

IMPACT OF SELECTED MACROECONOMIC VARIABLES ON NON-OIL SECTOR DEVELOPMENT IN NIGERIA: THE ROLE OF QUALITY GOVERNANCE

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Abstract

This study investigated the impact of selected macroeconomic variables on the performance of non-oil sector of manufacturing industries in Nigeria, together with the moderating role of quality governance on foreign direct investment. The autoregressive distributed lag technique was employed on a quarterly dataset from 2000Q1 to 2023Q4. The results submit first, that there are no long run relationships between the regressand and the regressors. This was further corroborated by the long run result which showed no discerning relationship between the variables in the model as revealed by the ARDL bound test. Second, government expenditure, real gross domestic product as well as real exchange rate all had significant impact on the concerned sector. While regulatory control, foreign direct investment (FDI) together with its interaction did not exert any meaningful impact on manufacturing sector's productivity. The same report was seen for sectorial bank credit. Based on this, the study recommends amongst others, that government should create an investor-friendly environment by implementing strict compliance with growth engendered policies, reduce bureaucratic bottlenecks, and ensure policy stability. Targeted incentives, such as tax holidays or import duty waivers for manufacturing-related investments, can also help attract high-quality FDI in Nigeria.

KEYWORDS: Non-oil sector, sectorial bank credit, manufacturing sector, regulatory quality

1.0 INTRODUCTION

The Nigerian economy is one with diverse sectors, and the oil and gas sector plays a dominant role in terms of government concentration, foreign earnings and contribution to the nation's gross domestic product (GDP). However, in recent times, records have shown that the government has advanced effort in the angle of policy inclusion to other non-oil sectors of the economy so as to bring about diversification, all round growth and economic stability. The non-oil sectors such as agriculture, manufacturing and construction, as well as trade and service (telecommunication and finance) industries, amongst others are different fragments that make the buildup or structure of the Nigerian economy. Nigeria as an emerging nation has been foxed with a monoculture plague of relying majorly on earnings from crude oil. The need for massive diversification is long overdue. Thus, the idea of diversification refers to directing efforts into other productive angles which the nation has more potentials. In bit to combat food shortage, create jobs to meet rising population, attract foreign investments and encourage economic wide growth, there is the need to diversify economic activities, encourage local industries and engender growth in Nigeria (Ideh, Okolo, & Emengini,

2021; Uzonwanne, 2015).

The manufacturing sector is one of the many non-oil subsectors that is very crucial to the growth of any emerging economy, Nigeria inclusive. It tends to substantially impact GDP, create employment, and generate export revenues, (Ogunjobil, Oluga, Oyeniyi, & Oladipo, 2025; Okedele, Osabuohien,

Akinyemi-Babajide, & Edafe, 2023; Osakede & Adenikinju, 2022). The manufacturing sector, once a vibrant part of Nigeria's economy in the post-independence era, has faced significant challenges over the decades. One of which was its abandonment in the wake of oil and gas in Nigeria (Owamah, & Mgbomene, 2025; Gobna, Usman & Mohammed, 2022; Osabohien, Akinpelumi, Matthew, Okafor, Iku, & Olawande, 2019, Bature, 2012). The neglect of the sector has caused its value added (% to GDP) to nosedive into a very depreciating position, where its productivity, measured by contribution to GDP revolved within 8 to 10 percent for a period of 20 years, that is, from 2004 to 2024. Statistically, the sector had seen some better days where it maintained an average contribution of 20 percent to growth for a period of 17 years, in the early 80s to 90s. However, recent efforts to revitalize the sector through strategic policies geared towards the sector, such as the national industrial policy which aims at generating a projected 25 percent contributory action to the nation's GDP by 2035, prioritizing local product, encouraging private participation, injection of ₦75bn loan to the said sector, and other activities by the Nigerian bank of Industry, have shown potentials for fostering sustainable economic growth. Thus, reflecting the robust link between macroeconomic and fiscal stabilization actions with manufacturing sector's growth. With this, there is need to examine the efficacy of government interference, through regulatory governance indicator on the concerned sector. This intricate relationship between financing mechanisms, regulatory quality and manufacturing sectors' performance calls for more examination. Though it has been underscored by researchers in this discourse but their research mostly aligned with economic growth directly and with conflicting submissions and some others took the agricultural sectors' curve (Owamah & Mgbomene, 2025; Ogunjobil, Oluga, Oyeniyi, & Oladipo, 2025; Ideh, Okolo, & Emengini, 2021; Afolabi & Laseinde, 2019).

A vital commitment of this paper is its focus on investigating the contributions of selected macroeconomic variables of bank lending to the concerned sector, government expenditure, foreign direct investment, institutional variable of regulatory quality, together with its role in influencing foreign direct investments on manufacturing sector's productivity in Nigeria.

2.0 LITERATURE REVIEW

Conceptual Literature

The non-oil sector of oil producing economies refers to all economic activities outside the oil and gas industry (Ajayi & Omotunde, 2022), and for Nigeria, it represents over 97% of her GDP as at 2025Q4. The over reliance on crude oil led to the detriments of the productivity of other substantial sectors. However, recent statistics has shown some levels of improvements as policies are been adjusted to boost growth and productivity of the non-oil sector.

Quality governance on the one hand as put forward by AlShiab, Al-Malkawi, and Lahrech (2020) simply refers to improvements in institutional variables which includes

but not limited to rule of law, control of corruption, accountability, and political stability, which engineers financial transactions, economic development and the possibility of attracting foreign investments.

Theoretical Literature

Financial Intermediation Theory

Financial intermediation theory, developed by James Tobin (1963) and Merton Miller (1961), emphasized the role of financial intermediaries of financial institutions in channeling funds from savers to borrowers, thereby facilitating growth. According to Tobin, financial intermediaries are critical in reducing information asymmetry and transaction costs, which in turn promotes the efficient allocation of capital (Tobin, 1963). Levine (1997) argued that well-functioning financial intermediaries are essential for growth as they improve resource allocation and mobilize savings for investment purposes. Similarly, Beck, Levine, and Loayza (2000) highlighted that efficient financial systems are pivotal in promoting industrial growth by providing long-term financing options.

In the context of Nigeria, the financial intermediation theory is particularly relevant as it helps to explain the role of commercial bank loans and other financial products in supporting non-oil sectors. This study aligns with financial intermediation theory which asserted that an efficient financial system is crucial for channeling funds into productive sectors of the economy, especially non-oil sector.

Empirical Literature

Non-oil and economic growth

To begin with, the study of Duru, Kabia, Filani, and Abayomi (2025) submitted that non-oil revenue in the area of tax revenue collection (education and company tax) exerted positive effects on GDP but was statistically insignificant. However, in the long run of the ARDL technique employed, both taxes became statistically significant on Nigeria's GDP, with education tax revenue turning negative. Their study covered from 1994 to 2023.

Recently as well, Owamah, and Mgbomene, (2025) investigated a comparative effect of oil and non-oil sector on GDP. The result revealed that oil sector had a far-reaching effect on Nigeria's GDP than the non-oil sector due to positive and significant effect of the former both in the long and short run, unlike the later. The ARDL technique was used on a dataset from 1981 to 2023.

Conversely, similar research by Atuma, Chukwu, Nkwagu, Agwu, Chukwuajah, and Udentia (2024) in Nigeria, showed that the non-oil sector contributed better (positive) than its counterpart (oil sector). Though the study used a different analytical technique (VECM) from 1981 to 2019.

The study of Abdullahi, Muhammad and Yahaya, (2024) investigated the impact of non-oil exports on Nigeria economic growth using the ECM technique from 1980 to 2021. The result revealed that non-oil exports in Nigeria had no significant implications on the growth levels of the economy both in the short and long run. The study of Okpala and Anyanwu (2023) submitted that credit to non-oil sector of manufacturing industries amongst others, influenced economic growth from 1986 to 2018 and the ARDL technique was employed.

Still on non-oil sector contribution to economic growth, the study of Ideh, Okolo, and Emengini, (2021) submitted that non-oil sector influenced growth in Nigeria significantly by 92 percent from 2000 to 2019, having used the VAR method of data estimation.

Selected macroeconomic variables and manufacturing sector

A similar study to Muhammad, Abdullahi, and Abdul-Azeez (2021), was carried out by Nwikina, Wadi, Wilson, and Edi (2025). It was revealed that while real exchange rate did not exert any meaningful effect on manufacturing productivity, external reserve and trade openness showed a meaningful impact on the concerned sector in Nigeria from 1985 to 2022. The ECM technique was adopted. Sunday (2025) submitted that finance to the manufacturing sector amongst other variables, did not yield the expected result of positive and statistically significant influence, having admitted 385 questionnaires to the six geopolitical zones in Nigeria.

In establishing a link between fiscal policy and manufacturing sector's productivity in Nigeria from 1986 to 2017, Muhammad, Abdullahi, and Abdul-Azeez (2021) submitted that there is no statistically significant effect of government national expenditure on the concerned sector. Their study used the ARDL mechanism to reveal this fact. However, effective exchange rate and tax revenue exerted significant and negative impact on manufacturing sector for the periods covered. The study of Akinuli, B. O., Akintan, A. A., Adedayo, O. C., & Adedotun, A. K. (2024) also investigated the effect of exchange rate on manufacturing sector's productivity in Nigeria. The study revealed that, while FDI was lost in the estimation process, exchange rate exerted no meaningful effect on the concerned sector both in the short and long run. Having employed the ARDL technique. The submission of Ogunewe, Ananwude and Nduka (2020) revealed that non-oil exports did not significantly influence the growth levels of manufacturing sector in Nigeria from 1986 to 2018, having employed the ordinary least square technique.

Kenny (2019), employed the VECM technique and noted that gross fixed capital formation as well as exchange rate, positively influenced manufacturing sector's productivity in Nigeria from 1981 to 2015.

A careful read-through of the empirical literatures highlighted, reveals the significance of non-oil sector- manufacturing productivity on growth and it further establishes factors that can influence its productivity. However, none has taken into consideration the effect and role of regulatory quality which is very germane in this discourse, especially in the Nigeria clime. Also, majority of studies in this discourse are directed towards growth, rather than specific sub sectors. This study intends to cover this gap by investigating not only financing to the non-oil sector of manufacturing sector's performance, but also the role of quality governance on the said sector, as well examining its influencing role on foreign direct investment to manufacturing sector productivity in Nigeria from 2000Q1 to 2023Q4.

3.0 METHODOLOGY

Model Specification

The model is designed in line with the underpinning theory and objectives of this study, and it is specified in its functional form, mathematical form and econometrics form in 1a, 1b, and 1c respectively.

$$MANC_t = f(BCMAN_t, GOVTEX_t, FDI_t, RQ_t, RQ*FDI_t, RGDP_t, EXCHRATE_t).....1a$$

Where:

MANC= Manufacturing contribution to RGDP (sector's productivity)

BCMAN= Bank credit to the manufacturing sector

GOVTEX= Government Expenditure

FDI=Foreign Direct Investment

RQ= Regulatory Quality

RQ*FDI= interaction of Regulatory Quality and Foreign Direct Investment

EXCHRATE= Exchange rate (control variable)

RGDP= Real Gross Domestic Product (control variable)

Mathematical form of the model is given as:

$$MANC_t = \beta_0 + \beta_1 MANC_{t-1} + \beta_2 BCMAN_t + \beta_3 GOVTEX_t + \beta_4 FDI_t + \beta_5 RQ_t + \beta_6 RQ*FDI_t + \beta_7 RGDP_t + \beta_8 EXCHRATE_t \dots\dots\dots 1b$$

Econometric form of the model is given as:

$$MANC_t = \beta_0 + \beta_1 MANC_{t-1} + \beta_2 BCMAN_t + \beta_3 GOVTEX_t + \beta_4 FDI_t + \beta_5 RQ_t + \beta_6 RQ*FDI_t + \beta_7 RGDP_t + \beta_8 EXCHRATE_t + \epsilon_t \dots\dots\dots 1c$$

β_0 = intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 = are the partial slope coefficient or parameters of repressors'

μ_t = Error term.

Apriori Expectation

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and $\beta_6 > 0$

Estimation Procedure

This study relied on secondary dataset from 2000Q1 to 2023Q4 sourced from Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicator. It is important to note here that; first, there is a linear estimation of the dependent variable and independent variables, which also included the moderating role of governance and Foreign Direct Investment on manufacturing sector's productivity in Nigeria.

The method of estimation employed in this study is the ARDL which is well suited for variables with varying levels of stationarity, however the basic and necessary preliminary test precedes it.

PRESENTATION AND INTERPRETATION OF REGRESSION RESULTS

Descriptive Statistics

The descriptive statistics showing the properties of the data employed in this study is reported in Table 4.1

Table 4:1 Descriptive Statistics

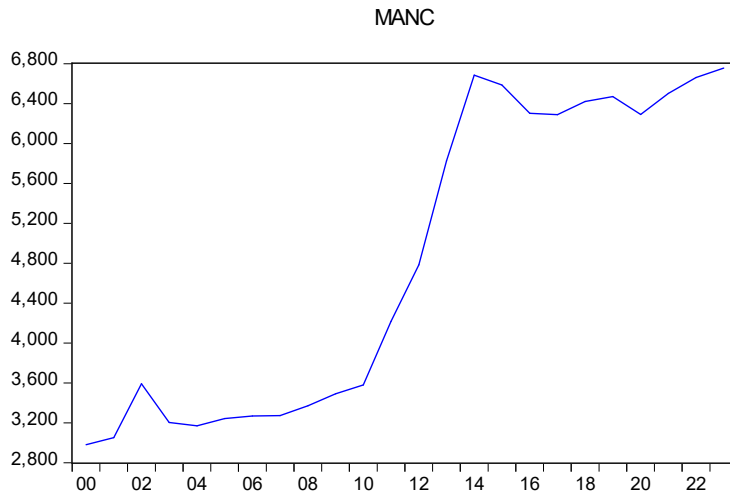
	MANC	BCMAN	GOVTEX	FDI	RQ*FDI	RGDP	EXCHRATE
Mean	8.427237	5.181323	8.242643	21.78322	-19.98827	10.86165	101.5708
Median	8.346687	5.684632	8.431067	21.92118	-19.81419	10.97130	100.5039
Maximum	8.818032	7.721064	9.893861	22.90267	-15.29848	11.22194	133.1903
Minimum	7.999897	2.425658	6.552522	18.27903	-27.60343	10.14370	70.16199
Std. Dev.	0.326284	1.803997	0.878001	0.911691	3.074185	0.342727	18.06645
Skewness	0.012235	-0.348419	-0.166099	-1.363705	-0.832713	-0.707265	-0.167265
Kurtosis	1.171020	1.569232	2.193711	5.607436	3.310044	2.163802	1.884102
Jarque-Bera	13.24366	10.02520	3.010145	56.35674	11.35952	10.68798	5.372010
Probability	0.001331	0.006654	0.222001	0.000000	0.003414	0.004777	0.068153

Source: Author's computation, 2026. E-views 10 output

Table 4.1 provides an insightful summary of the research variables. The mean of MANC averages 8.427237, with a standard deviation of 0.326284, indicating moderate dispersion around the mean. Its value of skewness; 0.012235 suggested a subtle tendency for higher growth values, while the kurtosis of 1.171020 reflects a distribution that is slightly flatter than normal, signifying a lower probability of extreme values.

Trend Analysis

Figure 1: Trend of manufacturing sector contribution to RGDP in Nigeria.



Source: Authors' Computation (2026)

Figure 1 shows a rising trend of manufacturing sector's productivity in Nigeria from 2010 to 2014 where it experienced a peak before the decline 2016. It also recorded some levels of fluctuations before the steady rise from 2021 to 2023. This implies that manufacturing sector productivity in Nigeria has a positive trend.

Unit Root Test

Table 4.2 ADF Unit Roots Test

Variables	ADF Statistics levels	test at	5% critical values	ADF Statistics at first difference	test at first	5% critical values	Order of Integration
MANC	-1.424384		-3.457808	-10.03522		-3.458326	1(1)
BCMAN	-1.296189		-3.457808	-9.601192		-3.458326	1(1)
GOVTEX	-2.631310		-3.457808	-9.128393		-3.458856	1(1)
FDI	-0.604670		-3.458856	-9.704689		-3.459950	1(1)
RQ	-2.191521		-2.892200	-9.540881		-3.458326	1(1)
RQ*FDI	-2.343690		-3.457808	-9.492607		-3.458326	1(1)
RGDP	-0.773035		-3.458326	-11.10981		-3.458856	1(1)
EXCHRATE	-2.467984		-3.457808	-9.730450		-3.458326	1(1)

Source: Author's compilation 2026, using E-views 10 output.

Table 4.2 shows the ADF test for stationary, and it can be depicted that none of the variables were stationary at levels but all became stationary after first difference.

Bound Test for Co-integration

The Bound test for co-integration is used to check if there is a long run relationship among variables, below are the bound test for co-integration

Table 4.3: Bound Test for Co-integration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	1.687633	10%	2.03	3.13
K	7	5%	2.32	3.5
		2.5%	2.6	3.84

Source: Author's compilation 2026, using E-views 10 output.

Given the result of bound test in table 4.3 with the F-statistics value of 1.687633, which is lesser than 2.32 of the I(0) and 3.5 I(1) bound at 5%, the null hypothesis of no long run relationship cannot be rejected, thus, there exist only a short-run co-integrating relationship among variables in our model.

Lag Selection Criterion

In ARDL modeling, it is of vital importance to determine the optimal lag and to find out the appropriate lag periods of the model. The lag selection results from the Vector error correction model result were employed and it is presented in Table 4.4

Table 4.4 Lag Selection Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-435.3062	NA	0.000533	9.490456	9.653849	9.556429
1	283.3757	1329.175*	2.25e-10*	-5.190875*	-4.047121*	-4.729060*

Source: Author's compilation 2026, using E-views 10 output.

The optimal lag length for this model is 1. This is decided based on the recommendation of the Akaike information criterion.

ARDL Regression Results

The combined ARDL Results Short Run Error Correction

Table 4.5.0 Combined ARDL Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGMANC(-1)	0.940242	0.048284	19.47329	0.0000
EXCHRATE	0.001811	0.000866	2.091414	0.0395
EXCHRATE(-1)	-0.001239	0.000902	-1.374076	0.1731
FDI	1.15E-11	1.26E-11	0.911888	0.3645
LOGBCMAN	-0.001283	0.003250	-0.394688	0.6941
LOGRGDP	0.912694	0.153027	5.964261	0.0000
LOGRGDP(-1)	-0.886609	0.152800	-5.802419	0.0000
LOGGOVTEX	-0.137778	0.045863	-3.004111	0.0035
LOGGOVTEX(-1)	0.139248	0.046972	2.964468	0.0040
RQ	0.024998	0.047302	0.528473	0.5986
RQ_FDI	1.89E-11	1.47E-11	1.283276	0.2030
C	0.199376	0.401395	0.496708	0.6207
R-squared	0.992135	Mean dependent var		8.435849
Adjusted R-squared	0.991092	S.D. dependent var		0.325682
F-statistic	951.7895	Durbin-Watson stat		2.224162
Prob(F-statistic)	0.000000			



Source: Author's compilation 2026, using E-views 10 output

The short run analysis of manufacturing sector productivity model in relation to selected macroeconomic variables are reported in table 4.5.1.

Table 4.5.1 Short Run Error Correction Result

Dependent Variable	MANC			
Variable	Coefficient	Standard Err.	T-Statistics	Prob
D(GOVTEX)	-0.137778	0.042486	6.642407	0.0017
D(RGDP)	0.912694	0.137404	2.359399	0.0000
D(EXCHRATE)	0.001811	0.000768	3.873075	0.0207
CointEq(-1)*	-0.059758	0.015618	-3.242905	0.0003
R Squared	0.449804			
Adjusted R Squared	0.425351			
F-Statistics	18.39452			
Prob(F Statistics)	0.000000			
Durbin-Watson Stat	2.224162			

Source: Author's compilation 2026, using E-views 10 output.

Table 4.5.1 provided the short run results of the model based on the ARDL (1, 0, 0, 1, 1, 1, 0) process selected. The coefficient of the error correction term CointEq(-1) was negative (-0.059758) and significant at the 5 percent level. This met with apriori expectation and indicated that about 60 percent of the deviations of the model from its equilibrium value in previous period were corrected in the current period. The R-Squared is 0.449804 while the adjusted R-Squared is 0.425351 when adjustments were made for the degree of freedom. This implies that about 45 percent of the variations in the sector's productivity were explained by all the explanatory variables (BCMAN, GOVTEX, FDI, RQ, RQ*FDI, EXCHRATE and RGDP). Note that in the short run, BCMAN, FDI, RQ and RQ*FDI were automatically eliminated by the process. The F-statistics together with the probability value showed that the model is statistically significant at 5% level of significance. This implies that the overall model is significant in explaining the variations.

Furthermore, GOVTEX was negative and statistically significant at 5% level of significance going by the probability value of 0.0017. The negative value of government expenditure indicated that 1 percent rise in government expenditure would reduce MANC by 13% over the period under study. This finding contradicts that of Muhammad, Abdullahi, and Abdul-Azeez (2021). Also, the coefficient of RGDP of 0.912694 with probability value of 0.0000 reflected a significant contribution to the productivity of manufacturing sector in Nigeria and was rightly behaved, thus, a 1 percent increase in economic growth will bring about 91 percent increase in the sector. This further supports the economic idea that the level of an economy's growth can stimulate further growth of internal sectors. EXCHRATE was also reported positive and significant at 5% level of significance judging by the probability value of 0.0207. The positive value of exchange rate indicated that 1 percent rise in exchange rate would increase the manufacturing sector contribution to RGDP by 0.001811 units in the short run all things being equal. This submission is in tandem with that of Muhammad, Abdullahi, and Abdul-Azeez (2021), but does not corroborate the findings of Nwikina, Wadi, Wilson, and Edi (2025).

Table 4.5.2 Estimated Long Run Result

Variable	Coefficient	Standard Error	T-Statistics	Prob
LBCMAN	-0.021462	0.051641	-0.415610	0.6788
LGOVTEX	0.024603	0.274482	0.089635	0.9288
FDI	1.92E-10	2.68E-10	0.717641	0.4750
RQ	0.418318	0.844983	0.495061	0.6219
RQ*FDI	3.16E-10	3.30E-10	0.955018	0.3423
LRGDP	0.436517	0.834675	0.522978	0.6024
EXCHRATE	0.009564	0.009507	1.005977	0.3174
C	0.199376	0.401395	0.496708	0.6207

Source: Author's compilation 2026, using E-views 10 output.

The result in table 4.5.2 showed that Bank credit to manufacturing sector (BCMAN) reported a negative and not statistically significant relationship with manufacturing sector performance going by the coefficient -0.021462 and 0.6788 probability value. The implication is that when bank credit to the sector is high enough to contribute significantly to its output, manufacturers may struggle to invest in new equipment, technology and development, hindering their ability to innovate and remain competitive. Also, without access to sufficient credit, manufacturers may be forced to reduce production, leading to a decline in productivity.

Government expenditure (GOVTEX) was positively related to manufacturing sector's performance. This implies that all things being equal, a rise in government expenditure will lead to an increase in productivity of the concerned sector. But based on the probability value of 0.9288 it is obvious that government expenditure has an insignificant impact on manufacturing sector productivity in the long run. Foreign Direct Investment (FDI) also reported a positive and insignificant relationship with manufacturing sector output. Foreign direct investment injects foreign capital into the economy and by extension different sectors of the economy is expected to be improved as a reason of such injection, including the manufacturing sector. The result thus revealed that a unit increase in FDI will cause an increase in manufacturing sector's output by 92%. But this is yet to be high enough to contribute significantly to the concerned sector.

Moreover, the institutional variable of regulatory quality (RQ) was positively signed but still revealed an insignificant contribution to the sector's output.

The Interaction of regulatory quality and foreign direct investment (RE*FDI) improved the contribution of foreign direct investment to manufacturing sector by 16% in the long run but it was statistically insignificant at 5% level of significance as well. The implication of this interaction is that high quality regulations provide a stable and predictable business environment, encouraging FDI inflows. This stability allows foreign investors to make informed decisions, reducing uncertainty and risk. Also, regulations that promote fair competition and prevent anti-competitive practices creates a level playing field for foreign investors, encouraging investments in Nigeria and the manufacturing sector.

Furthermore, real gross domestic product (RGDP) showed a positive but not statistically significant relationship on MANC. As RGDP rises, aggregate demand follows suit, however, this economic expectation is not reflecting on the productivity of the manufacturing sector in Nigeria. Exchange rate (EXCHRATE) had a positive and insignificant relationship with manufacturing sector contribution to economic growth.

Post-Diagnostics Test Results

It is still important to check for the validity of the estimated model; hence a battery of diagnostic tests was performed. The results of these tests are reported as follow:

Result of Test for Autocorrelation

This test is done using the Breusch-Godfrey series correlation LM test

The hypothesis is given as;

H_0 : There is no autocorrelation among the residuals. The decision rule is that H_0 is rejected if the P-value of the observed $R^2(N^* R^2)$ of the Breusch-Godfrey series correlation LM test is greater than 0.05.

Table: 4.6 Result of Breusch-Godfrey series correlation LM test

Observed R^2	Prob. Chi-Square(2)
0.452209	0.7976

Source: Author's compilation 2026, using E-views 10 output.

The probability value is greater than 0.05 implying that the residuals are not serially correlated. Hence, we fail to reject the null hypothesis.

Result of Test for Heteroscedastic

Table 4.7 Result of Breusch-Pagan Godfrey Test for Heteroscedasticity

Observed R^2	Prob. Chi-Square(2)
3.327781	0.5045

Source: Author's compilation 2026 using E-views 10 output.

It is also assumed that the residuals of an estimated equation have constant variance and the violation of this assumption affects the efficiency of the estimated parameters. The Breusch-Pagan Godfrey serial correlation LM test result presented above showed that the Chi-square probability value is 0.5045 is larger than 5% level of significance. The null hypothesis of homoscedasticity is therefore not rejected.

Result of Test for Normality

Table 4.8 Results of Jarque-Bera Test for Normality

Skewness efficient	co- Kurtosis efficient	co- JB-statistics	Prob-value
-0.387683	3.747397	4.300912	0.116431

Source: Author's compilation 2026, using E-views 10 output.

Jarque-Bera normality test statistics under the null hypothesis that the residuals are normally distributed. The Jarque-Bera statistics is 4.300912 and the probability value of 0.116431 shows that it is substantially larger than 5% level which leads to non-rejection of the normality assumption. Hence, residuals in the estimated model are normally distributed.

Robustness Checks

To ascertain the reliability of the regression results from ARDL technique. The Fully Modified Ordinary Least Square (FMOLS) and the Dynamic Ordinary Least Squares (DOLS) methods were employed. The results of FMOLS and DOLS are presented as follows:

Table 4.9.1 Estimated MANC Model using FMOLS

Variable	Coefficient	Standard Error	T-Statistics	Prob
BCMAN	-0.015363	0.010878	-1.412331	0.1614
FDI	-3.65E-13	4.41E-11	-0.008272	0.9934
GOVTEX	-0.077816	0.054183	-1.436175	0.1545
RQ	0.080846	0.165402	0.488781	0.6262
RQ*FDI	6.55E-11	5.11E-11	1.282129	0.2032
RGDP	0.734478	0.167063	4.396423	0.0000
EXCHRATE	0.005821	0.001785	3.260410	0.0016
R-squared	0.949445			
Adjusted R-squared		0.945378		

Source: Author's compilation 2026 using E-views 10 output.

Table 4.9.2 Estimated MANC Model using DOLS

Variable	Coefficient	Standard Error	T-Statistics	Prob
LBCMAN	-0.018057	0.012801	-1.410607	0.1632
FDI	2.05E-11	5.40E-11	0.380160	0.7051
LGOVTEX	-0.104230	0.063139	-1.650791	0.1037
RQ	0.016527	0.217126	0.076117	0.9396
RQ*FDI	9.02E-11	6.05E-11	1.490561	0.1410
LGDP	0.748343	0.193917	3.859084	0.0003
EXCHRATE	0.006741	0.002111	3.192625	0.0022
R-squared	0.970284			
Adjusted R-squared		0.957283		

Source: Author's compilation 2026 using E-views 10 output.

The robustness checks as presented in tables 4.9.1 and .2 using DOLS and FMOLS showed that Exchange rate (EXCHRATE), and Gross Domestic Product (GDP) are statistically significant in driving manufacturing sector contribution to GDP at 5% level of significance, as seen in the short run. These results are similar to those of the short run and long run estimate of the ARDL approach. This implies that the findings are reliable as they tend to be consistent even with the use of other methods of analysis.

4.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

This study specifically investigated the impact of selected macroeconomic variables on performance of non-oil sector of manufacturing industries in Nigeria, and the moderating role of governance on foreign direct investment on the said sector from 2000Q1 to 2023Q4. The major findings of this study from the ARDL estimates are enumerated as follows:

In the estimated results, it was observed that aggregate commercial banks' sectorial credit to the concerned sector do not have any significant effect on the performance of

the manufacturing sector in Nigeria both in the short and long run. Government expenditure revealed a significant impact on the concerned sector in the short run with right sign but in the long run, it became insignificant even though the positive sign was maintained. While, both Foreign direct investment (FDI) and regulatory quality did not exert any discerning significant effect on the performance of the manufacturing sector in Nigeria in both short and long run. Their interaction (FDI*RQ) was also seen to have no statistically significant effect on the manufacturing sector's performance in Nigeria, though they were rightly signed. The variables- real gross domestic product and exchange rate were significant to economic growth and rightly signed in the short run both became insignificant in the long run, though their signs were maintained.

The empirical investigation of the effects of macroeconomic variables, together with the link between regulatory quality and foreign direct investment on the productivity of the manufacturing sector is of indispensable concern. Therefore, considering the immense relevance of the manufacturing sector in Nigeria as emphasized in this study, it is sufficient for it to draw the following recommendations:

First, policymakers should encourage banks to provide more affordable and accessible loans to manufacturing firms. This can be achieved by offering credit guarantees and interest rate subsidies to reduce the cost of borrowing for manufacturers.

Second, government should create an investor-friendly environment by implementing strict compliance with growth engendered policies, reduce bureaucratic bottlenecks, and ensure policy stability. Targeted incentives, such as tax holidays or import duty waivers for manufacturing-related investments, can also help attract high-quality FDI.

Third, government spending should continue to focus more on infrastructures critical to manufacturing, such as energy, transportation, and digital connectivity. Special attention should be given to industrial parks and export processing zones to reduce operational costs for manufacturers.

Finally, government should develop a comprehensive regulatory framework that strengthen regulatory enforcement mechanisms so as to prevent corruption and also establish agencies responsible for ensuring and upholding regulatory quality that engenders investments and facilitates investment processes, fairness, transparency and accountability.

Contribution to Knowledge

1. This study provides robust empirical evidence on the significant role of commercial bank loans, FDI, and government expenditure and regulatory quality in enhancing the performance of Nigeria's manufacturing sector, offering insights specifically to a developing economy context.
2. By examining institutional quality, and its interaction with FDI on manufacturing sector, the study contributes to understanding how a combination of financial and fiscal resources, as well governance drives industrial performance.

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