KAMPALA INTERNATIONAL UNIVERSITY

*International Journal of Strategic Research in Public Administration and Organizational Process* | **IJSRPAOP**
*p-ISSN: 2636-6843* | *e-ISSN: 2636-6851*
*Volume 4, Number 1 October, 2024*

# Foreign Private Investment and Manufacturing Sector's Growth in Nigeria: A Bounds Testing Co-Integrative Approach

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**Article DOI:** 10.48028/iiprds/ijsrpaop.v4.i1.07

**Abstract**

The paper examines empirically, whether or not foreign private investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) impact significantly and positively on manufacturing output (MNQ) in Nigeria over the sample period of twenty-seven year from 1995 and 2022. The newly developed bounds testing approach to co-integration was adopted in the study. The results obtained reveal that both the short-run and long-run growth effects of manufacturing output in Nigeria are significant and positive. These findings on foreign private investment underscores the imperative for adopting appropriate measures that would attract more foreign investments to the manufacturing sector in Nigeria. Having ascertained the significance of foreign private investment positively influencing manufacturing output in Nigeria, the study submits that a set of policies to the Nigerian government with a view to enhancing foreign private investment and fostering manufacturing sector's growth in Nigeria should be vigorously pursued.

**Keywords:** *Foreign Private Investment, Manufacturing Sector, Growth, Nigeria, Bounds Testing Co-integrative*

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**Background to the Study**

The late 1970s saw a substantial spike in the price of oil internationally, which led to the crisis facing Nigeria's manufacturing industry. In response, the government devalued the naira, deregulated the foreign exchange market, and abolished import licenses in addition to implementing a strict financial and fiscal plan. These legislative initiatives had little effect because the economy continued to deteriorate. The structural adjustment program (SAP) started in 1986 to boost domestic production. The introduction of SAP led to an increase in exchange rates, which raised the price of raw materials and replacement parts. The SAP initiative ultimately failed. A number of negative effects were brought on by the severe economic climate, including high production costs, a shortage of raw materials and spare parts, and a large stockpile of unsold items since consumers had little purchasing power. Capacity utilization was adversely affected by each of these factors (Mojekwu and Iwuji, 2011). In fact, Oluba (2008) identified a number of factors, including trade barriers, the government's poorly thought-out economic policies, an unrelentingly unstable power supply, a wide range of total infrastructure failure, and banks' restricted lending availability to the manufacturing sector, as the reasons for the decline in the capacity utilization rate.

The Nigerian gross domestic product (GDP) is significantly impacted by the manufacturing sector. It is evident that a number of Nigeria's economic sectors are struggling, and the manufacturing sector has long been one of the main recipients for a variety of reasons. Nigeria, like the majority of African nations, has an agrarian monoculture that is extremely susceptible to fluctuations in global prices. Nigeria's natural resources typically provide little to no direct value to the general public, making the country highly dependent on imports. This causes the country's manufacturing sector to become dysfunctional as a result of rising imports and falling exports (Ugbaka, Abuh-Amasi & Ndome, 2022). The acquisition of capital equipment to support the process of growth and development has led to the perception that foreign investments are linked to Nigeria's manufacturing industry. This has worked well in Nigeria up until the early 1980s, when a decline in oil prices caused the market to collapse, which was the main source of the country's foreign profits. Consequently, the amount of foreign investments from oil exports decreased. This was unable to supply the required catalysts for the manufacturing sector's growth and advancement (Akinmulegun & Oluwole, 2013).

The Nigerian government has implemented a number of policy initiatives to address issues related to the nation's foreign revenues, but not much progress has been made. These policies included the Structural Adjustment Programme (SAP) of 1986, which promoted non-oil exports, particularly those of manufactured goods, in an effort to lessen the country's heavy reliance on crude oil as a major source of foreign exchange (Okoli & Agu, 2015). Other policies included the Restrictive Monetary Policy, the Stabilization Measure of 1982 and the Stringent Measure of 1984. Despite this, Nigeria continued to rank second among low-income nations in terms of foreign private investment inflows as a result of these measures (CBN, 2019).

Additionally, the manufacturing sector had a significant growth as a result of the import substitution policy, with its share of GDP rising steadily until 1970, when it began to decline. Political unrest and an unpredictable investment climate during the latter part of the period

scared off investors from the industry (Edo & Monye–Emina, 2005). The fact that an unstable climate foreshadows high risk and acts as a deterrent to investment in the manufacturing sector and other economically productive areas cannot be overstated. It is noteworthy that a number of issues are preventing foreign private investment from flowing into the Nigerian economy, which has negatively impacted other sectors of the economy, particularly the manufacturing sector, where performance and productivity levels appear to be extremely low. The social-political unrest caused by the terrorist group known as the "Boko Haram Sect," anti-social groups, poor resource management, outdated machinery and equipment, corruption, political instability, and a lack of a technological foundation to support the growth of manufacturing activities are some of these factors (Opaluwa, Ameh, Alabi & Abdul, 2012; Ugbaka & Oseigbemi, 2020). In light of the foregoing, this study investigates the impact of FDI on the growth of Nigeria's manufacturing sector output. The primary objective of this study is to analyze the link between Nigeria's manufacturing sector growth and foreign direct investment.

## Literature Review

### Conceptual Review

### Foreign Direct Investment

Ogunkola and Jerome (2006, referenced in Ozughalu & Ogwumike (2013)) noted that there are several conceptualizations of foreign direct investment (FDI) in the literature when reviewing the notion of FDI. Generally, foreign direct investment occurs when a business organization in one nation purchases all or a significant portion of the share capital of a business organization in another nation, frequently through mergers and acquisitions. One major criterion for the existence of a direct investment relationship in corporate governance is ownership of at least 10% of the ordinary shares or voting stock; ownership of less than 10% of the ordinary shares or voting stock is considered a portfolio investment (Ayanwale, 2007, cited in Ozughalu and Ogwumike, 2013).

Foreign direct investments can be broadly classified into two categories: official (public) and private foreign direct investments, according to Okafor (2012) & Anyanwu, Aiyedogbon & Ohwofasa (2015). Both bilateral and multilateral agreements are made about official foreign direct investments. In the former case, investments are made directly between governments of two nations; in the latter case, investments are made to governments and private companies by way of transfers from international organizations like the World Bank and the IMF. According to Okaro (2016), foreign direct investment (FDI) is defined as investments made in businesses to acquire a permanent management interest (10% of voting stock or ordinary shares) in a business located in a nation other than the investor's home country. These investments can be made through mergers and acquisitions, which involves purchasing an existing business rather than making a new one, or as "green field" investments, also known as "mortar and brick" investments.

### Manufacturing Sector

An economy's manufacturing sector is typically included under Industry. According to Hewitt et al. (1992a.6, cited in!dejumo, 20 13), industry is "a particular way of organizing production and assumes there is a constant process of technical and social change which continually

increases society's capacity to produce a wide range of goods." Due to its numerous advantages for the process of growth, the manufacturing sector is essential to the industrialization process. According to Chandra (1992, cited in Adejumo 2013), some academics define industrialization as a rise in the manufacturing sector's contribution to the GDP. A Competitive Industrial Development Index was created by the United Nations Industrial Development Organization (UNIDO). In doing so, UNIDO determined the index's constituent parts based on characteristics of a country's manufacturing sector (UNIDO, 2009). Therefore, one of the metrics used to assess industrial success was Manufacturing Value Added, or MVA, according to the industrial development report.

**Theoretical Review**

According to Orji, Anthony-Orji, Nchege, and Okafor's (2015) summary, the majority of the early research on foreign direct investment was predicated on traditional theories. Perfect knowledge, certainty, and competitive markets are the foundations of classical thought. The primary factor influencing international competitiveness is the cost of manufacturing, according to traditional theories of trade and foreign investment. Natural resources or low costs are two of the more crucial elements. According to modern growth theory, investment leads to capital accumulation, which in turn produces economic growth (Okaro, 2016). Examining the prerequisites that support FDI inflow is crucial given the paramount significance of an environment that encourages investment. These can be divided into four categories: legal, social, political, and economic. Infrastructure and favorable trade, monetary, fiscal, and exchange rate policies are among the economic factors.

The level of openness of a nation's financial system, tariff policies, indigenization initiatives, market size, macroeconomic stability, and the possibility for economic growth. Two types of theories—the push and pull forces theories—explain the course of both private capital inflows and foreign direct investment (Oyejide, 2005, quoted in Anyanwu, et al. 2015). According to the push factor theory, local developments like sensible policies and robust economic performance for private portfolio investments have contributed to the increase in foreign direct investment, but it is also dependent on the growing tax burden of multinational businesses in their home nations.

The pull factor theory, on the other hand, links domestic factors like an independent rise in the demand for domestic money, a growing degree of integration between the domestic and international capital markets, an improvement in external credit relationships, etc. to the source of capital flows. Dunning (1988, 1993; quoted in Okoli and Agu, 2015) appears to have incorporated the majority of theoretical work on foreign direct investment (FDI) by several authors into his groundbreaking Eclectic Theory, also known as the OLI Paradigm. Through industrial organizations, this theory attempts to describe and analyze the process of multinationals' spillovers to enterprises in host countries.

As a result, this theoretical framework has evolved into the norm for research on multinational companies' overseas operations. The theoretical framework for this investigation was developed using this methodology. Despite certain inherent flaws, Dunning's Eclectic

Paradigm has long served as a useful framework for empirical research on the factors influencing foreign direct investment (Adejumo, 2013). The theory combines three different factors in an attempt to explain FDI and the returns on it. These are: locational advantage factors (L), which focus on where to produce; ownership advantages of firms (O), or the monopolistic advantage; and internalization factor (I), which answers the question of why firms engage in foreign direct investment (FDI) rather than granting licenses to foreign firms to use their proprietary assets (Dunning, 1993, cited in Okoli and Agu, 2015). This theory is frequently referred to as an OLI theory. Each of these sub paradigms establishes the groundwork for spillovers in the host economy, as acknowledged by Adejumo (2013). This implies that rather than licensing a foreign corporation, it must be more cost-effective for the foreign investor to use the firm-specific technology within the multinational concern through a subsidiary. This is due to the fact that the wish to internalize some firm-specific advantages requires the existence of spillover opportunities. It follows that there is no way to fully prevent domestic companies from using technology that is integrated into a foreign company. Therefore, the foreign company's competitive advantage is what generates the anticipated benefits for local enterprises in terms of technology and/or knowledge spillovers, among other things. As a result, the study's theoretical framework will be the eclectic paradigm of foreign direct investment tan granting a foreign business a license.

**Empirical Review**

According to Findlay's (1978) theory, foreign direct investment (FDI) accelerates technological advancement in the receiving nation by spreading the usage of more sophisticated technology, management techniques, etc. among its member companies. According to Borensztein et al. (1998), Foreign direct investment is thought to increase domestic capital and boost the productivity of domestic investments. In theory, FDI encourages the growth of the manufacturing sector in the host nation by reorganizing the industrial sector and transferring technologies. Many developing nations, like the Asian Tigers of Hong Kong, Singapore, South Korea, and Taiwan, have become developed nations as a result of foreign direct investment in their manufacturing sectors. Since the 1960s, they have experienced accelerated industrialization as a result of transnational corporations' (TNCs) search for low-cost labor and other resources.

Generally, Multinational Co-operations (MNC) or foreign firms are technologically advanced than local firms when investing in the host country. Technology transfer takes place when local firms adapt MNC's or foreign firm's technology. The existing competition of the host country may be affected in the presence of affiliates of MNC's or foreign firms. In such a situation, the industrial structure of the host country may change or restructure to compete with MNC's. According to Dunning and Lundan (2008), this spillover effect arises as a direct consequence of linkages between FDI and host country economic agents.

Empirically, both in developed and developing nations across the globe, a great deal of research has been done on the relationship between FDI and the growth of the manufacturing sector. While some researchers found no significant correlation, others found one between foreign direct investment (FDI) and the growth of the manufacturing sector. Patience (2011)

investigated how foreign direct investment affected West African manufacturing output growth. The most well-known regional economic association in Africa, the Economic association of West African States (ECOWAS). Information was gathered via annual bank assessments. It was discovered that West African industrial production grows as a result of foreign direct investment.

According to Javorcik's (2004) analysis of the effect of foreign direct investment (FDI) on the productivity of Lithuanian industries from 1996 to 2000, the most advantageous relationships are those that arise from upstream or vertical ties between international companies and local enterprises. These beneficial spillovers, however, come primarily from businesses that receive some funding from foreign investors rather than those that are fully controlled by foreigners. Blomstrom and Wolf (1994) attempted to ascertain whether foreign direct investment (FDI) had a greater impact on Mexican manufacturing in order to assist local firms in reaching a productivity level comparable to that of American firms between 1965 and 1982. According to their findings, foreign investments had a significant positive impact on the rate of development in domestic productivity. Aitken and Harrison (1999) looked into how FDI affected over 4,000 local businesses in Venezuela between 1976 and 1989. In plants with fewer than 50 workers, they have discovered a positive correlation between productivity and foreign equity participation. They have also discovered a negative correlation between FDI and the productivity of fully domestic companies. Furthermore, they have argued that foreign ownership has very little overall effect on the economy. They were unable to identify any influence that overseas companies had on domestic companies.

Samantha and Liu (2018) looked into how Sri Lanka's industrial sector performed overall from 1980 to 2016 and the amount of foreign direct investment that came in. To determine the short-term dynamics and long-term relationship of the chosen variables, they employed the Auto Regressive Distributed Lag (ARDL) model. The ARDL bounds test confirms that the variables that were chosen have co-integration. The study was unable to determine if foreign direct investment (FDI) and Sri Lanka's industrial sector growth were significantly correlated over the long term. In a panel data sample comprising 14 manufacturing industries, Jayawickrama and Thangavelu (2007) investigated the impact of foreign direct investment (FDI) on Singapore's manufacturing growth during a 30-year period, from 1975 to 2004. They found that FDI had a favorable contemporaneous influence on the manufacturing industries' production growth in Singapore. In their 2007 study, Haskel et al. investigated the possibility that inward foreign direct investment might increase the productivity of domestic businesses in the United Kingdom (UK). Their regression analysis revealed no evidence of spillovers to domestic businesses in the UK.

The effect of foreign direct investment (FDI) on the productivity of Cameroonian manufacturing enterprises was assessed by Moussa et al. (2019). Using the Generalized Least Squares approach, the Cobb Douglass type production function was estimated for 1,269 businesses across 24 industrial sector branches of the nation between 2005 and 2011. The results demonstrate that FDI has a detrimental effect on manufacturing firms' productivity. The productivity of local enterprises decreased by 4.4% for every 1% increase in that of

international corporations. Additionally, a 1% increase in international corporations decreased the growth in domestic companies' sales by 0.10%. In Nigeria, Obi-Nwosu et al. (2019) examined the role of foreign direct investment in the manufacturing capacity for the period of 1984–2017. Using multiple regression analysis (OLS) models, the study discovered that FDI was able to impact the manufacturing capacity significantly.

On the relationship between outward foreign direct investment and the manufacturing sector growth, Sauramo (2008) analyzed the relationship between outward FDI and domestic investment using macroeconomic data for Finland over the period 1965–2006. The finds that outward FDI decreases the domestic investment rate by a one-to-one ratio. Al-Sadig (2013) conducted an empirical investigation of the impact of foreign direct investment (FDI) on domestic investment in developing nations. Based on information gathered from 121 developing and transitional economies between 1990 and 2010, the findings imply that FDI outflows have a detrimental effect on the pace of domestic investment. Using firm-level data spanning the domestic and international operations of seven US MNEs over a 16–20-year period, Stevens and Lipsey (1992) demonstrate that there is a significant positive link between FDI outflows and domestic investment.

## Methodology

### Data

In order to conduct the empirical analysis of the study, time series data from the National Bureau of Statistics (NBS, 2019) and the Central Bank of Nigeria Statistical Bulletin (CBN, 2020) covering the years 1995 to 2022 are used. These data, manufacturing output (MNQ), foreign direct investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) had boosted the performance of Nigeria's manufacturing sector. The choice of the starting period was constrained by the availability of time series data on foreign direct investment and other control variables.

### Unit Root Testing

Testing for the unit root in each of the variables used is necessary because this study works with time series variables. The significance of this stems from the fact that standard errors of the coefficients estimated when non-stationarity in the variables is present are typically skewed and inconsistent, and if the right technique is not used to address the issue, this could result in misleading conclusions. The Augmented Dickey–Fuller (ADF) is used to perform the unit root tests

### Model Specification

The study's model is utilized to ascertain foreign private investment and manufacturing are related. As a result, the study's model is defined in accordance with Adeyemi and Ayomide's (2013). The model is listed below:

$$MNQ_t = \alpha_0 + \alpha_1 MGM_t + \alpha_2 FDI_t + \alpha_3 BCR_t + \alpha_4 PCY_t + \alpha_5 INF_t + \varepsilon_t \quad (1)$$

Where: foreign direct investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) had boosted the performance of Nigeria's manufacturing output (MNQ). = regression parameters or coefficients = probability error word. The first equation (or hypothesis) states that foreign direct investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) are all positively correlated with manufacturing output (MNQ). Every explanatory factor was examined for significance. The given equation passes the Durbin-Watson (DW) test for auto correction in addition to the multiple determination test (R-Square).

**Bounds Testing Methodology**

The data was analyzed using bounds co-integration analysis, a recently developed econometric technique. The co-integration technique for bounds testing is credited to Pesaran, Shin, and Smith (2001). It is a method for determining whether a level relationship exists between a regressand and a regressor vector when it is uncertain whether the underlying set of regressors is first stationary or trend stationary. An autoregressive distributed lag (ARDL) model definition serves as the foundation for the methodology. Bounds testing has several econometrically instructive benefits, such as avoiding the endogeneity issues and the incapacity to test hypotheses on the estimated coefficients in the long run associated with the Engle-Granger (1987) method; simultaneously estimating the long and short-run parameters of the model under study; and eliminating the need for pretesting for unit roots and determining the order of integration among the variables from the econometric methodology. It follows that the ARDL method can be used to determine whether a long-term relationship exists between the variables in levels regardless of whether the underlying regressors are fractionally integrated, simply I(0), or fully I(1).

As a result, the order of integration of variables may not be exactly the same when using the bounds testing approach, which permits a combination of I (1) and I (0) variables as regressors. Consequently, one benefit of the ARDL technique is that it does not necessitate a precise identification of the underlying data's order (Pesaran et al., 2001). Testing the relevance of the lagged values of the variables in a univariate equilibrium error correcting mechanism is the process that follows, purely I (1) regressors, and simply I(0) regressors make up the other set. Following Pesaran et al. (2001), we assemble the vector auto-regression (VAR) of order p, denoted VAR (p), for the following growth equation:

$$G_t = \Theta + \sum_{\tau=1}^{\rho} \delta_t Z_{t-1} + v_t \qquad 2$$

Where t is a time or trend variable and Z is the vector of the regressors and lagged values of the regressand. Pesaran et al. (2001) state that the collection of regressors can be either I(0) or I(1), but the regressand needs to be an I(1) variable, or first differenced stationary. Thus, the following is the specification of the related vector error correcting model (VECM):

$$\Delta G_t = \alpha + \varphi_t + \theta G_{t-1} + \sum_{i=1}^{p-1} \lambda_t \Delta Z_{t-1} + \sum_{i=1}^{p-1} \lambda_t \Delta G_{t-1} + v_t \qquad 3$$

Where Z is the vector of the regressor and in this study we have manufacturing output (MNQ) foreign direct investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF). G is the regressand, defined as the manufacturing output. As is typical, υt is a Gaussian stochastic disturbance term and t is a time (trend) variable. The definition of the long-run multiplier matrix Δ is:

$$\Theta = \begin{pmatrix} \Theta_{YY} & \Theta_{YX} \\ \Theta_{XY} & \Theta_{XX} \end{pmatrix}$$

Since the matrix's diagonal elements are unconstrained, the chosen series may be either I(0) or I(1). When 0 YY ΐ =, Y is equal to I (1). On the other hand, Y is I (0) if 0 YY Θ <. Testing for at most one co-integrating vector between the regressand and the vector of regressors requires the use of the VECM technique. With the conditions ΘYY = 0,α ≠ 0 and φ = 0, our unrestricted error correction ARDL unrestricted error correction model can be developed as follows, in accordance with Pesaran et al. (2001) as in their Case III of unrestricted intercepts and no trends:

$$\Delta(MNQ)_t + \beta_0 + \beta_1(MNQ)_{t-1} + \beta_2(FDI)_{t-1} + \beta_3(INF)_{t-1} + \beta_4(PCY)_{t-1} + \beta_5(BCR)_{t-1} + \sum_{i=t}^{p} \beta_6 \Delta(MNQ)_t + \sum_{i=1}^{p} \beta_7 \Delta(FDI)_{t-1} + \sum_{i=1}^{p} \beta_8 \Delta(INF)_{t-1} + \sum_{i=1}^{p} \beta_9 \Delta(PCY)_{t-1} + \sum_{i=1}^{p} \beta_{10} \Delta(BCR)_{t-1} + v_t \quad 5$$

Equation (3), an ARDL of order (p, q, m, l, j), asserts that manufacturing output (MNQ) is prone to being dictated by its own lag, which includes the lag values of foreign direct investment (FDI), bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) and manufacturing output (MNQ). Traditionally, minimum Akaike's information criteria (AIC) are used to determine the structural delays. The long-run elasticities are obtained from the estimate of the ARDL unconstrained error correction model and can be expressed as the coefficients of the regressors' one-period lag (multiplied by a negative sign) divided by the coefficient of the regressand's one-period lagged value (Bardsen, 1989). As a result, the long-run foreign direct investment (FDI), impacts of bank credit to the private sector (BCR), manufactured goods import (MGM), real per capita income (PCY) and inflation rate (INF) and manufacturing output (MNQ) are calculated as in our ARDL model, respectively. The estimated coefficients of the first-differenced variables in the ARDL model are immediately retrieved as the short-run effects.

**The Wald Test for Short-run Causality: Zero Restriction Hypothesis**

The Wald test, which is based on the conventional F-statistic, was used to calculate the co-integration connection between the study's variables after we had calculated our unconstrained error correction ARDL model. The estimated long-run coefficients of manufacturing output (MNQ), foreign direct investment (FDI), bank credit to the private sector (BCR), real per capita income (PCY) and inflation rate (INF) as a percentage of manufacturing output (MNQ), and foreign direct investment (FDI), as a percentage of manufacturing output were restricted in order to perform the Wald test.

$\beta 1$ $\beta 1$
$\beta 2$ $\beta 2$
$H_0$: $\beta_3 = 0$, $H_1$: $\beta_3 \neq 0$ 6
$\beta 4$ $\beta 4$
$\beta 5$ $\beta 5$

According to the null (alternative) hypothesis, the co-integration relationship either does not exist or does exist. The Wald statistic was calculated and the critical values given in Pesaran et al. (2001) were used to determine if the result was significant or not.

## Results

**Table 1:** Augmented Dickey-Fuller Unit Root Test

| Variables | Constant | | | Constant & trend | | | None | |
|---|---|---|---|---|---|---|---|---|
| | Level | FD | | Level | FD | | Level | FD |
| MNQ | -1.1153 | -10.2656* | | -1.9762 | -10.2303* | | -0.4156 | -10.2711* |
| FDI | -1.9229 | -4.7717* | -0.4333 | -5.1114* | | 1.7172*** | -4.7688* | |
| INF | -1.2706 | -10.2334* | | -2.1328 | -10.2345* | | -0.0436 | -10.2213* |

*FD signifies First Difference. *, ** and *** denote significance at 1%, 5% and 10% respectively.* ***Source****: Authors' computation*

From Table 1, it is obvious that all the variables are integrated of order 1 or 1(I). In other words, all the variables are said to be stationary at first difference. Therefore, we can safely conclude that first differencing is sufficient for modeling the time series adopted in this study.

**Table 2:** Bounds Results

| Regressor | Coefficient | t- value |
|---|---|---|
| Constant | 4.095* | 25.605 |
| Log (MNQ-1) | 0.0269* | 13.436 |
| Log (FDI-1) | 0.826* | 4.662 |
| Log (INF-1) | -0.002 | -0.228 |
| Log (PCY-1) | 1.052*** | 2.999 |
| Log (BCR-1) | 1.228 | 5.656 |
| *Panel B: Short-Run Estimates* | | |
| Δ Log (MNQ) | 0.224*** | 2.688 |
| Δ Log (MNQ-1) | 0.556* | 4.082 |
| Δ Log (FDI-1) | 0.426*** | 2.255 |
| Δ Log (FDI-2) | 0.222*** | 2.856 |
| Δ Log (PCY-1) | 0.244 | 1.452 |
| Δ Log (PCY-2) | 0.244*** | 2.652 |
| Δ Log (BCR-1) | 0.698* | 2.226 |
| Δ Log (BCR-2) | 1.062 | 9.466 |
| *Summary Statistics* | | |
| R2 | 0.683 | |
| Adj $R^2$ | 0.625 | |
| Sum of Squared Residuals | 0.0066 | |
| Standard Error of Regression | 1.0222 | |
| F-Statistics | 15.998 | |

Note: ***, ** denotes statistical significance at the 1% and 5%levels.

**Source**: Authors' Computation.

**Table 3:** Bound Testing Approach to Co-integration

| Level of Significance<br>Critical Value<br>$\alpha$ % | Lower | Upper |
|---|---|---|
| 1% Significance*1 | 3.74 | 5.06 |
| 5% Significance*2 | 2.86 | 4.01 |
| 10% Significance*10 | 2.45 | 3.52 |
| Computed F-statistic: 6.555*** | | |

***Note:*** *critical values are cited from Pesaran et al. (2001). Unrestricted intercept and no trend. Refers to the number of estimated coefficients and *** denotes significance at 1% level*

**Table 4:** Long-Run Manufacturing output and foreign direct investment in Nigeria

| Variable | Long-Run foreign direct investment |
|---|---|
| Log (FDI) | 0.568*** |

*Note: *** denotes statistical significance of the computed longrun elasticity at the 5% level*

**Table 5:** Short-Run Causality Results from the Wald Statistical Hypothesis Test

| | | |
|---|---|---|
| Δ Log (FDI) | 5.255* | 0.0000 |
| 5 Δ Log (INF) | 12.255* | 0.0000 |
| Δ Log (PCY) | 2.562*** | 0.0000 |
| Δ Log (BCR) | 13.002*** | 0.0000 |

Note: *, *** denotes statistical significance at the 1 percent and 5 percent levels. Figures in parenthesis are the marginal significance values

Table 2 above reports the bounds results of the unconstrained error correction ARDL model. In terms of foreign direct investment, the coefficient is statistically significant and positive. This does, in fact, provide empirical support for the hypothesis that the foreign direct investment positively and considerably stimulates long-term manufacturing out growth. The study's control variables had a long-term detrimental impact on the manufacturing output growth, according to the findings. Thus, the result suggests that long-term growth of manufacturing output is not positively impacted by attracting foreign direct investments in the economy. At the ten percent significant level, real per capita income is favorably significant for the control variables. This result demonstrates that a rise in real per capita income will eventually result in higher manufacturing output growth. After accounting for degrees of freedom, the coefficient of determination of the model is 0.625. In other words, within a year of adjustment, 62.5% of the entire variance in the rise of real output is compensated for. Therefore, the calculated error correction model can be deemed statistically fit and robust after accounting for degrees of freedom. There is a 15.998 F-statistic. This is really important. The estimated model's overall relevance is implied. This does, in fact, support the estimated error equation's goodness of fit.

At the significance half percent level of significance, the provided F ratio passes the significance test. This suggests that there is a strong linear long-term relationship between Nigeria's manufacturing output growth rate and the country's level of foreign direct investment that s attracted into the economy. Considering the relative importance of each explanatory variable, it is clear that increasing the investment is essential to accelerating Nigeria's

manufacturing sector growth rate. At the five percent significance level, real per capita income likewise passes the test of significance. These essentially imply that real per capita income, bank credit to the private sector, and the availability foreign investment are important factors influencing Nigeria's manufacturing sector. This demonstrates even more how important the results are for policy. At the one percent significance level, the bounds co-integration test findings reject the hypothesis that there is no co-integrating relationship between the growth rate of manufacturing output, foreign direct investment, bank credit to the private sector and real per capita income. Thus, to put it simply, the findings indicate that there is a long-term relationship between Nigeria's manufacturing sector growths.

The computed F-statistic of 6.555 is higher than the lower critical bound value of 3.74, which goes against the backdrop of this. In Nigeria, the manufacturing sector growth rate's long-run with regard to the foreign direct investment is 0.568, which indicates econometrically how strong the calculated regression results are. The model has the desired BLUE qualities, according to every test. The residuals of the model are, in fact, homoskedastic, regularly distributed, and serially uncorrelated. As a result, there are no econometric issues with autocorrelation, misspecification, or heteroskedasticity in the estimated set of outcomes. The dynamic short-run causality effect was ascertained by applying the zero restriction to the coefficients of manufacturing output (MNQ), foreign direct investment (FDI), bank credit to the private sector (BCR), real per capita income (PCY) and inflation rate (INF) as a percentage of manufacturing output (MNQ), and foreign direct investment (FDI) with their lag values likewise equal to zero, using the Wald statistical test procedure. Upon rejecting the causal relationship between the aforementioned regressors, we do find that, at the one percent and five percent significance levels, respectively, the granger-cause manufacturing output growth rate in Nigeria is statistically significantly correlated with foreign direct investment (FDI), bank credit to the private sector (BCR), real per capita income (PCY).

**Conclusion and Recommendations**

In order to stimulate manufacturing sector over a thirty-six-year sample period, we experimentally investigated the effects of foreign direct investment in this paper. Other regressors, the private sector, real per capita income and inflation rate and foreign direct investment, were investigated using an estimated econometric model, with the foreign direct investment serving as the primary variable under investigation. The empirical findings indicate that there exists a favorable correlation between the provision of foreign direct investment and manufacturing in Nigeria. The main conclusion is that Nigeria's manufacturing sector output is growing at a considerable rate thanks to the foreign direct investment inflows.

This implies that actions to improve the prospects for foreign direct investment inflows are necessary in order to promote a steady rise in the manufacturing sector output growth rate. Therefore, in order to attract foreign direct investment inflows scarcity, the Nigerian government ought to enact a wide range of laws pertaining to foreign direct investment inflows. Policies should also be implemented to expand the capacity that already exists. This is quite desirable in light of the pressing need to appropriately improve the economy's growth prospects.

Once more, since investment influences positively influences manufacturing, monetary authorities should implement the proper monetary policy to lower lending rates in the banking industry. The increased capitalization available to small investors at a lower cost facilitates the growth of already-existing businesses as well as the creation of new ones, which increases purchasing power and creates additional job possibilities.

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