to relocate factories abroad [16]. A few key industries, such as beverages, textiles, cement and tobacco kept the sector afloat, but even these operated at under half of their capacity. The Central Bank of Nigeria statistical bulletin of 2023 revealed that from 2008 to 2015, government total expenditure increased by only 16.21%. It was N6, 653.06 billion in 2008, N43 005.39 billion in 2009, N4, 165.32 billion in 2009, N5, 457.39 billion in 2010, and N5, 888.86 billion in 2011 while an increase from N8,813.7 billion in 2018 to N12, 331.7 billion in 2019. On recurrent and capital expenditure analysis, recurrent expenditure grew by 11.10% from N2, 224.51 billion in 2011 to N4, 751.95 billion in 2015 and it increase from N6,865.2 billion in 2018 to N7,155.8 billion in 2021. Nevertheless, it is sad that capital expenditure which is supposed to increase productive

economic activities declined by 10.23% from N706.55 billion in 2011 to N856.37 billion in 2015 and from N2,562.1 billion in 2018 to N2,764.9 billion in 2021. In the light of the foregoing, the study seeks to examine the impact of government expenditure on the manufacturing sector in Nigeria economy [17].

METHODOLOGY

Musgrave Theory of Public Expenditure

This theory was propounded by Musgrave as he found changes in the income elasticity of demand for public services in three ranges of per capita income. He posits that at low levels of per capita income, demand for public services tends to be very low. This is so because such income is devoted to satisfying primary needs and that when per capita income starts to rise above these levels of low income, the demand for services supplied by the public sector such as health, education and transport starts to rise, thereby forcing government to increase expenditure on them. He observes that at the high levels of per capita income, typical of developed economics, the rate of public sector growth tends to fall as the more basic wants are being satisfied.

Usman, Francis and Henry examines how Government expenditure promote manufacturing sector in Nigeria using the ARDL model of analysis. The findings discovered from the study indicates that government recurrent expenditure is negatively related to manufacturing output in Nigeria within the study period. Government capital expenditure was found to be statistically significant to manufacturing output in Nigeria within the period under review. Grounded on findings, the study recommended that Government capital expenditure be directed to infrastructural development such as electricity, road construction, that have direct bearing on manufacturing sector output. Finally, the study recommends that Nigerian government should review its recurrent expenditure and identify areas where costs can be reduced without compromising crucial services. Igohroje and Osevwe-Okoroyibo studied the impact of government expenditure on the manufacturing sector output in Nigerian from

1981 to 2021. The study employed the Ordinary Least Squared (OLS) method of data analysis because of its Best Linear Unbiased Estimators (BLUE) properties and the data for the variables was sourced from Central Bank of Nigeria Statistical Bulletin. The variables used were government recurrent expenditure, government current expenditure and manufacturing sector output. The unit root test, co-integration method, and error correction mechanism were all adopted in course of the study. The study discovered that, the manufacturing sector is significantly impacted upon by capital expenditures. Correspondingly, the output of the industry is significantly impacted upon by recurring expenditure. Originating from the empirical investigation, the study recommends that satisfactory budgeting provision should be allocated to Government spending and therefore be channeled to capital projects tailored towards better execution of spending guideline. Oru (2024) examine the effect of government spending on the manufacture of Nigeria's manufacturing sector by using secondary data from the Central Bank of Nigeria Statistical Bulletin that spans over 41 years, from 1981 to 2020. Employing secondary methodology, the study begins by determining the order of integration of individual time series through unit root tests and conducting stationary tests on all variables. Successively, co-integration tests are performed, followed by the implementation of a Vector Autoregressive (VAR) model. The results show that, at lags one and two, capital spending and the manufacturing sector in Nigeria have a positive link, while at lag three, there is a negative relationship. On the contrary, recurrent expenditure reveals a negative association with the manufacturing sector at lag one and lag two, but a positive correlation at lag three. Moreover, the study identifies a positive correlation between interest rates and manufacturing sector output. The study recommends that concerted efforts be made to improve and encourage manufacturing sector output. Nwokobia and Okonkwo examined the relationship between the federal government capital expenditure and industrial production output in Nigeria: 1981-2022. The Federal Government of Nigeria had observed the importance of diversifying the Nigeria's economy away from mono-product economy. The government policies and strategies aimed at accelerating industrialization of the nation may not have achieved the desired goals especially in boasting industrial output. This work proposed that properly targeted

government capital expenditure (GCAPE) has capability of promoting manufacturing Sector Output; and increasing the sector's contribution to Gross Domestic Product in Nigeria. The data were sourced from World Bank financial indicators website and Central Bank of Nigeria statistical bulletin. The models' parameters were estimated using ordinary least square method. The empirical results revealed that GCAPE had significant positive relationship with manufacturing Sector Output (MSO) in Nigeria; and that GCAPE had significant negative relationship with manufacturing Sector Output contribution to Gross Domestic Product (MSOCGDP) in Nigeria. The study concluded that the economic managers of Nigeria had not performed creditably in the way and manner in which the government capital expenditures are actually spent to achieve results. The study recommended among others for frugal government. Joshua-Gyang, Ogwuche and Aiyedogbon (2023) attempts to examine the impact of government expenditures on industrial output in Nigeria using time series data sourced from the Central Bank of Nigeria statistical bulletin 2021 and the study also employed the Fully Modified Ordinary Least Squares (FMOLS) because the data were co-integrated at order 1(1) and the Johansen co-integration test result discovered that there are two (2) co-integrating equations. The R-Square of 98 percent suggests that government expenditures have a positive relationship with industrial output in Nigeria. Specifically, the result revealed that government capital expenditures have a positive and insignificant impact on industrial output in Nigeria. However, the government's recurrent expenditure was said to have a positive and significant impact on industrial output in Nigeria. Therefore, the study recommended that government should review the recurrent expenditures to be real sector and industrial output is driven to increase the impact of industrial output in Nigeria. Similarly, the government should design a mechanism to track the government capital expenditures in Nigeria to ensure that projects are industrial driven especially the infrastructural projects for industrial output in Nigeria. Barlas examined the impact of government recurrent expenditure on manufacturing output growth in Nigeria from 1990-2019 using manufacturing output as the dependent variable and capital expenditure, recurrent expenditure, inflation and tax as the independent variables. The data was obtained from CBN statistical bulletin. The study employed vector error correction model VECM and discovered that recurrent expenditure has a negative effects manufacturing output in the short run and a positive effect in the long-run. However, the study failed to employ some other variables of interest which would have been beneficial for output growth such as labour, investment and agricultural output among other things.

RESULT

Model specification

This study adopts a modified version of Barlas to analyze the government expenditure on manufacturing output in Nigeria. The model specifies manufacturing sector output as the dependent variable while government capital expenditure, recurrent expenditure, inflation and tax independent variables [18]. The functional model is specified as

$$MSQT = f(CAXP, REXP, INFR, TAXR).....(1)$$

Where MSQT = Total value of manufacturing sector output, GCAX = Government capital expenditure, GREX= Government recurrent capital expenditure, INFR = Inflation rate and TAXR = Tax revenue

The mathematical function is

$$MSQT = GCAX + GREX + INFR + TAXR).....(2)$$

The econometric form is

$$MSQT_{t-1} = \alpha_0 + \alpha_1 GCAX_{t-1} + \alpha_2 GREX_{t-1} + \alpha_4 INFR_{t-1} + TAXR_{t-1} + \mu_t.....(3)$$

Where;

MSQT = total value of Manufacturing sector output at time “t”, GCAX = Government capital expenditure at time “t”, GREX= Government recurrent capital expenditure at time “t”, INFR = Inflation rate at time “t”, TAXR = Tax revenue at time “t”.

The re-modified functional model is specified as

$$MSQT = f(EXCR, CAXP, REXP).....(4)$$

Where;

MSQT = total value of Manufacturing sector output, CAXP = Capital expenditure, REXP= Recurrent capital expenditure and EXCR = Exchange rate.

The mathematical model is

$$MSQT = \alpha_0 + \alpha_1 EXCR + \alpha_2 CAXP + \alpha_3 REXP + \mu_t(5)$$

The econometric form of the model is

$$MSQT_{t-1} = \alpha_0 + \alpha_1 EXR_{t-1} + \alpha_2 CAXP_{t-1} + \alpha_3 REXP_{t-1} + \mu_t(6)$$

Where; MSQT = total value of manufacturing sector output at time “t”, CAXP = Capital expenditure at time “t”, EXCR = Exchange rate at time “t”, REXP= Recurrent Expenditure at time “t” μ_t = stochastic error term [19].

DISCUSSION

Table 1. Descriptive test

	MASQ	EXCR	GCXP	GREP
Mean	72.99467	17.36311	85.12000	82.08444
Median	91.70000	17.59000	91.70000	91.70000
Maximum	99.70000	29.80000	99.70000	99.70000
Minimum	10.47000	7.500000	16.90000	16.90000
Std. Dev.	33.90728	4.719776	19.74077	21.24561
Skewness	-1.040423	0.063258	-2.415926	-1.693325
Kurtosis	4.224982	4.369313	8.029562	5.117156
Jarque-Bera	9.244831	0.285746	91.20614	29.90954
Probability	0.009829	0.866864	0.000000	0.000000
Sum	3284.760	781.3400	3830.400	3693.800
Sum Sq.Dev.	50586.96	980.1568	17146.71	19860.54
Observations	45	45	45	45

Source: Author’s computation E-view 9.0

Table 1 shows that MASQ, EXCR, GCXP and GRXP are peaked (leptokurtic) because K is greater than 3. The Jarque Bera statistics for normality reveals low values for the variables and high probability values meaning that the variables are normally distributed. The skewness result reveals a positively skewed distribution, meaning that the distribution of the series along the means is skewed to the right [20]. From the result, manufacturing sector output (MASQ), government capital expenditure on

manufacturing sector (GEXP), government recurrent expenditure (GRXP), and exchange rate (EXCR) respective maximum values are N99.70000m, N29.80000m, N99.70000m and N29.80000m. The corresponding minimum values are N10.47000m, N7.500000m, N16.90000m and N16.90000m. The standard deviation are N33.90728M, N4.719776m, N19.74077m and N21.24561m.

Table 2. Unit Root Tests: The Augmented Dickey Fuller (ADF) unit root test.

Variables	Levels		First Difference		Order of Integration	P-value
	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value		
MSQP	-1.048907	-3.529758	-8.167176	-3.520787	1(1)	0.0000
EXCR	-3.507074	-3.555523	-7.349251	-3.520787	1(1)	0.0000
GCXP	-4.224569	-3.515523	-12.27238	-3.520787	1(1)	0.0000
GRXP	-2.029300	-3.523623	-11.30906	-3.520787	1(1)	0.0000

Source: Author Computation from E-Views 2024* Level of significance at 5%

This study employs the Augmented Dickey-Fuller (ADF) unit root test to check the order of integration of the variables and the results are presented above in table 2. The result of Augmented Dickey-Fuller (ADF) test revealed that the variables are integrated of order 1(1) series. The ADF result discovered that all variables are stationary at the first difference 1(1). This condition makes the Error Correction Mechanism (ECM) test approach to co-integration possible for investigating the long-run relationship among these variables [21].

Table 3. Co-Integration test: Trace Statistic

Hypothesized		Trace	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.739049	82.71978	47.85613	0.0000
At most 1	0.252174	24.95255	29.79707	0.1631
At most 2	0.206041	12.45740	15.49471	0.1363
At most 3	0.057278	2.536285	3.841465	0.1113

Source: Author Computation from E-Views 2024. Level of significance at 5%

Co-Integration test: Max-Eigen

Hypothesized		Max-Eigen	0.05	Prob.**
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.739049	57.76722	27.58434	0.0000
At most 1	0.252174	12.49515	21.13162	0.4996
At most 2	0.206041	9.921120	14.26460	0.2172
At most 3	0.057278	2.536285	3.841465	0.1113

Source: Author Computation from E-Views 2024. Level of significance at 5%

Co-integration analysis can help divulge long-run links given the fact that there is interaction between government expenditure and the manufacturing sector in Nigeria and such interplay is complicated by numerous factors [22]. Arising from the Co-integration test using Trace Statistic and Max-Eigen test, there

is an indication of a long run links amongst the variables used. The rule states that even if there is the existence of one co-integrating variables, there is long run equilibrium in the model [23]. This consequently enables the error correction test (ECM) justification for a short run equilibrium dynamics test within the periods under review, 1980-2024.

Table 4. ECM Short-run Result (MSQP)

Variable	Coefficient	Std. Error	t-Statistics	Prob
C	-0.354265	0.056428	-3.413683	0.0014
D(EXCR	-0.434288	0.052321	-4.564532	0.0956
D(EXCR(-1)	-0.234278	0.065467	-4.543290	0.0042
D(GCXP)	0.423267	0.045400	-3.547865	0.0956
D(IGCXP(-1)	0.543269	0.044376	-2.790632	0.0567
D(GRXP(-1)	-0.323278	0.054428	-2.534270	0.0023
D(GRXP(-2)	-0.424266	0.046234	-2.645320	0.0722
Ecm (-1)*	-0.764674	0.056428	-2.664329	0.0000
Adj R ² = 0.549022	F-stat = 5.342190	DW1.= 1.534210		

Source: Author Computation from E-Views 2024. Level of significance at 5%

The coefficient estimate for the Error Correction term, ECM (-1) has a negative value of -0.764674 and is significant (-2.664329) at the 0.0000 level of significance suggesting that the model will reach long-run equilibrium at a rate of 7% every year. This means that a yearly adjustment speed of 7 percent may fix the errors from the previous year [24]. The R² explains 0.549022 or 54% of the total variation in the model. In nutshell, the model is remarkable since the F-statistic is significant at 5% level of significance. Without serial correlation, the model would not work, according to the Durbin-Watson statistics of 1.534210, which is close to 2.

Model Variables and their Relationships

Exchange rate and Manufacturing output and in Nigeria.

Inference drawn from the ECM result discovered that exchange rate have a negative relationship with manufacturing output in level and lagged period (1) i.e in the level and first year period of the short-run in Nigeria. The negative association between exchange rate and manufacturing output follow economic theory [25]. It is expected that increases in exchange rate decrease manufacturing output in Nigeria and otherwise would be the case. The study thus reject the null hypotheses that there is no significant relationship between exchange rate and manufacturing output in Nigeria as there exist a significant link between exchange rate and manufacturing output in level and lagged period (1) in Nigeria.

Government capital expenditure and manufacturing output in Nigeria.

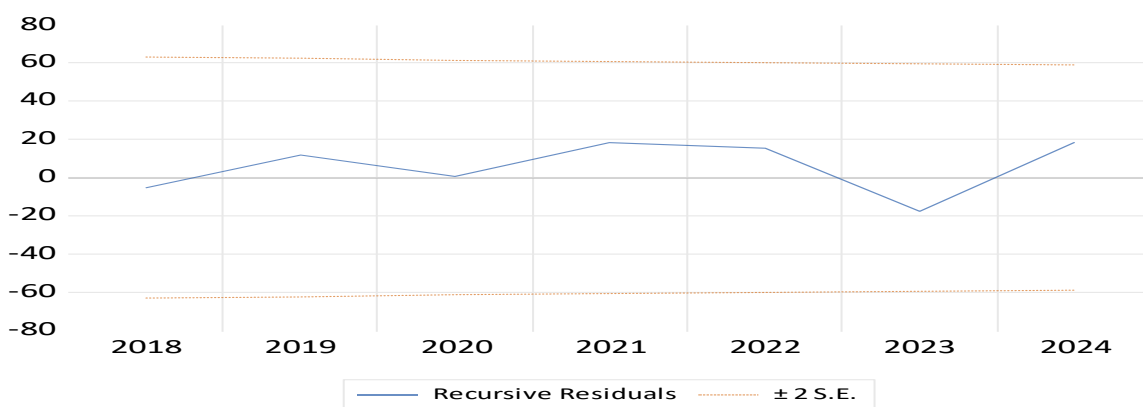
From the ECM result, it was discovered that, government capital expenditure have a positive relationship with manufacturing output both in level and period (1) in the first and second year period of the short-run in Nigeria. The positive relationship between government capital expenditure and manufacturing output do conform to economic theory. It is expected that increased government capital expenditure will increase manufacturing output in Nigeria [26]. The study thus reject the null hypotheses that there is no significant relationship between government capital expenditure and manufacturing output in both level and period one (-1) but there exists statistically significant relationship between government capital expenditure and manufacturing output in Nigeria.

Government recurrent expenditure and manufacturing output in Nigeria

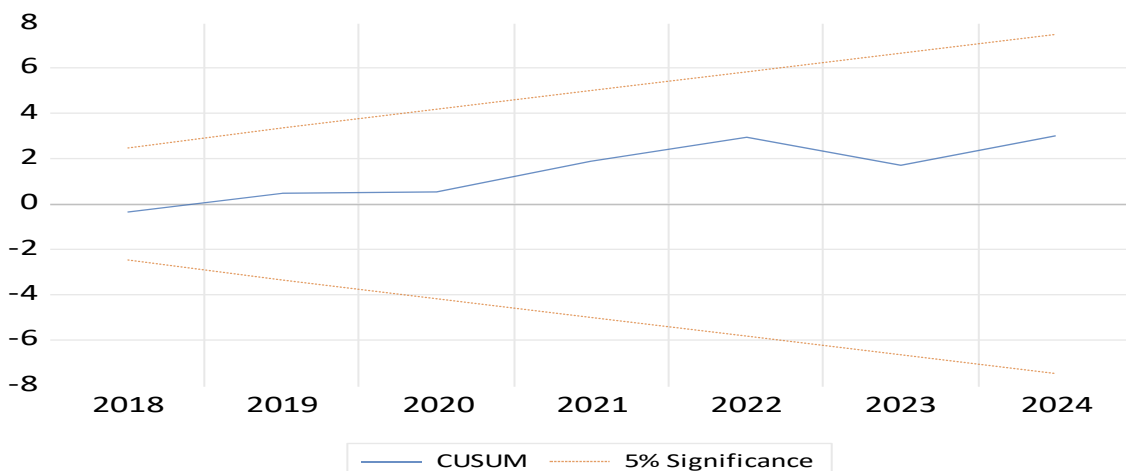
From the ECM result, it was revealed that **Government recurrent expenditure** has a negative relationship with manufacturing output for both level and period (1) in the level first and first year period of the short-run in Nigeria. The negative relationship between Government recurrent expenditure and manufacturing output conform to economic theory. When an increase occurs in government recurrent expenditure (day-to-day spending like wages and overheads), empirical economic studies mostly show a negative short-run impact on manufacturing output, because it diverts funds away from vital infrastructure but this study shows a significant relationship. Recurrent expenditure can reduce output by crowding out capital through high routine government spending of money for capital projects like roads and power. Seconding, high operating costs can increase poor public infrastructure thereby driving up factory production expenses.

Stability Tests

Table 5. Stability Tests



And



The stability tests indicates that the model is stable over time from 1980- 2024 using Recursive Residuals and CUSUM tests.

CONCLUSION AND RECOMMENDATIONS

By adopting the Co-integration and ECM analysis, the study provides understandings into the short-run dynamics and long-run interactions among various economic factors and manufacturing output from 1980-2024 in Nigeria.

The findings submits the following crucial suggestions:

Government capital expenditure is found to have a positive and significant impact on manufacturing output. Thus, the null hypothesis of no significant impact between capital expenditure and manufacturing output is rejected. Also, recurrent expenditure is found to have a negative and significant impact on manufacturing output. Hence, the null hypothesis of no significant impact between recurrent expenditure and manufacturing output is rejected. Furthermore, exchange rate is found to have a negative and significant impact on manufacturing output. So, the null hypothesis of no significant effect between exchange rate and manufacturing output is rejected.

The study thus conclude that government capital expenditure, recurrent expenditure and exchange rate have significant effect on manufacturing output in Nigeria and so government policies should be well directed.

Built on the findings, the ensuing recommendations are emphasized:

Government capital expenditure, given the positive effect of government capital expenditure on manufacturing output, authorities should continue to invest in infrastructure and projects that stimulate economic activity in the manufacturing sector. Efficient allocation and management of these funds can enhance manufacturing growth. On recurrent expenditure given the positive impact on manufacturing output, policy makers should prudently manage and scrutinize recurrent spending. It might be worthwhile to discover ways to rationalize expenses while ensuring that the necessary infrastructure and services are sustained. Finally, exchange rate displayed a negative long-run link between exchange rate and manufacturing output, thus government should consider implementing policies that gives incentives to manufacturing sectors and enhance their motivation through non-monetary benefits which can contribute to improved productivity.

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