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Mini Review

Impact of Exchange Rate Volatility on the Manufacturing Sector Growth Performance in Nigeria

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Abstract

This study investigated the impact of exchange rate volatility on the manufacturing sector's growth performance in Nigeria from 1978 to 2022. Employing the Autoregressive Distributed Lag (ARDL) technique, the study utilized the Augmented Dickey Fuller (ADF) test to assess the stationarity of the variables. The regression analysis revealed a partial effect of the exchange rate on the manufacturing sector's growth. However, the study concluded that exchange rate volatility insignificantly influenced Nigeria's manufacturing sector throughout the examined period. It suggests that other factors, including government policies, global economic conditions, and domestic market dynamics, play pivotal roles in shaping the overall growth performance of the manufacturing sector.

Keywords: Exchange rate volatility, Growth rate, Manufacturing sector, Augmented Dickey Fuller (ADF), Government policies

INTRODUCTION

Background of the study

The persistent high volatility in Nigeria's exchange rate regime can be attributed to several intertwined factors, creating a complex economic landscape (Abdulkarim, 2023). Primarily, the country's heavy reliance on a single product, crude oil, has rendered it vulnerable to global market fluctuations (Abdul-Mumuni, 2016). This monoculture economic structure exposed Nigeria to the inherent volatility of the commodity price making the exchange rate susceptible to external shocks (Akinlo et al., 2014).

Surging domestic price inflation adds another layer of complexity to the exchange rate volatility (Ehinomen et al., 2012). Inflationary pressure has eroded the purchasing power of the local currency, creating a challenging environment for maintaining exchange rate stability (Mckinnon, 1963). The Central Bank of Nigeria's attempts to manage the exchange rate in the face of inflationary challenges have often proven futile, leading to increased uncertainty (David et al., 2010).

The very efforts to stabilize the exchange rate, while well-intentioned, have sometimes unintentionally contributed to the prevailing uncertainties (Pesaran et al., 2001). That is, liberalization of the exchange rate policy that is supposed to unlock the huge potential for investment and reverse the multi-year widening spreads between the official exchange rate and the parallel market exchange rate turn out to be a curse rather than blessing (Ayobami, 2019).

The policy has created distortions in the market and undermined investor confidence. As its aftermath is the endless free fall in value of the naira, coupled with high dependence on importation that has led to galloping inflation. Currency speculators have also taken advantage of the shortages in foreign reserves to place a bet on the possible movement in exchange rates thereby fueling round-tripping, hoarding and artificial scarcity.

This uncertainty, in turn, inhibits the manufacturing sector’s operations. The prevailing volatility hampers

long-term investment decisions, constraining the growth of the sector, which is vital for overall economic development. The Nigeria's manufacturing sector has underperformed, with its contribution to GDP consistently declining. For instance, according to the National Bureau of Statistics, the sector contributed 9.2% to the nation's GDP in 2018, a figure that gradually receded to 8.92% in 2022. This decline can be attributed to exchange rate volatility, high inflation rate, low manufacturing capacity utilization rate, reduced manufacturing foreign direct investment, and over dependence on Imports of raw materials inputs which have adversely affected the potential gains of the sector.

This research aims to investigate how exchange rate volatility adversely affects the growth performance of the Nigerian manufacturing sector. By examining the specific channels through which exchange rate volatility impacts manufacturing growth in Nigeria, this research seeks to provide insights into potential policy interventions and strategies to mitigate its adverse effects.

Statement of the problem

In Nigeria, erratic fluctuations in exchange rates have significantly hampered the manufacturing sector's output in recent years. Despite its promising potential, the volatile currency environment makes it incredibly difficult for manufacturers to plan and predict their business environment, consequently stifling growth and output.

This abysmal performance cannot be tolerated any longer. This research project delves into the negative impacts of exchange rate volatility on the manufacturing sector and proposes concrete solutions to stem the tide and pave the way for sustainable growth.

Research objectives

The broad objective of this study is the impact of exchange rate volatility on manufacturing sector growth performance in Nigeria. The study has the following specific objectives:

- To investigate the key drivers of exchange rate volatility in Nigeria.
- To analyze the impact of exchange rate volatility on manufacturing sector growth.
- To formulate concrete solutions to mitigate exchange rate volatility in Nigeria.

Research questions

This research work will enable the researcher to come up with answers to the following research questions namely:

- What are the key drivers of exchange rate volatility in Nigeria?
- How does exchange rate volatility impact manufacturing sector growth performance in Nigeria?
- What are the solutions to mitigate exchange rate volatility in Nigeria?

LITERATURE REVIEW

This section embarks on a critical exploration of exchange rate volatility in Nigeria and its impact on manufacturing sector growth, drawing upon both theoretical and empirical perspectives. Our twin goals are to: Illuminate the theoretical underpinnings of exchange rate volatility in the Nigerian context and evaluate the current state of relevant empirical research to identify existing knowledge and potential gaps.

We will then navigate the unique contribution this study intends to make by pinpointing these gaps and outlining how our research aims to bridge them. This meticulous synthesis of theoretical frameworks and prior research lays the groundwork for the subsequent analysis and findings, ultimately leading to a nuanced understanding of our study's objectives and methodology.

Conceptual review

Exchange rate policy regimes in Nigeria: Over the past sixty years, there have been numerous modifications to the exchange rate policies and regimes in Nigeria. When it was tied to the British pound sterling in 1960, it had changed from a fixed parity. Following the devaluation of the pound sterling in 1967, the parity exchange arrangement introduced the US dollar. The parity exchange rate strategy with the British Pound was abandoned in 1972 due to the advent of the stronger US Dollar. The fixed parity with the British Pound was re-introduced in 1973 due to the depreciation of the US Dollar. In 1974, the US dollar and British pounds were used to bind the Nigerian Naira to lessen the negative effects of the devaluation.

Additionally, it was claimed that the naira was overvalued because of the continuous appreciation of the nominal exchange rate that resulted from rises in the price of crude oil on the international market in the 1970's. Then, in September 1986, the Naira was deregulated to address the issues that were associated with over-valuation with the introduction of the Second-tier Foreign Exchange Market (SFEM). The SFEM was a mechanism design to determine the true value of the naira through the market forces of demand and supply with concomitant introduction of Bureaux de Change in 1989 for dealing in privately sourced foreign exchange.

In 1994, the Foreign exchange market underwent additional modifications in response to the exchange rate instability. Among these were the official naira exchange rate peg and the CBN's centralization of foreign exchange. The failure to achieve the intended goals resulted in the forex market's liberalization in 1995 when the CBN established the Autonomous

Foreign Exchange Market (AFEM), allowing it to sell foreign currency to end users at a rate set by the market through a chosen group of approved dealers. This was in use prior to October 1999, when the Inter-bank Foreign Exchange Market (IFEM) was introduced, further liberalizing the market.

Between 2002 and 2015, the Central Bank of Nigeria adopted the Interbank Rate System Regime, the Wholesale Dutch Auction System (WDAS), and the Retail Dutch Auction System (RDAS). Both RDAS and WDAS involved twice-weekly auctions; RDAS provided direct client service, while WDAS was provided to banks for customer sale. The interbank rate system regime, which allows the Bank to step-in, when necessary, was adopted in 2015. The CBN implemented the managed floating system in 2016 because of growing demand pressure. The forces of supply and demand determined the value of the naira in the interbank foreign exchange market under the new system.

However, in June 2023, the Central Bank of Nigeria announced a significant shift by unifying the country's exchange rate regime. Under this new approach, the naira's exchange rate will be determined by supply and demand dynamics through the Bureaux de Change platform and the Importers and Exporters window (I and E).

This strategic shift represents a departure from the previous exchange rate system, marking a transition towards a more flexible and market-driven approach. The move towards unification and market-determined exchange rates reflects a commitment to fostering transparency, efficiency, and stability within the foreign exchange market.

Drivers of inflation and exchange rate volatility in Nigeria

Indeed, monetary policy alone does not exclusively dictate the inflationary pressure in Nigeria. Several interrelated factors contribute significantly to this complex economic phenomenon. Escalating food and energy prices, for example, exert substantial upward pressure on inflation. Fluctuations and increases in these essential commodities directly impact consumer prices, thereby influencing inflationary trends within the country.

Supply shocks represent another critical factor. These disruptions in the equilibrium between supply and demand often result from unforeseen events such as natural disasters, geopolitical instability, or sudden shifts in market dynamics. These shocks can significantly impact prices, leading to inflationary pressures within the economy.

Production costs, a key determinant of price levels, also play a pivotal role in influencing inflation. When the cost of producing goods and services rises, these additional expenses are often passed on to consumers in the form of higher prices, thereby contributing to inflationary trends.

Demographic elements, including population growth and shifts in consumer behavior, also impact inflation. As the population expands, the demand for goods and services increases, potentially driving prices upward. Additionally, changes in consumer preferences and spending patterns can influence inflationary dynamics within the economy.

Inadequacies in infrastructure and technology also contribute to inflationary pressures. Inefficient infrastructure and technological limitations can hinder production efficiency, increase costs, and disrupt supply chains, ultimately impacting price levels and contributing to inflation.

It is crucial to recognize that increasing the exchange rate multifold will not necessarily have a substantial effect on inflation, nor would interventions by the Central Bank of Nigeria necessarily result in a positive impact on exchange rate instability. The intricate relationship between exchange rates, monetary policy, and inflation requires a nuanced and comprehensive approach, considering the multifaceted factors contributing to inflationary pressures.

Addressing these multifaceted factors necessitates a holistic approach that extends beyond monetary policy. It requires targeted strategies to enhance agricultural productivity, manage energy costs, invest in infrastructure development, and foster technological innovation. By addressing these underlying factors, Nigeria can mitigate inflationary pressures and promote economic stability.

Theoretical review

Plethora of academic works have demonstrated the detrimental impact of volatile exchange rates on the manufacturing sector's contribution to a nation's GDP. The repercussions extend to import capacity, directly impacting manufacturing output. Fluctuations in exchange rates introduce instability to purchasing power, adversely affecting investments in the importation of crucial manufacturing inputs. The interplay between investments in input imports and exchange rates inevitably influences industrial output and the overall income level. This intricate relationship is accentuated by the demand for foreign exchange, a factor intricately tied to a nation's production level, exerting a pivotal influence on the exchange rate dynamics. The intricate web of these factors underscores the critical importance of a stable exchange rate environment for fostering a thriving manufacturing sector and sustaining robust economic growth. These theories depict the nexus between exchange rate volatility and manufacturing sector’s growth performance:

The exchange rate regime theory

The exchange rate regime theory refers to the framework and principles that underpin the management and determination of a country's exchange rate system. This theory encompasses various approaches and models that governments and central banks use to establish, maintain, or change the exchange rate arrangements of their currency.

This model delves into the influence of a country's chosen exchange rate system on the volatility of its currency. The theory refers to the framework within which a nation manages its currency in the foreign exchange market. Different regimes include fixed (pegged), floating, or a hybrid system.

In a fixed or pegged exchange rate system, a country ties its currency's value to another major currency or a basket of currencies. This regime aims to provide stability but may face challenges when economic conditions diverge from the anchor currency. Conversely, a floating exchange rate regime allows the currency to fluctuate based on market forces, providing flexibility but potentially leading to increased volatility. Hybrid systems incorporate elements of both fixed and floating arrangements, offering a middle ground. For instance, a managed float allows some flexibility while central banks may intervene to stabilize the currency.

The choice of exchange rate regime significantly impacts a country's susceptibility to exchange rate volatility. Fixed regimes may face challenges during economic shocks, while floating regimes may experience heightened short-term volatility. The effectiveness of a chosen regime depends on various factors, including economic conditions, policy objectives, and global market dynamics.

This theory considers the interplay between a country's policy choices and the resulting impact on exchange rate stability or volatility. Additionally, the theory acknowledges that changes in the exchange rate regime, such as transitions from fixed to floating or vice versa, can influence market expectations and contribute to shifts in currency valuations.

The international monetary model

This is also known as the Mundell-Fleming model. It is an economic framework that integrates open economy macroeconomics with exchange rate dynamics. It was developed by economists Robert Mundell and Marcus Fleming in the 1960's. The model seeks to explain the relationship between exchange rate regimes, monetary policy, and fiscal policy in an open economy.

The model provides insights into the interdependence of macroeconomic policies and external conditions in shaping a country's economic performance. It helps policymakers and economists to understand the trade-offs and policy implications associated with different exchange rate regimes, monetary policy stances, and fiscal measures in an open economy.

By considering the impact of international factors on domestic economic variables and the transmission mechanisms through which policies affect the economy, the International Monetary Model offers a comprehensive framework for analyzing the complexities of macroeconomic policy in an interconnected global environment.

Purchasing Power Parity (PPP) theory

Purchasing Power Parity (PPP) is an economic theory that seeks to explain the exchange rate between two currencies based on the relative price levels of identical baskets of goods and services in each country. One practical application of PPP is the Big Mac Index, introduced by The Economist. It compares the price of a Big Mac in different countries as a measure of the relative value of currencies. The central idea behind PPP is that, in the long run, exchange rates should move towards equalizing the prices of identical goods and services in different countries, making the cost of living the same.

The model is predicated on the presence of a proportionate link between the relative inflation rates of two countries and the exchange rate of their respective currencies. This theory is based on the law of one price, explains how spatial commodity arbitrage guarantees that the price of any good in one nation is equal to the prices of similar goods across different nations when trade barriers and transportation costs are absent. There are two ways to formulate the theory: Absolute and relative. The absolute form, on the other hand, asserts that the equilibrium exchange rate equalizes the overall purchasing power of a given income in terms of relative price levels. The relative form argues that changes in the exchange rate measured from a base period reflect changes in relative price levels. As a result, it has to do with the respective price levels and the exchange rate level.

Empirical review

Empirical studies shed light on the intricate relationship between exchange rate volatility and manufacturing sector output. Numerous scholarly works posit that the impact of fluctuating exchange rates on the manufacturing sector is multifaceted, influencing it in diverse ways. The literature underscores the need for a comprehensive understanding of how exchange rate dynamics can significantly shape the performance and resilience of the manufacturing industry. For example, Ehinohem and Oladipo researched into the relationship between exchange rate and manufacturing performance in Nigeria between 1986 and 2010. The Ordinary Least Square (OLS) technique was used in the study, it concluded that the depreciation of the currency rate has no appreciable effect on Nigerian industrial output. It was shown that there is a substantial correlation between domestic output and exchange rate appreciation. It was also discovered that the manufacturing output is significantly impacted by exchange rate appreciation. Additionally, it was noted that manufacturing output is positively impacted by inflation. Consequently, it recommended that the Nigerian government should concentrate on providing subsidies to the manufacturing sector in order to mitigate the adverse impact of fluctuations in exchange rates on the manufacturing sector.

In another research, Opaluwa, Umeh and Ahmen studied the impact of exchange rate volatility on manufacturing sector in Nigeria between 1986 and 2005. The manufacturing GDP was the primary dependent variable in the study, while the manufacturing employment rate, manufacturing

foreign private investment, and exchange rate served as the explanatory variables. The study's conclusions revealed that the performance of Nigeria's manufacturing sector performance is negatively impacted by exchange rate and manufacturing foreign private investment. Also, Odusola and Akinlo examined the linkage among exchange rate, inflation and output in Nigeria. The exchange rate and output interactions were captured using a structural VAR model. The study's findings indicated that the parallel exchange rate had a short-term contractionary effect on output.

Gap in literature and contribution of the study

The comprehensive literature review revealed a wealth of empirical studies on exchange rate volatility, yet none specifically investigated its impact on the manufacturing sector's growth performance in Nigeria. This identifies a significant gap in existing knowledge that this study aims to bridge. Recognizing the importance of understanding both the root causes of exchange rate volatility in Nigeria and its specific effects on the manufacturing sector, this research endeavours to contribute valuable insights and empirical evidence to the field.

Data and methodology of the research

This study employed the descriptive research design and the quantitative approach to provide empirical answers to the research concerns. Descriptive research designs facilitate the process of answering the questions of who, what, when, where, and how that relate to a research problem. For this study, secondary data were obtained from the World Development Indicators statistical database, the National Bureau of Statistics (NBS), and the Central Bank of Nigeria (CBN). The components of the data collected include Manufacturing Foreign Direct Investment proxy for foreign direct investment, manufacturing capacity utilization rate, interest rate, inflation rate, import proxy for importation of goods and services, exchange rate and manufacturing value added proxy for manufacturing output. The variable was measured with the value of 1 in the years 1987 to 2022 the various years adopted various exchange rate regimes.

All variables were taken on an annual basis in nominal and percentage terms from 1987–2022. Data on MFDI, MQ, and IMP are taken in nominal forms and log-transformed to stabilize the variance of the series and make interpretation in proportionate terms easy while the INFR, EXR, MCUR, and INTR retained their percentage forms. E-views 9 statistical package was utilized for data analysis.

In accordance with the lead of Abdul-Mumuni, this study modelled manufacturing output proxied by MQ as a function of disaggregated forms of manufacturing contribution to GDP and the aforementioned control variables. In line with literature and the study's objectives, an Auto-Regressive Distributed Lag (ARDL) model with modifications, presented in its general form as an Unrestricted Error-Correction Model (UECM) regression from which all tests and estimations are conducted was devised and specified as follows:

$$MQ = f(EXR, INFR, MCUR, INTR, MFDI, IMP) \quad (1)$$

Based on its advantages over other estimation techniques, the Autoregressive Distributed Lag (ARDL) technique was used to evaluate the impact of exchange rate volatility on manufacturing sector growth performance in Nigeria. First, ARDL integrates the relationships between variables of interest in the short and long run. Second, aside from I (2) variables, ARDL can accommodate variables with other orders of integration. Moreover, the ARDL model is beneficial since it uses the lags as instruments to adjust for endogenous regressors and residual serial correlation. In accordance with Pasaran et al., submission, equation (1) can be represented as follows in the ARDL specification:

$$\Delta LnMQ=\beta_0+\beta_{1Ln}EXR+\beta_{2INFR}+\beta_{3MCUR}+\beta_{4LnMFDL}+\beta_{5INTR}+\beta_{6LnIMP}+\propto_1\Delta LnMQ_{t-1}+\propto_2\Delta LnEXR_{t-1}+\propto_3\Delta INFR_{t-1}+\propto_4\Delta MCUR_{t-1}+\propto_5\Delta LnMFDL_{t-1}+\propto_6\Delta INTR_{t-1}+\propto_7\Delta LnIMP_{t-1}+U_t+ ETC_{t-1} \quad (2)$$

Where,

β_0=Intercept

β_1 to β_6=Represent the long-run multipliers which show the long-run effects of the identified determinants of manufacturing output to be calculated.

$\propto_1$ to $\propto_7$=These are the short-run dynamic coefficients which help to estimate the error correction mechanism and the model's convergence.

Δ=Denotes the first difference operator.

t=deterministic time trend consisting of years from 1987 to 2022.

U=The disturbance term that is uncorrelated with the independent variables.

ECT t-1 is the error correction term's one-period lag value and the speed adjustment parameter that gauges how quickly the variables, in the event of a disturbance, returned from short-run to long-run.

MQ=Manufacturing output.

EXR=Exchange Rate

INTR=Interest Rate

INFR=Inflation Rate

MCUR=Manufacturing Capacity Utilization Rate

MFDI=Manufacturing Foreign Direct Investment

IMP=Imports

Using Pesaran and Shin's Autoregressive Distributed Lag (ARDL) limits test, the co-integration relationship between the variables was investigated. The tendency of co-integrated variables to respond to shocks that may need a deviation from long-term predictability is one of their most crucial traits. The ARDL has been widely employed in contemporary empirical research because of its robustness, reliability, and statistical features, which are considered to be superior to other long-run analytical procedures in the literature.

Since the ARDL model may contain many optimal lag

structures for distinct variables within the model, it is more variable-friendly and versatile in terms of lag structure. The issue of serial correlation is lessened by the inclusion of lag variables. The ARDL technique is also more basic and user-friendly than other multivariate co-integration methods since it permits the co-integration relationship to be estimated by OLS after the lag order of the model is determined. The ARDL technique also has the advantage of accounting for potential endogeneity between explanatory factors. The ARDL technique is expected to address the endogeneity issue because the macroeconomic variables this study looks at have an endogenous influence on one another.

A priori expectation

The signs that will be attached to the parameters are informed by theoretical consideration. Exchange rate and the attendant fluctuations is expected to leave a negative effect on manufacturing output. Also, foreign direct investment is expected to impact positively on manufacturing output, both import and interest rate expected to have negative effect. While inflation will be either positive or negative.

RESULTS

Presentation of empirical results

Any empirical analysis should start by looking at the descriptive statistics used for the data series that are being used. To get insight into the residual term's distribution and normalcy, we specifically looked at the variables' mean, median, skewness, kurtosis, and Jarque-Bera statistic. Table 1 displays the outcome of the descriptive statistic.

Table 1. Descriptive statistics of the variables.

	MQ	MFDI	MCUR	INTR	INFR	IMP	EXR
Mean	12.22539	9.245034	48.21111	18.54661	19.55556	10.35809	137.6111
Median	12.33041	9.283611	53.61000	17.69000	13.00000	10.34935	127.5000
Maximum	13.43947	9.946504	62.52000	31.65000	73.00000	12.72925	424.0000
Minimum	10.66238	8.271359	29.29000	9.959167	5.000000	9.457192	4.000000
Std. dev.	0.779757	0.463732	10.50130	4.048202	17.53762	0.627790	122.7500
Skewness	-0.39026	-0.23678	-0.47194	0.824039	1.745078	1.263713	0.897624
Kurtosis	2.227955	2.042222	1.708548	4.871738	4.724815	6.638611	2.870840
Jarque-Bera	1.807898	1.712394	3.838158	9.329346	22.73427	29.44106	4.859401
Probability	0.404967	0.424774	0.146742	0.009422	0.000012	0.000000	0.088063
Sum	440.1140	332.8212	1735.600	667.6780	704.0000	372.8913	4954.000
Sum Sq. dev.	21.28071	7.526650	3859.706	573.5778	10764.89	13.79419	527364.6
Observations	36	36	36	36	36	36	36

The table provides insights into the normal or moderate variations in the variables, as indicated by their low average values. Notably, the standard deviation of the exchange rate emerges as high throughout the study period, signifying a considerable degree of volatility in the exchange rate. This observation underscores the fluctuating nature of the exchange rate during the investigated timeframe.

Furthermore, the analysis delves into the skewness and kurtosis values for all variables in the model. With positively skewed distributions for all variables except manufacturing output, manufacturing foreign direct investment, and manufacturing capacity utilization rate, the findings suggest a tendency towards higher values in these variables. Variables with a kurtosis value below three, identified as platykurtic, include manufacturing output, manufacturing foreign direct investment, manufacturing capacity utilization rate, and exchange rate. Conversely, variables with a kurtosis value above three, classified as leptokurtic, encompass interest rate, inflation rate, and import.

The Jarque-Bera test outcomes reveal that certain data sets do not conform to a normal distribution, given that the probability values for these variables fall below 5%. Specifically, the null hypothesis of normal distribution is upheld for Manufacturing Output (MQ), Manufacturing Foreign Direct Investment (MFDI), Manufacturing Capacity Utilization Rate (MCUR), and exchange rate, as their probabilities exceed 5%. Conversely, the null hypothesis is rejected for Interest Rate (INTR), Inflation Rate (INFR), and Import (IMP), indicating that these variables do not follow a normal distribution pattern (Table 2).

Table 2. Unit root test.

Variables	ADF statistics @5%	Critical value @5%	Order of integration
MQ	121.581	2.954021	I(1)(Stationary)
MFDI	104.477	2.954021	I(1)(Stationary)
MCUR	100.452	2.954021	I(1)(Stationary)
INTR	23.804	2.954021	I(1)(Stationary)
INFR	98.126	2.954021	I(1)(Stationary)
IMP	89.214	2.954021	I(1)(Stationary)
EXR	46.832	2.954021	I(1)(Stationary)

The Augmented Dickey-Fuller (ADF) test was employed to assess the stationarity of each variable in the analysis. The primary objective of this test is to ascertain whether a variable exhibits stationarity. According to the general rule of the test, if the absolute value of the ADF test statistic surpasses the critical value at the 5% significance level, we reject the null hypothesis that the variable is non-stationary.

In practical terms, when the absolute value of the ADF test statistic exceeds the critical value at 5%, it indicates that the variable is stationary. Stationarity is a critical condition for time series analysis, ensuring that statistical properties such as mean and variance remain constant over time.

This meticulous application of the ADF test serves as a robust foundation for subsequent analyses, providing assurance regarding the stationarity of the variables under consideration. The emphasis on statistical rigor in assessing stationarity contributes to the reliability and validity of the overall analytical framework (Table 3).

Table 3. Unrestricted cointegration rank test.

Null hypothesis	Eigenvalue	Trace statistic	Critical Value 0.05	Prob.**
MQ*	0.888363	204.5613	125.6154	0.0000
MFDI*	0.701696	130.0162	95.75366	0.0000
MCUR*	0.680101	88.88833	69.81889	0.0007
INTR*	0.465460	50.13682	47.85613	0.0300
INFR	0.403120	28.84097	29.79707	0.0641
IMP	0.239856	11.29567	15.49471	0.1939
EXR	0.056329	1.971241	3.841466	0.1603

Note: Trace test indicates 4 cointegrating eqn (s) at the 0.05 level
*Denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis p-values

Determining the presence of cointegration among non-stationary time series is crucial for understanding long-term equilibrium relationships between variables. In the context of economic interpretation, cointegration implies a stable, long-term connection between variables. To safeguard against erroneous regression outcomes, pretesting becomes imperative.

In this scenario, the Johansen cointegration test is a suitable choice, especially when the variables are stationary at the first difference (order 1, I). The trace test results, as depicted in Table 2 above signify the existence of four cointegrating equations at the 5% level. Additionally, the Eigenvalue test, at the same significance level, confirms the presence of three cointegrating equations.

These findings support the conclusion that the seven variables under consideration exhibit long-term equilibrium relationships. The cointegration analysis, anchored in rigorous statistical tests, provides a robust foundation for interpreting and modeling the interplay between these variables (Table 4).

Table 4. Ordinary least square output.

Dependent variable: Manufacturing output (MQ)
Method: Least squares
Date: 01/09/24
Time: 11:03
Sample: 1987 2022

Included observations: 36				
Variable	**Coefficient**	**Std. error**	**t-Statistic**	**Prob.**
MFDI	0.564679	0.137026	4.120958	0.0003
MCUR	-0.020482	0.008853	-2.313608	0.0280
INTR	0.012451	0.012458	0.999420	0.3259
INFR	-0.003262	0.002991	-1.090865	0.2843
IMP	0.484276	0.130954	3.698062	0.0009
EXR	0.004346	0.000662	6.564700	0.0000
C	2.211054	1.743265	1.268341	0.2148
R-squared	0.906570	Mean dependent var		12.22539
Adjusted R-squared	0.887239	S.D. dependent var		0.779757
S.E. of regression	0.261841	Akaike info criterion		0.330509
Sum squared resid	1.988264	Schwarz criterion		0.638415
Log likelihood	1.050844	Hannan-Quinn criter		0.437976
F-statistic	46.89863	Durbin-Watson stat		0.967252
Prob(F-statistic)	0.000000			

The results of the regression analysis indicate that the exchange rate has a partial effect on the growth performance of the manufacturing sector. Specifically, the test-statistic suggests that a one-unit increase in the exchange rate corresponds to a 0.004346 unit change in manufacturing output.

Moreover, the R^2 value of 0.906570 indicates that 90% of the variability in manufacturing output is accounted for by the independent variables considered in the study. This high R^2 suggests a strong explanatory power of the model, indicating that the selected variables collectively contribute significantly to explaining variations in manufacturing output.

Furthermore, the F-statistic, with a value of 46.89863, is found to be statistically significant at the 5% level of significance. This implies that the overall model, encompassing the selected independent variables, is jointly significant in explaining the variability in manufacturing output. The statistical significance of the F-statistic strengthens the confidence in the reliability of the regression model.

CONCLUSIONS

The objective of this study is to examine the impact of exchange rate volatility on the growth performance of Nigeria's manufacturing sector in Nigeria. The existing literature presents conflicting findings on the relationship between exchange rate volatility and manufacturing sector production. The study aims to contribute to the existing body of knowledge by providing insights into the specific dynamics observed in the Nigerian context.

The findings of this study reveal an insignificant influence of exchange rate volatility on Nigeria's manufacturing sector throughout the study period. Its impact on manufacturing production was carefully examined, considering variables such as manufacturing value added, imports, inflation, exchange rates, manufacturing capacity utilization, foreign direct investment, and interest rates.

The study establishes a long-term relationship between all the variables considered, and they are found to be stationary up to the first order. This implies that the variables exhibit stability and coherence in their patterns over time, contributing to a comprehensive understanding of the dynamics within the manufacturing sector.

The results of the regression analysis indicate that the exchange rate has a partial effect on the growth performance of the manufacturing sector. However, it is noteworthy that the statistical significance of this relationship was not observed, implying that the exchange rate is not a significant determinant of manufacturing sector output.

The finding of statistical insignificance implies that the exchange rate, within the context of this study, does not exert a significant influence on the manufacturing sector's output. While there is a measurable effect in terms of the partial effect, this effect is not deemed statistically meaningful, given the observed variability in the data.

It is essential to interpret these results cautiously and consider the broader economic context. Other factors, such as government policies, global economic conditions, and domestic market dynamics, may contribute to the overall growth performance of the manufacturing sector.

By shedding light on the intricate interactions between exchange rate volatility and various manufacturing indicators, this study offers valuable insights for policymakers, researchers, and industry stakeholders. The findings can inform strategic decision-making processes aimed at fostering a resilient and sustainable manufacturing sector in Nigeria amidst the challenges

posed by exchange rate fluctuations. Future research may explore the multifaceted influences on manufacturing output to provide a more comprehensive understanding of the sector's dynamics.

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