FINANCIAL CHANNELS AND MANUFACTURING PERFORMANCE IN NIGERIA: EVIDENCE FROM CREDIT, INTEREST, INVESTMENT, LIQUIDITY AND CAPITALIZATION

Terese Uji Ph.D.
Department of Economics
College of Economic and Management Sciences
University of South Africa.
ujiterese1@gmail.com/ujit@unisa.ac.za
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Abstract
This study examined how domestic credit to private sector, lending interest rate, foreign direct investment, broad money supply, and market capitalization affect manufacturing value added in Nigeria. The real effective exchange rate is included as a control variable to account for competitiveness of external prices. The motivation of the study is drawn from the literature gap where most of the empirical studies isolate individual financial channels rather than examining combined influence of various financial channels on manufacturing performance. The Autoregressive Distributed Lag (ARDL) was applied using annual time series data covering the period from 1991 to 2025to determine impacts of different financial channels on manufacturing performance. It was found that lending interest rate and broad money supply had significant negative impact on manufacturing performance while FDI had positive and significant impact on manufacturing performance in the long run. Domestic credit to private sector positively influenced manufacturing performance only in the short run, while impact of market capitalization was insignificant in the long run, the positive impact of real effective exchange rate is significant only in the short run period. The study therefore recommended reduction in borrowing costs, directing liquidity to productive sectors, investments in export-related manufacturing and encouragement of technology transfers, expansion of long-term loans by commercial banks, and ease access to equity financing and cost of listing manufacturing companies.

Keywords: ARDL, financial channels, manufacturing performance, manufacturing value added.

1.0 Introduction

Manufacturing is the engine of structural transformation for sustainable economic development across the globe, it stimulates increased productivity and promotes technological innovation that create employment opportunities and facilitate export diversification of economies (Nguimkeu & Zeufack, 2024). The manufacturing activities create backward and forward linkages across sectors of the economy paving way for improved productivity, while primary commodity sectors with limited value addition continue to impede economic growth in most developing countries like Nigeria (Cantore, Clara, Lavopa & Soare, 2017). Given the relevance of manufacturing to economic transformation, the manufacturing sector has continued to occupy central position in strategies aimed at structural transformation in both developed and developing countries. Despite the importance of manufacturing, its contributions to gross domestic product in Nigeria has been weak over the years fluctuating around 8% to 10% from 2015 to 2026 (World Bank, 2026). The poor trend of Manufacturing in Nigeria has raised concerns regarding the slow rate of industrialization amidst decreasing competitiveness of industrial firms across Nigeria. The Nigerian economy is heavily dependent on primary commodities ranging from extraction of crude oil and other mineral resources as well as agricultural products without value addition (Wolf, 2023). The manufacturing sector has been bedevilled with poor infrastructural facilities such as epileptic power supply and poor road networks which usually caused high cost of production and macroeconomic instabilities. The performance of manufacturing depends on financing, particularly on the effectiveness of financial channels that could assist entrepreneurs in addressing financial deficits occasioned by poor infrastructural facilities.

Financial channels of any economy have implications on manufacturing through interconnected mechanisms. Adequate credit from banks through domestic credit to private sector are used infinancing investments for expansion and increased productivity of firms (Oyebowale & Babatunde, 2025), more credits to domestic firms enhances the firm's capacity to invest in both physical capital and operational efficiency, the expansion and operational efficiency of firms placed firms in the position to harness large economies of scale. The cost of capital measured by lending interest rate determine affordability of firms accessing external financing where high lending interest rates reflects increase cost of manufacturing which discourage investments (Udegbule, Esara, Tonye & Ebikiwenimo, 2025). Money supply shows the depth of the financial system that support investments for structural transformation, however, excessive liquidity through monetary expansions creates inflationary pressures that posed challenges to industrialization. Foreign direct investment as an external financial channel promotes manufacturing through external transfer of advanced technology and expertise as well as capital accumulation, though the benefits of foreign direct investment are largely dependent on the readiness and absorptive capacity of the receiving economy (Chornyi & Chorna 2026). Capital market development as an alternative for domestic credit to private sector provides financing long term investments that promote manufacturing (Farooq, Tabash, Anagreh & Khudoykulov, 2022).

However, the structure and trends of financial channels ranging from domestic credit to private sector, lending interest rate, broad money supply and market capitalization of listed domestic companies in Nigeria have been unstable, which posed challenges to manufacturing performance. Nigeria's domestic credit to private sector as a percentage of gross domestic product averaged 15% from 2023 to 2025; lending interest rate is high with a sharp increase from 13% in 2022 to 18% in 2023 reaching a peak above 30% in 2025, which has made the cost of borrowing to finance manufacturing very high and discourage expansion of manufacturing firms, also, broad money supply continue to rise, surging around 72 trillion naira in 2023 to 122 trillion naira in 2025 with inflationary pressures and uncertain prices that discourage increased investments, though market capitalization of listed domestic companies showed impressive performance of massive increase from 56 trillion naira in 2023 to 99.38 trillion naira in 2025 (Central Bank of Nigeria, 2025; World Bank, 2025). Despite the unimpressive compositions of financial channels in Nigeria, empirical evidencehas continued to be inconclusive and mixed, which require further investigations to ascertain both collective and individual impact of the financial channels on manufacturing performance.

Several empirical studies such as Gozgor (2018); Gizaw, Getachew and Mancha (2024); Chowdhury, Tamanna, Akhter and Syed (2024); Ubong, Ukere and John (2024); Chornyi and Chorna (2026); Aigbodioh (2025); Roy, Omar and Prasad (2023); Schlingemann and Stulz (2021); Wang, Gong and Wang (2025) among others investigated financial channels and manufacturing performance by isolating certain aspects of financial channels as it affect either manufacturing or economic growth while others aggregated financial channels and treated it as one variable, this study simultaneously examined the key financial channels as they affect manufacturing performance. The study would be significant as it contributes to existing literature and stimulate policy direction in terms of sector specific targeted at promoting manufacturing and export diversification, the study is relevant as it would provide policy direction covering financial and investment promotion strategies. The remaining sections of the paper include literature review, methodology, results and discussions, conclusion and recommendations.

2.0 Empirical Literature Review

There has been an expansion of empirical literature that attempt to analyse how financial channels affect manufacturing performance in different regions. The reports of the previous studies are reviewed under the following headings in line with the major variables that constitute financial channels with effects on manufacturing.

Domestic Credit to Private Sector

Gozgor (2018) identified income and the money supply as determinants of domestic credit to private sector in 61 emerging and non-emerging economies. Gizaw, Getachew and Mancha (2024) investigated how allocations of sectoral domestic credit influence economic growth in Ethiopia, they adopted CS-ECM and discovered that credits allocated to industries had negative impact on economic growth. Mesagan, Olunkwa and Yusuf (2018) studied financial development and manufacturing performance in Nigeria applying error correction model, they reported that credit to private sector improved manufacturing capacity utilization in the short run but negatively affected manufacturing value added in the long run. Nwagu and Udeagbala (2024) employed ARDL to estimate effect of bank credit to the private sector on manufacture sector performance in Nigeria, the study established insignificant impact of bank credit to the private sector on manufacturing sector performance. Ozili, Oladipo, and Iorember (2023) traced how increase in credit supply affect economic growth in Nigeria and arrived that abnormal domestic credit to private sector affect economic growth negatively.

Lending Interest Rate

Chowdhury, Tamanna, Akhter and Syed (2024) applied VECM to assess rise of interest rate on loans in industrial sector of Bangladesh, they discovered that rise in interest rate negatively affected industrial development. Ubong, Ukere and John (2024) investigated how interest rate affects manufacturing sector performance in Nigeria, the study used ARDL which detected insignificant negative impact of interest rate on manufacturing sector performance. Onaga, Arize, Onwumere and Kalu (2023) employed system GMM approach to study impact of monetary policy transmission channels as it affects real sector performance in Sub-Saharan African countries, they confirmed that interest rate channel negatively and significantly influenced manufacturing. Edem, Ukere and Polycarp (2024) used ARDL to test impact of interest rate on manufacturing sector performance in Nigeria and found that interest rate showed significant positive effect on manufacturing both in the short run and long run. Udegbule, Esara, Tonye and Ebikiwenimo (2025) studied relationship between differences in interest rate and manufacturing sector in Nigeria using ARDL, they reported negative relationship between lending interest rate and manufacturing value added. Tonye and Nwikina (2023) in a study that evaluated interest rate and manufacturing sector performance in Nigeria, used ARDL and discovered a significant negative impact of interest rate on manufacturing sector performance.

Foreign Direct Investment

Chornyi and Chorna (2026) applied quantitative and qualitative approach to investigate how foreign direct investment promote economic growth in Poland, Ukraine, and Vietnam, they discovered that foreign direct investment improved productivity gains based on absorptive capacity. Gui-Diby and Renard (2015) investigated foreign direct investment inflows and industrialization covering 49 African countries, the study concluded that foreign direct investment has a promising positive influence on structural transformation.Aigbodioh (2025) sought to determine whether foreign direct investment influenced growth of manufacturing sector in Middle East and Northern Africa, the study applied dynamic and fully modified OLS, and arrived at a

conclusion that foreign direct investment positively influenced the growth of manufacturing sector. Jamshed, Vatanjon and Nouhad (2025) studied foreign direct investment and economic growth using evidence from 45 Asian countries by employing panel regression analysis, the study reported that foreign direct investment had positive impact on economic growth. Habanabakize and Mncayi (2022) tested impact of foreign direct investment among other variables on manufacturing in developing countries using ARDL, the results showed that foreign direct investment impede growth of manufacturing sector. Rizaldi, Setiawan, Kharisma and Hasanah (2026) investigate impact of manufacturing foreign direct investment on industrial output among the ASEAN Countries and discovered through the application of fixed effect regression that foreign direct investment had significant positive impact on industrial output. Mano, Tita and Obalade (2025) applied both ARDL and NARDL to estimate impact of foreign direct investment on manufacturing in South Africa, results revealed that foreign direct investment negatively affected manufacturing value added.

Broad Money Supply

Roy, Omar and Prasad (2023) investigate how monetary policy affect manufacturing output in Bangladesh, the study adopted structural VAR and concludes that monetary policy positively influenced manufacturing both in the short run and long run. Bajrami, Tafa, Gashi and Hashani (2024) analysed how money supply affects economic growth in Western Balkan countries with the application of both fixed effect, random effect and GMM, they reported that money supply significantly and positively influenced economic growth. Buthelezi (2023) used structural VAR to check effect of money supply on economic growth in South Africa and discovered that increased in money supply decreased domestic gross domestic product. Khobai and Dingela (2017) used ARDL to measure impact of broad money supply on economic growth in South Africa, the study revealed significant positive impact of broad money supply on economic growth.

Market Capitalization

Schlingemann and Stulz (2021) argued with the use of trend and time series regression analysis that market capitalization positively contributes to economy through employment that enhance manufacturing. Kuvshinov and Zimmermann (2021) studied trends of stock market growth for long run periods in 17 developed countries, the study discovered that market capital is driven by rise in equity and profits from listed firms. Wang, Gong and Wang (2025) used dynamic panel regression to establish that stock market equity financing significantly promoted manufacturing and created global value chain. Farooq, Tabash, Anagreh and Khudoykulov (2022) studied market capitalization as determinant of industrial investment in China, India, and Pakistan, they employed estimated generalized least squares and system GMM and indicated that market capitalization had significant positive effect on investment decisions of industrial firms. Buboi and Cosmulese (2023) analysed market capitalization and the performance of 68 listed companies in Romania using ordinary least squares, they conclude that market capitalization had positive impact on financial performance of the listed companies. Aigbodioh (2025) investigates stock market development and manufacturing sector in Nigeria with the use of VECM, the study argued that all shares'indexes had significant positive effect on manufacturing in the short run but became negative and insignificant in the long run.

Financial Developments

Li, Xia and Du (2024) investigated financing constraints and the productivity of manufacturing enterprises using China listed manufacturing enterprises, they uncovered that Chinese commercial bank significantly improved factor productivity and reduced constraints associated with financing.

Zhou and Zhang (2025) studied financial flexibility in manufacturing enterprise digital transformation using evidence from China, the study reported that digital transformation reduce the risk of financing manufacturing enterprise. Shikimi and Yamada (2019) use detailed firm-level data to discover level of heterogeneity of firms in Asia, they conclude that financial channels influence financing of firms in Asian manufacturing firms. Feng, Shen and Guo (2024) used panel data of 298 sampled cities in China, and alluded that digital finance enhanced manufacturing effectively. Kumar and Panda (2024) evaluated the transmission effect of monetary policies through capital to manufacturing using GMM regression model, the study revealed that contractionary monetary policy had no significant impact on borrowings of manufacturing firms in the long run. Romero-Alvarez, Martinez, Pasciaroni, Salas-Navarro and Zamora-Musa (2025) adopted ordered logit models to explore funding channels among small scale enterprises in Colombia andstressed that internal financing slow down innovation for the growth of the enterprises. Zhang, Li, Ding and Zhang (2019) analysed the mechanisms of financial development as it affects manufacturing industries in 121 cities in China, they reported a positive correlation between financial efficiency based on quality and manufacturing upgrading.

Although previous empirical studies have investigated various relationship between financial channels and the performance of manufacturing in Nigeria. However, the existing evidence does not adequately provide a comprehensive analysis of the distinct channels through which financial conditions affect manufacturing value added. This current study addresses this issue by examining five financial channels within a unified framework covering domestic credit to the private sector, lending interest rate, foreign direct investment, broad money supply, and market capitalization; these variables represent different dimensions of financial intermediation, the cost of borrowing, external investment, monetary liquidity, and capital market development, respectively. A further contribution is the inclusion of the real effective exchange rate as a macroeconomic control variable to account for external price competitiveness, which may influence manufacturing performance independently of the five key financial channels. The contribution is therefore not that previous research has ignored finance and manufacturing, but that the study provides an integrated assessment of the specified channels and their short run and long run relationships with manufacturing value added.

Theoretical Framework

This study is anchored on financial intermediation theory, which provide a theoretical foundation for explaining the relationship between financial channels and manufacturing performance in Nigeria. The theory explains how the allocation of financial resources influences productive investment to support manufacturing performance.

Financial Intermediation Theory

Financial intermediation theory explains the role of financial institutions in mobilising savings, allocating credit, and facilitating the transfer of funds from surplus economic units to productive enterprises. By reducing information and transaction costs associated with financing, financial intermediaries can improve firms' access to the resources required for investment and production (Diamond, 1984; Levine, 2005). In the manufacturing sector, access to domestic credit enables firms to acquire machinery, purchase raw materials, finance inventories, and expand production capacity. Consequently, greater domestic credit to the private sector is expected to enhance manufacturing value added, provided that credit is channelled towards productive activities. The theory also provides a basis for understanding the influence of lending interest rates and broad money supply. Lending interest rates determine an important component of the cost of external

finance, such that higher rates may discourage manufacturers from borrowing for investment and working capital, whereas lower borrowing costs may stimulate productive investment (Bernanke & Gertler, 1995). Broad money supply reflects the liquidity available within the economy and may support manufacturing by facilitating financial transactions and increasing the potential availability of funds for productive activities. However, the effect of monetary liquidity depends on whether additional funds are channelled into productive investment rather than speculative activities or consumption alone. Furthermore, the development of capital markets complements financial intermediation by providing alternative mechanisms for mobilising long-term finance. Greater market capitalisation may indicate an expanding capital market and improved opportunities for firms to access equity financing. Accordingly, financial intermediation theory predicts positive relationships between domestic credit, broad money supply, market capitalisation, and manufacturing performance, while higher lending interest rates are expected to have a negative relationship with manufacturing value added, other things being equal.

3.0 Methodology

Annual time series data is utilized for this study, the data covered the period from 1991 to 2025 with 35 data points, which is considered enough to provide reliable outcomes (Sam, McNown & Goh, 2019). The choice of the study period is premeditated based on up-to-date availability of data across the variables used in the study. Data is majorly sourced on the indexes of manufacturing value added, domestic credit to private sector, lending interest rate, foreign direct investment, broad money supply, market capitalization of listed domestic companies, and real effective exchange rate from the World Bank – World Development Indicators. Also, the period covered by the study from 1991 to 2025 presented different dynamics of financial channels with diverse structural transformation that is suitable for quantitative measurement and analysis.

Variable Description

Manufacturing value added as percentage of gross domestic product serves asa proxy for manufacturing performance, and it is used as the dependent variable in this study. Manufacturing covers industries classified by World Bank in International Standard Industrial Classification under major division C; the industries are the ones handling physical or chemical transformation of raw materials into new products. Value added represent the contribution of industries to economy which is measured by deducting value ofintermediate consumption used in production from the total value of goods produced. Manufacturing value added is a suitable proxy to manufacturing performance because it measures manufacturing sector’s contribution to gross domestic product which is a measure of the performance of economy.

Domestic credit to private sector by banks is measured by amount of financial resources provided to the private sector by financial institutions except Central Bank. The financial resources provided to the private sector include loans, trade credits, and purchases of non-equity securities that are repayment claimable. The indicator domestic credit to private sector as a percentage of gross domestic product is measured as total income earned through the production of goods and services. Domestic credit to private sector is a monetary and financial statistic that give a detailed picture of financial conditions of an economy, it provides a window into the financial sector’s stability and performance which help investors to make informed judgement and decisions in respect of borrowing to invest, expand business.

Lending interest rate is the bank rate that usually meets short- and medium-term financing needs of the private sector, the rate is differentiated according to credit worthiness of borrowers. The lending interest rate represents the cost of external financing experienced by manufacturing firmsobtaining loans from commercial banks for investments financingsuch as expansion of production and acquisition of improved technology. Thus, lending interest rate measures cost of borrowing by the manufacturing firms. It is measured as the annual average lending interest rate.

Foreign direct investment net inflows as a percentage of gross domestic product measures the inflows of investment to acquire a lasting management interest in enterprises operating in economies other than the investors. It comprised of the total equity capital, reinvestment of earnings as well as balance payments showing long-term and short-term capital; in reporting the foreign direct investment, it is divided by gross domestic product. The financial channel of foreign direct investment serves as a source of external capital and transfer of technology, expertise that contribute to industrialization.

Broad money is the sum of all liquid financial instruments held by money holding sectors that are widely accepted in an economy as a medium of exchange, plus those that can be converted into a medium of exchange at short notice or close to their full nominal value. The indicator of broad money is expressed as a percentage of gross domestic product which is the total income earned through the production of goods and services in an economic territory during an accounting year. It is a measure of financial depth in relation to gross domestic product, it represents financial resources that can be intermediated into productive investment.

Market capitalization of listed domestic companies is measured as the total market value of all shares of domestic companies listed on stock exchange of a country, expressed as a percentage of gross domestic product. Investment funds, unit trusts, and companies whose only business goal is to hold shares of other listed companies are excluded. The reported data are usually at the end of year value as end of year total market capitalization of listed domestic companies divided by gross domestic product expressed as percentage.

Real effective exchange rate index is an inflation adjusted measure of a country's currency value against the currencies of its major trading partners. Unlike the nominal exchange rate, the real effective exchange rate accounts for both relative price levels and trade weights, making it a more comprehensive measure of a country's international price competitiveness. The country's bilateral exchange rate is weighted against its major trading partners. The real effective exchange rate captures changes in both exchange rates and inflation, reflects a country's international competitiveness, considers trade relationships with multiple partner countries rather than a single currency, and provides a better measure of the impact of exchange rate movements on trade, industrialization, and economic growth.

Model Specification

This study modified the models of previous empirical studies such asUdeagbala (2024); Ubong, Ukere and John (2024); Udegbule, Esara, Tonye and Ebikiwenimo (2025); Mano, Tita and Obalade (2025) among othersto accommodate more number of financial channels as they affect manufacturing performance. Thus, the functional model for this study establishing the relationship between financial channels and manufacturing performance is specified as:

$$MVA_t = f\left(DCPS_t, LIR_t, FDI_t, BMS_t, MCDC_t, REER_t\right) \quad - \quad - \quad - \quad 1$$

Where MVA_t is manufacturing, value added (% of GDP); $DCPS_t$ represents domestic credit to private sector by banks (% of GDP); LIR_t stands for lending interest rate (%); FDI_t is foreign direct investment, net inflows (% of GDP); BMS_t is broad money (% of GDP); $MCDC_t$ stands for market capitalization of listed domestic companies (% of GDP); $REER_t$ represents real effective exchange rate index (2010 = 100); and f indicates the functional notation interpreted as manufacturing value added is a function of the financial channels. The functional model in equation 1 is transformed into stochastic model specified as:

$$MVA_t = \delta_0 + \delta_1 DCPS_t + \delta_2 LIR_t + \delta_3 FDI_t + \delta_4 BMS_t + \delta_5 MCDC_t + \delta_6 REER_t + \mu_t \quad - \quad - \quad - \quad - \quad - \quad - \quad - \quad 2$$

Where δ_0, δ_1, δ_2, δ_3, δ_4, δ_5, and δ_6 are parameters to be estimated while μ_t covers the random errors not specified in the model.

The ARDL Model

To determine the impact of financial channels on manufacturing performance, the ARDL in line withPesaran, Shin, and Smith (2001) is employed, the ARDL is considered on the strength that it can accommodate data points of between 30 and 80 (Narayan, 2004; Mano, Tita, & Obalade, 2025). The ARDL model for this study is specified to incorporate variables of interest as follows:

$$MVA_t = \beta_0 + \sum_{i=1}^{p} \beta_1 MVA_{t-i} + \sum_{i=0}^{q_1} \delta_1 DCPS_{t-i} + \sum_{i=0}^{q_2} \delta_2 LIR_{t-i} + \sum_{i=0}^{q_3} \delta_3 FDI_{t-i} + \sum_{i=0}^{q_4} \delta_4 BMS_{t-i} + \sum_{i=0}^{q_5} \delta_5 MCDC_{t-i} + \sum_{i=0}^{q_6} \delta_6 REER_{t-i} + \mu_t \quad - \quad - \quad - \quad - \quad 3$$

Equation 3 captures the persistence of manufacturing performance through the lag dependent variable denoted as MVA_{t-i} where p represents lag length of MVA_{t-i}, and q_1 to q_2 denotes the lag lengths of the explanatory variables. The unrestricted error correction model measuring existence of long run equilibrium relationship is specified as follows:

$$\Delta MVA_t = \beta_0 + \sum_{i=1}^{p-1} \beta_1 \Delta MVA_{t-i} + \sum_{i=0}^{q_{1-1}} \delta_1 \Delta DCPS_{t-i} + \sum_{i=0}^{q_{2-1}} \delta_2 \Delta LIR_{t-i} + \sum_{i=0}^{q_{3-1}} \delta_3 \Delta FDI_{t-i} + \sum_{i=0}^{q_{4-1}} \delta_4 \Delta BMS_{t-i} + \sum_{i=0}^{q_{5-1}} \delta_5 \Delta MCDC_{t-i} + \sum_{i=0}^{q_{6-1}} \delta_6 \Delta REER_{t-i} + \eta_1 MVA_{t-1} + \eta_2 DCPS_{t-1} + \eta_3 LIR_{t-1} + \eta_4 FDI_{t-1} + \eta_5 BMS_{t-1} + \eta_6 MCDC_{t-1} + \eta_7 REER_{t-1} + \mu \quad - \quad 4$$

Where the bounds test is used to examine the joint significance of the coefficients on the lagged level variables given that *Ho* is $\eta_1 = \eta_2 = \eta_3 = \eta_4 = \eta_5 = \eta_6 = \eta_7 = 0$ .The error correction model capturing the short-run dynamics is specified to reflect error correction term measuring the speed of adjustment as follows:

$$\Delta MVA_t = \psi_0 + \sum_{i=1}^{p-1} \psi_1 \Delta MVA_{t-i} + \sum_{i=0}^{q_{1-1}} \phi_1 \Delta DCPS_{t-i} + \sum_{i=0}^{q_{2-1}} \phi_2 \Delta LIR_{t-i} + \sum_{i=0}^{q_{3-1}} \phi_3 \Delta FDI_{t-i} + \sum_{i=0}^{q_{4-1}} \phi_4 \Delta BMS_{t-i} + \sum_{i=0}^{q_{5-1}} \phi_5 \Delta MCDC_{t-i} + \sum_{i=0}^{q_{6-1}} \phi_6 REER_{t-i} + \xi ECT_{t-1} + \mu_t \quad - \quad 5$$

Where ψ_1 is the parameter of the short-run lag of dependent variable (*MVA*), ϕ_1 to ϕ_6 represent the short-run parameters, ξ is the coefficient of error correction term measuring speed of adjustment.

Estimation Procedure

Descriptive statistics was first estimated to check the spread and behaviour of the series in terms of distribution, central tendency, and dispersion. Unit root test using Augmented Dickey Fuller (ADF) withElliott, Rothenberg, and Stock Generalized Least Squares (ERS-GLS) advanced by Elliott, Rothenberg, and Stock (1996) were carried out to check stationarity properties in order to avoid misleading results. Based on the outcome of the unit root tests, the ARDL was estimated using Akaike Information Criterion for optimal lag selection to minimize information loss while balancing model fit and parsimony. Post-diagnostic tests were conducted using Breusch-Godfrey Serial Correlation LM to test for residual autocorrelation, Breusch-Pagan-Godfreyheteroskedasticity test to assess the assumption of constant variance, perform CUSUM and CUSUM of Squares stability tests to confirm the stability of the estimated coefficients.

4.0 Results and Discussions

Descriptive Statistics

The summary statistics on the variables used in the studywere estimated and presented in Table 1.

Table 1:

Summary Statistics

Variable	Obs	Mean	Std. dev.	Min	Max
MVA	35	11.785	4.4752	6.5528	20.927
DCPS	35	10.409	3.5672	4.9923	19.603
LIR	35	18.250	3.8373	11.483	31.650
FDI	35	1.2419	0.8635	-0.0288	2.9002
BMS	35	18.412	6.1254	9.0633	31.014
MCDC	35	9.5324	6.4163	1.7716	30.508
REER	35	107.16	49.196	34.874	273

Source: STATA Output.

Table 1 indicates 35 data set of annual observations for each variable. The mean value of 11.785 suggest that MVA contributes to gross domestic product for about 11.78% over the study period with a moderate fluctuation given the standard deviation of 4.4752, the maximum and minimum values of 20.927 and 6.5528 respectively show a considerable variation in the manufacturing contribution across the years under study. The mean and standard deviation of 10.409 and 3.5672 respectively for DCPS indicate moderate variation in financial intermediation over time, and the range of 4.9923 to 19.603 is a sign of low access to private sector credit. The mean value of 18.250 for LIR shows high cost of borrowing, with a standard deviation of 3.8373 revealing moderate volatility in lending rates, the minimum and maximum of 11.483 and 31.650 respectively suggesting variations in lending interest rates covering periods of accommodative restrictive monetary conditions on borrowing.FDI has mean and standard deviation of 1.2419 and 0.8635 respectively, which imply low net inflows of FDI into Nigeria's economy with moderate variations during the study period; the range of -0.0288 to 2.9002 suggest grossly inadequate FDI since the contribution of FDI could not reach 3% throughout the period under study. Broad money supply reveal fluctuations in monetary expansion given the mean value of 18.412 with corresponding standard deviation of 6.1254, its range of 9.0633 to 31.014 frequent periods of tight and

expansionary monetary policies that characterized Nigeria's economy. MCDC averaged 9.5324, with standard deviation of6.4163, which indicate fluctuations in the size and performance of the Nigerian stock market. The wide range of 1.7716 to 30.508 reveal significant fluctuations in market development over the study period. The mean value of 107.16 with a high standard deviation of 49.196 indicate high volatility of exchange rate while the minimum and maximum values (34.874 and 273 respectively) suggest high variations in Nigeria's external competitiveness over the study period.

Unit Root

The ADF and ERS-GLS unit root test were estimated to check stationarity properties to avoid spurious outcomes, the results of the unit root tests are presented in Table 2.

Table 2:

Results of ADF and ERS-GLS Unit Root

Variables	ADF Unit Root		ERS-GLSUnit Root		
	Test Stat at level	Test Stat 1st Diff	Test Statat level	Test Stat 1st Diff	Order of Integration
MVA	-0.904	-5.232**	-1.579	-4.966**	I(1)
DCPS	-2.186	-4.097**	-3.156	-3.751**	I(1)
LIR	-3.928**	-	-4.062**	-	I(0)
FDI	-2.660	-6.964**	-3.150	-8.031**	I(1)
BMS	-2.162	-4.729**	-2.375	-4.304**	I(1)
MCDC	-2.717	-6.972**	-2.467	-6.148**	I(1)
REER	-2.548	-5.340**	-1.854	-2.499**	I(1)

Note: ** imply 5% significance level

Source: STATA Output.

Table 2 indicates that all the variables except LIR were not stationary at levels, but became stationary at first difference for both ADF and ERS-GLS unit root tests while variable LIR was stationary at level in the both tests. The outcome suggest a mixed order of integration, which support the application of ARDL model.

Cointegration using Bounds Test

To confirm evidence of long run relationship among the variables, the Bounds test is estimated and presented in Table 3.

Table 3:

Pesaran, Shin, and Smith (2001) bounds test

Test	5% Significance level		P-value	
F-Statistic	I(0)	I(1)	I(0)	I(1)
5.395	2.978	4.660	0.003	0.027

Note:6 variables; 33 observations. Critical values and approximate p-values are from Kripfganz and Schneider (2020), as reported by Stata

Source: STATA Output.

The result in Table 3 indicates strong evidence of cointegration given that the F-statistic value of 5.395 is greater than the upper bound of I(1) critical value of 4.660 at the 5% significance levelwith the probability values of 0.003 and 0.027 for assumptions of both I(0) and I(1) respectively, which is below 0.05 level of significance. The strong evidence of cointegration presented by the estimates of bounds test confirmed existence of long run relationship between financial channels and

manufacturing performance in Nigeria. The confirmation of cointegration justifies proceeding with the application and interpretation of long run ARDL estimates along with error correction model.

Long-run and Short-run ARDL Analysis

The ARDL was estimated to determine both long run and short run effects of financial channels on manufacturing performance, the estimated coefficients are presented in Table 4.

Table 4:

ARDL Regression Estimates (Dep = MVA)

Variable	Coefficient	Std. error	t-statistic	P-value
Long-run Estimates				
DCPS	2.1823	1.1364	1.92	0.070
LIR	-0.8452	0.2798	-3.02	0.007
FDI	5.4136	2.6123	2.07	0.052
BMS	-2.0985	0.8752	-2.40	0.027
MCDC	0.1548	0.1855	0.83	0.414
REER	0.0085	0.0341	0.25	0.806
Adjustment Term				
ECT (-1)	-0.1715	0.0814	-2.11	0.049
Short-run Estimates				
Δ DCPS	0.2943	0.1143	2.57	0.019
Δ LIR	-0.1449	0.0767	-1.89	0.074
Δ FDI	0.3402	0.3077	1.11	0.283
Δ BMS	-0.1850	0.0867	-2.13	0.046
Δ MCDC	0.0265	0.0285	0.93	0.364
Δ REER	0.0111	0.0038	2.90	0.009
Model Statistics:				
R-squared = 0.7045				
Adjusted R-squared = 0.5023				

Notes: Selected specification is ARDL (2,1,1,0,1,0,2), chosen using AIC.

Source: STATA Output.

The long-run estimates in Table 4 reveal significant negative effect of lending interest rate onmanufacturing value added given that LIR had an estimated coefficient of -0.8452 with probability value of 0.007 while in the short-run, the negative (-0.1449) impact was not significant (0.074). The outcome of significant negative impact of lending interest rate on manufacturing performance concurred with Udegbule, Esara, Tonye and Ebikiwenimo (2025); Tonye and Nwikina (2023); andOnaga, Arize, Onwumere and Kalu (2023). The significant negative impact of lending interest rate on manufacturing value added is attributed to persistent high cost of borrowing which impede investment in productive capital leading to poor manufacturing performance.Similarly, broad money supply exhibits significant negative impact on manufacturing value added in both short-run and long-run; the estimated coefficient for long run was -2.0985 with probability value of 0.027, and short-run was -0.1850 with probability value of 0.046, this finding is partly in line with Buthelezi (2023) who examined a different economy. The significant negative impact of increase in money supply on manufacturing value added is due to structural and institutional inefficiencies associated with monetary expansions, which adversely affected productive investments leading to poor manufacturing performance. The inefficiency from the

monetary expansions is characterized by inflationary pressures and exchange rate depreciation which increase production costs and reduce firms' profitability and manufacturing value added.

The FDI had positive (5.4136) and insignificant (0.052) impact on manufacturing value added in the long run and the short run positive (0.3402) impact was also not significant given the probability value of 0.283 that exceeds 5% level of significance. The finding of positive influence of FDI inflows on manufacturing performance agrees with Chornyi and Chorna (2026); Aigbodioh (2025); Habanabakize and Mncayi (2022); Rizaldi, Setiawan, Kharisma and Hasanah (2026). The insignificant positive impact of FDI on manufacturing performance in the short run suggests that investments from the FDI inflows could not yield immediate benefits, it takes a relatively long period before the impact is felt by adding to improved manufacturing performance, while in the long run, the FDI inflows had weak manufacturing performance through capital accumulation for investments in manufacturing, and transfer of technology to domestic firms which marginally increase productivity.Impact of domestic credit to private sector on manufacturing value added was positive both in the long run and short run (2.1823 and 0.2943 respectively), however, the long run effect was not significant (0.070) at 5% significance level, but significant (0.019) in the short run analysis, which implied that the short run significant positive impact of domestic credit to private sector is not sustained in the long run as a result of high level of short-term loans that characterized Nigeria's economy amidst misallocation of private sector credit often not directed to manufacturing; this dimension of significant positive impact of credit to private sector on manufacturing only in the short run is in line with Mesagan, Olunkwa and Yusuf (2018).

The estimated coefficients on market capitalization of listed domestic companies for both long run and short run were 0.1548 and 0.0265 respectively, with corresponding probability values of 0.414 and 0.364 that were respectively more than the 5% significance level, which implied that market capitalization had insignificant positive impact on manufacturing performance both in the long run and short run, the finding of insignificant impact of market capitalization on manufacturing in the long run supports Aigbodioh (2025). The insignificance positive impact of market capitalization of listed domestic companies on manufacturing performance is caused by the weak and rigid operations of stock market where many manufacturing firms have limited access to Nigerian Exchange Group, which make it difficult for firms to raise capital through the stock market due to high compliance costs and tough listing requirements. The long run estimated coefficient for real effective exchange rate was 0.0085 with probability value of 0.806, which means that real effective exchange rate does not significantly influenced manufacturing performance in the long run, while in the short run, the estimated coefficient was positive (0.0111) and significant (0.009), which indicates that domestic currency appreciation in relation to trading partners improved manufacturing performance in the short run.

The error correction term was negative (-0.1715) and statistically significant (0.049) as expected, which means that 17.1%short run deviations from the long run are gradually corrected in each year which further confirm existence of long run relationship between financial channels and manufacturing performance.The model statistics indicate R-squared and adjusted R-squared of 0.7045 and 0.5023 which means that the estimated model explained about 70.4% of the manufacturing value added, and even after adjustments, the strength of the explanatory variables was moderate at approximately 50.2% as determinants of manufacturing performance in Nigeria.

Post-Diagnostic Tests

The post-tests examinations were carried out to establish the reliability, validity, and stability of the models estimated and analysed in the study. The Breusch-Godfrey Serial Correlation LM, and Breusch-Pagan-Godfrey heteroskedasticity tests were estimated and presented in Table 5.

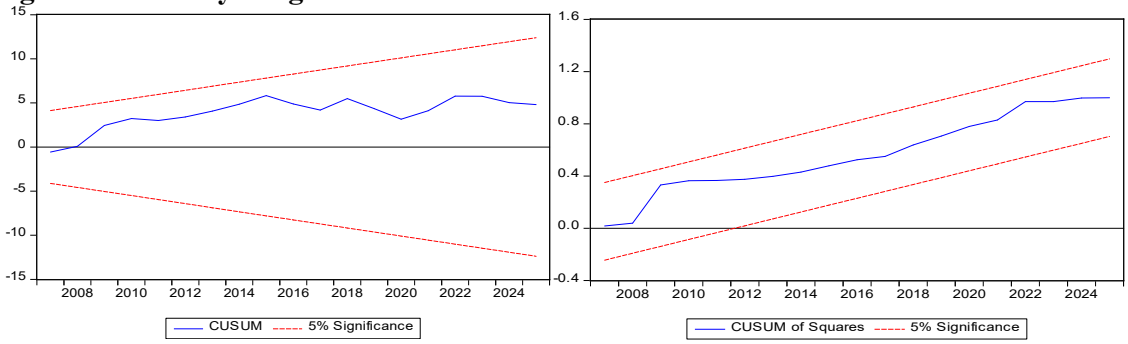
Table 5:
Results of Residual Diagnostic Tests

Test	Chi-Square	P-Value	Decision
Serial Correlation	33.000	0.1311	No serial correlation
Heteroskedasticity	9.73	0.7155	No heteroskedasticity

Source: STATA Output.

Table 5 shows a decision of no serial correlation and no heteroskedasticity since the probability values for chi-squaresof the tests exceed 5% significance level, which means that the error terms are not correlated where the residuals are independently distributed, and that the constant error variance assumption is satisfied making the model free from problem of serial correlation and heteroskedasticity.

Figure 1: Stability Diagnostics



Source: STATA Output.

Figure 1 indicates that the blue lines for both CUSUM and CUSUM squares measuring stability were within the critical bounds throughout the period covered, which confirmed that the estimated coefficients of ARDL used in the study were stable over time.

5.0 Conclusion and Recommendations

This study used ARDL to examine how financial channels affect manufacturing performance using time series data from 1991 to 2025.The study unlike most previous studies simultaneously measured effects of domestic credit to private sector, lending interest rate, FDI, broad money supply, and market capitalization on manufacturing value added. It wasconcluded that lending interest rate and broad money supply negatively and significantly affect manufacturing performance, while FDI positively improve manufacturing performance, however, the impact of domestic credit to private sector on manufacturing performance was not significant in both long run and short run. It was further concluded that market capitalization had insignificant impact on manufacturing in the long run while real effective exchange rate had significant positive impact on manufacturing only in the short run.These findings on the key financial channels reveal that while other financial channels improved manufacturing performance, other financial channels impede the effectiveness of manufacturing, hence the need for financial reforms that can improve the financial systems to positively contribute to manufacturing in Nigeria.

Recommendations

The following recommendations suggested as financial reforms were made in line with the major findings outlined in the study:

i. The Central Bank of Nigeria (CBN) should adjust financial reform on lending interest rate aimed at lowering borrowing costs to encourage manufacturing firms.
ii. Monetary authorities should ensure that monetary expansions are targeted at directing liquidity to productive sectors instead of consumption activities.
iii. Government should intensify reforms that attract FDI that emphasize investments in export-related manufacturing, and investments that encouraged transfer of technology.
iv. Financial sector reforms should be designed to encourage commercial banks in expanding long-term loans to assist manufacturing firms invest for large scale production to enjoy economies of scale.
v. Market capital regulatory reforms should be targeted at improving investor confidence by making firms have access to equity financing and make the cost of listing moderate to firms.

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