IJEFMDS

JOURNAL OF & FINANCE

INTERNATIONAL JOURNAL OF ECONOMICS, FINANCE AND MULTIDISCIPLINARY DEVELOPMENT STUDIES

OIL PRICE FLUCTUATION AND MANUFACTURING SECTOR IN NIGERIA: THE MODERATING ROLE OF INSTITUTIONAL QUALITY

ISSN Online: 2634-1370

ISSN Print: 2678-2944

Volume 1, Issue 1, September (2025).

International Journal of Economics, Finance and Multidisciplinary Development Studies
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Volume 1, Issue 1, September, (2025)

OIL PRICE FLUCTUATION AND MANUFACTURING SECTOR IN NIGERIA: THE MODERATING ROLE OF INSTITUTIONAL QUALITY

Authors:

[1]Gaius, Mashor Tokshik

[2]Onmonya Abraham Otsapa

[3]Paul Joseph

Affiliation:

[1,&2]Department of Economics, Faculty of Social Science, Federal University, Lafia Nasarawa State, Nigeria.

[3]Department of Economics, Federal College of Education Odugbo, Benue State.

Contacts:

[1]Onmonyaotsapa4real@gmail.com

Dates:

Received: 2025-07-21

Accepted: 2025-07-28

Published: 2025-09-08

Citation:

Gaius, Mashor Tokshik, Onmonya Abraham Otsapa &Paul Joseph. (2025). Oil Price Fluctuation and Manufacturing Sector in Nigeria: The Moderating Role of Institutional Quality. International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS), 1(1), 146-171. https:// veritaspublishing.net/index.php/home/article/view/01

Abstract

This study investigates the impact of oil price fluctuations on manufacturing sector performance in Nigeria, with institutional quality examined as a moderating factor. Using annual time series data spanning 1981–2023, sourced from the World Development Indicators (WDI) and the Central Bank of Nigeria Statistical Bulletin, the study employs the Autoregressive Distributed Lag (ARDL) framework to capture both long-run and short-run dynamics. The Phillips–Perron (PP) unit root test confirms a mix of I(0) and I(1) series, justifying the ARDL approach, while the bounds test indicates the presence of a long-run relationship among the variables. The results reveal that exchange rate volatility consistently exerts a significant negative impact on manufacturing output in both the short and long run, while foreign direct investment inflows, dominated by oil-related activities, have a negative effect, particularly in the short run. Most importantly, institutional quality plays a critical moderating role, with evidence showing that improved governance and regulatory effectiveness enable oil price windfalls to positively influence manufacturing performance in the short run. Other macroeconomic variables, including gross capital formation, technology adoption, and interest rates, are largely insignificant. The error correction mechanism confirms a stable adjustment process towards long-run equilibrium. These findings underscore the importance of strong institutions, exchange rate stability, and investment diversification for mitigating the adverse effects of oil price shocks and leveraging oil wealth to promote industrial development. The study concludes that governance reforms remain indispensable for transforming Nigeria's oil windfalls into sustainable manufacturing growth and broader economic diversification.

Keywords: Oil price, Manufacturing output, Institutional quality,

JEL Classification: I32, O18, Q12, Q15, Q53

Introduction

Since the industrial revolution, oil has played a critical role in global manufacturing, beginning with coal-powered machinery and evolving to include oil, gas, and electricity (Smil, 2017). The widespread adoption of petroleum in the 20th century, and the subsequent oil crises of the 1970s, exposed manufacturers worldwide to the dangers of energy price volatility (Hamilton, 1983). As it gained prominence, industries in both developed and developing economies became increasingly sensitive to fluctuations in oil prices (International Energy Agency [IEA], 2021). In recent decades, petroleum markets have faced further instability driven by geopolitical tensions, global market liberalization, and climate policies such as carbon pricing and subsidy reforms (World Bank, 2022). These evolving dynamics have amplified the vulnerability of oil-dependent manufacturing sectors, particularly in emerging economies, reinforcing the global relevance of understanding how fluctuations in oil prices impact industrial productivity (Yergin, 2009).

African manufacturing sector has long struggled with high energy costs, unreliable supply, and poor infrastructure, making it highly vulnerable to oil price fluctuations (Africa Development Bank [AfDB], 2019). Many countries rely heavily on imported petroleum products, exposing industries to global oil price shocks (IEA, 2019). Despite some improvements in petroleum supply and accessibility, pricing remains unstable due to underinvestment, subsidy burdens, and regulatory inefficiencies (Eberhard, Gratwick, Morella & Antmann, 2016). While countries like South Africa and Kenya have explored diversification into gas and renewables, manufacturing firms often still depend on costly petrol or diesel generators (Bazilian et al., 2012). These structural challenges have limited industrial productivity and competitiveness, reinforcing the impact of oil price shifts on Africa's industrial development (Kojima & Trimble, 2016).

Nigeria's manufacturing sector is heavily dependent on fossil fuels and grid electricity, both of which have been unstable in price and supply over the years. Despite being a major crude oil producer, Nigeria still imports some of its refined petroleum products, making domestic fuel prices susceptible to international market fluctuations (Central Bank of Nigeria [CBN], 2023). For instance, the average pump price of petrol rose sharply from ₦145 per litre in 2019 to over

International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS)
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Vol. 1 No. 1, September, 2025, Pg 146- 171
DOI: https://doi.org/10.33003/ijefmds-2023-0705-2028

₦617 in mid-2023 following the removal of fuel subsidies and exchange rate floatation (National Bureau of Statistics [NBS], 2023). Additionally, the significant increase in electricity tariff since the implementation of the Multi-Year Tariff Order (MYTO), with average residential and industrial tariffs rising from ₦22/kWh in 2015 to over ₦70/kWh by 2023, further compounded by erratic grid supply —averaging less than 4,000 MW for a population of over 200 million—has forced many manufacturers to rely on private diesel and petrol generators, further increasing production costs (Nigerian Electricity Regulatory Commission [NERC], 2023; IEA, 2022). As a result, the manufacturing sector's contribution to GDP has remained relatively stagnant, averaging around 9% from 2015 to 2023, despite various industrialization policies (World Bank, 2024). These petroleum-related constraints underscore the sector's acute sensitivity to fuel price fluctuations in Nigeria.

The primary objective of this research is to empirically examine the moderating role of institutional quality on oil price fluctuations and Nigeria's manufacturing sector output. By analysing both short- and long-term impacts using time series econometric methods, the study aims to uncover how oil price fluctuations influence industrial output, operational efficiency, and overall sectoral contribution to the economy. This research contributes to the existing literature by introducing institutional quality as a moderating factor in the relationship between oil price fluctuations and the manufacturing sector in Nigeria, a gap largely overlooked in previous research. It integrates the Resource Curse, Dutch Disease, and Institutional Quality theories to build a sector-specific, theory-driven framework. Methodologically, it applies interaction modelling to capture the conditional effects of institutions on oil shocks, offering a more nuanced analysis than traditional linear models. The study also provides policy-relevant insights for economic diversification and industrial resilience in oil-dependent developing economies.

2. LITERATURE REVIEW

2.1 Conceptual Clarifications

2.1.1 Oil Price Fluctuation

Oil price fluctuation is broadly understood as the unpredictable and often sharp changes in the cost of oil – petroleum, influenced by factors like geopolitical events, global demand-supply imbalances, and domestic policy shifts (Hamilton, 2003; Kilian, 2009). Scholars view it not just as a market occurrence but as a macroeconomic risk with significant implications for industrial output and planning. Awerbuch and Berger (2003) emphasize its role in complicating energy investment and cost management, especially in developing countries. Basher and Sadorsky (2006) link oil price fluctuation to firm-level financial performance, particularly in petroleum-intensive sectors. In low- and middle-income economies, Rentschler (2013) notes that such fluctuations can be especially damaging due to weak institutions and the absence of cost-absorption mechanisms. Overall, oil price fluctuation is a critical variable that directly affects manufacturing stability, policy design, and long-term economic resilience.

2.1.2 Manufacturing Sector

The manufacturing sector is widely acknowledged as a key engine of economic growth and structural transformation due to its ability to drive productivity, create employment, and generate value-added output (Kaldor, 1967; Szirmai & Verspagen, 2015). Manufacturing performance, typically measured by indicators such as manufacturing value added (MVA), capacity utilization, and sectoral GDP contribution, reflects how efficiently the sector transforms inputs into outputs. In developing countries, strong manufacturing performance is often linked to industrialization, export diversification, and poverty reduction (United Nations Industrial Development Organization [UNIDO], 2015). However, many African nations, including Nigeria, face persistent challenges such as oil constraints, infrastructure deficits, and weak competitiveness, which hamper sectoral performance (United Nations Economic Commission for Africa [UNECA], 2020). Rodrik (2016) highlights the phenomenon of premature deindustrialization, where manufacturing stagnates or declines before economies reach high-income status, further undermining sustainable growth. These perspectives reinforce the importance of a resilient and energy-secure manufacturing sector for long-term economic development.

2.1.3 Institutional Quality

Institutional quality plays a critical role in shaping economic outcomes, particularly in resource-rich but institutionally weak economies like Nigeria. It encompasses dimensions such as rule of law, regulatory quality, government effectiveness, and control of corruption, which influence how efficiently public resources are managed and how resilient the economy is to external shocks (Kaufmann, Kraay, & Mastruzzi, 2010). In the context of oil price volatility, strong institutions can mitigate adverse effects on the manufacturing sector by promoting transparent fiscal policies, ensuring effective regulation, and supporting long-term industrial planning (Mehlum, Moene, & Torvik, 2006). Conversely, weak institutions tend to exacerbate the resource curse, leading to misallocation of oil revenues, policy inconsistency, and underinvestment in non-oil sectors, including manufacturing (North, 1990). Thus, in this study, institutional quality is conceptualized as a moderating variable that conditions the extent to which oil price fluctuations affect manufacturing performance in Nigeria.

2.2 Theoretical Framework

The theoretical foundation of this study is drawn from four interrelated theoretical perspectives: The Resource Curse Theory, the Dutch Disease Hypothesis, Institutional Quality Theory, and the Endogenous Growth Model. These frameworks provide a theoretical basis for understanding how oil price fluctuations influence the manufacturing sector in Nigeria, particularly within the context of institutional capacity.

The Resource Curse Theory suggests that countries endowed with abundant natural resources, especially oil, often experience slower industrial and economic growth compared to less resource-rich nations (Sachs & Warner, 2001). In Nigeria, heavy reliance on oil exports has led to revenue volatility, crowding out of productive investments, and limited structural transformation. This paradox arises because resource booms may reduce the incentive for governments to diversify their economies or invest in long-term sectors like manufacturing.

Building on this, the Dutch Disease Hypothesis explains how oil booms can hurt the manufacturing sector by causing exchange rate appreciation, which makes non-oil exports less competitive (Corden & Neary, 1982). As oil prices rise, resources shift toward the booming petroleum sector, while manufacturing and other tradable industries contract due to reduced profitability. In Nigeria, this effect is particularly pronounced given the economy's limited diversification and overdependence on oil revenues.

The Institutional Quality Theory posits that the strength and effectiveness of a country’s institutions—such as governance structures, legal frameworks, and policy enforcement—

determine how resource wealth is managed and whether it leads to sustainable development (North, 1990). Strong institutions can reduce corruption, ensure prudent management of oil windfalls, and support industrial development through effective policy implementation. Mehlum, Moene, and Torvik (2006) argue that the presence of "producer-friendly" institutions enables countries to channel resource rents into productive uses, thereby avoiding the resource curse.

Finally, the endogenous growth model emphasizes that long-run economic expansion in Nigeria's manufacturing sector depends more on internal drivers—particularly technological progress and institutional strength—than on external shocks like oil price volatility. This model posits that investments in technology and innovation generate cumulative knowledge spillovers, fostering productivity and resilience (Romer, 1990; Ahuja, 2012). In the Nigerian context, strong institutions—through effective governance, regulatory frameworks, and innovation support—enhance the economy's capacity to absorb and utilize new technologies, thereby mitigating the adverse effects of oil price fluctuations on manufacturing output.

This study views institutional quality as a moderating factor in the relationship between oil price fluctuations and manufacturing output. While oil dependence and external shocks can weaken industrial performance (Sachs & Warner, 2001), strong institutions mitigate these effects by ensuring stability and pro-industrial policies (North, 1990; Acemoglu & Robinson, 2012). Additionally, technology complements this role, as institutions that foster innovation and industrial investment enhance manufacturing resilience to oil price volatility (Romer, 1990; Aghion & Howitt, 1998). Empirical evidence from Nigeria supports these theoretical links. For instance, Balogun, Obele and Adeniyi (2024) found that access to clean fuels and technologies contributes positively to economic growth, with institutional quality enhancing the benefits of oil revenues; This integrated theoretical approach allows for a more comprehensive understanding of the complex dynamics between natural resource wealth, institutional governance, technological progress, and manufacturing sector performance in Nigeria.

2.3 Empirical Studies

Several empirical studies have examined the relationship between energy prices and manufacturing output, both globally and in developing contexts. However, most of these studies

International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS)
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Vol. 1 No. 1, September, 2025, Pg 146- 171
DOI: https://doi.org/10.33003/ijefmds-2023-0705-2028

either focus on a single energy source or analyse aggregate industrial sectors, leaving important gaps this study aims to address.

In a survey of manufacturing firms in FCT-Abuja, Kolo, Ibrahim, and Aliyu (2023) found that technology application had a negative but insignificant effect on manufacturing firm performance in Abuja, indicating that access to technology alone does not ensure improved outcomes. A key limitation of their study is the narrow firm-level scope, which ignores broader shocks like oil price volatility and sector-wide dynamics which this study seeks to address. Another empirical evidence presented by Onwuka (2021) shows that exchange rate volatility had a significant negative effect on manufacturing output in both the short and long run, highlighting how currency instability raises costs, disrupts planning, and discourages investment in Nigeria's manufacturing sector. However, the study does not account for the potential moderating roles of institutional quality and technology, a gap this research seeks to fill by linking oil price shocks, governance, and technological adoption to industrial performance. Raifu (2021) used ARDL analysis to show that institutional quality significantly moderated the link between oil revenues and Nigeria's economic growth from 1984 to 2017, with stronger institutions enhancing outcomes. However, the study focused on overall growth, not specific sectors. This research builds on Raifu's work by narrowing the focus to manufacturing, offering deeper insight into how institutional quality shapes the sectoral impact of oil price fluctuations.

Adeloye and Adesoye (2019) found that oil price shocks reduced Nigeria's manufacturing output via exchange rate appreciation but did not consider institutional or fiscal factors. This study builds on their work by introducing institutional quality as a moderating variable, offering a more comprehensive view of how governance shapes the oil-manufacturing relationship. A study by Nusair (2019) showed that negative oil shocks more strongly hurt Pakistan's manufacturing sector but did not consider institutional influences or Nigeria's context. This study addresses those gaps by examining how institutional quality moderates oil price effects on manufacturing in Nigeria.

Similarly, Baumeister and Kilian (2016) found oil shocks impacted U.S. manufacturing unevenly, with energy-intensive sectors most affected, but their focus on a stable, developed economy limits relevance to weaker contexts. This study extends their work by examining Nigeria, where institutional quality may alter oil shock impacts on manufacturing. Sala-i-Martin and Subramanian (2013) linked oil windfalls in Nigeria to exchange rate appreciation and weakened manufacturing exports but did not consider post-2000 institutional reforms. This study updates their analysis by using recent data and examining how changes in institutional quality influence the oil-manufacturing relationship. A study carried out by Arezki and Nabli (2012) found that resource windfalls reduced manufacturing investment in MENA countries, though strong institutions helped mitigate this effect. However, their regional focus limits applicability to Nigeria. This study builds on their insights by offering a country-specific analysis of how institutional quality shapes oil price impacts on Nigeria's manufacturing sector. An investigation of the determinants of foreign direct investment (FDI) inflows in African countries between 1996 and 2008 using cross-country regressions was carried out by Anyanwu (2012), results revealed that market size, trade openness, rule of law, and natural resource endowment, particularly oil, significantly drive FDI, while financial development had a negative effect. This highlights the importance of institutional quality and resource endowment in shaping FDI flows, which is relevant to understanding how external shocks like oil price fluctuations interact with governance and sectoral performance.

Furthermore, Bhattacharyya and Hodler (2010) showed that resource rents increase corruption, especially where democratic institutions are weak. However, they focused narrowly on corruption. This study broadens the scope by examining how multiple aspects of institutional quality jointly moderate the impact of oil price volatility on Nigeria's manufacturing sector. Gelb and Associates' study (2010) showed that improved governance helped Nigeria's manufacturing sector withstand oil price shocks, using regime-switching models from 1970–2008. However, they did not formally test institutional moderation. This study advances their work by applying econometric techniques to explicitly assess how institutions moderate oil price impacts on manufacturing. Collier and Hoeffler (2009) discovered that natural resource dependence negatively affects development when institutional capacity is weak and ethnic divisions are high. However, their focus was on conflict, not sectoral economic performance. This study shifts focus to how institutional quality influences the impact of oil price fluctuations on Nigeria's manufacturing sector. Mehlum, Moene & Torvik (2006) found that the effect of resource wealth depends on institutional quality—weak institutions worsen outcomes, while strong ones improve them. Their cross-country analysis supports the idea that institutions moderate the resource-growth link. However, it lacks country-specific depth. This study applies their framework to Nigeria, focusing on how institutional quality shapes the impact of oil price fluctuations on manufacturing. The study of Olomola and Adejumo (2006) revealed that oil price volatility harms manufacturing more in countries with weak institutions, using data from 1980–2003. While insightful, their study is dated and broad. This current research updates the analysis with recent Nigerian data and applies improved methods to assess how institutional quality moderates oil price impacts on manufacturing.

Finally, Hamilton and Herrera (2004) found that oil price hikes reduced industrial output in G7 nations, but ignored institutional differences. This study focuses on Nigeria, highlighting how governance quality shapes oil price impacts on manufacturing. Sachs and Warner (2001) linked resource dependence to slower growth, especially in manufacturing, but treated institutional quality only as a control. This study builds on their work by positioning institutional quality as a key moderating factor in Nigeria's oil-manufacturing relationship. Gylfason (2001) in his study, found that resource abundance harms manufacturing in weak institutional settings but did not explore how specific governance factors drive this outcome. This study extends that work by analysing distinct institutional dimensions that moderate oil price effects on Nigeria's manufacturing sector.

While most studies examine aggregate economic effects, this research provides granular analysis of manufacturing sector dynamics, offering insights relevant to industrial policy and economic diversification strategies. The literatures reviewed reveals key gaps that this study addresses: it integrates institutional moderation into oil-manufacturing models, applies advanced techniques like threshold models, and analyses distinct institutional dimensions and their combined effects.

3. Methodology

3.1 Nature and Sources of Data

The study utilizes annual time series data spanning from 1981 to 2023. The variables and data sources include: Manufacturing Output (MFG) is the dependent variable sourced from National Bureau of Statistics (NBS) and World Bank World Development Indicators while oil price (OilP) and Institutional Quality Index (INSTQ) (constructed using control of corruption, rule of law, government effectiveness, voice and accountability, regulatory quality and political stability) are the independent variables sourced from organization of petroleum exporting countries (OPEC) and WDI respectively. The control variables employed include: Real Effective Exchange Rate (REER), Real Interest Rate (RINTR), Foreign Direct Investment (FDI), Gross Capital Formation (GCF), and Technology (TECH), all sourced from WDI. Lastly, the interaction variable is OILPxINSTQ.

3.1.1 Description of Variables

Table 3.1: Description of Variables and Data Sources

Variables	Description and Measurement	Sources	Expected Sign
MFG	Output of manufacturing sector, representing industrial activity (constant LCU)	World Bank, NBS	Dependent Variable
OilP	The brent crude oil price being the benchmark for global oil price. It is measured as dollar per barrel ($/b)	OPEC	Negative (-)
INSTQ	Institutional quality index which measures control of corruption, rule of law, government effectiveness, voice and accountability, Regulatory quality and political stability	World Governance Indicators	Positive (+)
TECH	Technological adoption proxied by internet penetration, measured as individuals using the internet (% of population)	World Bank WDI	Positive (+)
REER	Real effective exchange rate index adjusted for inflation, trade-weighted (2010 = 100)	World Bank WDI	Negative (-)
RINTR	Interest rate adjusted for inflation (%)	WDI, CBN	Negative (-)
FDI	Net inflow of investment into Nigeria's economy (FDI inflow as % of GDP)	WDI, CBN	Positive (+)
GCF	Measures the total investment in fixed assets by both public and private sector (GCF as % of GDP)	WDI	Positive (+)
(OILPxINSTQ)	Interaction term capturing moderating effect between oil price fluctuation and institutional quality	Authors' construction	Positive (+)
(OILPxTECH)	The interaction term which tests whether technological reduces the effect on oil price fluctuation on manufacturing sector performance	Authors' construction	Positive (+)
(OILxINSTxTECH)	The interaction term which captures how the effect of oil price fluctuation on manufacturing sector differs in terms of institutional strength and the level of technological adoption.	Authors' construction	Positive (+)

Source: Author's Explanation

3.2 Model Specification

Grounded on the theoretical foundations of the Resource Curse Theory, the Dutch Disease Hypothesis, and Institutional Quality Theory, the functional form of the model is specified in log-linear form to allow for interpretation of coefficients as elasticities and help stabilize variance and normalize skewed data:

$$MFG_t = \alpha + \beta_1 OILP_t + \beta_2 INSTQ_t + \beta_3 TECH + \beta_4(OILP_t \times INSTQ_t) + \beta_5(OILP_t \times TECH_t) + \beta_6(OILP_t \text{ x } INSTQ_t \text{ x } TECH_t) + \beta_7 REER_t + \beta_8 RINT_t + \beta_9 FDI_t + \beta_{10} GCF_t + \varepsilon_t$$

Where:

MFG_t is Manufacturing sector output (proxy for performance) at time t, $OILP_t$ is oil price at time t, $INSTQ_t$ is institutional quality index at time t, $TECH_t$ is technological adoption at time t, $REER_t$ is Real Effective Exchange rate at time t, $RINT_t$ is real interest rate at time t, FDI_t is foreign direct investment at time t, GCF_t is gross capital formation at time t, α is the constant, β_1, β_2, β_3, β_4, β_5, β_6 and β_7 are the parameter estimates or the coefficients of the variables and ϵ_t is the error or stochastic term.

3.3 Method of Data Analysis

3.3.1 Pre-Estimation Techniques

Before estimation, the following diagnostic tests will be conducted: descriptive statistics which involves the use of measures to determine the distribution of observations around their mean values so as to ascertain the normality and to provide key insights into the central tendency dispersion and distributional characteristics of the study variables, unit root test employing the Augmented Dickey-Fuller (ADF) approach to reveal the stationarity properties of the study variables and to determine whether the variables are stationary at a level [I(0)] or requiring differencing to achieve stationarity [I(1)] and ARDL bounds test for cointegration to confirm the existence of a long-run equilibrium relationship among the variables.

3.3.2 Estimation Technique

This study adopts the Autoregressive Distributed Lag (ARDL) model approach developed by Pesaran et al. (2001) to examine the short-run and long-run effects of oil price fluctuations on manufacturing sector performance in Nigeria. The ARDL framework is appropriate given the likelihood of a mixed order of integration among the variables (i.e., I(0) and I(1)). Additionally, if cointegration is confirmed, an Error Correction Model (ECM) will be estimated to capture the short-run adjustments to long-run equilibrium. The error correction term (ECT) is expected

International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS)
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Vol. 1 No. 1, September, 2025, Pg 146- 171
DOI: https://doi.org/10.33003/ijefmds-2023-0705-2028

to be negative and statistically significant, indicating convergence. The ARDL-ECM form of the equation is expressed as:

$$\Delta MFG_t = \alpha_0 + \sum_{i=1}^{p-1} \alpha_1 \Delta MFG_{t-i} + \sum_{j=0}^{q_1} \beta_1 j \Delta OILP_{t-j} + \sum_{k=0}^{q_2} \beta_2 k \Delta INSTQ_{t-k} + \sum_{l=0}^{q_3} \beta_3 l \Delta TECH_{t-l} + \sum_{m=0}^{q_4} \beta_4 m \Delta (OILP_t \times INSTQ_t)_{t-m} + \sum_{n=0}^{q_5} \beta_5 n \Delta (OILP_t \times TECH_t)_{t-n} + \sum_{o=0}^{q_6} \beta_6 o \Delta (OILP_t \times INSTQ_t \times TECH_t)_{t-o} + \sum_{r=0}^{q_7} \beta_7 r \Delta REER_{t-r} + \sum_{s=0}^{q_8} \beta_8 s \Delta RINT_{t-s} + \sum_{t=0}^{q_9} \beta_9 o \Delta FDI_{t-t} + \sum_{u=0}^{q_{10}} \beta_{10} u \Delta GCF_{t-u} + \lambda ECT_{t-1} + \varepsilon t$$

3.3.3 Post-Estimation Diagnostics

To ensure robustness of the model, the following post-estimation tests will be performed: Serial Correlation (Breusch-Godfrey LM test), Heteroskedasticity (Breusch-Pagan-Godfrey test), Normality (Jarque-Bera test), Model Specification (Ramsey RESET test) and Stability (CUSUM and CUSUMSQ tests).

International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS)
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Vol. 1 No. 1, September, 2025, Pg 146- 171
DOI: https://doi.org/10.33003/ijefmds-2023-0705-2028

4. Data Analysis and Discussion of Findings

4.1 Descriptive Statistics

Table 4.1: Descriptive Statistic Results

	MFG	FDI	GCF	INSTQ	OILPR	REER	RINTR	TECH
Mean	4.34E+12	1.221217	35.29044	-1.113370	45.82860	146.3151	0.482534	9.176741
Median	3.59E+12	1.069539	29.39000	-1.110673	28.81000	101.4473	3.023542	0.559000
Maximum	6.75E+12	4.282088	89.38000	-1.005022	111.6200	536.9218	18.18000	39.20000
Minimum	2.90E+12	-0.039127	14.90392	-1.267109	12.71000	49.77717	-65.85715	0.008830
Std. Dev.	1.38E+12	0.945836	18.47137	0.055492	31.35132	113.1174	13.91620	12.58526
Skewness	0.700824	0.946879	1.198641	-0.543733	0.816470	2.010337	-2.788874	1.102936
Kurtosis	1.828602	3.760779	4.198199	3.815842	2.331364	6.355904	13.56168	2.781672
Jarque-Bera	5.978411	7.462483	12.86890	3.311322	5.578474	49.14168	255.6000	8.803429
Probability	0.050327	0.023963	0.001605	0.190966	0.061468	0.000000	0.000000	0.012256
Observations	43	43	43	43	43	43	43	43

Source; Authors Computation 2025

The descriptive analysis highlights significant variability across the key variables used in the study. Manufacturing output (MFG) averaged ₦4.34 trillion, with wide fluctuations reflecting the sector's vulnerability to macroeconomic and oil price shocks. Oil prices (OILP) were highly volatile, averaging \$45.83 per barrel, with extreme swings between \$12.71 and \$111.62, confirming their role as the dominant external shock to the Nigerian economy.

Foreign direct investment (FDI) averaged 1.22% of GDP but was unstable, with episodes of capital flight, while gross capital formation (GCF) was relatively high (35.29% of GDP) yet volatile, reflecting oil boom–bust cycles. Institutional quality (INSTQ) remained persistently weak (–1.11 average), suggesting governance and policy challenges that may hinder effective channelling of oil windfalls into manufacturing growth.

Exchange rate movements (REER) exhibited wide variability, indicating frequent misalignments linked to oil earnings, while real interest rates (RINTR) were unstable, with highly negative values during inflationary episodes, reflecting distortions in monetary policy transmission. Technological adoption (TECH) showed uneven penetration, with high variability, pointing to structural gaps in industrial modernization.

Tests of distributional properties revealed significant deviations from normality for key variables (FDI, GCF, OILP, RINTR, and TECH), justifying the use of robust econometric methods. Overall, the descriptive evidence underscores that Nigeria's manufacturing sector is highly exposed to oil price fluctuations, with institutional weakness, exchange rate volatility, and unstable macroeconomic conditions amplifying the risks. This justifies the study's focus on institutional quality as a moderating factor in the oil–manufacturing relationship.

International Journal of Economics, Finance and Multidisciplinary Development Studies (IJEFMDS)
ISSN Online: 2634-1370
ISSN Print: 2678-2944
Vol. 1 No. 1, September, 2025, Pg 146- 171
DOI: https://doi.org/10.33003/ijefmds-2023-0705-2028

4.2 Unit Root Test

Table 4.2: Unit Root Test

	Phillips-Perron (PP) at Level		Phillips-Perron (PP) at 1st Diff		Order of integration
Variables	**T-Stats**	**Critical value.**	**T-Stats**	**Critical value.**	**(d).**
LMFG	-0.981899	-2.933158	-4.522608	-2.935001	**I(1)**
FDI	-3.777302	-2.933158	-	-	**I(0)**
GCF	-4.012207	-2.933158	-	-	**I(0)**
INSTQ	-3.067528	-2.933158	-	-	**I(0)**
LREER	-2.525424	-2.933158	-4.792009	-2.935001	**I(1)**
OILPRICE	-1.348631	-2.933158	-6.104004	-2.935001	**I(1)**
RINTR	-7.432760	-2.933158	-	-	**I(0)**
TECH	4.326354	-2.933158	-7.622417	-2.935001	**I(1)**

Source; Authors Computation 2025.

The Phillips–Perron (PP) test results reveal a mix of stationarity across the variables. FDI, GCF, INSTQ, and RINTR are stationary at levels [I(0)], while MFG, OILPRICE, REER, and TECH become stationary only after first differencing [I(1)]. None of the variables are integrated at order two [I(2)], thereby validating the use of the ARDL framework, which is suitable for a combination of I(0) and I(1) variables. Economically, the results imply that shocks to oil prices, technology, and exchange rates have persistent long-run effects, whereas FDI, capital formation, institutional quality, and real interest rates tend to adjust more quickly in the short run. This justifies the focus on institutional quality as a moderating factor in understanding how oil price shocks influence Nigeria's manufacturing performance.

4.3 Co-integration Test

Table 4.3: Bounds Co-integration Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.040761	10%	1.76	2.77
K	10	5%	1.98	3.04
		2.5%	2.18	3.28
		1%	2.41	3.61

Source; Authors Computation 2025.

Table 4.3 shows the result of the ARDL Bounds co-integration test. From the table, the calculated F-statistics (4.04) is higher than the upper bounds at 5% level of significance and as such the null hypothesis is rejected. Thus, there is a long run relationship among the variables, therefore the study proceeds to estimate the long and short run ARDL model.

4.4 Estimated Long and Short ARDL Model

Table 4.4: ARDL Results

Dependent Variable: MGF				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Long-Run Estimates				
FDI	-0.114697	0.058822	-1.949914	0.0616
GCF	0.001388	0.002253	0.616247	0.5429
INSTQ	-0.424241	0.809244	-0.524244	0.6044
LREER	-0.465772	0.186912	-2.491938	0.0191
OILPRICE	0.014473	0.025788	0.561249	0.5793
RINTR	0.002713	0.002701	1.004574	0.3240
TECH	0.004146	0.006492	0.638610	0.5285
OILP_INSTQ	0.011039	0.023215	0.475539	0.6382
OILP_TECH	-0.000777	0.000727	-1.069025	0.2945
OILP_INST_TECH	-0.000730	0.000668	-1.092277	0.2844

C	13.03694	0.980421	13.29728	0.0000
Short-Run Estimates				
D(FDI)	-0.021323	0.005151	-4.139810	0.0003
D(GCF)	-0.001204	0.000932	-1.291864	0.2074
D(INSTQ)	-0.132788	0.256294	-0.518109	0.6086
D(LREER)	-0.145787	0.038767	-3.760594	0.0008
D(OILPRICE)	0.004530	0.008184	0.553520	0.5845
D(RINTR)	0.000849	0.000712	1.193081	0.2432
D(TECH)	0.001298	0.002363	0.549182	0.5874
D(OILP_INSTQ)	0.004059	0.000588	6.906119	0.0000
D(OILP_TECH)	-0.000243	0.000241	-1.009694	0.3216
D(OILP_INST_TECH)	-0.000228	0.000219	-1.041542	0.3069
CointEq(-1)*	-0.313002	0.037889	-8.260991	0.0000
R-squared	0.648910	Mean dependent var		0.001499
Adjusted R-squared	0.621192	S.D. dependent var		0.047513
S.E. of regression	0.029243	Akaike info criterion		-4.135961
Sum squared resid	0.032496	Schwarz criterion		-3.970469
Log likelihood	90.85519	Hannan-Quinn criterion		-4.075302
Durbin-Watson Stat	2.196754			

Source; Authors Computation 2025.

Table 4.4 reports the ARDL estimates of the relationship between oil price fluctuations, institutional quality, and manufacturing output in Nigeria. Long-run dynamics reveal that the real effective exchange rate (LREER) exerts a significant negative effect on manufacturing output (–0.466, $p < 0.05$), suggesting that exchange rate depreciation and volatility undermine competitiveness through higher import costs and production uncertainties. Foreign direct investment (FDI) also has a marginally significant negative coefficient (–0.115, $p < 0.10$), which may reflect the dominance of oil-sector FDI that crowds out non-oil industrial investment. Other variables, including gross capital formation, institutional quality, oil price, real interest rate, technology, and all interaction terms, are insignificant in the long run, indicating that their effects are either weak or not persistent.

Short-run dynamics show more pronounced relationships. FDI exerts a strong negative and highly significant effect (–0.021, $p < 0.01$), implying that short-term inflows, often concentrated in extractive industries, do not benefit manufacturing but instead contribute to resource diversion and exchange rate pressures. Similarly, LREER maintains a negative and significant effect (–0.146, $p < 0.01$), reinforcing the detrimental role of exchange rate instability on manufacturing performance. Crucially, the interaction between oil price and institutional quality (ΔOILP_INSTQ) is positive and highly significant (0.0041, $p < 0.01$), highlighting the importance of institutional quality in moderating oil price shocks and enabling oil revenues to be channelled into industrial development. Other short-run variables are statistically insignificant, underscoring the dominant role of institutional quality as the key moderating mechanism.

The error correction term (–0.313, $p < 0.01$) is negative and significant, confirming the presence of a stable long-run relationship, with approximately 31% of short-run disequilibria corrected annually.

Model diagnostics indicate good fit and reliability. The R-squared (0.649) and adjusted R-squared (0.621) show that about 62% of the variation in manufacturing output is explained by the regressors. The Durbin–Watson statistic (2.20) rules out serious autocorrelation, while information criteria (AIC = –4.14; SC = –3.97) support model adequacy.

4.5. Post Estimation Test

Table 4.5: Summary of Post-Estimation Test Result

Diagnostic Test	t-statistics/Observation	P. Value	Conclusion
Normality Test (Jarque-Bera)	1.123	0.57	Residuals are normally distributed
Serial Correlation (Breusch-Godfrey LM)	0.256896	0.7757	No serial correlation
Heteroskedasticity (Breusch-Pagan)	1.591553	0.1475	No heteroskedasticity
CUSUM Test	Blue line within red bounds	5% bounds not crossed.	No structural instability in coefficients
CUSUM of SQ.	Blue line within red bounds	5% bounds not crossed.	No break in residual variance

Source; Authors Computation 2025.

The Distribution of Residuals of the Model, as revealed from figure 4.1 above shows that the residuals of the model are normally distributed. This is ascertained, by the fact that the probability value of the Jarque–Bera statistic (p = 0.57) exceeds the 5% significance level. It therefore implies that the estimates from the model are good, consistent and reliable. While the Breusch-Godfrey serial correlation LM test shows that the probability value (0.78) of the serial correlation test for the model is less than 5% significance level, leading to non-rejection of the null hypothesis. It can therefore be concluded that the model is free from serial correlation, the Breusch-Godfrey Pagan heteroscedasticity test result shows that the probability value of F-statistics (0.15) is not significant at 5% significance level. This denotes non-rejection of the null hypothesis. The distribution of the error term has a constant variance. Lastly, result of the cumulative sum of recursive residuals (CUSUM) revealed that the model specified is stable and free from misspecification error. This is because the blue lines are in-between the two red lines which implies that the ARDL model is stable.

4.5 Discussion of Findings

The findings of this study provide important insights into the dynamic relationship between oil price fluctuations, institutional quality, and manufacturing sector performance in Nigeria. The results reveal that both long- and short-run factors interact in complex ways to shape the trajectory of manufacturing output, with institutional quality playing a critical moderating role. First, the evidence that exchange rate volatility consistently exerts a significant negative impact on manufacturing output in both the long and short run is consistent with prior studies. For instance, Onwuka (2021) found that exchange rate volatility significantly reduces manufacturing output in both the short and long run, pointing **out** how currency instability raises costs, disrupts planning, and discourages investment in Nigeria's manufacturing sector. This suggests that a stable and predictable exchange rate regime is essential for fostering manufacturing sector growth.

Second, the negative and significant short-run effect of FDI on manufacturing output highlights a structural challenge in Nigeria's investment profile. Similar to the findings of Anyanwu (2012), the results indicate that FDI inflows are predominantly oil-sector oriented, crowding out investments in non-oil sectors such as manufacturing. This underscores the need for targeted policies that attract foreign capital into value-adding and industrial subsectors rather than extractive industries.

Third, the study provides strong evidence that institutional quality moderates the effect of oil price shocks on manufacturing performance, particularly in the short run. The significant positive interaction between oil prices and institutional quality implies that improved governance, effective regulations, and reduced corruption enable oil revenues to be better utilized in supporting manufacturing development. This finding aligns with the work of Arezki and Nabli (2012) who found resource windfalls to reduce manufacturing investment in MENA countries, though strong institutions helped mitigate this effect. For Nigeria, this suggests that governance reforms remain a prerequisite for transforming oil wealth into industrial progress.

In contrast, other macroeconomic variables such as gross capital formation, interest rate, and technology displayed insignificant effects on manufacturing in the long run. This may reflect structural weaknesses such as low absorptive capacity of capital investments, financial sector inefficiencies, and underutilization of technology in the Nigerian industrial space. The insignificance of technology in particular supports earlier arguments by Kolo, Ibrahim, and Aliyu (2023) who emphasized that having access to or knowledge of technology doesn't automatically translate into better outcomes noting that application and integration may **often** remain ineffective or poorly managed, especially if institutions and complementary capacities are weak.

Finally, the post-estimation diagnostics confirm that the ARDL model is robust, stable, and free from serial correlation, heteroskedasticity, and non-normality of residuals. This reinforces the reliability of the estimated coefficients and the validity of the conclusions drawn.

In summary, the findings highlight three critical lessons: (i) exchange rate stability is fundamental for manufacturing sector competitiveness; (ii) oil-dominated FDI does not support industrialization in Nigeria; and (iii) strong institutional quality is indispensable for ensuring that oil price windfalls contribute positively to manufacturing development. These results lend empirical support to Dutch disease and institutional quality theories which emphasize how surge in resources can hurt manufacturing sector through appreciation in exchange rate, sectoral diversification and the role of governance in achieving sustainable growth.

5. Conclusion and Policy Implications

This study examined the effect of oil price fluctuations on Nigeria's manufacturing sector, with institutional quality considered as a moderating factor, using annual data from 1981 to 2023 and the ARDL framework. The results highlight three critical insights. First, exchange rate volatility consistently undermines manufacturing performance in both the short and long run, underscoring the vulnerability of Nigeria's industrial sector to external shocks and macroeconomic instability. Second, foreign direct investment has a negative effect, particularly in the short run, reflecting its concentration in extractive industries that crowd out investments in non-oil manufacturing. Third, institutional quality significantly moderates the effect of oil price shocks in the short run, demonstrating that governance structures and regulatory effectiveness are crucial for transforming oil windfalls into industrial growth.

From a policy perspective, the findings carry important implications. Efforts to strengthen institutional quality through improved governance, regulatory efficiency, and transparency are essential for channelling oil revenues into productive industrial development. Stabilizing the exchange rate is equally important, as persistent volatility raises production costs and erodes competitiveness. Additionally, policies should redirect FDI away from oil-related activities toward value-added manufacturing sectors, supported by targeted incentives, sound industrial policies, and strategic infrastructure investment.

Finally, the study underscores the need for broader economic diversification. While oil price volatility will remain a structural feature of Nigeria's economy, strong institutions and supportive macroeconomic policies can reduce its adverse impact on manufacturing and enable oil windfalls to serve as a catalyst for industrialization.

Reference

Acemoglu, D., & Robinson, J. A. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown Business.

Adeloye, A. P., & Adesoye, A. B. (2019). Monetary transmission channel, oil price shock and the manufacturing sector in Nigeria. *Folia Oeconomica Stetinensia*, *19*(1), 83-105. https://doi.org/10.2478/foli-2019-0007

Aghion, P. and P. Howitt. (1998). *Endogenous growth theory*, Cambridge, MA: MIT Press

Ahuja, H.L. (2012) *Modern Economics* (17th Edition). New Delhi: S. Chand & Company

African Development Bank (AfDB). (2019). *African economic outlook 2019*. https://www.afdb.org/en/documents/african-economic-outlook-2019

Anyanwu, J. C. (2012). Why does foreign direct investment go where it goes? New evidence from African countries. *Annals of Economics and Finance, 13*(2), 425–462.

Arezki, R., & Nabli, M. K. (2012). Natural resources, volatility, and inclusive growth: Perspectives from the Middle East and North Africa. *IMF Working Paper*, WP/12/111. International Monetary Fund.

Awerbuch, S., & Berger, J. (2003). Energy security and diversity in the EU: A risk management approach. *IEA/EET Working Paper*.

Balogun, A. Q., Obele, T. E., & Adeniyi, T. M. (2024). Oil Revenue, Institutional Quality and Economic Growth in Nigeria. *ABUAD Journal of Social and Management Sciences, 5*(2), 242–260. https://doi.org/10.53982/ajsms.2024.0502.02-j

Basher, S. A., & Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal*, 17(2), 224–251. https://doi.org/10.1016/j.gfj.2006.04.001

Baumeister, C., & Kilian, L. (2016). Forty years of oil price fluctuations: Why the price of oil may still surprise us. *Journal of Economic Perspectives*, *30*(1), 139-160. https://doi.org/10.1257/jep.30.1.139

Bazilian, M., Nussbaumer, P., Rogner, H.-H., Brew-Hammond, A., Foster, V., Pachauri, S., Williams, E., Howells, M., Niyongabo, P., Musaba, L., Ó Gallachóir, B., Radka, M., & Kammen, D. M. (2012). Energy access scenarios to 2030 for the power sector in sub-Saharan Africa. *Utilities Policy, 20*(1), 1–16. https://doi.org/10.1016/j.jup.2011.11.002

Bhattacharyya, S., & Hodler, R. (2010). Natural resources, democracy and corruption. *European Economic Review*, *54*(4), 608-621. https://doi.org/10.1016/j.euroecorev.2009.10.004

Central Bank of Nigeria (CBN). (2023). *Statistical Bulletin: Energy and Petroleum Statistics*. https://www.cbn.gov.ng

Collier, P., & Hoeffler, A. (2009). Testing the neocon agenda: Democracy in resource-rich societies. *European Economic Review*, *53*(3), 293-308. https://doi.org/10.1016/j.euroecorev.2008.05.006

Corden, W. M., & Neary, J. P. (1982). Booming Sector and De-industrialisation in a Small Open Economy. *The Economic Journal*, 92(368), 825–848. https://doi.org/10.2307/2232670

Eberhard, A., Gratwick, K., Morella, E., & Antmann, P. (2016). Independent power projects in sub-Saharan Africa: Lessons from five key countries. *World Bank Publications*. https://openknowledge.worldbank.org/handle/10986/23970

Gelb, A., & Associates. (2010). *Economic diversification in resource rich countries*. Center for Global Development. https://www.cgdev.org/publication/economic-diversification-resource-rich-countries

Gylfason, T. (2001). Natural resources, education, and economic development. *European Economic Review*, *45*(4-6), 847-859. https://doi.org/10.1016/S0014-2921(01)00127-1

Hamilton, J. D. (1983). Oil and the macroeconomy since World War II. *Journal of Political Economy*, 91(2), 228–248. https://doi.org/10.1086/261140

Hamilton, J. D. (2003). What is an oil shock? *Journal of Econometrics*, 113(2), 363–398. https://doi.org/10.1016/S0304-4076(02)00207-5

Hamilton, J. D., & Herrera, A. M. (2004). Oil shocks and aggregate macroeconomic behavior: The role of monetary policy. *Journal of Money, Credit and Banking*, *36*(2), 265-286. https://doi.org/10.1353/mcb.2004.0012

International Energy Agency (IEA). (2019). *Africa Energy Outlook 2019*. https://www.iea.org/reports/africa-energy-outlook-2019

International Energy Agency (IEA). (2021). *World Energy Outlook 2021*. https://www.iea.org/reports/world-energy-outlook-2021

International Energy Agency (IEA). (2022). *Nigeria Energy Profile 2022*. https://www.iea.org/countries/nigeria

Kaldor, N. (1967). *Strategic factors in economic development*. Cornell University Press.

Kolo, I., Ibrahim, I. O., & Aliyu, Y. (2023). Effect of technology intelligence on performance of selected manufacturing firms in FCT-Abuja, Nigeria. *UMM Journal of Accounting and Financial Management, 3*(1), 206-227

Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *The Economic Journal, 116*(508), 1–20. https://doi.org/10.1111/j.1468-0297.2006.01045.x

Nusair, S. A. (2019). Does oil price volatility influence real sector growth? Empirical evidence from Pakistan. *Energy Reports*, *5*, 688-703. https://doi.org/10.1016/j.egyr.2019.06.006

Olomola, P. A., & Adejumo, A. V. (2006). Oil price shock and macroeconomic activities in Nigeria. *International Research Journal of Finance and Economics*, *3*, 28-34.

Onwuka, C. E. (2021). *Exchange rate volatility and the performance of manufacturing sector in Nigeria: An econometric analysis*. Available at SSRN: https://ssrn.com/abstract=3970479 or https://dx.doi.org/10.2139/ssrn.3970479

Raifu, I. A. (2021). The institutional role in oil revenue–economic growth nexus in Nigeria. *OPEC Energy Review*, *45*(1), 52-80. https://doi.org/10.1111/opec.12197

Romer, P. M. (1990). *Endogenous Technological Change*. *Journal of Political Economy*, 98(5, Part 2), S71–S102. https://doi.org/10.1086/261725

Sachs, J. D., & Warner, A. M. (2001). The curse of natural resources. *European Economic Review*, 45(4–6), 827–838. https://doi.org/10.1016/S0014-2921(01)00125-8

Sala-i-Martin, X., & Subramanian, A. (2013). Addressing the natural resource curse: An illustration from Nigeria. *Journal of African Economies*, *22*(4), 570-615. https://doi.org/10.1093/jae/ejt001

Smil, V. (2017). *Energy and civilization: A history*. MIT Press.

Szirmai, A., & Verspagen, B. (2015). Manufacturing and economic growth in developing countries, 1950–2005. *Structural Change and Economic Dynamics*, 34, 46–59. https://doi.org/10.1016/j.strueco.2015.06.002

United Nations Industrial Development Organization (UNIDO). (2015). *Industrial Development Report 2016: The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development*. https://www.unido.org

World Bank. (2022). *State and trends of carbon pricing 2022*. https://openknowledge.worldbank.org/handle/10986/37455

World Bank. (2024). *World Development Indicators*. https://databank.worldbank.org/source/world-development-indicators

Yergin, D. (2009). *The prize: The epic quest for oil, money & power*. Free Press.