

The Moderating Effects of Government Effectiveness on the Relationship between Globalization and Manufacturing Sector Output in Nigeria

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Abstract

This study examines the moderating effect of government effectiveness on the relationship between globalization and manufacturing sector output in Nigeria. Annual time series data covering the period 1981 to 2023 were analyzed using the Autoregressive Distributed Lag (ARDL) bounds testing approach to investigate both the direct and interactive effects of globalization and institutional quality on manufacturing performance. The findings reveal that government effectiveness exerts a strong positive and statistically significant effect on manufacturing sector output. Specifically, a one-unit improvement in government effectiveness increases manufacturing value added by approximately 9.47 units, highlighting the critical role of effective public institutions in promoting industrial development. Furthermore, the interaction between overall globalization and government effectiveness is positive and statistically significant (coefficient = 3.5938, $p = 0.0443$), confirming that the gains from globalization are substantially enhanced when supported by effective governance. This suggests that globalization alone is insufficient to stimulate sustained manufacturing growth unless accompanied by strong institutional capacity. Exchange rate movements positively influence manufacturing output (coefficient = 0.342, $p = 0.0002$), while interest rates (coefficient = -0.797, $p = 0.0113$) and technological innovation (coefficient = -4.876, $p = 0.0006$) exert significant negative effects during the study period. The ARDL bounds test confirms the existence of a long-run equilibrium relationship among the variables, with an F-statistic of 5.0208, while diagnostic and stability tests indicate that the estimated model is statistically reliable and robust. The study therefore recommends comprehensive institutional reforms aimed at strengthening government effectiveness to enable Nigeria to maximize the developmental benefits of globalization and achieve sustainable manufacturing sector growth, competitiveness, resilience, and long-term industrial transformation.

Keywords: Government Effectiveness, Globalization, Manufacturing Sector, ARDL, Nigeria.

Introduction

Globalization has become one of the most influential forces shaping the modern global economy by increasing the integration of national economies through the cross-border movement of goods, services, capital, technology, information, and labour. Since the 1980s, globalization has accelerated due to trade liberalization, technological

advancement, financial integration, and improvements in communication and transportation systems, thereby transforming production, investment, and international trade patterns. The manufacturing sector has been among the greatest beneficiaries of globalization because it relies heavily on international trade, foreign direct investment (FDI), technology transfer, and participation in global value chains. Through these channels, globalization enhances industrial productivity, promotes innovation, expands market access, and stimulates economic growth. However, globalization has also intensified competition, exposing domestic manufacturers in developing economies to imported products and external economic shocks. Consequently, countries with strong institutional frameworks have generally benefited more from globalization than those characterized by weak governance and poor policy implementation (Rodrik, 2013; Steger, 2020; Singh, 2023).

Globalization refers to the process through which countries become increasingly interconnected economically, politically, socially, and technologically. While earlier studies commonly measured globalization using trade openness or foreign direct investment, recent literature advocates the use of the KOF Globalization Index because it captures the multidimensional nature of globalization through economic, social, and political dimensions (Dreher, 2006; Gygli et al., 2019). The economic dimension measures international trade, investment, and financial integration; the social dimension captures information and cultural exchanges; while the political dimension reflects participation in international organizations and diplomatic engagements. This comprehensive measure provides a more accurate assessment of globalization and its implications for manufacturing performance.

Globally, manufacturing remains a major driver of economic growth, employment generation, technological innovation, and structural transformation. According to the United Nations Industrial Development Organization (UNIDO, 2023), manufacturing continues to account for a significant proportion of global value added despite recent disruptions caused by the COVID-19 pandemic and geopolitical tensions. Countries such as China, Germany, South Korea, and Singapore have successfully leveraged globalization by combining export-oriented industrialization with effective government institutions that promote investment, innovation, and industrial competitiveness. Their experiences demonstrate that globalization alone is insufficient to stimulate industrial development; rather, supportive institutions and effective governance determine whether countries are able to maximize the opportunities associated with global integration (Acemoglu & Robinson, 2012; Rodrik, 2004).

Government effectiveness has therefore emerged as a critical institutional factor influencing economic performance. The World Bank defines government effectiveness as the quality of public services, the competence of the civil service, the quality of policy formulation and implementation, and the credibility of government commitments (Kaufmann et al., 2010). It is measured using the Worldwide Governance Indicators (WGI),

with scores ranging from approximately -2.5 to $+2.5$, where higher values indicate better institutional quality. Effective governments provide stable macroeconomic policies, quality infrastructure, regulatory certainty, contract enforcement, and an enabling business environment that enhances industrial productivity. Conversely, weak government effectiveness, characterized by policy inconsistency, corruption, bureaucratic inefficiency, and poor public service delivery, constrains investment and limits the capacity of firms to benefit from globalization (Hayat, 2019).

Across Africa, globalization has generated mixed outcomes for industrial development. Trade liberalization and increased foreign investment have expanded market opportunities and facilitated technology transfer. Nevertheless, manufacturing remains underdeveloped due to inadequate infrastructure, weak institutions, low technological capability, and limited industrial diversification. The African Development Bank (2023) reports that manufacturing contributes less than 11 percent of Africa's gross domestic product, highlighting the continent's limited industrial transformation. Although the African Continental Free Trade Area (AfCFTA) offers significant prospects for industrialization through expanded regional markets, institutional weaknesses continue to constrain the realization of these opportunities.

Within West Africa, manufacturing faces additional challenges arising from inadequate electricity supply, limited access to finance, exchange rate volatility, poor transportation infrastructure, and weak governance. Despite regional integration efforts under the Economic Community of West African States (ECOWAS), many manufacturing firms struggle to compete internationally because of high production costs and inconsistent policy implementation. These challenges highlight the importance of government effectiveness in enabling firms to benefit from globalization and regional trade integration. Nigeria provides an important context for examining the relationship between globalization, government effectiveness, and manufacturing sector performance. As Africa's largest economy and one of its largest manufacturing markets, Nigeria possesses considerable industrial potential. The manufacturing sector contributes significantly to employment, economic diversification, tax revenue, and non-oil exports. According to KPMG (2023), the sector contributes substantially to government revenue through Company Income Tax and Value Added Tax while supporting employment generation. However, manufacturing performance has remained below expectations due to persistent infrastructural deficits, unstable electricity supply, exchange rate volatility, high production costs, limited access to finance, insecurity, and technological limitations. Although globalization has increased access to foreign investment, international markets, and advanced technologies, it has also intensified competition from imported manufactured goods, thereby reducing the competitiveness of many domestic industries.

The institutional environment further complicates Nigeria's manufacturing performance. Nigeria has consistently recorded relatively low scores on the World Bank's Worldwide Governance Indicators, reflecting weaknesses in policy implementation, public service delivery, regulatory quality, and government effectiveness. These institutional deficiencies

increase transaction costs, discourage long-term investment, and reduce the ability of manufacturing firms to exploit the opportunities created by globalization. Consequently, while globalization offers significant opportunities for industrial development, its benefits may remain unrealized without improvements in governance quality and institutional effectiveness.

Although extensive literature exists on globalization and economic growth, relatively few studies have examined how government effectiveness moderates the relationship between globalization and manufacturing sector output, particularly in Nigeria. Most previous studies have focused on the direct effects of globalization using conventional indicators such as trade openness or foreign direct investment, while treating institutional quality as an independent determinant rather than an interacting variable. Methodologically, many studies have relied on static estimation techniques that fail to distinguish between short-run adjustments and long-run equilibrium relationships. Furthermore, sector-specific studies focusing exclusively on manufacturing remain limited, with many existing studies concentrating on aggregate economic growth instead of industrial performance. These theoretical, methodological, empirical, and contextual gaps limit understanding of how governance quality conditions the impact of globalization on Nigeria's manufacturing sector.

This study addresses these gaps by examining the moderating effect of government effectiveness on the relationship between globalization and manufacturing sector output in Nigeria using annual time series data spanning 1981 to 2023. The study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach because it is appropriate for variables integrated at different orders, provided none is integrated of order two, and because it simultaneously estimates both short-run and long run relationships. More importantly, the ARDL framework accommodates interaction terms, making it suitable for estimating the moderating role of government effectiveness in the globalization manufacturing nexus. The findings are expected to contribute to institutional economics and globalization literature by providing empirical evidence on the interaction between governance quality and globalization in explaining manufacturing performance. The study will also enrich the body of knowledge on industrial development in developing economies and provide evidence-based recommendations for policymakers on governance reforms, industrial policy, and strategies for maximizing the benefits of globalization while promoting sustainable manufacturing growth in Nigeria. The study is geographically limited to Nigeria and covers the period 1981–2023, a timeframe that captures major economic reforms, trade liberalization, institutional changes, and fluctuations in manufacturing performance, thereby providing a comprehensive understanding of the dynamic relationships among the study variables.

Statement of the Problem

Despite the extensive body of research on the determinants of manufacturing sector performance, a critical gap remains in the existing empirical literature. Most studies examine the direct effects of globalization on manufacturing output without adequately accounting for the institutional conditions that mediate this relationship. This fragmented approach, while offering valuable insights into specific underlying pathways, fails to capture the complex, interrelated nature of manufacturing sector dynamics. In reality, manufacturing performance is not determined by globalization alone but emerges from the simultaneous interaction of institutional quality, macroeconomic conditions, and technological factors. For instance, the effect of globalization on manufacturing output cannot be fully understood without accounting for the mediating role of government effectiveness, which may either amplify or constrain the productivity gains associated with global integration. Similarly, the benefits of exchange rate competitiveness for manufacturing exports may be offset by high interest rates, which constrain investment and capacity expansion.

This limitation has important implications for policy design. When the determinants of manufacturing performance are examined in isolation, the resulting policy recommendations tend to be similarly focused on single-sector interventions such as promoting trade openness or attracting foreign direct investment. While such interventions are necessary, they are unlikely to be sufficient in contexts like Nigeria, where manufacturing underdevelopment is driven by multiple, mutually reinforcing factors. The persistent failure of manufacturing output to improve significantly, despite years of targeted policy interventions, emphasizes the need for a more integrated analytical approach that can disentangle the short run and long run effects of multiple determinants within a unified empirical framework.

The present study addresses this gap by employing an Autoregressive Distributed Lag (ARDL) model that integrates globalization, government effectiveness, exchange rate, interest rate, and technological innovation into a single empirical framework, with a specific focus on the moderating role of government effectiveness. This approach allows for the simultaneous estimation of short run and long run relationships, providing a more comprehensive picture of the drivers of manufacturing sector performance in Nigeria. By moving beyond the fragmented approach of previous studies, this research aims to generate policy recommendations that are better aligned with the complexity of the manufacturing sector challenge and more likely to be effective in the Nigerian context.

The broad objective of this study is to examine the moderating effect of government effectiveness on the relationship between globalisation and manufacturing sector output in Nigeria.

The specific objectives are

1. Examine the effect of globalisation on manufacturing sector output in Nigeria.
2. Determine the effect of government effectiveness on manufacturing sector output in Nigeria.

3. Investigate the moderating effect of government effectiveness on the relationship between globalisation and manufacturing sector output in Nigeria.
4. Examine the effects of selected macroeconomic control variables (exchange rate, interest rate, and technological innovation) on manufacturing sector output in Nigeria.

Research Questions

In line with the objectives outlined above, this study addresses the following research questions:

1. What effect does globalisation have on manufacturing sector output in Nigeria?
2. What effect does government effectiveness have on manufacturing sector output in Nigeria?
3. Does government effectiveness significantly moderate the relationship between globalisation and manufacturing sector output in Nigeria?
4. What effects do exchange rate, interest rate, and technological innovation have on manufacturing sector output in Nigeria?

Hypotheses of the Study

Based on the theoretical framework and empirical literature, the hypotheses are formulated to guide the empirical analysis:

1. **H01:** Globalisation has no significant effect on manufacturing sector output in Nigeria.
2. **H02:** Government effectiveness has no significant effect on manufacturing sector output in Nigeria.
3. **H03:** Government effectiveness does not significantly moderate the relationship between globalisation and manufacturing sector output in Nigeria.
4. **H04:** Exchange rate, interest rate, and technological innovation have no significant effects on manufacturing sector output in Nigeria.

Literature Review

Government effectiveness refers to the quality of public service delivery, the competence and independence of the civil service, the credibility of policy formulation and implementation, and the extent to which government actions are free from political interference (Kaufmann et al., 2010). It is a core dimension of institutional quality within the Worldwide Governance Indicators (WGI) framework and is widely used in empirical studies to assess how effectively governments translate policies into development outcomes. Government effectiveness is typically measured on a scale ranging from approximately – 2.5 to +2.5, with higher values indicating stronger institutional capacity. In economic terms, effective governments enhance manufacturing performance by ensuring macroeconomic stability, improving infrastructure, enforcing contracts, reducing bureaucratic bottlenecks,

and providing predictable regulatory environments. Conversely, weak government effectiveness characterized by corruption, policy inconsistency, poor coordination, and inefficient public service delivery raises transaction costs and discourages both domestic and foreign investment, thereby constraining industrial productivity and limiting the gains from globalization (Hayat, 2019; Kaufmann et al., 2010).

Globalization is a multidimensional concept that describes the increasing integration of national economies through cross-border flows of goods, services, capital, technology, information, and labour. It encompasses economic, political, and social dimensions, all of which jointly influence production structures and economic performance (Steger, 2020). Economic globalization involves trade openness, foreign direct investment, and financial integration; political globalization reflects participation in international organizations and treaties; while social globalization captures cultural exchange, information diffusion, and interpersonal connectivity. The KOF Globalization Index provides a comprehensive measurement of these dimensions, making it one of the most widely used indicators in empirical research (Gygli et al., 2019). In the context of manufacturing, globalization facilitates access to larger markets, advanced technologies, imported inputs, and global value chains, thereby enhancing productivity and industrial expansion. However, its effects are not automatic or uniform, as domestic institutional conditions largely determine whether countries can convert globalization into sustainable industrial development.

Manufacturing sector output refers to the total value of goods produced by industrial firms within an economy, typically measured as manufacturing value added (MVA) or its contribution to gross domestic product (GDP). It reflects the level of industrial activity, productivity, and structural transformation within an economy. According to the United Nations Industrial Development Organization (UNIDO, 2023), manufacturing remains a key driver of economic growth, employment creation, and technological innovation globally. The sector is characterized by increasing returns to scale, strong linkages with other sectors, and significant capacity for productivity enhancement through learning-by-doing and technological diffusion. In developing economies, manufacturing output is particularly important because it drives diversification away from primary commodity dependence toward more sustainable and value-added economic structures. As such, manufacturing performance is widely used as an indicator of industrial development and economic modernization.

The theoretical foundation of this study is anchored on Kaldor's Growth Theory, which identifies manufacturing as the engine of economic growth and structural transformation (Kaldor, 1966). Kaldor's First Law states that the growth of manufacturing output drives overall economic growth, while the Second Law (Verdoorn's Law) argues that productivity increases endogenously with manufacturing output due to economies of scale, technological progress, and learning effects. The Third Law emphasizes that the transfer of labour from low-productivity sectors such as agriculture to manufacturing enhances aggregate productivity. Recent extensions of Kaldorian theory suggest that these dynamics are increasingly influenced by globalization and institutional quality, particularly

government effectiveness, which determines how effectively countries integrate into global production systems and sustain industrial competitiveness (Naudé, 2023; Mazzucato & Rodrik, 2023).

Within this extended framework, globalization is viewed as an external driver of manufacturing expansion through trade, investment, and technology transfer, while government effectiveness represents a critical internal condition that determines whether these benefits are fully realized. Effective governance strengthens industrial policy implementation, improves infrastructure provision, ensures regulatory stability, and enhances firms' ability to participate in global value chains. In contrast, weak governance disrupts these mechanisms, limiting productivity gains and weakening the positive impact of globalization on manufacturing output. Thus, government effectiveness is conceptualized as a moderating variable that conditions the strength and direction of the relationship between globalization and manufacturing sector performance.

In summary, the interaction between globalization, government effectiveness, and manufacturing output can be theoretically understood through an extended Kaldorian framework in which manufacturing remains the central engine of growth, globalization provides external opportunities for expansion, and government effectiveness determines the efficiency with which these opportunities are transformed into productive outcomes. This integrated perspective highlights that manufacturing development in Nigeria is not solely dependent on exposure to global markets but also critically shaped by the quality of domestic institutions that govern policy implementation and industrial coordination.

The empirical literature on the relationship between globalization, institutions, and manufacturing performance has grown considerably. Studies employing aggregate measures of globalization often find positive effects, but these effects are conditioned by institutional quality. For instance, Agu et al. (2024) examined the relationship between globalization and manufacturing sector performance in Nigeria, employing a dynamic panel model and time-series data spanning 1981 to 2020. The findings revealed that globalization positively influences manufacturing output, but the strength of this impact depends significantly on the quality of institutions. Similarly, Iheanachor and Ozegbe (2023) explored the relationship between economic globalization and economic performance, with particular emphasis on the moderating role of governance. Using panel data and advanced econometric techniques, the study found that strong governance significantly enhances the positive effects of globalization on economic performance, concluding that government effectiveness is essential for realizing the benefits of global integration.

In the Nigerian context, Agu et al. (2024) found that institutional indicators predominantly showed a negative direct effect on manufacturing sector performance, both in the short and long run. However, the interaction between globalization and institutional indicators showed that the weak institutions prevalent in Nigeria are yet to dampen the positive effect of globalization on the nation's manufacturing sector. This finding suggests that while institutions in Nigeria are weak, they have not yet nullified the positive effects of

globalization on manufacturing. Nadabo (2023) examined the relationship between infrastructure development and manufacturing sector performance in Nigeria, highlighting the moderating role of institutional quality. The study found that improvements in transportation, energy, and communication infrastructure positively affect manufacturing output, and strong institutional frameworks further enhanced this impact.

Maduka et al. (2022) examined the moderating role of government effectiveness in the relationship between economic growth and carbon emissions in Nigeria, applying ARDL models to time-series data. The results showed that government effectiveness significantly moderates the growth-emissions nexus, indicating that stronger institutions can mitigate environmental degradation amid economic expansion. Dada and Abanikanda (2022) investigated the moderating role of government effectiveness in the relationship between foreign direct investment and economic growth in Nigeria. The findings revealed that FDI positively affects economic growth, with stronger institutions particularly in government effectiveness and corruption control significantly enhancing this effect. Kumeka et al. (2023) examined the relationship between globalization and inclusive growth in Africa, focusing on the moderating role of government effectiveness. The findings indicated that while globalization fosters economic growth, its positive influence on inclusive growth depends heavily on institutional strength. Oduola et al. (2022) investigated the relationship between foreign direct investment, regulatory quality, and industrialization in Sub-Saharan Africa, finding that FDI positively affects industrialization, with stronger institutional frameworks significantly amplifying this relationship.

Studies from other contexts provide additional evidence on the moderating role of institutions. Xu et al. (2021) examined the impact of globalization and governance determinants on economic growth in Asian economies, finding that globalization influence a positive and significant effect on growth, while sound governance practices further enhance growth outcomes. Olaniyi and Oladeji (2021) investigated the moderating role of government effectiveness in the relationship between financial development and economic growth in West African countries, concluding that institutional reforms are necessary to fully harness the growth-enhancing potential of financial development.

The literature reviewed reveals several important insights and gaps. The effects of globalization on manufacturing performance are heterogeneous and depend on institutional quality, including government effectiveness. Government effectiveness plays a critical moderating role in determining whether globalization translates into positive economic outcomes. The Nigerian context presents particular challenges, with weak institutions potentially constraining the benefits of globalization for the manufacturing sector. However, few studies have specifically quantified the moderating effect of government effectiveness on the globalization manufacturing nexus in Nigeria using a robust empirical framework that captures both short-run and long run dynamics. This study addresses these gaps by examining government effectiveness as a moderating factor between globalization and manufacturing sector output in Nigeria, using an ARDL framework with annual data from 1981 to 2023.

Methodology

The theoretical foundation of this study is anchored on a modified Kaldorian Growth framework, which positions the manufacturing sector as the central engine of economic growth and structural transformation. Kaldor's Growth Theory emphasizes that sustained economic development is driven primarily by the expansion of manufacturing output due to increasing returns to scale, dynamic economies of scale, learning by doing, and strong inter sectoral linkages (Kaldor, 1966). The first law of Kaldor posits that manufacturing growth is the main driver of overall economic growth, while Verdoorn's Law explains that productivity growth is endogenously generated within manufacturing as output expands. The third law further highlights the role of manufacturing in absorbing surplus labour from low-productivity sectors, thereby enhancing aggregate productivity and structural transformation. Recent extensions of Kaldorian theory have increasingly recognized that manufacturing-led growth in the contemporary global economy is shaped by external integration and internal institutional capacity, particularly the ability of governments to effectively implement industrial policies and support firms' participation in global value chains (Usman & Adebayo, 2019). In this regard, globalization is conceptualized as a channel that expands market access, technology transfer, and investment inflows that can stimulate manufacturing expansion, while government effectiveness determines the extent to which these gains are realized through efficient policy implementation, infrastructure provision, and regulatory stability. Accordingly, this study adopts a modified Kaldorian framework in which globalization enhances manufacturing output, but its impact is conditioned and strengthened by government effectiveness, thereby providing a more context-specific explanation of manufacturing performance in developing economies such as Nigeria.

Following the theoretical framework and drawing from existing empirical studies (Agu et al., 2024; Dada & Abanikanda, 2022), the study specifies the following empirical model:

$$MAN_t = \beta_0 + \beta_1 KOFGL_t + \beta_2 GE_t + \beta_3 (KOFGL_t \times GE_t) + \beta_4 EXCHRT_t + \beta_5 INTR_t + \beta_6 TECH_t + \epsilon_t$$

Where MAN represents manufacturing sector output, KOFGL represents the Overall Globalization Index, GE represents Government Effectiveness, KOFGL×GE is the interaction term between overall globalization and government effectiveness, EXCHRT is the Exchange Rate, INTR is the Interest Rate, TECH is Technological Innovation, β_0 is the constant term, β_1 – β_6 are coefficients to be estimated, and ϵ is the error term.

A positive and significant coefficient on the interaction term would indicate that government effectiveness enhances the beneficial effects or alleviates the adverse effects of globalization on manufacturing.

To examine the moderating effect of government effectiveness on the relationship between globalisation and manufacturing sector output, an interaction term (KOFGL*GE) was incorporated into the empirical model. The interaction variable was generated by multiplying the observed values of the KOF Globalisation Index (KOFGL) and Government Effectiveness (GE). The component variables were not mean-centred before constructing

the interaction term because the study primarily focused on estimating the interaction effect within the ARDL framework. Furthermore, the estimated model was subjected to a comprehensive set of diagnostic tests, including serial correlation, heteroskedasticity, normality, and stability tests, all of which confirmed the robustness and reliability of the estimated parameters. Consequently, the absence of mean centering does not compromise the validity of the empirical findings.

The justification for the inclusion of control variables is as follows. Exchange rate is included because currency movements affect export competitiveness, import costs of intermediate inputs, and production planning (Maduka et al., 2017; Nwikina, 2025). Interest rate captures the cost of capital faced by manufacturers, as higher borrowing costs constrain investment and capacity expansion (Lawal et al., 2022). Technological innovation represents production efficiency and modernization, consistent with studies showing that technology adoption influences industrial productivity (Ojo and Ogunleye, 2021).

The study employs the Autoregressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran et al. (2001). The ARDL framework is particularly well suited for this analysis for several reasons. First, it accommodates variables of mixed integration orders some stationary at levels ($I(0)$) and others at first differences ($I(1)$) which is essential given the unit root test results. Second, it is robust to small sample sizes, which is relevant given the study's 43 observations. Third, it enables the simultaneous estimation of short-run dynamics and long-run equilibrium relationships. Fourth, it provides consistent estimates even in the presence of endogenous regressors, provided the lag structure is appropriately stated. The bounds test evaluates the null hypothesis of no cointegration against the alternative of cointegration. The computed F-statistic is compared against critical values provided by Pesaran et al. (2001). If the F-statistic exceeds the upper bound critical value at the 5% significance level, the null hypothesis of no cointegration is rejected, confirming a long-run relationship. If cointegration is confirmed. The Error Correction Model is estimated to capture the speed of adjustment toward long-run equilibrium.

The estimation procedure follows standard practices in time series econometrics. The analysis starts with descriptive statistics and correlation analysis to characterize the data and identify preliminary patterns. Unit root tests are then conducted using the Augmented Dickey-Fuller (ADF) test to determine the stationarity properties of each series. The optimal lag length for the ARDL model is selected using the Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). The ARDL bounds test is then conducted to test for cointegration. If cointegration is confirmed, both the long run and short run models are estimated. Diagnostic tests are conducted to validate the model, including the Jarque-Bera test for residual normality, the Breusch-Godfrey test for serial correlation, the Breusch-Pagan-Godfrey test for heteroskedasticity, the Variance Inflation Factor (VIF) for multicollinearity, and the CUSUM and CUSUMSQ tests for parameter stability.

The study uses annual time series data for Nigeria covering the period 1981 to 2023. The dependent variable, manufacturing sector output, is measured by Manufacturing Value Added (constant prices), sourced from the World Bank World Development Indicators

(WDI). Overall globalization is measured using the KOF Overall Globalization Index, sourced from the KOF Swiss Economic Institute (Gygli et al., 2019). Government effectiveness is measured using the World Governance Indicators (WGI) from the World Bank (Kaufmann et al., 2010). Control variables exchange rate, interest rate, and technological innovation are sourced from the WDI and the Central Bank of Nigeria Statistical Bulletin. The study period covers 43 observations, which is sufficient for the ARDL estimation technique.

Result and Discussions

Table 1: Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Dev.	Co efficient of variable
MAN	14.186	21.098	6.553	4.889	34.46
KOFGI	0.321	4.201	-4.449	1.551	483.10
GE	-0.861	0.481	-1.213	0.375	-43.55
KOFGI×GE	-0.040	3.059	-6.398	1.166	-2920.41
EXCHRT	15.347	219.215	-7.241	37.386	243.61
INTR	6.484	11.064	0.317	2.652	40.90
TECH	2.514	11.910	1.000	1.910	76.00

Source: Author's computation based on EViews output, 2026.

Note. MAN = Manufacturing Value Added; KOFGI = Overall Globalization; GE = Government Effectiveness; KOFGI×GE = Interaction term; EXCHRT = Exchange Rate; INTR = Interest Rate; TECH = Technological Innovation. $n = 43$ observations for each variable.

The descriptive statistics summarized in Table 1 reveal notable variation across the study variables over the sample period. Manufacturing value added (MAN) records a mean of 14.19 with a standard deviation of 4.89, ranging from 6.55 to 21.10, indicating notable fluctuations in manufacturing performance over the sample period. Overall globalization (KOFGI) has a mean of 0.32 with a standard deviation of 1.55, ranging from -4.45 to 4.20, reflecting variation in Nigeria's global integration. Government effectiveness (GE) has a negative mean of -0.86, reflecting persistent governance constraints and institutional weaknesses, with limited variation (standard deviation of 0.38). The exchange rate (EXCHRT) stands out with a very large standard deviation (37.39) and an exceptionally wide range, highlighting pronounced exchange rate instability. The interest rate (INTR) averages 6.48 percent with substantial variation (standard deviation of 2.65). Technological innovation (TECH) shows considerable variation with a standard deviation of 1.91. These patterns collectively suggest that manufacturing output in Nigeria is highly sensitive to changes in its key determinants, and that inconsistency in governance quality, exchange rate volatility, and uneven technological uptake are likely constraining manufacturing productivity.

Table 2: Diagnostic Test Results

Test	Statistic (p-value)
Jarque-Bera Normality Test	0.2314 (0.8908)
Breusch-Godfrey Serial Correlation LM Test (F-stat)	2.1124 (0.2154)
Breusch-Pagan-Godfrey Heteroskedasticity Test (F-stat)	1.6648 (0.2007)
Variance Inflation Factor (VIF)	6.30
R-Squared (R ²)	0.99
CUSUM / CUSUMSQ Stability Test	Stable

Source: Author's computation based on EViews output, 2026.

Note. P-values reported in parentheses. A p-value above 0.05 indicates the null hypothesis for the respective test is not rejected.

Table 2 presents the diagnostic test results. The Jarque-Bera statistic confirms that the model residuals are normally distributed. The Breusch-Godfrey Serial Correlation LM test finds no evidence of autocorrelation in the residuals, while the Breusch-Pagan-Godfrey heteroskedasticity test confirms constant variance. The Variance Inflation Factor falls within the conventionally acceptable threshold, indicating no serious multicollinearity among the regressors. The R-squared value shows that the model explains a substantial proportion of the variation in manufacturing output over the sample period. The CUSUM and CUSUMSQ stability tests confirm structural stability in the estimated parameters. These results validate the reliability of the model and establish a firm basis for interpreting the estimated long-run coefficients.

Table 3: Pairwise Correlation Matrix

Variable	MAN	KOFGI	GE	KOFGI*GE	EXCHRT	INTR	TECH
MAN	1.000						
KOFGI	0.037	1.000					
GE	0.538***	-0.070	1.000				
KOFGI×GE	-0.126	0.572***	0.389**	1.000			
EXCHRT	-0.080	0.044	-0.112	0.022	1.000		
INTR	-0.257***	0.027	-0.078	0.014	0.132	1.000	
TECH	-0.309**	-0.105	-0.240	0.049	0.128	0.239	1.000

Source: Author's computation based on EViews output, 2026.

Note. *** $P < 0.01$, ** $p < 0.05$, * $p < 0.10$. MAN = Manufacturing Value Added; KOFGI = Overall Globalization; GE = Government Effectiveness; KOFGI×GE = Interaction term; EXCHRT = Exchange Rate; INTR = Interest Rate; TECH = Technological Innovation.

Table 3 presents the pairwise correlation matrix. The results indicate that manufacturing value added shows a positive and statistically significant correlation with government effectiveness ($r = 0.538$, $p = 0.0002$), implying that improvements in governance quality are associated with higher manufacturing output. Manufacturing value added shows a weak positive correlation with overall globalization ($r = 0.037$, $p = 0.8151$), suggesting a limited

direct relationship between globalization and manufacturing output without accounting for institutional factors. Manufacturing value added shows a negative correlation with the interaction term ($r = -0.126$, $p = 0.4282$), though this is not statistically significant. Manufacturing value added shows a negative and statistically significant correlation with interest rate ($r = -0.527$, $p = 0.0003$) and technological innovation ($r = -0.309$, $p = 0.0466$), suggesting that higher borrowing costs and technological challenges constrain manufacturing output.

Table 4: ADF Unit Root Test Results

Variable	Level (t-stat, p-value)	First Difference (t-stat, p-value)	Order
MAN	-0.491 (0.9802)	-7.915 (0.0000)	I(1)
KOFGI	-5.193 (0.0008)	—	I(0)
GE	-2.261 (0.1889)	-6.634 (0.0000)	I(1)
KOFGI×GE	-6.079 (0.0000)	—	I(0)
EXCHRT	-2.487 (0.3326)	-5.103 (0.0009)	I(1)
INTR	-2.640 (0.2659)	-6.827 (0.0000)	I(1)
TECH	-6.655 (0.0000)	—	I(0)

Source: Author's computation based on EViews output, 2026.

Note. A variable is considered stationary when the p -value falls below the 5% significance level. $I(0)$ = stationary at level; $I(1)$ = stationary after first differencing

Table 4 presents the ADF unit root test results. Manufacturing value added (MAN) is non-stationary at level ($p = 0.9802$) but becomes stationary after first differencing ($p = 0.0000$), confirming that it is integrated of order one, $I(1)$. Overall globalization (KOFGI) is stationary at level ($p = 0.0008$), indicating $I(0)$. Government effectiveness (GE) is non-stationary at level ($p = 0.1889$) but stationary after first differencing ($p = 0.0000$), confirming $I(1)$. The interaction term (KOFGI×GE) is stationary at level ($p = 0.0000$), indicating $I(0)$. Exchange rate (EXCHRT) is non-stationary at level ($p = 0.3326$) but stationary after first differencing ($p = 0.0009$), indicating $I(1)$. Interest rate (INTR) is non-stationary at level ($p = 0.2659$) but stationary after first differencing ($p = 0.0000$), indicating $I(1)$. Technological innovation (TECH) is stationary at level ($p = 0.0000$), indicating $I(0)$.

Table 5: ARDL Bounds Cointegration Test

Test Statistic	Value	Significance Level	I(0) Lower Bound	I(1) Upper Bound
F-statistic	5.020789	10%	1.99	2.94
C		5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

Source: Author's computation based on EViews output, 2026.

Note. The F -statistic exceeds the $I(1)$ upper bound at the 5% level, confirming cointegration. Null hypothesis: no long-run levels relationship.

The ARDL bounds cointegration test results indicate the existence of a stable long-run relationship among the variables included in the model. The computed F-statistic is 5.020789, which is higher than the upper bound critical values at all conventional significance levels, including 10% ($I(1) = 2.94$), 5% ($I(1) = 3.28$), 2.5% ($I(1) = 3.61$), and 1% ($I(1) = 3.99$). Since the F-statistic exceeds the upper bound across all significance levels, the null hypothesis of no cointegration is rejected. This confirms that globalization, government effectiveness, exchange rate, interest rate, technological innovation, and manufacturing sector output share a long-run equilibrium relationship over the study period. The implication is that despite short-run fluctuations, these variables move together in the long run, and any short-term disequilibrium among them is temporary and will be corrected over time.

Table 6: Short-Run ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.0194	2.5082	4.3934	0.0013
MAN(-1)	-0.3004	0.0703	-4.2717	0.0016
D(MAN(-3))	0.8054	0.1673	4.8138	0.0007
D(GE)	-1.9911	1.3548	-1.4697	0.1724
D(GE(-1))	-3.2162	1.1082	-2.9021	0.0158
D(EXCHRT)	0.0154	0.0056	2.7784	0.0195
D(EXCHRT(-1))	-0.0412	0.0147	-2.7962	0.0189
D(EXCHRT(-2))	-0.0402	0.0117	-3.4326	0.0064
D(INTR)	-0.4412	0.1179	-3.7414	0.0038
D(TECH(-1))	1.0691	0.2702	3.9568	0.0027
D(TECH(-2))	0.7988	0.2403	3.3238	0.0077

Source: Author's computation based on EViews output, 2026.

The short-run results indicate that macroeconomic instability and dynamic adjustment processes rather than globalisation or institutional variables mainly drive Nigeria's manufacturing sector. The error correction term (MAN (-1)) is negative and highly significant (-0.3004 , $p = 0.0016$), confirming that approximately 30% of any short-run disequilibrium is corrected toward the long-run steady state each period, which validates the cointegrating framework. In the short run, exchange rate dynamics display a volatile pattern a positive contemporaneous effect (0.0154 , $p = 0.0195$) is reversed by significant negative lags at the first and second periods (-0.0412 , $p = 0.0189$; -0.0402 , $p = 0.0064$), suggesting that currency fluctuations initially boost manufacturing but subsequently raise import-input costs, consistent with Rodrik (2013). Concurrently, the immediate negative impact of interest rates (-0.4412 , $p = 0.0038$) emphasises the contractionary pressure of high borrowing costs on industrial investment and working capital.

Regarding government effectiveness, the contemporaneous effect of changes in government effectiveness (D(GE)) is statistically insignificant ($p = 0.1724$), but its first lag exerts a significant negative influence (-3.2162 , $p = 0.0158$). This delayed negative effect

may reflect institutional adjustment costs: improvements in government effectiveness may take time to translate into productive outcomes, and in the interim, institutional reforms or policy, adjustments could temporarily disrupt manufacturing activity. This interpretation is consistent with the institutional economics perspective, which recognizes that governance improvements often involve short-run transition costs before yielding long-run benefits. Alternatively, the negative lagged effect could indicate that past deteriorations in government effectiveness are only now manifesting their adverse effects on manufacturing output. Notably, the sparing specification excludes the globalization proxies (KOF), as they proved statistically insignificant in preliminary estimations, further reinforcing that domestic macroeconomic and institutional factor are the primary short-run drivers of Nigeria's manufacturing value-added.

Table 7: Long-Run ARDL Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
KOFGI*GE	3.5938	1.5632	2.2989	0.0443
KOFGI	-0.6876	1.4315	-0.4804	0.6413
GE	9.4673	1.9468	4.8629	0.0007
EXCHRT	0.3421	0.0592	5.7789	0.0002
INTR	-0.7973	0.2575	-3.0958	0.0113
TECH	-4.8764	1.0007	-4.8729	0.0006
C	36.6798	3.0067	12.1992	0.0000

Source: Author's computation based on EViews output, 2026.

The long-run ARDL estimates indicate that government effectiveness exerts a positive and statistically significant influence on manufacturing sector output ($\beta = 9.4673$, $p = 0.0007$), suggesting that improvements in institutional quality substantially enhance industrial performance in Nigeria. This finding is consistent with Agu et al. (2024), who concluded that institutional quality is a critical determinant of manufacturing sector performance in Nigeria. Similarly, Nadabo (2023) found that effective institutions strengthen manufacturing productivity by enhancing infrastructure development and improving policy implementation. The result also agrees with Dada and Abanikanda (2022), who reported that government effectiveness strengthens economic performance by creating a conducive investment climate.

The interaction term between globalization and government effectiveness is positive and statistically significant ($\beta = 3.5938$, $p = 0.0443$), indicating that government effectiveness strengthens the positive impact of globalization on manufacturing output. This finding validates the moderating hypothesis of the study and aligns closely with Agu et al. (2024), who found that institutional quality conditions the impact of globalization on manufacturing performance in Nigeria. It is equally consistent with Iheanachor and Ozegbe (2023), who concluded that governance significantly enhances the growth effects of globalization. Likewise, Kumeka et al. (2023) reported that government effectiveness

amplifies the developmental benefits of globalization across African economies, while Oduola et al. (2022) found that stronger institutional frameworks enhance the contribution of foreign direct investment to industrialization in Sub-Saharan Africa. Collectively, these studies support the conclusion that globalization produces superior manufacturing outcomes only in the presence of effective governance.

Conversely, the coefficient of globalization alone is negative and statistically insignificant ($\beta = -0.6876$, $p = 0.6413$), indicating that globalization, in isolation, does not significantly promote manufacturing performance in Nigeria. This finding is consistent with Agu et al. (2024), who argued that globalization alone is insufficient to drive manufacturing growth where institutional weaknesses persist. It also supports the findings of Iheanachor and Ozegbe (2023), who emphasized that globalization without effective governance, produces limited developmental outcomes.

Exchange rate positively and significantly affects manufacturing output ($\beta = 0.3421$, $p = 0.0002$), suggesting that exchange rate competitiveness supports industrial expansion over the long run. This finding corroborates Nwikina (2025), who reported that exchange rate movements significantly influence manufacturing performance in Nigeria. Similarly, Lawal et al. (2022) observed that macroeconomic variables remain important determinants of manufacturing sector performance.

Interest rate exhibits a negative and statistically significant effect ($\beta = -0.7973$, $p = 0.0113$), indicating that high financing costs constrain manufacturing investment and long-term production. This finding is in agreement with Lawal et al. (2022), who established that elevated lending rates discourage investment in Nigeria's manufacturing sector and reduce industrial productivity.

Technological innovation has a negative and statistically significant long-run effect ($\beta = -4.8764$, $p = 0.0006$), contrary to conventional expectations. This finding is partially consistent with Naudé (2023), who argued that technological advancement does not automatically translate into productivity improvements in developing economies because of weak institutional capacity, inadequate skills, and low technological absorption. It also complements Ojo and Ogunleye (2021), who emphasized that the productivity benefits of technological innovation depend on firms' capacity to adopt and effectively utilize new technologies.

Discussion of Findings

The findings reveal that government effectiveness significantly enhances manufacturing sector output in Nigeria, while the interaction between globalization and government effectiveness confirms that the benefits of globalization are conditional on the quality of domestic institutions. The positive and significant effect of government effectiveness suggests that improvements in institutional quality including better public service delivery, policy consistency, regulatory quality, and contract enforcement create an enabling environment for manufacturing firms to thrive. This finding is consistent with the institutional economics perspective, which emphasizes that effective governance reduces

transaction costs, provides regulatory certainty, and supports private sector investment (Kaufmann et al., 2010; Acemoglu and Robinson, 2012). It also aligns with the extended Kaldorian framework adopted in this study, which posits that institutional capacity determines the efficiency with which external opportunities such as globalization translate into productive outcomes.

The positive and significant interaction term indicates that government effectiveness amplifies the positive impact of globalization on manufacturing output. This finding is particularly important because it demonstrates that globalization alone is insufficient to drive manufacturing growth; rather, its effects are contingent on the quality of domestic institutions. This supports the arguments of Rodrick (2004, 2013), who contended that institutional quality determines whether countries can harness the benefits of globalization for industrial development. The result also corroborates the findings of Agu et al. (2024), Iheanachor and Ozegbe (2023), and Kumeka et al. (2023), all of whom found that government effectiveness enhances the growth effects of globalization in developing economies.

The negative and insignificant coefficient on globalization alone suggests that Nigeria has not been able to fully capitalize on global integration without corresponding improvements in governance. This finding reflects the reality that while globalization has increased Nigeria's access to foreign markets, investment, and technology, the country's weak institutional environment has constrained the productive application of these opportunities. This result is consistent with the broader literature on the globalization-institutions nexus, which emphasizes that institutional quality is a critical conditioning factor for reaping the developmental benefits of globalization (Rodrik, 2013; Singh, 2023). The positive effect of exchange rate on manufacturing output suggests that exchange rate competitiveness supports industrial expansion by making exports more competitive and reducing the cost of imported inputs when the naira is appropriately valued. This finding is consistent with the export-led growth hypothesis and the Kaldorian emphasis on international competitiveness for industrial expansion. The negative effect of interest rates indicates that high borrowing costs constrain manufacturing investment, consistent with the literature on the cost of capital and industrial productivity (Lawal et al., 2022). The negative effect of technological innovation, while surprising, reflects the challenges of technology absorption in Nigeria's manufacturing sector, including limited skills, weak infrastructure, and inadequate complementary investments (Naudé, 2023; Ojo and Ogunleye, 2021).

Conclusion and Recommendation

This study concludes that government effectiveness plays a vital role in shaping the performance of Nigeria's manufacturing sector and in determining the extent to which globalization translates into productive outcomes. The ARDL results confirm a stable long-run relationship among globalization, government effectiveness, macroeconomic

variables, and manufacturing output. While globalization alone does not significantly enhance manufacturing performance, its interaction with government effectiveness is positive and statistically significant, indicating that the gains from globalization are conditional on the quality of domestic institutions. In both the short and long run, manufacturing output is also strongly influenced by macroeconomic conditions such as exchange rate movements and interest rates, while technological innovation shows mixed effects, reflecting weak absorptive capacity within the sector. Overall, the findings demonstrate that Nigeria's manufacturing sector is institutionally constrained, and globalization becomes beneficial only when supported by effective governance structures. Based on these findings, the study recommends that Nigeria should prioritize comprehensive institutional reforms aimed at strengthening government effectiveness through improved regulatory quality, policy consistency, reduced bureaucratic inefficiencies, and stronger enforcement of contracts and property rights. These reforms are essential for creating a stable and predictable business environment that allows manufacturing firms to fully benefit from globalization. In addition, macroeconomic stability should be enhanced by ensuring more predictable exchange rate management and reducing interest rates to improve access to affordable credit for manufacturing investment. The government should also strengthen technological absorptive capacity by investing in education, skills development, research and development, and stronger linkages between firms and innovation systems to ensure that technological advancements translate into actual productivity gains. Finally, industrial policy should be strategically aligned with globalization dynamics by supporting export-oriented manufacturing, improving infrastructure, and facilitating integration into global value chains, thereby ensuring that Nigeria maximizes the developmental benefits of globalization under strong institutional governance.

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