



Manufacturing sector performance and lending rate in Nigeria

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Abstract

The role of interest rate in influencing the manufacturing sector performance has led to several empirical works in this direction. In this study, the role played by the lending rate in influencing the performance of the manufacturing sector is evaluated. In this study, employed annual data that covered the period from 1981 to 2024 is employed and the estimation technique employed is the ARDL model. Results revealed that lending rate impacted the manufacturing sector performance has positive and significant impact in the long-run. However, the short-run result indicates that the impact is negative and insignificant. The result also indicates a positive and significant impact of the gross fixed capital formation on the manufacturing sector performance, but the impact of trade openness is negative and significant. It is thus recommended that fiscal and monetary policies should be aligned in order to address the problem of high inflation in Nigeria. Other measures should also be adopted to reduce the cost of production such as tax reduction, concessionary exchange rate window and improvements in infrastructure.

Keywords: Manufacturing sector, Lending rate, Trade openness, ARDL

Introduction

The role of manufacturing in enhancing the growth of the economy has been largely emphasized by economists and scholars. The sector is the main source of driving import substitution necessary to encourage

exportations, attracts earnings from foreign exchange and creates jobs. It also plays an essential role of promoting long-term growth, enhancing innovation and income. The positive roles of the manufacturing sector has equally being observed by Udegbole et al. (2025) who

noted that the sector drives economic growth, creates jobs and enhances value addition. In Nigeria, over the years, there have been several government interventions to improve manufacturing sector's productivity which include the establishment of the Nigerian Industrial Development Bank (NIDB) and other measures. However, as observed by Ola and Fola (2019), despite these interventions, the sector has faced with challenges such as irregular power supply. The sector has equally been noted to suffer some challenges arising from infrastructural decays, policy summersaults, financing deficits, among others. In recent times, exchange rate fluctuations have been having an adverse effect on the performance of the sector through an increase in the cost of imported raw materials and other inputs. Of all these factors, interest rate constraints has played significant role in shaping the growth of the sector. To corroborate this stance, Gideon et. al. (2015) observed that the sector's weak performance is associated with high bank lending interest rates in addition to other factors.

The lending rate in Nigeria is noted to be high to such as extent that it adversely affects the manufacturing sector in diverse areas such as cost of production, investment capacity and competitiveness. High borrowing cost leads to the difficulty on the part of the manufacturing sector to finance its operations, engage in equipment upgrading and business expansion. Lending rate in Nigeria is typically influenced by the Central Bank of Nigeria (CBN) which is

saddled with the responsibility of coordinating the country's monetary policy. Through influencing the benchmark rate, that is the monetary policy rate (MPR), the Bank influences other rates in the economy, including the lending rate. Whenever the MPR goes up, the lending rate also goes up and becomes expensive for manufacturers. Ifechukwu-Jacobs et al. (2025) observed that the adverse effect of high lending rate is complicated by some macroeconomic issues such as high inflation, volatile exchange rate and weak infrastructure which increase the risk of default in loan repayment and hence discourage bank loan extension. Consequently, to ensure an increase in the level of manufacturing activities, a favourable (i.e. expansionary) monetary policy should be put in place which entails a reduction in interest rate.

Arising from these constraints, the manufacturing value added which is among the measures used to assess how the manufacturing sector is performing; has been experiencing a downward trend over the years. Information in Fig.1 indicates that since 1994, this variable has been observing a downward trend despite slightly improving around 2011. In another perspective, the lending rate has been experiencing fluctuations over the study period. In recent times and precisely in 2017, it trended low but from 2021 the trend has been upward. Such fluctuations in lending rate have repercussion on the manufacturing sector performance which needs to be investigated.

Fig. 1: Trend in manufacturing value added in Nigeria

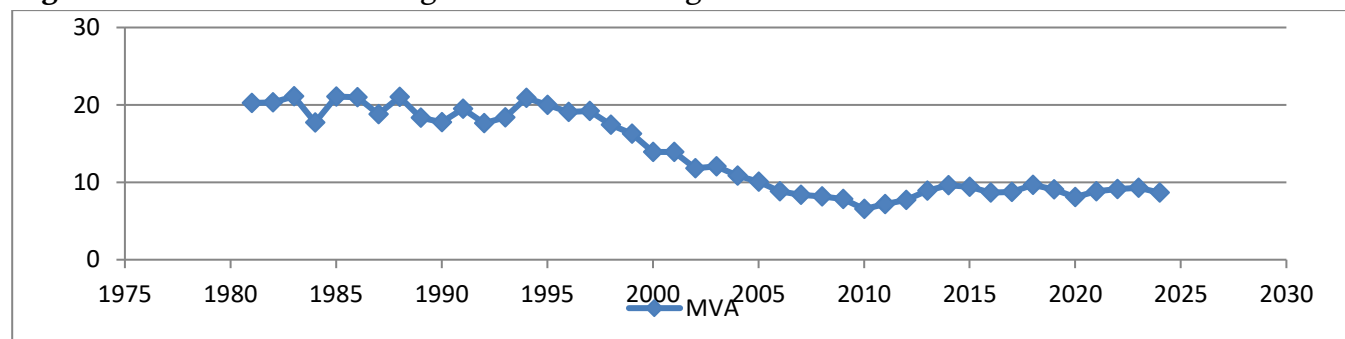
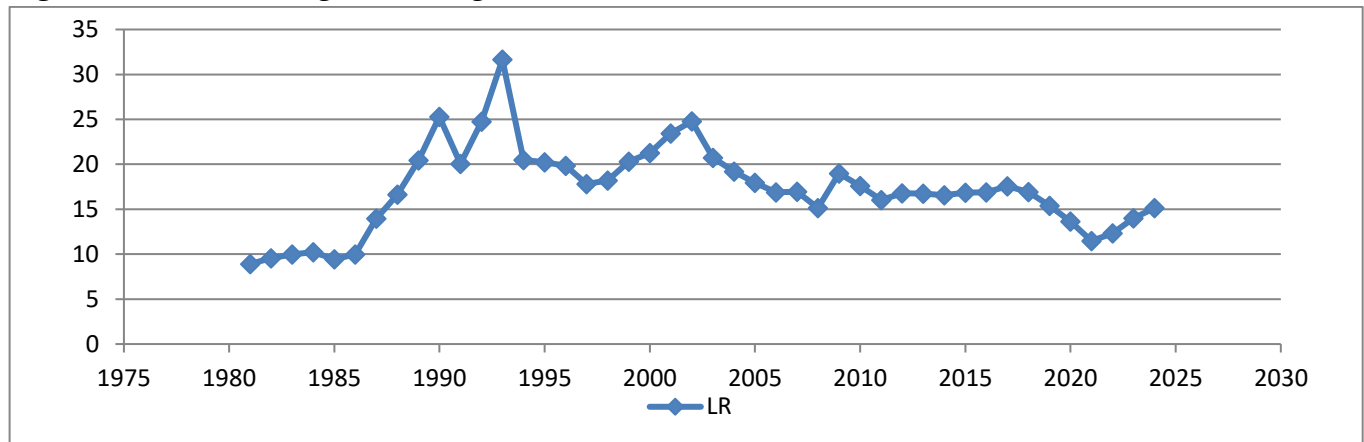


Fig. 2: Trend in lending rate in Nigeria

From the foregoing, the objective of this paper is to ascertain how the lending rate impacts the performance of the manufacturing sector in Nigeria with a view to proffer recommendations for policy interventions and which we think will also be relevant for other economies sharing similar features with the country. The study used the ARDL which combines the short-run and long-run impact of the independent variable on the dependent variable.

Literature Review

Theoretical Literature

Three theories that link bank credit to the performance of the manufacturing sector were reviewed to guide this work. These theories are the supply-leading theory, the credit creation theory and the Wicksell's theory of lending. These theories provide an insight on how credit allocation and interest rates stimulate the growth of the manufacturing sector. Schumpeter (1911) proposed the supply-leading theory which argues that apart from being financial intermediaries, deposit money banks also act as agents of industrial growth. The assumption guiding the theory is based on the hypothesis that financial institutions assist in technological innovation through the provision of credit for entrepreneurial ventures that stimulates industrial growth. The central assumption of the

theory is that banks' credit encourages the growth of entrepreneurship which leads to an advancement in technology and hence industrial growth. In a similar vein, Schumpeter (1911) proposed the credit creation theory that posits that through bank lending, deposits are generated which further improves banks' lending capacity. As observed by Kaynak, Gokmenoglu and Sahbaz (2019), the mechanism through which this occurs is termed the multiplier effect where an initial bank deposit creates a domino effect, raising the overall supply of money and credit in the economy. Such credit creation assists deposit money banks to provide funds for manufacturing activities. From another perspective, Wicksell (1901) proposed the theory of lending and economic growth. The theory emphasizes on the need to maintain a stable real interest rate that is in line with the natural rate of interest as a way to ensure sustainable economic growth. It hypothesizes that if the market rate is low compared to the natural rate, it will lead to increased economic activities through stimulating borrowing and investment. The converse however is the case if the natural rate is lower than the market rate.

Empirical Literature Review

The essential nature of the manufacturing sector in stimulating economic growth has aroused interest in empirical investigation of the factors that influence its performance. In particular, the

role of lending rate in influencing the performance of the manufacturing sector has received some empirical attention among scholars. In Nigeria, findings by Adesanya and Ajala (2020) reveal that interest rate impacted the manufacturing output positively and their significantly in the short-run but the impact is negative in the long-run. In study, findings by Nwabuisi et al. (2020) corroborated the positive impact of interest rate, while also revealing that exchange rate impacts negatively on the manufacturing out. In another study in Nigeria, Adebayo and Ademola (2020) find that contractionary monetary policy measure (high MPR) adversely impacted credit availability to manufacturers, making investment in productive activities difficult. The result also finds support by Olu and Okon (2021) which revealed that contractionary monetary policy retarded the manufacturing capacity utilization. However, another study in Nigeria by Taiga and Adofu (2021) indicate that the lending rate impacted positively even though the result is not significant. In their study also in Nigeria, Ojo and Ogungbenle (2022) show that the impact of inflation rate and interest rate is not significant.

Supporting earlier findings in Nigeria that revealed the positive impact of a decline in lending rate on the manufacturing sector, Olurinola (2022) observed that a fall in interest rate improves manufacturing sector's investment, leading to an improvement in manufacturing sector performance. This is further confirmed in another study in Nigeria by Olayemi and Onu (2022). In another study that employed the MPR, Eche et al. (2022) show that higher MPR discouraged investment in the manufacturing sector, supporting earlier findings in Nigeria. Findings by Abraham (2023) in Nigeria further reveal that interest rate impacts positively significantly in the short-run, but the impact is negative and not significant in the long-

run. On their part, Oparah et al. (2023) reveal that in Nigeria, lending rate and bank credit extension impacted favourably on the sector's performance. However, a study by Oniore, Akpan and Eziokwu (2023) find that while the impact of prime lending rate is negative in the long-run, the maximum lending rate impacted positively in the long-run in as significant way. Supporting earlier results, Ibekwe and Etuka (2025) observed a negative impact of the lending rate, though the result is not significant. Finding by Omankhanlen and Akinsanya (2025) indicate that lending rates positively correlate with the manufacturing output and the result is significant after one period lag. Also, the influence of inflation on the manufacturing output is positive after lag three. In further support of previous findings, Ndangra, Ibbih and Akawu (2025) show that while bank credit extended to the manufacturing sector has a positive and significant impact on the output of the manufacturing sector, the impact of high lending rates was negative. In a study that used interest rate spread as a proxy, Udegbule, Esara, Tonye and Ekadi (2025) find that manufacturing value-added has a negative relationship with interest rate spread. Iyadi, Osuji and Erhijakpor (2025) find that rising lending rates impede the manufacturing sector's growth through an increase in the cost of borrowing, while the depreciation in exchange rate boosts the sector's performance through enhancing the competitiveness of the country's products internationally.

Methodology

This study utilized the ARDL model in the investigation of the impact of the lending rate on the performance of the manufacturing sector. Annual series were employed that extends from 1981 to 2024. The series considered are manufacturing value-added (MVA) which proxies the manufacturing sector performance.

The explanatory variables include the lending rate, inflation rate, exchange rate, trade openness and gross fixed capital formation. All these variables were sourced from the World Bank Development Indicators. The behaviour of the variables used in the study was examined through carrying of some preliminary tests, including the descriptive statistics, correlation matrix and unit root. Furthermore, some post-diagnostic tests were carried out in order to confirm the robustness of the results. These include serial correlation, model specification, normality and stability tests.

Model Specification

The baseline model that guided the study is specified as follows:

(1)

where

$$\begin{aligned} \Delta MVA_t = & \eta_0 + \eta_1 MVA_{t-1} + \eta_2 LR_{t-1} + \eta_3 LEXCHR_{t-1} + \eta_4 INFLR_{t-1} + \eta_5 LGFCF_{t-1} + \eta_6 TOPEN_{t-1} + \\ & \sum_{i=1}^K \gamma_1 \Delta MVA_{t-1} + \sum_{i=1}^K \gamma_2 \Delta LR_{t-1} + \sum_{i=1}^K \gamma_3 \Delta LEXCHR_{t-1} + \sum_{i=1}^K \gamma_4 \Delta INFLR_{t-1} + \sum_{i=1}^K \gamma_5 \Delta LGFCF_{t-1} \\ & + \sum_{i=1}^K \eta_6 \Delta TOPEN_{t-1} + \varepsilon_t \end{aligned}$$

where: Δ = difference operator, K = lag length, ε_t = stochastic variable, η_i = long-run coefficients and γ_i = short-run coefficients

This model provides criteria to confirm the presence of cointegration among the series. The null hypothesis of a presence of cointegration is stated as follows:

$$\begin{aligned} \Delta MVA_t = & \eta_0 + \sum_{i=1}^K \gamma_1 \Delta MVA_{t-1} + \sum_{i=1}^K \gamma_2 \Delta LR_{t-1} + \sum_{i=1}^K \gamma_3 \Delta LEXCHR_{t-1} + \sum_{i=1}^K \gamma_4 \Delta INFLR_{t-1} + \sum_{i=1}^K \gamma_5 \Delta LGFCF_{t-1} \\ & + \sum_{i=1}^K \eta_6 \Delta TOPEN_{t-1} + \xi ECM + \varepsilon_t \end{aligned}$$

Where ECM = error correction model and ξ = the coefficient of the ECM

Results

= Manufacturing value-added at time t (a proxy for manufacturing sector performance), LR_t = lending rate at time t , $LEXCHR_t$ = log of exchange rate at time t , $INFLR_t$ = inflation rate at time t , $LGFCF_t$ = log of gross fixed capital formation at time t , $TOPEN_t$ = log of trade openness at time t

The ARDL Specification

As noted earlier, the ARDL introduced by Pesaran et al. (2001) was utilized in this study. The choice of this framework was informed by its superior features such its application no matter the order of integration of the series, that is whether the series are purely $I(0)$, purely $I(1)$ or the order of integration is mixed. Equally, the framework is superior considering its application even in a situation of endogeneity of the explanatory variables ((Narayan, 2005). Equation 2 shows the ARDL representation that guided this work:

$$H_0: \eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5 = \eta_6 = 0$$

This is compared with the alternative hypothesis of no cointegration:

$$H_1: \eta_1 \neq 0, \eta_2 \neq 0, \eta_3 \neq 0, \eta_4 \neq 0, \eta_5 \neq 0 \text{ and } \eta_6 \neq 0$$

If there is a presence of cointegration, the following error correction model (ECM) is formulated:

As noted earlier, before commencing on the analysis, the behaviour of the variables included in the study are examined through some pre-diagnostic tests. The first conducted in this

direction is the unit root test. In Table 1, the tests for unit root are conducted at level and at first difference. Findings indicate that apart from inflation rate which is stationary (without unit root) at level, others achieved stationarity after

first difference. By implication, while inflation rate is integrated of order zero or $I(0)$, other variables are integrated of order one or $I(1)$. Thus, the variables have an admixture of order of integration.

Table 1: Unit Root Results

Variable	ADF		PP		Order of Integration
	Level	First Diff.	Level	First Diff.	$I(1)$
MVA	-1.82	-8.59	-1.90	-8.42	$I(1)$
LR	-2.47	-5.80	-2.40	-7.26	$I(1)$
LEXCHR	-2.19	-4.43	-2.18	-4.52	$I(1)$
INFLR	-13.25	-14.57	-10.94	-30.17	$I(0)$
LGFCF	-2.29	-4.27	-2.29	-4.27	$I(1)$
TOPEN	-2.56	-5.64	-2.71	-5.61	$I(1)$

The next test conducted is the descriptive statistics which is shown in Table 2. It is found that while trade openness exhibited the least mean, the variable with the highest mean is inflation rate. Result also indicates the presence of symmetry as revealed by the low variability in the difference between the mean and the median of each variable. With inflation rate exhibiting

high range, it indicates that it has the highest volatility, while trade openness which has low range exhibits low volatility. Apart from gross fixed capital formation and trade openness which are negatively skewed, others are positively skewed. However, each of the variables has positive kurtosis; indicating that the variables are heavily tailed.

Table 2: Descriptive Statistics

	MVA	LR	LEXCHR	INFLR	LGFCF	TOPEN
Mean	13.66	17.19	4.77	21.84	7.87	0.34
Median	11.93	16.89	4.61	11.94	8.14	0.34
Maximum	21.09	31.65	6.28	219.00	11.37	0.52
Minimum	6.55	8.91	3.90	0.68	4.46	0.03
Std. Dev.	5.20	4.74	0.58	33.91	2.11	0.13
Skewness	0.19	0.42	1.05	4.71	-0.17	-0.57
Kurtosis	1.32	3.70	3.33	27.39	1.85	2.60
Jarque-Bera	5.42	2.24	8.35	1253.75	2.63	2.72
Probability	0.06	0.32	0.01	0.00	0.26	0.25
Sum	601.38	756.76	210.07	961.00	346.62	15.18
Sum Sq. Dev.	1165.95	966.29	14.61	49452.95	192.25	0.82
Observations	44	44	44	44	44	44

In this work also, a test to ascertain the correlation among the variables using the correlation matrix test was carried out. Findings in Table 3 show that lending rate, exchange rate and inflation rate exhibited weak but positive correlation with manufacturing value added.

However, while the correlation between the gross fixed capital formation and the manufacturing value added is high and negative, the correlation between trade openness and the manufacturing value added is weak but negative.

Table 3: Correlation Matrix

	MVA	LR	LEXCHR	INFLR	LGFCF	TOPEN
MVA	1	0.01	0.38	0.31	-0.89	-0.38
LR	0.01	1	-0.70	-0.08	0.01	0.33
LEXCHR	0.38	-0.70	1	0.14	-0.35	-0.61
INFLR	0.31	-0.08	0.14	1	-0.27	-0.13
LGFCF	-0.89	0.01	-0.35	-0.27	1	0.12
TOPEN	-0.38	0.33	-0.61	-0.13	0.12	1

In Table 4, the ARDL estimated results indicate that in the short-run, the lending rate impacted negatively on the manufacturing sector performance but the result is not significant. However, the long-run impact is positive in a significant way. The long-run result indicates that if lending rate is increased by one percent, manufacturing value added which proxies the performance of the manufacturing sector increased by 0.32 unit. None significant negative impact of lending rate finds corroboration by previous studies such as Ibekwe and Etuka (2025). However, the positive impact finds support in the works of (Adesanya & Ajala, 2020; Oparah et al., 2023; Oniore, Akpan & Eziokwu, 2023; Omankhanlen & Akinsanya, 2025). Ideally, lending rate impact on the performance of manufacturing should be evaluated from the perspective of whether it is high or low. If lending rate is high, there is the likelihood that its impact on the sector could be adverse. However, the reverse is the case if it is low. The inability to account for this asymmetric relationship could be the reason for the divergent outcomes. This is notwithstanding that we interpreted the result from the perspective of an increase in lending rate. Supposing however that this study upholds the fact that an increase in lending rate results into an increase in the manufacturing value added, one plausible reason for such outcome could be the tendency for manufacturers in Nigeria to pass their high cost of production on the consumers. Since there is no known form of price regulation in the country, any increase in the cost of doing

business is easily passed onto the consumers through higher prices. Such scenario could account for the reason why high lending rate results into improved manufacturing value added.

While the study did not find any significant impact of exchange rate and inflation rate on the sector's performance, findings indicate that the impact of both gross fixed capital formation and trade openness is significant. Gross fixed capital formation impacted positively on the performance of manufacturing in a significant way both in the short-run and in the long-run. However, trade openness impacted negatively and significantly in both time horizons. The negative impact of trade openness finds support in the finding by Akpan, Yilkudi and Opiah (2016). The implication of this result is that opening up trade between Nigeria and other countries does not enhance the growth of the manufacturing sector. One main reason for this outcome is that the country's manufacturing output is not competitive internationally. This could be accounted for by the increasing production cost which impacts on the prices of the commodities. In another vein, even when the positive and significant impact of gross fixed capital formation on the manufacturing sector performance follows popular expectation, the low coefficient of the variable in the two-time horizons is a testament that the country still lags behind in capital formation.

It is found that the ECM term is negative and significant which confirms the existence of cointegration. The ECM result indicates the

speed of adjustment and it reveals that about 65% percent of errors generated in each period is corrected by the system in later period.

Table 4: ARDL Estimated Results

Dependent Variable: MVA Selected			
Model: ARDL (1, 1, 1, 0, 0, 0)			
Short-run Results			
Variable	Coefficient	t-Statistic	Prob.
D(LR)	-0.022	-0.265	0.792
D(EXCHR)	-0.005	-1.542	0.132
D(INFLR)	-0.0003	-0.022	0.982
D(GFCF)	0.00006	3.452	0.001
D(TOPEN)	-6.931	-3.140	0.003
ECM(-1)	-0.653	-4.159	0.000
Long-run Results			
LR	0.312	2.867	0.007
EXCHR	0.002	0.549	0.58
INFLR	-0.0005	-0.022	0.98
GFCF	0.0001	4.481	0.000
TOPEN	-10.610	-4.648	0.000
C	20.250	6.391	0.000

In Table 5, the post-diagnostic tests evaluated at the 5% level reveal that the null hypothesis is accepted for all the tests. This implies that there is no heteroskedasticity and that there is no serial correlation. It is also found that the error terms are normally distributed and that the model is appropriately specified. In a similar vein, findings in Figures 4 and 5 show that the coefficients of the model are stable judging from the plots of CUSUM and CUSUM of Squares which are located within the critical bands of the 5% confidence interval.

Table 5: Post-diagnostic Results

Test	P-value
Heteroskedasticity Test:	0.91
Breusch-Pagan-Godfrey	
Serial Correlation: Breusch-	0.83
Godfrey LM Test	
Model Specification: Ramsey	0.20
RESET Test	
Normality Test: Jarque-Bera	0.88

Fig. 3: Plot of Normality Test

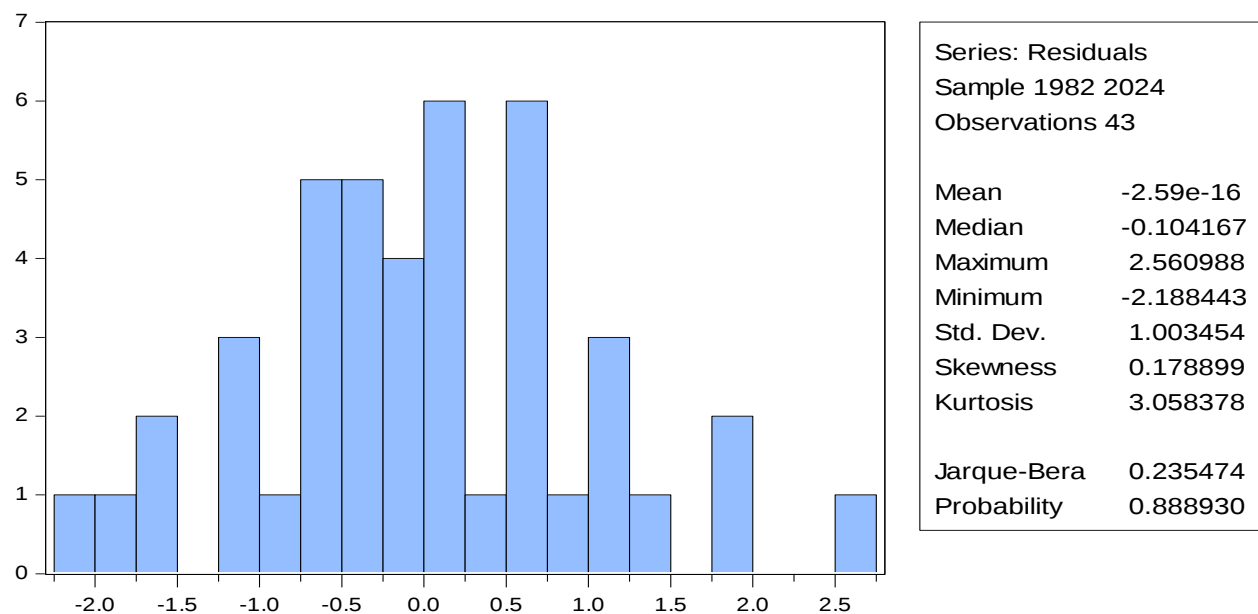
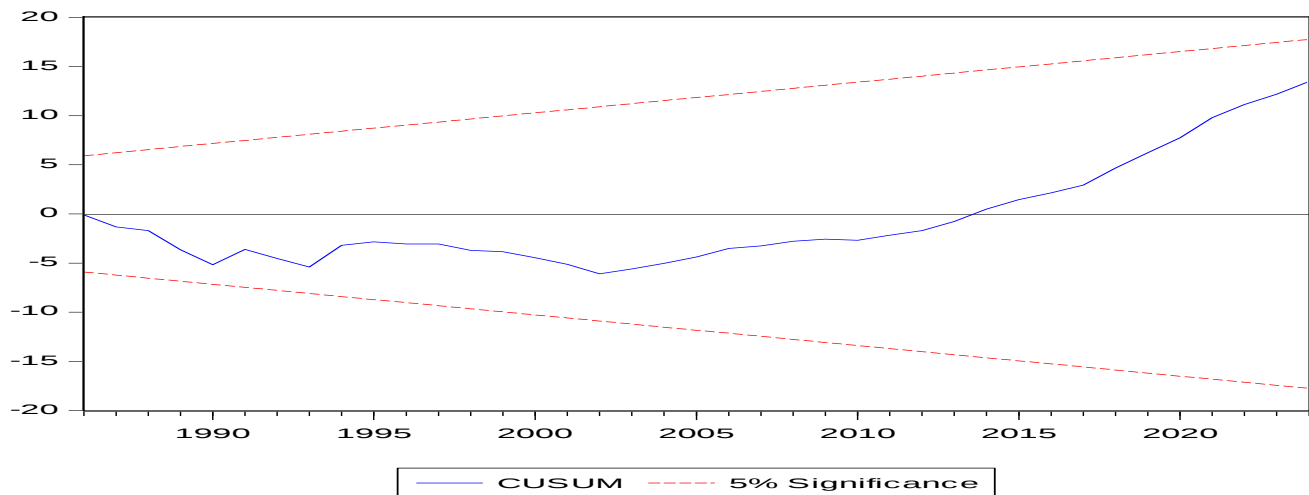
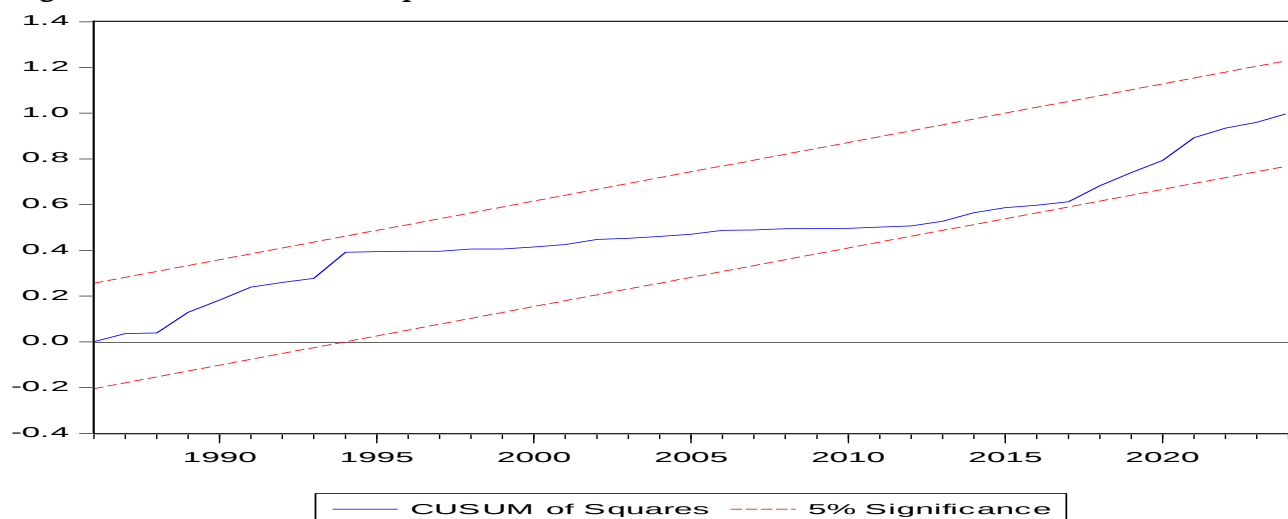


Fig. 4: Plot of CUSUM**Fig. 5:** Plot of CUSUM of Square

Conclusion and Recommendation

In this study, the study focused on investigating how the lending rate influences the performance of the manufacturing sector in Nigeria using the framework of ARDL. The results of the study bring up some issues that require for policy intervention. It is found that in the long-run lending rate impacted the manufacturing sector performance in a positive and significant way. However, the short-run result indicates that the impact is negative and insignificant. The results also indicate that while gross fixed capital formation has a positive and significant impact on the manufacturing sector performance in the

two-time horizons, the impact of trade openness is negative and significant in the two periods.

The aforementioned results have implications for policy in a country such as Nigeria where the manufacturing sector is confronted with so many factors that constrain its growth. The long-run positive impact of lending rate could be interpreted to mean that the manufacturers adjust the price of their products in line with changing cost of production. This is because lending cost is among the crucial cost of production for manufacturers. The existence of such possibility in an economy that do not have any form of price control measure will definitely

jeopardize the fight against inflation. The policy dilemma faced by the authorities in charge of monetary policy is that in an attempt to curtail inflation through contractionary measure, manufacturers will respond by upwardly adjusting the prices of their products; thereby worsening the inflationary situation. Another implication of the finding is that opening up trade with other countries will hurt the manufacturing sector, particularly in an environment like Nigeria where the cost of production is often high. As a result, locally manufactured products are often faced with stiff competition mainly with manufactured products from advanced economies. What this implies is that the country will continue to focus on the export of primary products.

From the foregoing, it is recommended that fiscal and monetary policies should be aligned in order to address the problem of high inflation in Nigeria. This is necessary because interest rate cannot be lowered through policy intervention in an economy where there is high inflation. Other measures should also be adopted to reduce the cost of production such as tax reduction, concessionary exchange rate window, and improvements in infrastructure. The moment these factors are addressed, manufacturers may not be compelled to arbitrarily adjust the prices of their products even in the face of increased lending rate. Once the cost of production is reduced, the benefit of opening up trade with other countries will begin to be felt by the manufacturers.

Further Study

As pointed earlier, the inability of this paper to handle the asymmetric relationship between the lending rate and the performance of the manufacturing sector is once are where the study is limited. Such investigation would have revealed both the positive and negative impact of lending rate on the manufacturing sector

performance. Consequently, future studies should focus on this area so as to capture the actual relationship between the two variables for proper policy intervention.

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