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TRADE POLICY, EXCHANGE RATE DYNAMICS AND MANUFACTURING SECTOR OUTPUT IN NIGERIA

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ABSTRACT **DOI No: 10.36713/epra16615** **Article DOI: https://doi.org/10.36713/epra16615**

This study examined the impact of trade policy and exchange rate dynamics on manufacturing sector output in Nigeria from 1981 to 2022. Manufacturing sector output was proxied by real manufacturing gross domestic product while import to GDP ratio, export to GDP ratio, index of energy consumption (IENEC), monetary policy rate (MPR), per capita income (PCI), exchange rate (EXR) and dummy variables for structural adjustment (DSAP) served as explanatory variables. The study used the autoregressive distributed lag (ARDL) technique to analyze the model. The results revealed that imports as a ratio of gross domestic product (IMGDP) impacted negatively on real manufacturing output (RMO) in both the short and long run periods while exports as a ratio of gross domestic product (EXGDP) exerted significant positive impact on RMO in both the short and long run periods. Trade liberalization proxied by DSAP exerted significant positive impact on real manufacturing output in the long run but insignificant positive impact on RMO in the short run. Exchange rate exerted negative impact on RMO in the long run but positive impact in the short run. It is recommended that trade policy in Nigeria should be designed by the federal government in line with export promotion industrialization strategy to enhance manufacturing output.

KEYWORDS: ***Trade Policy, Exchange Rate Dynamics, Manufacturing Output, ARDL, Nigeria.***

1. INTRODUCTION

Nigeria's trade policy has evolved from periods of extreme protectionism to its more free position now. Nigeria followed an import substitution industrialization strategy in its first ten years of independence. This entailed using trade policy, such as high import taxes and quantitative limits, to effectively defend regional manufacturing businesses. As a result, several goods were prohibited from entering the country. All goods from Japan during this time required an import license. Exchange regulations on the repatriation of earnings and dividends were put into action and imports of machinery and spare parts were prohibited. Additionally, imports of non-essential consumer products were subject to restrictions. Even after Nigeria's civil war concluded in 1970. The import substitution industrialization plan persisted, although trade policy became less restrictive between 1970 and 1980, perhaps as a result of post-war reconstruction demands. Beginning in 1981, there was a change in policy that emphasized trade development and increased the use of regional raw materials in industrial output. Trade policy underwent a dramatic modification beginning in 1986 that led to more liberalization. This policy change was a direct result of the structural alterations programs being implemented. (Adenikinju, 2005). In an effort to increase non-oil foreign exchange profits, international trade was gradually liberalized between 2001 and 2012, with an emphasis on export base diversification and private sector-led development. The trade strategy that was implemented in Nigeria from

2013 to 2022 upheld the country's adherence toward ideals of liberalizing trade as method of fostering growth and industrialization. The guidelines set forth three tactical goals: first, to foster regional trade by lowering various taxes and supplying trade-related infrastructure; second, to foster domestic trade by formalizing informal trade along Nigerian borders, formalizing quick cargo haulage within (ECOWAS) and raising product standards. Nigeria's Federal Government, 2023). Over time, Nigeria has furthermore experienced changes in its foreign exchange and currency rate control systems. The official pegged exchange rate regime ran from 1970 to 1985. From 1986 onwards, the market determines the exchange rate. Following 1986, exchange rate control kept changing. For example, in 1987, the first and second tiers of the foreign exchange market (FEM) were combined into a single, sizable FEM that used a variety of pricing techniques, including the Dutch system, weighted average, and marginal. The pressure from the 1992 Naira floating led to the formation of autonomous foreign exchange market (AFEM) by 1995.

The apex bank (Central Bank) and Government established, Nigeria Export and Import Bank (NEXIM), Nigerian Export Promotion Council with the intention of enhancing foreign exchange board, particularly increasing the country's supply of foreign exchange earnings. In an effort to curb speculation in the foreign currency market, In 1999, the AFEM was replaced by the Inter-Bank Foreign Currency Market (IFEM), a daily two-way quotation system. From 2002 until 2015. Three systems were used: the Wholesale Dutch Auction System (WDAS), the Retail Dutch Auction System (RDAS), and the Interbank Rate System Regime. However, the managed floating regime has been in effect since 2016 (CBN, 2022).

Over the years, the Nigerian manufacturing sector has been the productive center of the country's economy, contributing to GDP and employment creation. Despite its success, the sector faces several obstacles, including low energy supply, limited access to affordable financing, subpar infrastructure, and multiple taxation. To address these obstacles, the government, through the Central Bank of Nigeria, has been implementing various interventions in the sector with the goal of boosting value creation and foreign exchange earning capability.

Since 2015, the Bank has carried out a number of interventions such as the Differentiated Cash Reserve Requirement window (RSSF-DCRR) and the Real Sector Support Facility, the Presidential Fertilizer Initiative (PFI), the CBN-Bank of Industry Facility (CBIF), the 100 for 100 Policy on Production and Productivity (100 for 100 PP) and the COVID-19 Intervention for the Manufacturing Sector (CIMS) (CBN, 2022).

A brief examination of the manufacturing sector over time revealed that, in real terms, the industry's contribution to the Nigerian economy has continued to fall slowly but steadily, ranging between 8.5% and 9% from 2011 to 2022—a period that is marginally greater than that of 2001 to 2010. Still, the exchange rate continued to rise steadily.

This is shown in table 1 and reflected in figure 1.

Table 1: Manufacturing Real Output as Percentage of Real GDP and Exchange Rate

Variable/Period	1981 – 1990	1991 - 2000	2001 – 2010	2011 - 2022
RMO as% of RGDP	21/09%	14.92%	8.05%	8.97%
Exchange Rate	2.97	60.56	133.90	257.58

Source: Author’s computation

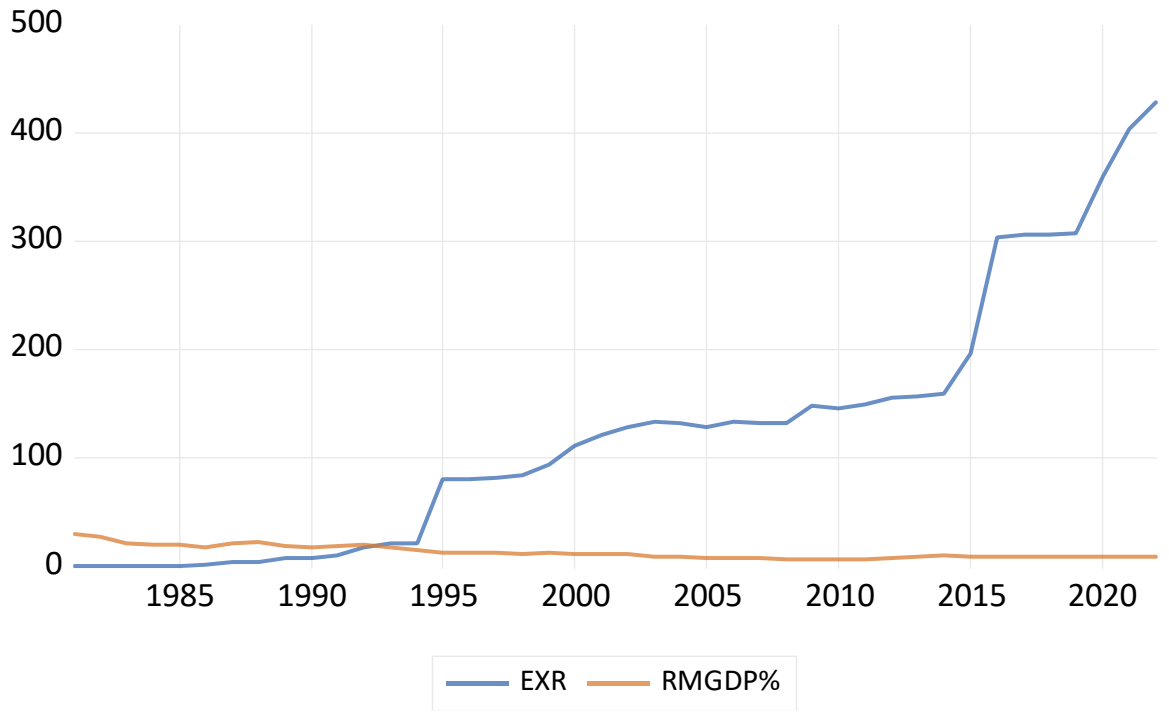

Figure 1: Manufacturing Real output as percentage, of Real GDP and Exchange Rate in Nigeria, 1981 – 2022.

According to Figure 1, Nigeria's real manufacturing output between 1981 and 1990 accounted for 21.09% of the country's real GDP on average. The average currency rate at this time was ₦2.97 to $1 USD. Between 1987 and 1990, trade policy was characterized by both liberalization and restriction. The real manufacturing production as a percentage of real GDP fell to 14.92% in the decade that monitored (1991–2000), while the exchange rate skyrocketed to ₦60.56 to USD $1, or an increase of around 1,939.1 % over the decade before. This was a period of liberalization in trade policy. The real production impact of manufacturing to GDP fell to 8.05% between 2001 and 2010, with an average exchange rate of ₦133.9 to USD $1 throughout that time.

Nonetheless, throughout the 12-year period from 2011 to 2022, the real production contribution of manufacturing to real GDP increased marginally to 8.97% despite the depreciation of the currency rate, which averaged ₦257.58 to USD $1, signifying a 92.34% increase from the previous period.

Despite numerous interventions, real manufacturing production as a percentage of real GDP has decreased over time. Trade policy does not appear to have produced the expected result of increasing sector productivity through imports of capital goods and raw materials, and exchange rate regimes typically react differently in the sector.

Considering the aforementioned, this study's goal is to look at the relationship that exists amongst Nigeria's industrial output, exchange rate dynamics, and foreign trade policy between 1981 and 2022. The remainder of this article is structured as follows: The review of relevant literature was the main topic of section two. The study's material and methods were examined in section three. The results and discussion of findings were examined in section four. The conclusion and recommendations were revealed in section five.

2. REVIEW OF LITERATURE

Both theoretical and empirical literatures are the main focus of the literature review. The study's theoretical foundation or framework is endogenous growth theory.

2.1 Endogenous Growth Theory's Theoretical Framework.

Romer (1986) established exemplary increasing earnings by means of steady progressive equipoise advance rate that came from endogenous understanding buildup, which revitalized the progress works. This represented a substantial withdrawal from the body of scholarship that had hitherto seen technological advancement as entirely exogenous. Firm J's production function in Romer's model has the following form:

$$Yt = At\ F(Kt,j\ Lt,j) \qquad 2.1$$

Captures aggregate output-enhancing technology advancement and its capital increases without depreciation.

$$\acute{K}_{t,j} = i_{t,j} \quad 2.2$$

As in Aggregation (and, crucially, there is no population increase), firms and individuals are dispersed along the unit interval with a total mass of 1. Accordingly, aggregate investment is,
e.g.,

$$I = \int_0^1 it, j \; dt \quad 2.3$$

Romer makes the assumption that the whole amount of knowledge in the economy is correlated with the total amount of previous investments.

$$\Xi_t = \int_{-\infty}^{t} Iv \; dv \quad 2.4$$

which, curiously, corresponds to the total capital stock size.

$$K_t = \int_{-\infty}^{t} Iv \; dv \quad 2.5$$

Romer makes the fundamental premise that productivity is determined by the effect of the knowledge stock via.

$$At = \Xi_t^{\eta} \quad 2.6$$

Where $\eta < 1$.

Thus, there is perpetual growth at a rate determined by the level of impatience and the proportion of capital to production. Lastly, the social planner would select a steady-state growth rate of

$$C_t^{\cdot} / C_t = \rho^{-1} (\alpha + \eta - v) \quad 2.8$$

since the outside forces suggest the existence of larger yields on capital growth compared to the individual level, at the societal level, which the social planner would take into consideration. Therefore if the goal of the social planner is to motivate the private sector to advance. This model offers a policy of subsidizing capital accumulation toward the social optimum.

According to the hypothesis, there is an unintended knowledge that maybe solely knowledge-driven business may spread to other parts of the economy, where it will be most effective in fostering a competitive edge for global competitiveness.

2.2 Empirical Literature

Numerous research works have provided empirical findings that calculate how trade liberalization affects productivity levels. Ijirshar (2019) uses annual time series data covering the years 1975 to 2017 to evaluate the effect of trade openness on economic growth among the ECOWAS member states. Because the temporal dimension exceeded cross-sections, the study used Mean Group (MG) and Pooled Mean Group (PMG) estimators to generate non-stationary heterogeneous dynamic panel models. The PMG estimator was chosen when the Hausman test was run. The findings indicate that openness to trade has mixed short-term effects on growth in (ECOWAS) member nations but positive long-term ones.

Tahir and Hayat (2020) looked at how trade openness affected Brunei Darussalam's economic growth. utilizing the Autoregressive Distributed Lagged Model (ARDL) method, from 1989 to 2018. The results showed a statistically significant favorable relationship between economic growth and trade openness. Likewise, the results also showed that natural resources and domestic investment engendered favorable impact on the expansion of the economy. Contrary to presumptions, it was found out that human capital has possessed a bad and substantial influence on economic growth. While all other variables were statistically significant, trade openness and domestic investment had lost their significance level.

Gnangnon carried out a quantitative evaluation of the concept of trade policy space in 2019 and examined its effects on the economic development and transitional convergence of different countries. The investigational study between 1995 and 2015 encompassed 150 nations. Trade policy space is the amount of flexibility a government has after its current trade policy departs from the structural domestic and international factors that may have an impact on the trade policy. The actual per capita income of a nation catching up to the global average was defined as the transitional convergence. The findings indicate that while trade policy area has a beneficial influence regarding economic expansion, the degree of this benefit varies among nations based on their structural policies. Furthermore, it was discovered that transitional convergence was significantly and favorably impacted by the trade policy space, with the level of transitional convergence rising as the trade policy space shrank.

The impact of trade policy changes on Ethiopian manufacturing enterprises was examined by Bigsten, Gebreeyesus, and Söderbom (2016). The study concentrated on the trade policy reforms' import liberalization component using firm-level panel data as well as commodity-level import and tariff data. The findings showed that increases in company productivity may be statistically explained by the lower input tariff. However, the output tariff estimate was not very important. Given this, the analysis came to the conclusion that protecting domestic manufacturers with high tariffs would reduce productivity, underscoring the possibility that imports could be a significant alternative

source of increased productivity. They concluded that output tariffs have no economic impact, which is noteworthy.

Driver (2019) conducted a retrospective analysis of the power of trade policies on the manufacturing sector in South Africa since the country's democratic transition, looking at the divergences and convergences between economists' arguments for and against further trade liberalization. A variety of effects on the manufacturing sector that were anticipated to result from trade policy reforms were tested using data from the Bureau of Economic Research. These effects included mark-ups, productivity, exports, employment, and investment. The analysis showed that, as predicted, lowering unit costs of raw materials are the consequence of an increasing real exchange rate. But because the markup also decreases, presumably to prevent prices from increasing too high in foreign currencies, exporter profitability still suffers. Additionally, there is proof that a genuine appreciation also results in a decline in export volume.

Puruweti (2017) looked into how trade openness affected the productivity of a few chosen African nations between 1980 and 2014. Disaggregated data were used to evaluate if trade openness affects different industries in different ways. The consequences demonstrated that transparency in trade. Typically had an encouraging influence on value added in industrialization and services using a pooled ordinary least square approach. The study discovered that, in relation to other variables, Negative labor productivity applies to all but service value added. Negative labor productivity applies to all but service value added, but capital contributes favorably to both total and sectoral significance added. Bargain returns to scale and subpar managerial services were cited as the reasons for the negative link between labor and production, with the argument that since most developing nations face capital constraints, they wind up consuming a lot of labor to the point where their marginal labor productivity declines. These findings supported the research's conclusion that increased trade openness can boost output in developing nations. It was therefore advised that African nations pursue sector-specific and progressive trade liberalization in light of the aforementioned information.

Zenebe (2016) examined the impact of tariff increases utilizing firm level panel data from 2000 to 2009 to examine Productivity at the firm level, exit of firms, and reallocation of industry resources in Ethiopian manufacturing companies. The research utilized the difference-in-difference regression framework, accounting for industry-specific characteristics and unobserved macro-economic shocks, by including time and dummies. As predicted by the theoretical literature, the results demonstrate higher productivity following resource reallocation and deregulation in a number of industries. Nonetheless, the effects vary throughout sectors. Because imports at a lower cost directly affect competition, there was no indication that firms would leave after tariff reductions; nonetheless, the tariff reductions' impact on productivity may influence firms' decisions to leave.

Numerous studies on how trade is related policy and performance of the industrial sector have also been conducted in Nigeria. Harrison (1994) and Adenikinju and Chete (2002) used a comparable methodology. After adjusting for market structure, they explored the connection between trade liberalization and businesses' productivity performance in Nigeria's manufacturing sector. The study's focus was on the first few years of the Structural Adjustment Program's implementation (1988– 1990). The study controlled for market structure and employed import and export penetration indices, simple average tariff rates, and quota weighted effective protection rates as proxies for trade liberalization.

The results showed that Production was significantly hindered by the average nominal tariff rates and the effective rate of protection. The index of export growth had a favorable effect on productivity, while the predicted import growth coefficient was statistically insignificant. Based on these results, the study found that trade liberalization yields large benefits, but it also advised caution regarding the speed of import liberalization because import policies may have unfavorable consequences on productivity. Also, the productivity of Nigerian businesses will be examined in relation to foreign trade in this study.

Adeagbo (2020) looked on how commerce and growth are related in Nigeria from 1970 - 2015. Real GDP is used as the variable under investigation in the empirical analysis, and the explanatory variables are oil rent as a percentage of GDP, real imports, real exports, and real gross capital formation. The model was estimated using a log-log Ordinary Least Square (OLS) regression using a single equation error correction model (ECM). Except for oil rent as a proportion of GDP, all of the explanatory factors in the OLS results yielded a positive sign; this is consistent with previous research.

Ikubor, Haruna, Igniga, and Anthony (2023) broke down the study into the production of mining, industrialization and electricity in Nigeria, so as to analyze the dynamic impact of trade policy on industrial output. The ARDL and NARDL frameworks were used in the study, was done via annual time series data from 1970 - 2018. With the exception of electricity output, the findings show that trade policy dynamics have short-term non-linear effects

on industrial output and its subsectors, manufacturing, building and construction, mining, and quarrying. These effects eventually faded, confirming the asymmetric effects of trade policies on industrial output. Further, the short-run non-linear ARDL results showed that, in contrast to trade liberalization, trade restrictions improve the performance of the manufacturing subsector and the industrial sector. The short-run linear ARDL supported these findings; nevertheless the long-run linear ARDL results revealed the opposite without changing the relationship's asymmetric status.

Umoh and Effiong (2017) used the autoregressive distributed lag to examine trade openness and the manufacturing sector in Nigeria performed between 1970 - 2013. Manufacturing index was the dependent variable in their analysis, and the explanatory factors included trade openness, nominal exchange rate, interest rate spread, and a fictitious variable for the structural adjustment program. According to their findings, trade openness significantly raises Nigeria's industrial productivity over the long and short terms. Over time, coefficient estimates demonstrated stability and robustness. It is therefore suggested that, as a long-term strategy, trade liberalization and open policies should be the primary emphasis of policy direction for Nigeria's manufacturing sector.

In order to assess the consequences of trade liberalization on the consumption of goods made in Nigeria, the inspiration of technology on product quality in the Nigerian manufacturing sector.

Hence, Agu, Anichebe, and Maduagwu (2016) look at the effects of globalization on the manufacturing sector in Nigeria and its effect on employee employment relations in that country. Using the Taro Yamane Formula at the 5% level of significance, a sample size of 246 out of the 640 participants in the study was determined. The results show that trade liberalization significantly reduces the amount of Nigerian-made goods consumed, technology improves the quality of items produced in the country's manufacturing sector, and globalization significantly improves employee job relations. According to the study's findings, globalization is a double-edged sword that both supports and undermines the economic activity of developing countries.

Obaji, Ogbanna, and Atuma (2022) examined how trade policies affected Nigeria's industrial sector performance between 1970 - 2019. The model was assessed using the Autoregressive Distributed Lag (ARDL) method. The findings showed that while customs and excise duties had a long-term positive and negligible impact on industrial performance, they had a short-term negative and substantial impact on industrial production. The outcomes also showed that, both in the short and long terms, non-oil exports had a negative and considerable impact on industrial output. Furthermore, interest rates had a little but detrimental short- and long-term effect on business productivity. Nevertheless, the findings revealed that, trade openness had a favorable and long-term considerable impact on the rise of industrial output.

Using the parsimonious error correction model, Ali, Obayori, and Obayori
(2018) examined the connection between globalization and the expansion of Nigeria's manufacturing sector between 1980 and 2016. The manufacturing sector expansion was the dependent variable in their model, while the explanatory factors were the trade intensity index, trade restrictions, and portfolio investment stocks. The findings demonstrated a positive correlation between the manufacturing sector's past growth and its current expansion. Additionally, the trade intensity index significantly boosted the expansion of the manufacturing sector. Conversely, trade restrictions had a major detrimental effect on the expansion of the manufacturing sector, whilst portfolio investments had a minor but negative effect. According to the study, policymakers should make sure Nigeria focused on producing and exporting manufactured goods where it has a comparative advantage and can do so at a reasonable cost in order to maximize the benefits of globalization.

In their examination of the connection between trade liberalization and the expansion of manufacturing output in Nigeria, Ogu, Aniebo, and Elekwu(2016)emphasized the short- to medium-term timeframe while simultaneouslyemphasizing the significance of the long term. This has been the subject of most studies and spans the years 1980–2013 via the error correction mechanism. Trade liberalization has been shown to have a negative short-term impact on manufacturing production, although having a positive long-term impact.

In order to evaluate the effect of trade liberalization on industrial value-added in Nigeria from 1970 to 2014, Ebenyi, Nwanosike, Uzoechina, and Ishiwu (2017) used autoregressive distributed lag. According to their findings, The Nigerian economy's export-oriented structure did not alter between 1970 and 2014. The only modifications to its exports have been a simple change in the exported product, which suggests a switch from key agriculture industry-based exports to exports-based on the primary mining industry (i.e. e crude oil).They uncovered that intermediate imports had a major detrimental effect on Nigeria's manufacturing industry as a result. Thus, the study came to the

conclusion that the high cost of production is the reason why the Nigerian manufacturing sector is unable to take advantage of the export opportunities that come with trade liberalization. Akims (2017) used trimestral firm-level records from the Nigerian industrial survey conducted between 2008 and 2010 to specifically analyze the paraphernalia of occupation liberalization on firm efficiency, exports, and competitiveness in the country's manufacturing sector. The data for companies was organized into structured cohorts based on factors such as size, location, and industrial activity. For the analysis, appropriate Random Effects and Fixed Effects estimation approaches were used. The discoveries demonstrated that while trade liberalization's import component hinders productivity, its export component increases it. Therefore, export-oriented policies would be comparatively more successful in raising productivity. Furthermore, the results demonstrated that while increased productivity does not affect a company's decision to engage in exports, it did raise the proportion of exports in overall sales for companies that are already doing business internationally. Additionally, the findings support the idea that trade liberalization is a means of enhancing the competitiveness of businesses in Nigeria's manufacturing sector by offering some evidence of the import discipline effect of trade liberalization.

Adofu and Okwanya (2017) assessed how Nigeria's industrial output was impacted by trade openness and total factor productivity between 1981 and 2015. The impact of trade openness on industrial output was predicted using the vector autoregressive (VAR) model, and the response of industrial output to shocks in trade openness and total factor productivity was assessed using the variance decomposition and impulse response function. The findings demonstrated that trade openness increased and had a positive impact on Nigeria's industrial output, but total factor productivity had a negligible effect. The impulse response function indicated that total factor productivity has a harmful long-term influence on Nigeria's industrial output.

3. METHODOLOGY OF THE STUDY

3.1 Model Specification

This study used a single model to capture the three specific objectives listed in section one as performance measure in the manufacturing sector. It achieved this by embracing, with changes the work of Effiong and Umoh (2017) whose work followed the works of Romer's (1986) endogenous growth model and Krugman (1979); Lancaster (1980) and Helpman (1981) new trade theory. The new trade theory which posits continuous return to scale, in particular, suggests a growth model wherein an individual firm's aggregate production advances with technical advancement and it is expressed as follows:

$Y_t = A_t F(K_{t,j} L_{t,j})$

where Y_t is the total production, A_t is the advancement in technology, $K_{t,j}$ represents capital accumulation without devaluation and $L_{t,j}$ is the constant population. As regards bridging the gap amongst rivalry and non-rivalry inputs and excludable and non-excludable goods, the model took into account government involvement using a social planner in order to effectively incorporate endogenous growth rate through technological spillover from other knowledge-based industries for the economy. These goods take the following forms:

$$C_t^{\cdot} / C_t = \rho^{-1} (\alpha + \eta - v)$$

Thus, there is perpetual growth at a rate determined by the level of impatience and the proportion of capital to production. This is due to the social planner's consideration of the externalities, which suggest that capital accumulation yields greater returns compared to the individual level, at the social level. Therefore, if the social planner want to encourage the private economy to advance toward the social optimum, this model suggests that capital accumulation should be subsidized.

In this study, aggregate production enhancing technological advancement is studied using a set of explanatory variables with particular changes, using the endogenous growth model. Import penetration, which indicates trade openness, determines the real manufacturing growth rate. The endogenous growth model recognized the influence of government intervention and the imperfect market. The monetary policy rate, which accounts for capital accumulation depreciation due to exchange rate fluctuations, represents technological advancement; per capita income, which accounts for the aggregate stock of knowledge and domestic demand; and the dummy variable for the structural adjustment program, which represents government trade policy. The sequence of integration of the time series variables used in this study led to the conclusion that the autoregressive distributed lag (ARDL) approach through bound testing to cointegration was the suitable econometric technique. As such, the real industrial growth rate (RMO) model's functional form is as follows:

RMO = f (IMPGDP, EXGDP, AMCUR, MPR, LnPCI, EXR, DSAP) (3.1)

Where:
RMO = Real Manufacturing Output
IMPGDP = The Ratio of Imports to GDP (import penetration)

EXPGDP = The Ratio of Exports to GDP (export penetration)

INENEC = Index of Energy Consumption

MPR = Monetary Policy Rate

LnPCI = Log of Per Capita Income (proxy for labour income and domestic demand)

EXR = Exchange Rate

DSAP = Dummy variable for Structural Adjustment Programme

Expressing equation 3.1 using the autoregressive distributed lag (ARDL) procedure yields:

$$RMO_t = \beta + \sum_{i=0}^{n} \beta_{1i}\Delta RMO_{t-i} + \sum_{i=0}^{n} \beta_{2i}\Delta IMGDP_{t-i} + \sum_{i=0}^{n} \beta_{3i}\Delta EXGDP_{t-i} + \sum_{i=0}^{n} \beta_{4i}\Delta IENEC_{t-i} + \sum_{i=0}^{n} \beta_{5i}\Delta MPR_{t-i} + \sum_{i=0}^{n} \beta_{6i}\Delta LnPCI_{t-i} + \sum_{i=0}^{n} \beta_{7i}\Delta EXR_{t-i} + \sum_{i=0}^{n} \beta_{8i}\Delta DSAP_{t-i} + \beta_9 RMO_{t-1} + \beta_{10} IMGDP_{t-1} + \beta_{11} EXGDP_{t-1} + \beta_{12} IENEC_{t-1} + \beta_{13} MPR_{t-1} + \beta_{14} LnPCI_{t-1} + \beta_{15} EXR_{t-1} + \beta_{16} DSAP_{t-1} + \varepsilon_{1t} \quad (3.2)$$

where Δ is the first difference operator, and $\beta 9$, $\beta 10$, $\beta 11$, $\beta 12$, $\beta 13$, $\beta 14$, $\beta 15$, and $\beta 16$ represent the long-run association in equation 3.2, while $\beta 1$i, $\beta 2$i, $\beta 3i$, $\beta 4$i, $\beta 5$i, $\beta 6$i, $\beta 7$i, and $\beta 8$i indicate the short-run dynamics in the above relations. The Bound test, also known as the F-statistic, is used to test the alternative hypothesis, $H1$: $\beta 9 \neq \beta 10 \neq \beta 11 \neq \beta 12 \neq \beta 13 \neq \beta 14 \neq \beta 15 \neq \beta 16 \neq 0$, against the null hypothesis, $H0$:$\beta 9 = \beta 10 = \beta 11 = \beta 12 = \beta 13 = \beta 14 = \beta 15 = \beta 16 = 0$. The Bound or F-statistic is contrasted with the critical Bounds test values obtained from Pesaran et al. at 5 percent and 1 percent. (2001). If the calculated Bound or F-statistic is higher than the upper bound I(1), the null hypothesis that there is no cointegration is rejected. This suggests that each series has long-term relationships with the others. However, if the Bound or F-statistic falls between the upper and lower bounds, no definitive conclusion is made. If the computed F-statistic or Bound is less than the lower Bound I(0), the null hypothesis of no cointegration is upheld. In order to evaluate the performance of Nigeria's manufacturing sector, the specific ECM estimate for RMGR is as follows:

$$RMO_t = \beta_0 + \sum_{i=0}^{n} \beta_1 RMO_{t-1} + \sum_{i=0}^{n} \beta_2 \Delta X_{t-1} + \beta_3 ECM_{t-1} + \varepsilon_{2t} \quad (3.3)$$

After a short run shock, the error correction term is the speed of adjustment back to the long run, and ε_{2t} is the stochastic error term. X_{t-1} is the vector of matrices reflecting a set of explanatory factors. We move on to the next stage of determining the coefficients and the significance level since the Wald test result supports the existence of cointegration. The Akaike Information Criterion is used to determine the ideal lag order (AIC). The long run ARDL model is estimated using the error correction model and bound test after the optimal lags have been determined. We used a superior diagnostic test, the Ramsey RESET for evaluation, to determine the validity of the predicted ARDL model.

4. PRESENTATION AND DISCUSSION OF RESULTS

4.1 Unit Root Test Result

We looked at the chosen variables' integration order. Even while the ARDL limits test works regardless of whether the variables are fractionally integrated, simply I(0), or purely I(1), the existence of the I(2) variables invalidates the F-statistics that Pesaran et al. (2001) obtained. This is because the limits test assumes that the variables are either I(0) or I(1). Unit root testing is therefore necessary to ensure that no variable is integrated at order I(2) or higher. We used the standard Dickey and Fuller (1981) Augmented Dickey–Fuller (ADF) test, which allows for a lax assumption on the distribution errors and takes heteroscedasticity and increased serial correlation into account.

Table 4.1: ADF Test Results

Variables	ADF Statistics		Probability		Order of Integration
	Levels	1st Differece	Levels	1st Difference	
RMO	-2.846923	-6.994930***	0.0000	0.0002	I(1)
IMGDP	-4.444790***	……ψ	0.0046	…….ψ	I(0)
EXGDP	-2.926942	-7.189253***	0.1635	0.0000	I(1)
IENEC	-1.538079	-5.942605***	0.8022	0.0001	I(1)
MPR	-2.487758	-7.230837***	0.3326	0.0000	I(1)
LNPCI	-1.645637	-5.381245***	0.7596	0.0003	I(1)
EXR	-0.817055	-5.979236***	0.9567	0.0000	I(1)

Notes: At the 1 percent, 5 percent, and 10 percent significance levels, respectively, ***, **, and * indicate rejection of the stationary null hypothesis. Around a trend and intercept, the null hypothesis remains stationary. Source: Author's calculations performed with E-views 13.

Notwithstanding the fact that import penetration (IMGDP) was stationary at levels and at the one percent significance level, Table 4.1 indicates that the variable was integrated of order zero I(0). Order one I(1) integration was used to calculate real manufacturing output (RMO). Exchange rate (EXR), monetary policy rate (MPR), log of per capita income (LnPCI), export penetration (EXGDP), index of energy consumption (IENEC), and monetary policy rate (MPR) are the variables that illustrate the integration of order one I(1).

Moreover, it was demonstrated that these variables were stationary at the one percent significance level and following first difference. For every one of these variables, the unit root tests produced stationary values around the intercept and trend.

4.2 Cointegration Analysis

Following the determination of the time series properties, the long run relationship's existence was examined. To determine whether there were any long-term relationships between any of the data, we used the ARDL model and the Bound test. The lag length is carefully chosen since the outcome of ARDL treatments depends on it. This study adopted the AIC guideline made by Pesaran et al. (2001) for lag duration selection. Consequently, the long-term association between all the variables was examined using the chosen ARDL model (2, 0, 1, 2, 0, 1, 1, 0). Table 4.2 displays the results of the Bound test. The significant upper bound value of 3.84 at the 2.5 percent significance level benchmark was found to be smaller than the F-statistic of 4.062277, which was found to be higher than the upper critical bound value of 3.5 at the 5 percent significance level benchmark. In summary, the long-term relationship between all the variables—real manufacturing growth rate, import/export penetration, average manufacturing capacity utilization rate, exchange rate, monetary policy rate, per capita income (which acts as a proxy for domestic demand), and the dummy for structural adjustment program—is demonstrated by the final analysis. Stated differently, these variables would eventually follow one another.

Table 4.2 ARDL Bound Testing Cointegration Analysis

F-Statistics = 4.062277 **Pesaran, Shin and Smith (2001): Unrestricted trend and intercept, k = 6**		
	Critical Bound Values	
Level of Significance	Lower Bound	Upper Bound
10%	2.03	3.13
5%	2.32	3.5
2.5%	2.6	3.84***
1%	2.96	4.26

Notes: The dummy variable is not included; critical values with trend and intercept are taken from Pesaran et al. (2001); *, **, ***, and **** indicate significance at the 10, 5, 2.5, and 1 percent levels.
Source: Author's computation with the use of E-views13

4.3 Long Run Estimates

We estimated the long-run coefficient values in Equation (3.2) after discovering a long-run link between the variables. Based on the AIC, the long-run elasticities were computed. The best model was determined to be ARDL [2, 0, 1, 2, 0, 1, 1, 0], with the outcomes shown in Table 4.3. Import penetration (IMGDP) has a long-term, detrimental effect on Nigeria's real manufacturing growth rate. Therefore, a rise in the proportion of domestic demand for goods satisfied by imports, as indicated by the IMGDP, is detrimental to the actual manufacturing growth rate since it lowers the demand for goods produced domestically. Specifically, the coefficient of -272.1 indicates that for every 1 percent increase in IMGDP, there is a considerable reduction in RMO of -272.1 percent.

Table 4.3 ARDL Long Run Estimates

Dependent Variable: Real Manufacturing Output (RMO)				
Variables	Coefficients	Std. Error	t-Statistic	Probability
IMGDP	-272.111390	326.540929	-0,833315	0.0120
EXGDP	321.133841	249.375021	1.287755	0.0088
IENEC	-1.400828	0.355556	-3.939821	0.0007
MPR	210.526063	327.922759	0.641999	0.5263

LNPCI	-2.873480	3.372565	-0.852016	0.0017
EXR	-13.487756	22.201756	-0.607509	0.5486
DSAP	1296.088353	5979.097301	0.216770	0.0300
C	832.696561	9813.772850	0.084850	0.9330

Source: Author's computation with the use of E-views13

Export penetration (EXGDP), which measures the proportion of global demand for commodities satisfied by domestic companies, significantly increases RMO. This finding supported the a priori economic hypothesis that EXGDP and RMO would positively correlate. Additionally, it supports the industrialization and export development strategy that the nation has used throughout the years.

Specifically, the coefficient of 321.1 indicates that for every 1 percent increase in EXGDP, there is a significant 321.1 percent increase in RMO.

The degree to which the variable affected actual manufacturing production during the analysis period can be seen in the export penetration rate. The energy consumption index, or IENEC, significantly reduces RMO. According to the IENEC coefficient of -1.400828 there is a 1.400828 percent decrease in RMO for every 1% increase in IENEC. The outcome defies the presumptive economic theory. The high cost of energy in Nigeria, where the majority of manufacturing companies produce their own energy to sustain production frequently since there aren't many public electricity sources, may be the cause of this disparity. a factor that has caused numerous businesses to go abroad (Barberopoulos, 2011).

RMO experienced a negligible beneficial influence from the monetary policy rate (MPR). This outcome supports the Manufacturers Association of Nigeria's assertion that inadequate funding availability is one of the barriers facing Nigerian manufacturing companies. Therefore, during the course of the analysis, Nigeria's monetary policy rate did not statistically significantly explain fluctuations in RMO with respect to manufacturing's contribution to the country's gross domestic product. Per capita income (PCI), which is used to substitute labor income and domestic demand, has a substantial negative impact on RMO. The value of -2.9 indicates that for every 1% rise in PCI, RMO is decreased by -2.9.

The a priori economic expectation, which assumed a positive link between LnPCI and RMO, is at odds with this conclusion. It confirmed Nigerians' appetite and preference for goods made elsewhere. As a result, during the analysis period, the country's per capita income increased, reducing RMO and seemingly favoring imports due to the preference for foreign goods. The exchange rate negatively affects RMO, but not significantly.

This indicates that during the course of our experiment, changes in EXR were not statistically significant to RMO. The dummy variable for the structural adjustment program (DSAP) has two sides. First, from 1981 to 1986, the constant coefficient in model 3.2 represents the time before SAP in Nigeria and the relative trade restrictions. Despite being positive, the coefficient is not statistically significant. The second factor is SAP's coefficient of the dummy, which significantly raises RMO. This suggests that measures implemented during the structural adjustment program had a favorable effect on Nigeria's RMO.

4.4 Short Run Estimates

Table 4.4 reports CointEq(-1) as the error correction model's (ECM) outcome. The dynamics in the real manufacturing output equation were captured in the short run using the ECM model, and we also looked into how quickly adjustments were made in response to deviations from the long-term equilibrium. Upon adjustment for lagged period error shocks, the error correction term's coefficient is shown to be negative and statistically significant, with an above-average speed of roughly 57.05 percent of long-run disequilibrium. Diagnostic checks are carried out for parameter stability using the Ramsey reset test and serial correlation using the Lagrange multiplier (LM) test. The Ramsey reset test reveals no indication of error correction model instability, and the outcome of the LM test indicates no serial correlation exists given the P-value of 0.21, requiring the null hypothesis of no serial correlation to be retained. Put otherwise, the error correction model's P-value of 0.5467 indicates that it is stable. At roughly 0.76, the adjusted R-squared (R2) is regarded as high.

Table 4.4 ARDL Short Run Estimates

Dependent Variable: D(RMO)

Variables	Coefficients	Std. Error	t-Statistics	Probability
D(RMO(-1))	-0.245767	0.098865	-2.485894	0.0194
D(IMGDP)	-155.238796	179.719057	-0.863786	0.0053
D(EXGDP)	507.727521	118.900922	4.270173	0.0002
D(IENEC)	-0.433667	0.156225	-2.775920	0.0107
D(MPR)	120.104537	184.587598	0.650664	0.5208
D(LNPCI)	18.898621	2.369803	7.974765	0.0000
D(EXR)	168.512164	41.263034	4.083853	0.0004
DSAP	739.414821	3458.329912	0.213807	0.8323
CointEq(-1)	-0.570497	0.160658	-3.551005	0.0014
Diagnostic Test Results: Adjusted R^2 = 0.89 Ramsey Reset= 0.5467 LM Test = 0.21				

Notes: LM test is the Lagrange multiplier for serial correlation test. Ramsey reset test is used as test of stability of the residuals.Source: Author's computation with the use of E-views13.

Short-term changes in the lagged value of real manufacturing output D(RMO(-1)) have a major detrimental effect on RMO's present value. The value of the D(RMO(-1)) coefficient, which is -0.245767, indicates that the value of RMO in the prior year reduced the value in the present year by 0.245767 percent. This outcome makes sense because, starting in 2022, Nigeria's RMO was consistently negative for three years before becoming positive. In other words, the RMO was -1.46 in 2019, dropped to -4.32 in 2020, then increased to -0.21 in 2021 and finally reached a positive value of 2.09 in 2022. As a result, the current value of RMO was less than its lag value. Variations in import penetration D (IMGDP) adversely affect RMO.

This indicates that when imports satisfy a portion of domestic demand, the short-term coefficient of RMO is dropped by -155.238796. Changes in export penetration D(EXGDP) have a considerable positive impact on RMO, indicating that RMO is raised by a coefficient of 507.727521 when exports account for a greater share of foreign demand. RMO suffers greatly from changes in the energy consumption index D (IENEC). The D(IENEC) coefficient of -0.433667 indicates that when energy consumption changed, RMO was decreased by 0.433667 percent. Similar to the long-term estimate, this result defies the theoretical expectation, perhaps because energy provisioning is expensive for businesses.

In the long run, a change in the monetary policy rate D(MPR) has a negligible beneficial effect on RMO. RMO is greatly benefited by changes in D(LnPCI), the per capita income. Although this outcome deviates from the long-term projection, it validates the initial economic expectation. It suggests that a shift in per capita income raises RMO momentarily. Short-term exchange rate changes have a major positive effect on RMO. Given that the structural adjustment program has a negligible positive impact on RMO, it is inferred that trade liberalization was not statistically significant in explaining changes in RMO over the near run.

5. CONCLUSION

Given that the structural adjustment program has a negligible positive impact on RMO, it is inferred that trade liberalization was not statistically significant in explaining changes in RMO over the near run. These proxies of foreign trade policy and exchange rate were import penetration, export penetration, dummy variable for structural adjustment program, and exchange rate. Specifically, during the long and short run periods, imports had a negative influence on real manufacturing output (RMO), as shown by IMGDP, whereas exports had a considerable positive impact on RMO, as shown by EXGDP. Trade liberalization, as embodied in the post-liberalization era of DSAP, had a negligible short-term positive impact on RMO but a major long-term positive impact on real manufacturing output. The constant coefficient in Table 3 indicated a positive but negligible trade limitation for RMO. Exchange rate on the other, exerted insignificant negative impact on RMO in the long run but significant positive impact on RMO in the short run. The results aligned with the study by Umoh and Effiong (2017). Specifically, this study indicates that trade liberalization affected positively on real manufacturing output in both the long run and the short run periods.

5.1 Recommendations

Based on the findings, the following recommendations are made:

(i) The federal government of Nigeria should formulate trade policy in accordance with an industrialization strategy that promotes exports. The findings of the IMGDP and EXGDP make this clear; they showed that although exports had a large positive impact on RMO, imports had a negative impact on RMO. The considerable long-term benefits of trade liberalization for RMO provide as more evidence for this. However, locally manufactured consumer items should be subject to restrictions.

(ii) The monetary policy rate should aim to target and encourage foreign investment as well as promote borrowing at moderate rates for profitable domestic investment objectives, with a focus on the manufacturing sector.

(iii) To enhance manufacturing production, there is an immediate need to increase the generation, transmission, and distribution of electricity.

(iv) The exchange rate is influenced by the three suggestions mentioned above.

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