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Manufacturing Sector Output Determinants And Manufacturing Sector Performance In Nigeria

Alugbuo Justin C., Eze Emeka and Asogwa Ikechukwu S.
Department of Economics, Michael Okpara University of Agriculture, Umudike, Abia State, Nigeria.
Corresponding Author: jc.alugbuo@mouau.edu.ng

ABSTRACT:
The study investigated the determinants of manufacturing sector output and manufacturing sector performance in Nigeria for the period 1981-2021 as the scope of the study. The OLS estimation technique was used to estimate empirical results, while E-views 12 statistical software was employed in computing the results. Time series data were obtained from World Development Indicators (WDI) and CBN Statistical Bulletin 2021. Results showed that the labour force had a positive and significant relationship with manufacturing sector output in Nigeria; Government expenditure had a positive and significant relationship with manufacturing sector output in Nigeria; Gross fixed capital formation had a positive and significant relationship with manufacturing sector output in Nigeria; Average manufacturing capacity utilization had a positive and significant relationship with manufacturing sector outputs in Nigeria while Lending interest rate had a negative and significant relationship with manufacturing sector output in Nigeria. Based on these findings, the study recommended, among others, that Government investment be encouraged, which forms capital formation and accumulation, while initiatives outside providing infrastructures and paying salaries should be welcomed.

KEYWORDS: *Manufacturing Sector Output, Manufacturing Performance, Government Expenditure, Gross Capital Formation, Labour Force*.

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INTRODUCTION

Because of its ability to provide extensive and effective backwards and forward linkages among other sectors of the economy, the manufacturing sector is seen as a very significant sector of an economy. Manufacturing was referred to as the "engine room" of every economy by Kayode (2000). Since 1980, the manufacturing sector's contribution to Nigeria's GDP has remained at or below 10%, except in 1982, when it increased to 11.21%. In July 2014, it contributed 6.8% of GDP, up from 4.16% in 2012 (Business Day, 2014). The industry relies heavily on imports, is internally focused (producing just products for the home market), and utilizes little of the abundant local raw materials. The exchange rate has also been pointed out as contributing to the manufacturing sector's appalling performance. This is crucial because it connects the price systems of two distinct nations, enabling direct comparisons of traded items in international trade (Enekwe, 2013).
Due to the manufacturing sector's failure to source locally for input necessary to the manufacturing process, the Nigerian economy relies heavily on imports for production components or inputs. Naira depreciation limits the manufacturer's ability to import factor inputs as their cost rises, increasing the cost of the

manufacturing process. Rising production costs would cause price increases for the output. Lack of consumer affordability would reduce the manufacturer's product's competitiveness in domestic and international markets. If the value of the naira rises, production and input costs will drop, increasing sales and allowing these goods to compete in domestic and international markets.This goal was not reached in Nigeria even though the country embarked on devaluation to promote exports and stabilize the exchange rate. Nigeria's debt service payment has increased since the Structural Adjustment Programme was implemented in 1986 to establish an export-led development economy and ended in 1993, despite the nation's capital investment being less than 30% of the total budgetary expenditure. The country's low capital spending, exacerbated by its bad fiscal performance, was to blame for the underwhelming performance of its infrastructure, including its inadequate road system and electricity generation. The forced reduction in public investment that has resulted in the infrastructure's unavailability or deterioration has imposed high costs and diverted resources away from profitable private investment in Nigeria. Therefore, it is crucial to assess the manufacturing sector's productivity in Nigeria in terms of its contribution to GDP and to look at the factors that affect it, including the exchange rate, manufacturing capacity utilization, interest rates, foreign direct investment, credit to the private sector, technology, labour, and energy, as well as monetary and fiscal policies.

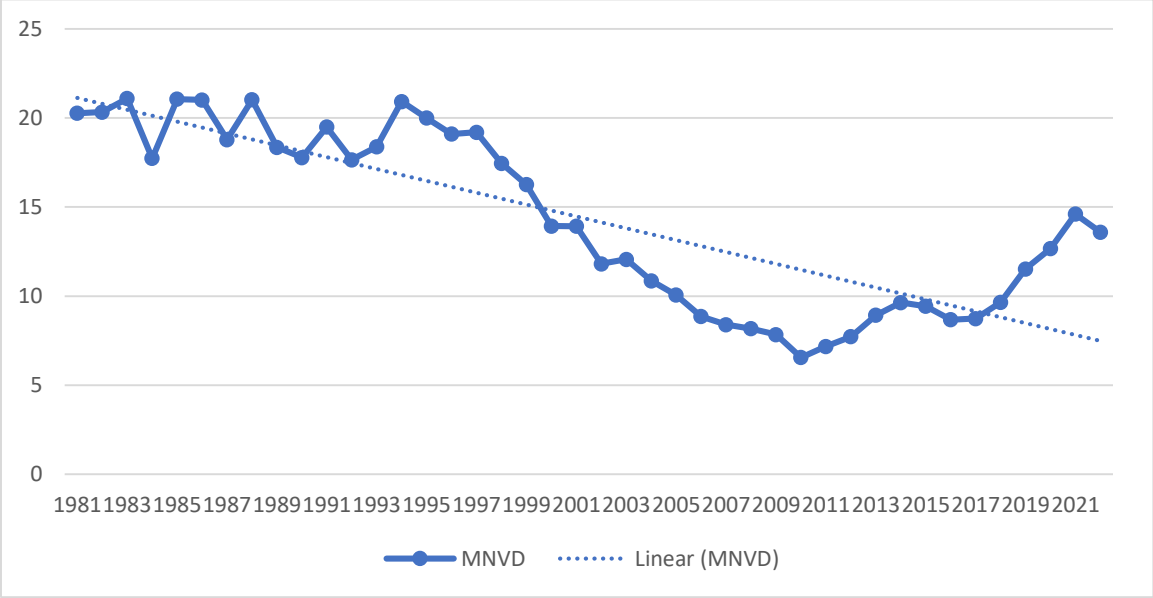

Fig 1: Trend Representation of Manufacturing Value Added Percentage Contribution to Gross Domestic Product for the period 1981-2022. Source: World Development Indicators

According to the following graph, Nigeria's manufacturing sector contributed more than 15% of the country's GDP from 1981 to 2009 before sharply declining to less than 10% from 2006 to 2013 until 2019. This industry's irregular performance is symptomatic of premature deindustrialization, which is the long-term fall of manufacturing following 2009 relative to other industries.

Nigeria's population has been increasing, which should have translated to a high potential for personnel in the industrial sector, but this has not been the case because businesses lack the capacity or financial resources to accommodate or employ the nation's expanding labour force and because the majority of businesses in the country are labour-intensive, as opposed to their counterparts in more developed countries, which are more mechanized and less labour-intensive.

Although manufacturing companies' contributions are widely recognized, industrialists face numerous challenges that impede their survival and ability to advance. Only a favourable investment climate, such as solid financial market structures allowing access to credit at reasonable interest rates and moderate corporate tax rates, can support industrial activity.
The unpredictability of Nigeria's industrial sector has hindered the expansion of the economy and, as a result, increased crime and unemployment. Additionally, it has raised the need for imported goods, leaving the domestic economy extremely susceptible to swings in international prices. The underwhelming performance of the industrial sector has been attributed to the banking sector's refusal to assist it effectively

(Levine, 1997; Hassan et al., 2011). Neither the government's trade policies nor the central bank's monetary policy have benefited the manufacturing sector. After all, it is anticipated that the financial sector will play a key role in increasing output and engineering the growth of manufacturing firms. This may be accomplished by making financing available to manufacturers at a low-interest rate to reduce operating expenses and raise productivity. The manufacturing sector has completely disappeared in emerging economies, most notably Nigeria, and it now makes up very little of the economy's output and employment (Shahbaz, 2009).

CONCEPTUAL CLARIFICATIONS

Numerous authors have published several materials on Nigeria's manufacturing industry for various objectives. This fact emphasizes this sector's vitality, significance, and applicability to the expansion of any given economy. The relevance of the manufacturing sector cannot be overstated, particularly among the less developed countries (LDCs) or developing countries, as evidenced by the experiences of established economies concerning the roles performed by this industry.

An empirical study by Adenikinju and Alaba (1999) analyzed the performance of the Nigerian manufacturing sector in terms of the correlation between productivity, performance, and energy consumption with manufacturing organizations. The researchers calculated the changes in the sector's total factor productivity relative to the change in energy consumption using the aggregate model. The study concluded that the energy supply and pricing are related to Nigerian industrial companies' productivity and efficiency. Although energy resources were determined to be crucial to the manufacturing sector, it was also learned that energy alone is insufficient to raise the Nigerian manufacturing sector's performance significantly. The industrial industry has a solid attachment to employing outdated technology. As a result, there is a clear need for adopting more innovative energy-efficient technical instruments and procedures. Because the sector is constrained by the demand for better technology and energy supply, reforms focusing on the cost of energy options have little impact on the sector's performance. Therefore, for manufacturing organizations to fully benefit from the advantages of energy resources, the energy sector needs to undergo reforms simultaneously with the technology sector.

The Nigerian Bureau of Public Enterprises recognized some of these significant hindrances to the expansion and development of the Nigerian manufacturing industry. Their causes include a high-interest rate, erratic government policies, the failure to enforce current rules, inefficient regulatory bodies, weak infrastructure, the dumping of subpar goods, an unjust tariff system, and poor consumer demand.

However, according to Mazumdar and Mazaheri (2003), certain Nigerian firms are successfully functioning in the nation and earning substantial returns on their investments because of outstanding competitive performance despite the uncertainty in the business environment. The researchers studied two Nigerian companies that have excelled in the business field through their strategies and management planning. They then emphasized the key elements that contributed to the success of these organizations. These elements included implementing open management rules and proactivity in competitive strategy.

Dipak and Ata (2003) contend that the ongoing technological improvements pushing the global manufacturing industry towards increasing consumption levels are the key issues plaguing Nigeria's manufacturing sector. When there is less protection for businesses, these unprotected businesses are forced to increase their spending on R&D while concentrating more and more on the quality of their products. However, Nigeria is not performing research and development at the level necessary for the constituents even to notice a consistent improvement in the performance of manufacturing organizations. The Nigerian government and the private partners must then step in to help the situation if they are to become better.

Adenikinju (2003) attributed the Nigerian industrial sector's current ineffective performance to the government. According to the study, the government's increased involvement in many manufacturing-related issues has diminished the private sector's function. As a result, the contribution of private manufacturers to manufacturing output is relatively small.

Empirical Review

Falade Abidemi Olufemi Olusegun (2021) studied the causes and sustainability of Nigeria's manufacturing sector performance between 1994 and 2019. Production in the manufacturing sector, interest rates, real exchange rates, tax rates, money supply, and trade openness were among the variables used. Additionally, the articulated objective included the usage of Pairwise Granger Causality (PGC) and the Error Correction

Model (ECM). The ECM addressed the imbalance at a 77.5% yearly rate. Additionally, the production of the manufacturing sector was directly and significantly impacted by the real exchange rate, tax rate, and trade openness. The money supply and the interest rate, however, were not significant. The PGC result showed a bi-directional causality between the real exchange rate and the manufacturing sector and tax rate and manufacturing sector output. It was concluded that increased consumption tax, real exchange rate, and economic liberation were the determinants of manufacturing sector performance. To sustain it, it requires an appreciation of Nigeria's currency (the naira), an increase in the tax rate, and proportionate improvement in infrastructural facilities.

Achi (2020) examined Nigeria's manufacturing and macroeconomic performance. According to the study, the manufacturing sector's performance in the nation was directly influenced by real GDP, currency rates, foreign direct investment, and inflation rates, while interest rates significantly impacted it. Ogunleye and Saliu's (2013) analysis of Nigeria's financial institutions and manufacturing performance, which used ECM data from 1970 to 2005, found no evidence that financial institution reforms significantly impacted the manufacturing sector's performance. In a related study, Charles (2012) found that while the inflation rate, loan rate, income tax rate, and exchange rate were all significant and had an inverse relationship with manufacturing index performance, monetary supply had a direct and significant impact.

Using the Cochrane-Orcuttthe method, Ebere and Lorember (2016),between 1980 and 2015, examined how commercial bank loans affected the industrial sector's output industrial sector's output. The findings showed that whereas broad money supply strongly and directly influenced manufacturing sector performance in Nigeria, the inflation rate and interest rate were indirectly related to manufacturing sector output. According to a related study by Ogar *et al.* (2014) using OLS data from 1999 to 2011, bank loans and interest rates had little impact on the industrial sector's production.

METHODOLOGY

Theoretical Framework and Model Specification

The theoretical framework is the Keynesian theory of investment. The idea, which Keynes first proposed in 1937, asserts that investment is a direct function of interest rates. Implies that a decline in interest rates will encourage business investment in the economy. Interest is always and everywhere a monetary phenomenon, as the theory presupposes. According to Onakoya (2014), a robust and flourishing manufacturing sector is essential and crucial in emerging nations' industrialization. This shows that the manufacturing sector's performance, which stimulates other economic sectors, including the service sector, is a subset of sustainable development. The following equation represents the theory as it relates to a nation's national accounts and the national income equation:

$$Y = C + I + G \quad (1)$$

Where,
Y represents the country's output, C for consumption, I for investment, and G for government. Investment (I) is a function of interest rate in equation (i) above.

$$I = f(i) \quad (2)$$

Where,
I represent an investment in the manufacturing industry, and *I* is the interest rate.
The model for this study was built on Tams *et al.* (2018) model. The baseline model of Tams *et al.* (2018) is given below in linear form;

$$IND = f(EXRT, INFL, MPR, M2, FDI, MCAP) \quad (3)$$

IND = Manufacturing Industry output, INFL =Inflation, MPR =Monetary policy interest rate, EXRT=Exchange rate, FDI =Foreign direct investment, M2= Broad money supply and MCAP=Market capitalization.
The modified model of Tams *et al*. (2018) for this study is represented below:

$$MSO_t = \beta_0 + \beta_1 LABF_t + \beta_2 REER_t + \beta_3 GOVEX_t + \beta_4 LINTR_t + \beta_5 GFCF_t + \beta_6 AMCU_t + \mu_1 \quad (4)$$

Where,
MSO – Manufacturing Sector Output, LABF – Labor Force, REER – Real Effective Exchange Rate, GOVEX – Government Expenditure, LINTR – Lending Interest Rate, GFCF – Gross Fixed Capital Formation, AMCU - Average Manufacturing Capacity Utilization, μ = Disturbance term/error term, β_0 = Constant term, $\beta_1$to β_6 are parameters to be estimated.

***a priori* Expectation**
The variables implored in the regression line, which are the determinants of manufacturing sector output in Nigeria, are expected to have a positive relationship with manufacturing output for the period of this study.

RESULTS AND DISCUSSIONS

Descriptive Statistics

The preliminary study aimed to find the normality of the data, measures of central tendency, and measures of dispersion. The average value of the sample is represented by the mean and median, two metrics of central tendency. Standard deviation is the positive square root of variance. It represents the degree to which the deviation from the mean deviates from the mean and is a measure of dispersion. The null hypothesis of the Jarque-Bera test is that the distribution is normal. Whenever the probability is less than 0.05, the null hypothesis is rejected.

Table 1. Common Sample Descriptive Statistics

	MSO	LABF	GOVEX	GFCF	AMCU	LINTR	REER
Mean	6.785145	17.52500	5.121561	29.55205	2.662098	17.44590	108.9123
Median	7.044629	17.56370	5.772618	29.71734	2.788546	16.93917	111.2313
Maximum	10.15525	17.98186	7.832993	30.39038	4.075841	31.65000	435.0000
Minimum	3.340367	16.96589	1.411011	25.53666	1.879895	8.916667	0.617708
Std. Dev.	2.123581	0.301028	2.047642	0.936703	0.486539	4.810843	112.3269
Skewness	-0.275514	-0.309480	-0.593846	-3.830944	0.650321	0.319220	1.070667
Kurtosis	1.805619	1.902578	1.899357	16.73465	3.633794	3.645428	3.548803
Jarque-Bera	2.955721	2.711888	4.479296	422.5482	3.576170	1.407980	8.347759
Probability	0.228125	0.257704	0.106496	0.000000	0.167280	0.494608	0.015392

Source: Researcher's Extract from Eviews 12 2023

From Table 1, the result of the descriptive statistics showed that the standard deviation calculated for Lending Interest Rate (LINTR) and Real Effective Exchange Rate (REER) were the most volatile in the series with values of 4.81 and 112.3 respectively while Labour Force (LABF), Gross Fixed Capital Formation (GFCF) and Average Manufacturing Capacity Utilization (AMCU) were the least volatile variable with values of 0.30, 0.93 and 0.48 respectively. The calculated values for the skewness statistics values of some of the variables such as Manufacturing Sector Output (MSO), Labour Force(LABF), Government Expenditure (GOVEX) and Gross Fixed Capital Formation (GFCF) were negatively skewed, suggesting that their distributions have a long-left tail while the skewness statistics value for Average Manufacturing Capacity Utilization (AMCU), Lending Interest Rate (LINTR) and Real Effective Exchange Rate (REER) were positively skewed, suggesting that their distribution have a long right tail. Based on these observations, f unit root (n the on-stationarity would be present) in the series. Thus, estimating these variables at the level might not give good results, hence the need to conduct the unit root test.

Unit Root Test

Table 2. Summary of Stationarity Test Using Augmented Dickey-Fuller

Variable	ADF Stat (levels)	5% Critical Value	Prob. Value	ADF. Statistic. 1st Difference	5% Critical Value	Prob. Value	General Remark
REER	3.293437	-2.936942	1.0000	-3.119317*	-2.938987	0.0035	*@I(1)*
lnMSO	-2.065533	-2.936942	0.5482	-8.409713*	-2.938987	0.0000	*@I(1)*
lnLABF	-1.961472	-2.941145	0.8174	-10.35897*	-2.938987	0.0000	*@I(1)*
lnGOVEX	-2.187699	-2.941145	0.0622	-9.184150*	-2.938987	0.0000	*@I(1)*
lnGFCF	-2.357403	-2.945842	0.1606	-7.974075*	-2.938987	0.0000	*@I(1)*
lnAMCU	-0.410914	-2.936942	0.8976	-4.955787*	-2.938987	0.0002	*@I(1)*
LINTR	-2.307129	-2.936942	0.1747	-6.843734	-2.938987	0.0000	*@I(1)*

Source: Researcher's Compilation from Eviews 12 Regression Output (2022). The Aesteriks (*) sign indicates stationarity at the 5% significance level.

The result of the unit root test in Table 2 indicated that all the variables, i.e., REER, lnMSO, lnLABF, lnGOVEX, lnGFCF, lnAMCU, and LINTR, achieved stability at first differences I(1), justifying the chosen estimation technique, the Ordinary Least Square (OLS), which can accommodate the introduction of the Error Correction Mechanism (ECM) in order to determine the convergence of the variables in the long run.

Cointegration Test

Table 3. Johansen Cointegration Test

Series: lnMSOlnLABFlnGOVEXlnGFCFlnAMCULINTR REER

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.769852	179.6735	125.6154	0.0000
At most 1 *	0.664888	122.3812	95.75366	0.0002
At most 2 *	0.572357	79.74290	69.81889	0.0065
At most 3	0.441516	46.61371	47.85613	0.0651
At most 4	0.296488	23.89509	29.79707	0.2049
At most 5	0.225379	10.17996	15.49471	0.2672
At most 6	0.005628	0.220101	3.841465	0.6390

Source: Researcher's Extract from Eviews 12 Software Package

Based on the cointegration result from Table 3 and the trace test, which indicated three cointegrating equations at the 0.05 level of significance, we conclude that there is a long-standing relationship between the dependent and explanatory variables.

Dynamic Short Run Error Correction Model

Table 4: Dynamic Error Correction Term Estimates

Dependent Variable: lnMSO

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-118.0279	15.79438	-7.472782	0.0000
lnLABF	6.773990	0.845993	8.007146	0.0000
lnGOVEX	0.165457	0.080006	2.068070	0.0468
lnGFCF	0.146351	0.080801	1.811259	0.0795
lnAMCU	0.513550	0.169887	3.022891	0.0049
LINTR	-0.020044	0.007354	-2.725399	0.0103
REER	-0.000919	0.000904	-1.015962	0.3173
ECT(-1)	-0.656112	0.156482	4.192881	0.0002
R-squared	0.894424	Mean dependent var		6.871265
Adjusted R-squared	0.893205	SD dependent var		2.076861
F-statistic	815.3276	Durbin-Watson stat		1.551227
Prob(F-statistic)	0.000000			

Source: Researcher's Compilation from Eviews 12.

From the short-run error correction term regression result in Table 4, the constant term (C) is positively signed with a value of -118.0279 units; this implies that when the regressors, i.e. lnLABF, lnGOVEX, lnGFCF, lnAMCU, LINTR, and REER, are held constant, Manufacturing Sector Output (lnMSO) in Nigeria will decrease by 118.0279 units on average.

Labour Force (lnLABF): Analysis of the short-run coefficient of the labour force was positively signed with a value of 6.773990 units and statistically significant at a 5% level of significance, implying a positive relationship with Manufacturing Sector Output (lnMSO) in Nigeria. A 1% change in the labour force will increase the value of the manufacturing sector output in Nigeria by 6.773990 units on average.

Government Expenditure (lnGOVEX): Analysis of the short-run coefficient of government expenditure was positively signed with a value of 0.165457 units and statistically significant at a 5% level of significance, implying a positive relationship with Manufacturing Sector Output (lnMSO) in Nigeria, whereby a 1% change in government expenditure will increase the value of the manufacturing sector output in Nigeria by 0.165457 units on the average.

Gross Fixed Capital Formation (lnGFCF): Analysis of the short-run coefficient of gross fixed capital formation was positively signed with a value of 0.146351 units and statistically insignificant at a 5% level of significance, implying a positive relationship with Manufacturing Sector Output (lnMSO) in Nigeria, whereby a 1% change in gross fixed capital formation will increase the value of the manufacturing sector output in Nigeria by 0.146351 units insignificantly on the average.

Average Manufacturing Capacity Utilization (lnAMCU): Analysis of the short-run coefficient of average manufacturing capacity utilization was positively signed with a value of 0.513550 units and statistically significant at a 5% level of significance, implying a positive relationship with Manufacturing Sector Output (lnMSO) in Nigeria, whereby a 1% change in average manufacturing capacity utilization will increase the value of the manufacturing sector output in Nigeria by 0.513550 units on the average.

Lending Interest Rate (LINTR): Analysis of the short-run coefficient of lending interest rate was negatively signed with a value of -0.020044 units and statistically significant at a 5% level of significance, implying a positive relationship with Manufacturing Sector Output (lnMSO) in Nigeria, whereby a 1% change in lending interest rate will decrease the value of the manufacturing sector output in Nigeria by -0.020044 units on the average.

Real Effective Exchange Rate (REER): Analysis of the short-run coefficient of accurate, effective exchange is negatively signed with a value of -0.000919 units and statistically insignificant at a 5% level of significance, implying a negative relationship with Manufacturing Sector Output (lnMSO) in Nigeria, whereby a 1% change in lending interest rate will decrease the value of the manufacturing sector output in Nigeria by 0.000919 units on the average insignificantly.

ECT(-1): Negative and statistically significant error correction coefficients are required to address any disequilibrium, according to the significance and rule of the Error Correction Mechanism (ECM). Due to this, the coefficient of ECT (-1) is -0.656112, or negative. The finding above shows that should there be system disequilibrium, the ECM (-1) value is -0.65%, showing the equilibrium convergence. The coefficient's negative sign met one criterion for statistical significance and another because the coefficient's P-value [0.0000] is less than 5% [0.05] significance level. According to the coefficient, there is a 65% adjustment rate between the short-run dynamics and the long-term equilibrium. Since ECM would effectively operate to correct any short-run dynamics that deviate from its long-run equilibrium by 65% yearly, it follows that if Nigeria's Manufacturing Sector Output (lnMSO) is out of equilibrium, it will return to equilibrium at an annual average rate of roughly 65%.

R-Squared: R-squared of 0.894424 indicated that 89% of the total variation in Manufacturing Sector Output (lnMSO) is averagely accounted for by Labour Force (lnLABF), Government Expenditure (lnGOVEX), Gross Fixed Capital Formation (lnGFCF), Average Manufacturing Capacity Utilization (lnAMCU), Lending Interest Rate (LINTR) and Real Effective Exchange Rate (REER) in Nigeria. However, the total variation of 11% lnMSO is attributable to the influence of other factors not included in the regression model.

Diagnostic Test/Post-Estimation Test

Breusch-Godfrey Serial Correlation LM Test

Serial correlation in the error term affects the standard errors and variances of the variables estimated in the model, confounding inference. To prevent this problem, the study used a serial correlation LM check for autocorrelation in the error term entering the model. The test's outcome is shown in the table below.

Table 5. Result Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 4 lags			
F-statistic	1.485779	Prob. F(4,28)	0.2332
Obs*R-squared	7.003619	Prob. Chi-Square(4)	0.1357

Source: Researcher's Extract from Eviews 12 Output package.

From the Breusch-Godfrey Serial Correlation LM Test table, the null hypothesis of no serial correlation cannot be rejected as the p-value from the LM serial correlation test is 0.1357 > 0.05 significance level, indicating an acceptance of the null hypothesis.

Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroscedasticity is when the ordinary least squares rule is broken. According to the regression assumption, the error terms' variance is homoscedastic, which means they have a constant variance. Heteroskedasticity occurs when the error terms' variance is not constant across all X values. To prevent this issue, the study used a Breusch-Pagan-Godfrey Heteroskedasticity Test in the error term entering the model. The test's outcome is shown in the table below.

Table 6. Result of Breusch-Pagan-Godfrey Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.193015	Prob. F(20,14)	0.9995
Obs*R-squared	7.564865	Prob. Chi-Square(20)	0.9149

Source: Researcher's Extract from Eviews 12 Output package.

From the Breusch-Pagan-Godfrey Heteroskedasticity result, the null hypothesis of no serial correlation cannot be rejected as the p-value from the Heteroskedasticity Test is 0.9149 > 0.05 significance level, indicating an acceptance of the null hypothesis.

Stability Test

Ramsey Reset Test

The Ramsey Regression Equation Specification Error Test (RESET) is a general linear regression model specification test that examines whether non-linear combinations of the fitted values help explain the response variable.

Table 7. Result of Ramsey Reset Test

Ramsey RESET Test			
Specification: *lnMSO C lnLABFlnGOVEXlnGFCFlnAMCU LINTR REER ECT(-1)*			
t-statistic	1.437323	33	0.1600
F-statistic	2.065896	(1, 33)	0.1600
Likelihood ratio	2.428859	1	0.1191

Source: Researcher's Extract from Eviews 12 Output package.

From the RESET test result, the null hypothesis of no specification error cannot be rejected as the p-value from the RESET F-test is 0.6100 > 0.05 level of significance, indicating an acceptance of the null hypothesis.

Cumulative and Cumulative Squares Test

The cusum and cusum of squares for model stability were employed to check for the stability of the parameters in the model. The result of the stability test is shown below:

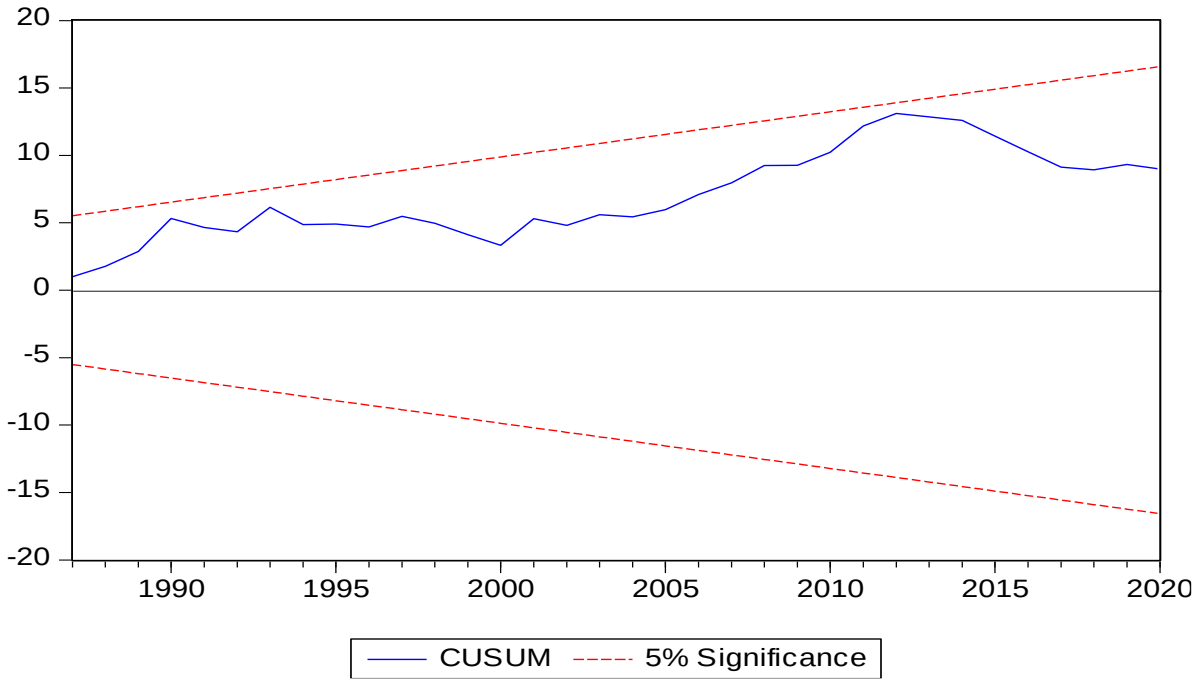

Figure 1: Cusum test for model stability

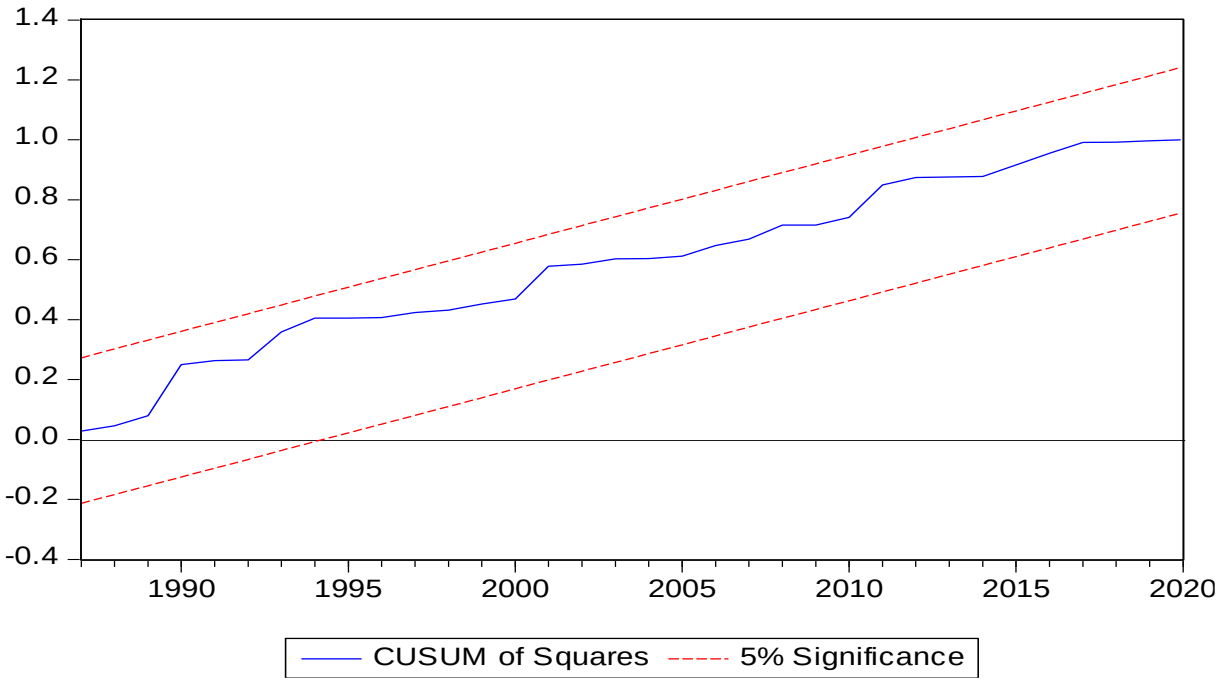

Figure 2: Cusum of Squares for model stability. The cusum and cusum squares diagrams show that the model is stable, as the cusum line lies between the 5% boundary.

Discussion

Effect of Labour Force on Manufacturing Sector Output in Nigeria (lnLABF): In Nigeria, the manufacturing sector's output was positively and significantly correlated with the analysis of the short-run coefficient of the labour force. Human capital, or labour, is rare and in short supply. For workers to be utilized effectively, employers must have the information, abilities, and skills necessary in today's knowledge-driven economy. Nigeria has struggled over the years to invest in human capital. An individual's employability is essential because it enables them to find gainful employment and contributes to their personal growth and well-being. On the other hand, a lack of employability results in both frictional and

structural unemployment and lower labour force productivity. This consequently affects a nation's capacity for economic growth as measured by aggregate demand and GDP, as well as its standard.

Effect of Government Expenditure on Manufacturing Sector Ouput in Nigeria (lnGOVEX): Analysis of the short-term coefficient of government expenditure revealed a strong and favourable relationship between the manufacturing sector production in Nigeria and government spending. This conclusion was anticipated a priori in light of the favourable and significant impact that government spending makes on the manufacturing sector's output. Government spending is essential in determining how the economy develops. It adds to overall demand, business investment, net exports, and consumer expenditure. As a result, the adjustments will affect the economy. We anticipate a faster pace of economic expansion when it increases because it drives up aggregate demand. On the other hand, the economy experiences a decline in aggregate demand when the government decreases spending.

Gross Fixed Capital Formation (lnGFCF): Nigeria's manufacturing sector output was positively and significantly correlated with the analysis of the short-run coefficient of gross fixed capital formation. Based on the anticipated positive and considerable contribution of capital formation to the manufacturing industries, this conclusion likewise complied with a priori expectations. Through its effects on price level, capital formation can affect economic growth. Theoretically, increasing capital formation will likely significantly reduce the inflationary pressure on a developing economy. A rise in the pace of capital formation typically corresponds to increased output of produced consumer products.

On the other hand, the demand for commodities rises when income rises along with capital growth. Because this rise in demand cannot be met by an equal increase in supply in the short run, inflationary pressure develops in the economy. But in the long run, a constant increase in the rate of capital formation boosts the supply of products, reins in inflation, and stabilizes the economy.

Average Manufacturing Capacity Utilization (lnAMCU): Analysis of the average manufacturing capacity utilization over the short term showed a positive and significant correlation with Nigeria's manufacturing sector outputs. Apriori expectations based on the anticipated favourable contribution of capacity utilization to the manufacturing businesses are also supported by this data, which aligns with them. Considering the average cost of production, the point at which fixed and variable costs split, and the best time to enter or leave existing markets are all factors that can be considered when calculating capacity utilization, a crucial production management metric.

Lending Interest Rate (LINTR): The manufacturing sector's output in Nigeria was negatively and significantly correlated with the analysis of the short-run coefficient of lending interest rate. This result did not match what the model predicted a priori. The monetary authorities can utilize the interest rate as an automatic stabilizer to boost aggregate investment by increasing the amount of economic activity and making more capital available to potential investors in the nation by lowering the interest rate. Real interest rates have a significant role in assessing the viability of manufacturing investments. The marginal efficiency of capital rises at decreasing interest rates. This means more investment projects will likely provide returns greater than the cost of debt interest payments when borrowing is more affordable. Additionally, high-interest rates tempt businesses to save money rather than invest because they may earn a decent return by depositing money in a bank. Businesses are less motivated to save when interest rates are lower.

Real Effective Exchange Rate (REER): Analysis of the real effective exchange rate's short-run coefficient revealed a weak and unimportant link between Nigeria's manufacturing sector production. This outcome is not unexpected given that Nigeria implemented a highly volatile floating currency regime that raises the risk of exchange rates that market participants must deal with. To reduce their exposure to exchange rate risk, they devote significant resources to forecasting exchange rate movements. Exchange rate fluctuations may make already serious economic issues worse. Floating exchange rates could exacerbate existing economic issues in a nation, as they have in Nigeria, such as higher inflation or unemployment.

CONCLUSION AND RECOMMENDATIONS

This study used the OLS estimation technique with the help of the Error Correction Mechanism (ECM) to investigate the econometric analysis of the determinants of manufacturing sector outputs in Nigeria from 1981 to 2021. From our findings, Labour force, government expenditure, average manufacturing capacity utilization, and gross fixed capital formation are strong determinants of the manufacturing sector output in

Nigeria, while lending interest rate and real effective exchange rate had a negative and insignificant effect on manufacturing sector outputs in Nigeria.

The conclusion to be drawn from this study is that lending interest rates and exchange rates contribute very poorly to the manufacturing sector output in Nigeria in the presence of other internal and external macroeconomic shocks. Nevertheless, to achieve high and sustainable growth, we proffer some policy recommendations that, when properly implemented, will surely stimulate greater output growth.

Based on our results, the following were recommended:
1. The Nigerian government must be resolute and more transparent in its fight against financial corruption and the misappropriation of public funds, especially those designated for implementing capital projects across the nation, to effectively harness the expected returns of public capital spending in the economy.
2. The Nigerian government should spend more money on highway projects as this will create the necessary infrastructure to boost economic growth, ease the distribution of raw materials and completed commodities, and promote private sector productivity.
3. According to this study, a country's manufacturing sector growth will continue to improve with the help of well-developed human capital and manufacturing sector components (such as the labour force, credit, energy consumption, and taxes on GDP). This is because higher labour force employment can lower production costs.
4. To stimulate investment and give the manufacturing industries a fair playing field to engage in more productive activities, efforts should be made to keep the lending interest rate to the real sector of the economy at an affordable level.
5. Government investment contributes to capital accumulation and should be supported. We should encourage more ventures that go beyond building infrastructure and paying salaries. The government should also ensure that monies allocated for a particular purpose are carefully adhered to.
6. Nigeria should take every economically viable step to increase the Naira's value in the FOREX market. However, this should not include flooding the FOREX market with billions of dollars, as this merely produces a transient economic situation. To stabilize Nigeria's economy, efforts should be made to ensure exchange rate stability.

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