EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

TRADE OPENNESS AND REAL SECTOR GROWTH IN NIGERIA: A FOCUS ON AGRICULTURAL AND MANUFACTURING SECTORS

Donatus Otaigbe ONOGBOSELE, Ph.D.
Department of Economics, University of Africa, Toru-Orua, Bayelsa State, Nigeria.

Article DOI: https://doi.org/10.36713/epra22416
DOI No: 10.36713/epra22416

ABSTRACT----------
This study investigates the impact of trade openness on Nigeria's real sector growth, focusing on the agricultural and manufacturing sectors. Utilizing the Autoregressive Distributed Lag (ARDL) Error Correction Model (ECM), we examine both short-run and long-run dynamics between trade openness and real sector growth. The findings reveal mixed effects of trade openness on these sectors. In the short-run, trade openness demonstrates weak impacts on manufacturing output, with interest rates and capital goods imports showing minimal significance. However, in the long-run, trade openness positively influences manufacturing growth, with interest rates and energy consumption emerging as significant factors. For the agricultural sector, trade openness exhibits a negative short-term effect, possibly due to external competition and domestic policy shifts. Nevertheless, precipitation and capital goods imports are identified as crucial determinants of agricultural growth, especially in the long-term. The study underscores the importance of tailored trade policies, particularly for agriculture and manufacturing, alongside structural reforms aimed at improving credit access, infrastructure, and energy supply.
KEYWORDS: *Trade Openness, Real Sector, Agricultural Sector, Manufacturing Sector, Economic Growth*
JEL Classifications: F14, O13. L60, Q18----------

1.0. INTRODUCTION

Trade openness essentially entails removing or reducing restrictions on international trade. It involves the reduction or removal of tariffs, abolition or enlargement of import quotas, abolition of multiple exchange rates and removal of requirements for administrative permits for imports or allocations for foreign exchange (Black, 2003). Nigeria's 1980s experience with debt burden and other sundry economic crisis-a result of the collapsed of the world commodity market and poor macroeconomic management among others, led to exchange rate fluctuations that adversely affected the growth of every sector of the Nigerian economy. An attempt to solve the economic crisis, led to the introduction of SAP in 1986, as recommended by the IMF, was trade liberalization, one of its conditionalities attached for its loan assessment, put pressure on Nigerian government to pursue trade openness as a policy option for her economic recovery and growth. Apart from that, some of the South East Asian and Latin America countries positive growth experiences with trade openness, further increased the pressure on other developing countries including Nigeria, to adopt or replicate such economic policies, as panacea, in order to mitigate their economic growth challenges.

World Bank data on Nigerian trade openness show an average of 43.29% between 1960-2016, the data reveal a minimum value of 19.62% in 1970, and a maximum value of 81.81% in 2001 (World Bank & OECD national accounts data). It should be noted that the larger this ratio, the more the country is exposed to international trade. The world average for 2017 according to World Bank data was put at 91.59%, with Luxembourg in the top position with 423.99%, while Sudan occupied the real position with 21.5% among the countries listed in the series.

Although the World Bank (1993) acknowledges that there is no single East Asian model that accounted for their growth successes, it however alluded to three contributing factors that enhanced these successes viz; their industrial policies that promoted particular sectors of the economy, government control of the financial markets that lowered

the cost and availability of credits as well as directing same to strategic sectors, and policies that promote exports and protect domestic industries were keys to the Asian miracles.
Trade being an engine of growth has a wide acceptance in economic literature, and the gains from trade has been classified into; static gains which stem from the law of comparative advantage, dynamic gains which is based mainly on increasing returns on production, as well as gains from trade as a vent for surplus. However, the dynamic as well as vent for surplus gains seem to be more amenable with trade openness in the literature.
Iyoha (2003) citing Haberler (1988) summarizes the dynamic effects of trade thus:

First, trade provides material means (capital goods, machinery, and raw and semi-finished materials) indispensable for economic development. Secondly, even more important, trade is the means and vehicle for the dissemination of technological knowledge, the transmission of ideals, for the importation of know-how, skills, managerial talents and entrepreneurship. Thirdly, trade is also the vehicle for the international movement of capital especially from the developed to the developing countries. Fourthly, free international trade is the best anti-monopoly policy, and the best guarantee for the maintenance of a healthy degree of free competition.

There is virtually no single nation on earth that operates in autarky, given that one form of economic relationship or the other exist via trade between or among countries, by whatever description or classification of the State-developed or developing, free market, mixed or command economies etc. Although the issue of trade between or among nations has been around from the era of mercantilism, the current interest it has elicited among contemporary scholars of various persuasions can be situated within the framework of experiences of participating countries, who are either winners or losers, or those who reap trade openness benefits versus those that count the costs or losses of trade openness. This controversy has created two dichotomous camps-trade optimsts theorists versus trade pessimists' theorists. While the former believes in free trade, open economics and outward looking development policies, the latter argue that without tariff protection or quantitative restrictions on trade, Less Developed Countries (LDC's) gain little or nothing from an export-oriented, open-economy posture (Todaro & Smith, 2020).

Akinwuyi (2002) opined that trade has been regarded as an engine of growth which leads to steady improvement in human states by expanding the range of people's living standards and preferences. A position vigorously canvassed by most economic scholars from developed countries. Though the ideal that trade openness affects economic growth is not new, the nature of the effect is a subject of controversy, as some empirical studies have identified positive linkage between a country's rate of economic growth and its openness to international trade, while other researches have failed to demonstrate such linkage Jn (2000), Snha & Sinha (1996) in (Saibu, 2004). Further, Kalu, Nwude & Nwonye (2016) opine that why some scholars insist on the existence of a positive relationship between trade openness and economic growth (e.g. Romer, 1986; Lucas, 1988; Baro, 1992; Edward, 1992 & 1998; Abinabo and Abubakar, 2023; Omoregbee et al., 2025), others have contrary views, insisting that a negative relationship exist between trade openness and economic growth (Levine & Reneth, 1992; Harrison, 1996; Rodriguez & Rodink, 1996; in Kalu *et.al.* (2016) and Hyun-Jung and Doojin, 2024), while the conclusions of Keho (2017), Ohwofasa and Ekaruwe (2023) were mixed, in their various studies. Also, Lotfalipour, Montazeri & Sedighi (2019), from empirical evidence of their study, argued that countries with more degree of international trade are exposed to higher rate of inflation in contrast to Roman's (1991) study that posits a negative correlation between trade openness and inflation.

However, some African scholars are skeptical about the positive effects of trade openness for African economic growth, motivated by African nations past experiences with trade deteriorations as a result of unequal exchange, which foreshadowed the external debt crisis and the abuses of failed IMF/World Bank imposed adjustments that diminished the capacity for development of African countries. It thus follows that quite a number of these scholars have been less enthusiastic for a wholesale acceptance of trade openness as a growth policy option for Africa. For example, Onimode (2003) reasoned that there are two main factors involved in trade deterioration as a result of unequal exchange, one was immobility of inputs between countries, which implies that commodities value is not formed in the international market vis- a- vis the national market, and also the effect of reciprocal demand which basically implies that it is no longer capital and labour (two factors) expended in production that determine the exchange values of commodities, but reciprocal demands of exchanging parties that determine prices, and thereby, the rewarding factors. He further listed some other factors compounding the problem of unequal exchange and falling terms of trade for developing countries to include; synthetic substitution for raw materials; the dominance of transnational monopolies; new protectionism in the north and the dismantling of trade agreements by them; as well as the external debt crisis.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

Arguing along similar line, Thirlwall (1999) opined that despite the fact that trade-liberalized economies appear to be faring better than non-liberalized countries, does not mean that developing countries as rapidly, and as soon as possible, should jettison protectionism and government intervention which were key to East Asian countries growth performance. These government interventions are needed to re-orientate trade to improve growth performance in the long-run. Similar argument has been offered for the economic growth successes recorded by countries in Europe, North America and Scandinavian, save Britain who developed their industrial sectors through tariffs and non-tariffs protection to trade (Thirlwall, 1999).

The strong complementarity between the agricultural and manufacturing sectors is a stylized fact in development economic literature, especially at the early stages of economic growth. This relationship ultimately promotes, and fast tracks economic growth, that becomes self-sustaining in the long- run. Thus, the main thrust of this study is an investigation to growth via openness, using sectorial approach, adopting these two key areas in the real sector of the economy, being key pivots of the whole economy that can significantly alter the growth, structure and composition of the economy, and hence highlight some stylized facts that trade openness has on the economy, applying empirical analysis techniques.

This study therefore addresses a gap in literature, wherein most of the focus is on the whole economy, by focusing on the impact of trade openness on real sector of the Nigeria's economy comprising of the agricultural and manufacturing sectors, which are not only vital for the country's growth but also display strong complementarity between the two, for a developing nation, such as Nigeria. While trade openness has been linked to overall economic growth, sector-specific effects, particularly in Nigeria, are underexplored.

2.0. LITERATURE REVIEW

2.1 Conceptual Clarifications

2.1.1. Trade Openness

Trade openness may be defined as the degree to which an economy maintains its outward orientation in trade. An empirical measure of trade openness is defined as the ratio of total trade to GDP, and represents a convenient variable routinely used in cross-country studies on a variety of issues (Fujii, 2017)

Trade openness plays a role in exchange rate volatility, the extent of which depends on the degree of integration into the global market. This implies that the more open an economy is, the less volatile is the exchange rate of its currency Calderon & Kubota (2009); Stancik (2006) in (Oaikhenan & Aigheyisi, 2005).

Onakoya, Johnson & Ogundajo (2019) view trade openness as the degree of business dealing of a country with the rest of the world. Onakoya*, et.al.* (2019), citing Bhatti, Amir, Raphoto, & Shaikh (2011), explained that this degree of openness is also measured by the Pitchet Index which is obtained by regressing the trade intensity (ratio of imports and exports) to a combination of total area, population, GDP per capital, GDP per capital squared and is expressed as:

$$TI = \alpha_0 + \alpha_1 POP + \alpha_2 AREA + \alpha_3 GDPPPC + \alpha_4 (GDPPPC)^2 + E \quad (1)$$

Trade openness ratio which is the simple average (i.e. Sum of exports and imports of goods and services) relative to GDP maybe somehow be misleading OECD (2011); reason being that a low ratio does not necessarily mean high barriers to foreign trade, but may be due to other factors such as the economic size and the geographical remoteness from potential trading partners. Despite these challenges, it aligns with Fujii (2017), and we adopt it as our working definition in this research

2.12 Real Sector

The Nigerian economy is classified into four major groups viz; Production, General commerce, Services and others. The production sector is referred to as the real sector of the economy and comprises of such sub-sectors as agriculture, manufacturing, mining and quarrying, real estate and construction (Obembe, 2011). Olaitan (2016) sees the real sector as that part of the economy concerned with the production of goods and services. The author is of the view that it is not only the driver of economic growth, but the engine of value-added productivity, and the creator of jobs and wealth. He classified the sector into primary, comprising; agriculture, forestry and mining, secondary, which includes; manufacturing/industry, building/construction (including quarrying), while the tertiary involves; services, commerce, information technology, telecom and tourism. The real sector as employed in this study, is the manufacturing and agricultural sectors-being the most crucial sub-sectors for sustainable economic growth in Nigeria. Ali, Aliero &

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

Abubakar (2015) citing Mike (2010), in emphasizing the relevance of this sector, opine that the manufacturing sector is a part of the real sector reputed to be an important engine of growth, an antidote for unemployment, a creator of wealth, and the threshold for sustainable development. However, low-capacity utilization recorded between 2010-2015, was attributed to low investors' confidence induced by a depreciation of the value of the naira and inadequate power supply (CBN, 2015), and is a cause of worry for a country that is desirous of reaping the benefits of trade openness.

2.2. Theoretical Review

2.2.1. Foreign Exchange Trade Nexus

Basu (1998) explored the 1964 Mckinnon's model to raise some issues in the dynamics of foreign exchange and trade. He explained two types of capital goods; domestic and foreign, which are required, and in fixed proportions to produce goods. Hence the following identity;

$$Y = \min \{aK_d, bK_f\} \quad (2)$$

Where K_d and K_f are the amounts of domestic and foreign capital goods available and, Y, is the national income. Let us assume that there is no excess capital in the economy, we have

$$Y = aK_d = bK_f. \quad (3)$$

The total savings, S, undertaken in a year is given by

$$S = {}_S Y. \quad (4)$$

The maximum amount that the economy can export, E, in a year is given by

$$E = eY \quad (5)$$

The presumption behind (5) is that, Y, is an index of the country's capacity to produce goods sophisticated enough to be considered exportable. The total investment, I, is the addition to the total capital stock of a country that occurs over a year, i.e.

$$I \equiv \Delta K \equiv \Delta K_d + \Delta K_f.$$

Let I_d and I_f represent, ΔK_d and ΔK_f, given that there is never unutilized capital, i.e., given (3), we have

$$I = I_f + I_d = b/v\ I_f, \quad (6)$$

Where, v = ab / (a + b) is the output-capital ratio. Let, F, be the amount of foreign capital transfer, that of foreign exchange take place during the year. It is convenient to think of, F, more specifically as the volume of foreign exchange received as loan or aid. Clearly, the *maximum* amount of foreign capital that can be acquired in a year is, (e + f)Y, Where f ≡ F/Y. This therefore is the maximum value of investment possible given the *foreign capital constraint*. Again, this maximum investment may however not be possible due to inadequate savings. From (4), it follows that (I– s)Y of the national income is consumed. Therefore, the total investment cannot exceed sY plus the amount that can be purchased with the foreign exchange, fY (it is assumed from, 3, that domestic capital can be bought abroad if necessary) i.e., investment must be less than (s + f)Y. This is the *savings constraint*. Putting the two constraints together, we have;

$$I = \min \{(s + f) Y, b/v (e + f) Y\}. \quad (7)$$

The growth rate of the economy, g, equals ΔY/Y where ΔY is the change in income during the year. From (3) and (6), it follows that, g = (v/Y) I. Substituting, I, from 2.7, we have

$$g = \min \{v(s + f), b (e + f)\}. \quad (8)$$

Hence, the growth rate depends on which constraint is binding. For example, if it is the foreign capital constraint which is binding, namely, (b/v) (e + f) Y ≤ (s + f) Y, then, g = b (e + f).

What is quite obvious from (8) is that one way of increasing the growth rate is to increase the country's capacity to export, e, and to simultaneously raise the rate of saving, s.

2.3. Empirical Literature Review

Thirlwall (1999) alluded to statistical evidence of developing countries in support of the hypothesis that export growth plays a major part in the overall growth process by stimulating demand and encouraging savings and investment including foreign direct investment (FDI), increasing the supply potential of the economy by raising its capacity to import. To this end, Brahmbhatt & Dadush (1996) of the IMF, have developed a speed of integration index based on four indicators:

- The ratio of total trade to GDP (a measure of trade openness).
- The ratio of FDI to GDP.
- The share of manufacturing in total export.
- A country's credit rating.

The authors further classified a sample of 88 countries into, fast, moderate, weak, and slow integrators. Again, they find that fast integrators were mostly East Asian exporting countries, while the weak and slowly integrating countries were found in sub-Saharan African and Latin American countries.

Hye, Wizarat, & Lau (2016) studied the impact of trade openness on economic growth in China for the period 1975-2019. The study used an endogenous economic growth model to determine the long-run relationship between trade openness and economic growth. An ARDL approach to cointegration and rolling regression method were employed in the study. Their empirical findings indicate that trade openness are positively related to economic growth in the long-run and short run. The results further show that trade openness as measured by individual trade indicator and composite trade openness index are positively related to economic growth in the long-run and short-run. However, results from the rolling window suggest that trade openness is negatively linked to economic growth only for a number of years.

In their study, Bilgin and Seker (2021) explored the relationship between per capita income and trade openness for 83 countries exposed to globalization process employing panel time series data for the period 1960-2018. They came to the conclusion that globalization experience for the developing countries is not as beneficial compared to those of the developed counterparts, as the positive effects attributed to openness and growth for developing countries seriously weakened when they aggressively pursued trade liberalization policies. It has been asserted that among the Association of South East Asia Nations (ASEA), trade openness is associated with low levels of trade barriers, and high levels of trade volumes, lower trade barriers may negatively affect GDP of developing countries economy, implying that excessive trade openness could hamper economic growth in these countries (Hyun-Jung & Doojin, 2024).

In an earlier study, Roman (1991) examined the link between openness and inflation in the United States, to tests previously unnoticed prediction of models in which the absence of pre-commitment in monetary policy leads to excessive inflation. He employed a simple theoretical model demonstrating the prediction of the theory that under discretionary policy-making, money growth and inflation will be lower in more open economy, using cross country data. The data revealed a quantitatively large statistically significant and robust negative relationship or link between openness and inflation, thus confirming the prediction of the theory. Edwards (2001) used comparative data of 93 countries to analyze the robustness of the relationship between openness and Total Factor Productivity (TFP) growth. Nine (9) indexes of trade policy were employed to investigate whether the evidence supports the view that TFP is in more open economies. The results were robust to the use of open indicator, estimation technique, time period and functional form, and suggests that open economies experienced faster productivity growth. Furthermore, Onakoya, *et.al*., (2019) studied the possible nexus between trade liberalization and poverty in 21 African countries in the period 2005-2014, using different estimation techniques, including descriptive statistics, correlation matrix and variance inflator. The panel unit root test, the pooled OLS technique among others, was used for estimating the data. The findings reveal that FDI and inflation rate had negative relationship with human development index, while exchange rate and trade openness were negatively related to poverty level. The study recommended among others, that developing countries should target other developing countries in their trade relationship, in the spirit of South-South Cooperation (SSC), through forming and strengthening of regional economic integration.

A Sri Lanka study on the effect of trade liberalization on agricultural productivity growth was carried out by Nirodha, Malaga and Johnson (2014), applying quantitative techniques. The authors employed GDP of agricultural sector and the associated explanatory variables of trade openness, total investment, real interest rate, as well as two dummy variables for trade liberalization and for free trade agreements. The study was based on data from 1960-2010, and estimation involving multiple regression models incorporating macro level data with OLS was employed. The results reveal that trade liberalization has a positive effect on agricultural production growth, and hence improved agricultural productivity in Sri Lanka. The authors concluded that trade openness, investment and real interest rates were significant factors that were positively related to agricultural productivity growth in the study.

Another similar research on the impact of trade openness on manufacturing sector performance in Nigeria, carried out by Onakoya, Fasanya, & Babalola (2012), using times series data from 1975-2010, employing the ECM technique, resolved that trade openness is positively related to the performance of the manufacturing sector. However, their study showed that exchange rate and inflation rate, had negative impact on manufacturing sector performance in Nigeria. Another major finding from the study by the authors, is that there is a significant pay-offs from the policy of trade liberalization in Nigeria.

A study on the impact of trade liberalization on agricultural sector in Nigeria was carried out by Anowor., Ukweni, and Ikeme (2013) with two models' specification; one involving agricultural sector performance, and the second, relating to agricultural export sub-sector. The study decomposed trade liberalization into macroeconomic variables comprising agricultural degree of openness (ADO), agricultural capital formation (ACF), agricultural export to import price ratio (EP/IP), real exchange rate (REXR) and foreign investment on agriculture (FIA). The results for model one reveal EP/IP and FIA variables were statistically significant in enhancing agricultural productivity. Model two results show that the variables ADO and FIA are statistically significant in determining agricultural export in Nigeria. The ECM estimates confirm that ADO and EP/IP variables were significant in both models, whereas, ACF, REXR and FIA variables were not significant, as such, the findings from both models were similar.

Kalu *et.al*. (2016) carried out a study to investigate whether trade openness engineers' economic growth in Nigeria, employing Classical Linear Regression Model (CLRM) in the period 1991-2013, to estimate the model of GDP as a dependent variable as well as net exports, imports and exports as the explanatory variables. The results of their study show that the export variable was a positive determinant of economic growth in Nigeria, why the import variable though positive, was not a significant determinant of economic growth in Nigeria.

In a study to investigate the effect of economic openness on industrial development in Nigeria, Okoye, Nwakoby & Okorie (2016), using econometric method of VECM, analysed the impact of exchange rate, financial deepening, trade openness lending rate variables on industrial output in Nigeria. Their findings reveal that change in exchange rate, trade openness and lending rate exert significant negative impact on industrial output. In addition, the result also shows evidence of significant positive impact of financial deepening on industrial output. The Granger causality test indicates a weak causal impact of financial deepening on industrial output, and a bi-directional between trade openness and industrial output. Further result display evidence of causal impact of industrial output on lending rate. The study recommended among others, that government should monitor real sector operators from diverting the foreign exchange allocated to them.

Furthermore, Ogu, Aniebo & Elekwa (2016) studied the role of trade liberalization on the growth of manufacturing output in Nigeria, with a focus on short to medium term period between 1980-2013, applying the ECM method. The results show that trade liberalization hurt manufacturing output in the short-run, although in the long-run, it showed a real potential to boost manufacturing output in Nigeria. The authors recommended an overhaul of competition policy with a view to establishing Neutral Status in manufacturing export trade. Equally, Imoisi (2018), using a variety of econometric methods, estimated a model of manufacturing sector output (MSO) as dependent variable and independent variables of trade openness (TO), foreign direct investment (FDI) and exchange rate (EXR) to test if trade openness is suitable for growth in the Nigerian manufacturing sector. He employed the ARDL bounds test, pairwise Granger causality tests, ECM tests as well as stability test for his estimations. The results show that TO, FDI have significant and negative relationship with MSO in the study period in Nigeria, why EXR had a negative and insignificant relationship with MSO. The bound tests results indicate that a long-run relationship exist between TO, FDI, EXR and MSO in Nigeria. Also, there was a bi-directional causation between TO and MSO in the study period. In an earlier study, Umoh & Effiong (2013) investigated the relationship between trade openness and manufacturing sector performance in Nigeria, in the period 1970-2008, employing econometric technique of ARDL approach to cointegration. Their results suggest that trade openness has a significant positive impact on manufacturing sector productivity in Nigeria in both short-run and long- run. The results also show that the coefficient estimates were robust and stable over time. They therefore advocated for open policies for Nigeria's manufacturing sector through trade liberalization as a long- term plan, as well as reduction in trade restriction as part of their recommendations for resuscitating the sector.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

Keho (2017) examined the impart of trade openness on economic growth in Cote d'Ivoire between 1965-2014 applying a multivariate framework including capital stock, labour and trade openness repressors, using the ARDL bounds to co-integration and Toda and Yamamoto granger causality tests. The result indicates that trade openness has a positive effect on economic growth, both in the short and long-run. The result further shows a strong complementary relationship between trade openness and capital formation in promoting economic growth. Mireku, Agyei & Elsewhere, Mireku, Agyei & Domeher (2017) carried out a similar study in the period 1970-2013, employing co-integration and error correction technique, their study estimated a model involving variables of output growth volatility, trade openness, financial sector development (domestic credit to private sector as a percentage of GDP), inflation, exchange rate and financial openness (intensity of capital controls). Their findings show that both the LR and SR economic growth volatility is positively influenced by changes in trade openness. Volatility in domestic credit to private sector, shocks after economic liberalization and financial openness contributed negatively to economic growth volatility in the SR. therefore, they advised developing economies to consider their own realities in their trade policies to limit economic growth volatility as part of their recommendations.

On their part, Egbulonu & Ezeocha (2018) investigated the relationship between trade openness and economic growth in Nigeria in the period 1990-2015, applying the ARDL approach to co-integration. The ARDL result confirmed the existence of a long-run relationship between economics growth, trade openness, Foreign Direct Investment (FDI) and Gross Capital Formation (GCF). It was found that trade openness, GCF had positive and negative impacts respectively on growth rate of GDP in the short-run. In a previous study, Saibu (2004) examined the causality between the openness variable and economic growth, using Nigerian economic data. The results indicated a uni-directional relationship between openness and growth. From the results, the author concluded that an increasing level of openness will be beneficial, depending on the level of economic development in Nigeria.

Omoregbee *et al.* (2025) concluded in their study, on the impact of trade openness on sectoral performance in Nigeria, that it enhances output performance in the industrial and service sectors, but had negligible impact on the agricultural sector, and recommended among others, sector-specific economic strategies that enhance the benefits of trade openness. Equally, Ohwofasa & Ekaruwe (2023) research on trade openness and economic growth in Nigeria, disaggregating trade openness into four, concluded that all the four sectors viz; solid mineral earnings, manufacturing, agricultural and oil exports, have long-run relationship with economic growth, while in the short-run, only two of the sectors; agricultural and oil sector exports have relationship with economic growth.

Business and Economic world data sample indexes of openness from 173 countries in 2018 indicate that Nigeria was 164 with 33.01 points, why Sudan took the rear position with a low index point of 1.30. The top five rated ranked countries in the world were Hong Kong (376.89); Luxembourg (360.13); Singapore (324.32); San Marino (309.4) and Djibouti (300.4). However, Malta, Ireland and Seychelles came 6th, 7th and 8th, with 272.95, 217.43 and 202.5 points respectively. Bringing up the top 9th and 10th position in the ranking were Slovakia and Belgium with 190.7 and 166.29 points respectively.

This study fills a gap in literature by examining the specific effects of trade openness on Nigeria's real sector made up of the agricultural and manufacturing sectors. This is often being overlooked in most existing research. While trade openness has been linked to overall economic growth, few studies focus on sector-specific impacts or the complementary relationship between agriculture and manufacturing in Nigeria. Additionally, previous research often neglects the role of policy interventions, such as government spending on agriculture and energy, in shaping these sectors' growth. By analyzing both short-term and long-term effects, this study will offer new insights into how tailored trade policies can foster sustainable economic development in these critical sectors.

3.0. METHODOLOGY

3.1. Models Specification and Estimation

Model specification and estimation methods: the starting point is the framework of the neoclassical production function of the Hicks'mould specified as;

$$Q = A_t \, f(K_t, L_t) \qquad (9)$$

Where, $f(K_t, L_t)$, is the linearly homogenous production function and, $A_{t,}$ is a steady state autonomous shift of the production function. Following this adaptation, and the works of Hye, Q *et al*. (2016); Imoisi (2018); Nirodha (2014) & Umo and Effiong (2013), we specify two models, one, for the manufacturing and the second, for agricultural sector-

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

being the most important sub-sectors in the real sector. Again, because of the complementarity between these sectors that enhances economic growth, in addition to the export potentials they hold, which is key and desirable for harnessing the gains from openness, the two models' specifications are apt for this study.

Model 1:

$$MO_t = f(TOP_t, INTR_t, EXRT_t, EC_t, CGM_t) \quad (10)$$

$$MO_t = \alpha_0 + \alpha_1 TOPt + \alpha_2 INTR_t + \alpha_3 EXRT_t + \alpha_4 EC_t + \alpha_5 CGM_t + U_{t1} \quad (11)$$

Model II

$$AGDP = f(TOP_t, INTR_t, EXRT_t, GEA_t, PT_t) \quad (12)$$

$$AGDP_t = \beta_0 + \beta_1 TOPt + \beta_2 INTR_t + \beta_3 EXRT_t + \beta_4 GEA_t + \beta_5 PT_t + U_{t2} \quad (13)$$

Where; MO_t is current manufacturing output, $AGDP_t$ current agricultural sector contribution to GDP_t, TOP_t is current trade openness, $INTR_t$ is current prime lending rate, $EXTR_t$ is current exchange rate (N/$), EC_t is current energy consumption, CGM_t is current capital goods imports, GEA_t is current government expenditure on agriculture and PT_t is current precipitation. The a priori restrictions of the variable coefficients are stated thus:

$\alpha_1, \alpha_2 < 0$. $\alpha_3, \alpha_4, \alpha_5 > 0$, and $\beta_1, \beta_3, \beta_4, \beta_5, > 0, \beta_2 < 0$

These variables included in both models were based on our reviewed literature. However, the inclusion of the variables, EC_t and CGM_t in the first model is due to their importance in enhancing manufacturing output growth in developing economies, and are well documented in development literature. Similarly, the addition of GEA_t and PT_t as explanatory variables in model II, capture the effect of fiscal policy on agriculture for the former, and the importance of the latter (precipitation) to the agricultural output in Nigeria, which is mainly rain-fed.

3.2. Data Requirements: The data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletins (various issues) as well as its CBN Annual Reports (various issues) Publications.

3.3. Model Estimation Method

In this study, we employ the Autoregressive Distributed Lag - Error Correction Model (ARDL-ECM) to investigate the relationship between trade openness and real sector growth in Nigeria, specifically focusing on the agricultural and manufacturing sectors. The ARDL-ECM approach is particularly well-suited for this analysis because it accounts for both short-run dynamics and long-run equilibrium relationships among variables, while also allowing for the inclusion of variables that may be integrated of different orders (I(0) or I(1)).

Two separate models are estimated in this study, each targeting the agricultural and manufacturing sectors. These models incorporate trade openness, exchange rates, interest rates, capital goods imports, energy consumption, and government expenditure as explanatory variables. The first model focuses on the manufacturing sector, while the second model is designed for the agricultural sector.

The optimal lag length for each model is determined using the Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC)**.** The selection of an appropriate lag length is critical for avoiding overfitting or underfitting the model. The maximum lag length is chosen based on the data frequency and the period of observation. Diagnostic checks, including tests for serial correlation, heteroscedasticity, and normality, were conducted to ensure that the selected lag length produces reliable results.

4.0. EMPIRICAL RESULTS

4.1. Unit Root Test Results

Before proceeding with the ARDL estimation, the Augmented Dickey-Fuller (ADF) test was conducted to determine the stationarity of the variables. The results of the ADF test Presented in Table 1 show that the variables exhibit mixed orders of integration. Specifically, Manufacturing Output (MO)**,** Interest Rate (INT)**,** Exchange Rate (EXRT)**,** Energy Consumption (EC)**,** Capital Goods Imports (CGM)**,** Agricultural GDP (AGDP)**,** and Government Expenditure on Agriculture (GEA) are all found to be I(1)**,** meaning they are non-stationary at the level and become stationary after first differencing. On the other hand, Trade Openness (TOP) and Precipitation (PT) are stationary at the level, with I(0) as their order of integration. These results suggest that the variables have different integration orders, which

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

justifies the use of the Autoregressive Distributed Lag (ARDL) model. The ARDL approach is ideal for this study because it allows for the estimation of both short and long-run relationships, even when the variables have different orders of integration. As the ARDL model is robust to mixed integration orders, it provides a suitable framework for analyzing the relationship between trade openness and real sector growth in Nigeria.

Table 1: Unit Root Test Results

Variables	ADF Statistics at Level		ADF Statistics at First Difference		Order Of Integration
	ADF Statistics	Prob.	ADF Statistics	Prob.	
MO	-2.4236	0.1444	-4.4286	0.0009	I(1)
TOP	-4.01822	0.0194	-4.6043	0.0013	I(0)
INT	-0.0329	0.9480	-4.9601	0.0004	I(1)
EXRT	-0.8848	0.7774	-6.2588	0.000	I(1)
EC	0.8331	0.9930	-4.8295	0.0006	I(1)
CGM	0.0951	0.9598	-3.0577	0.0413	I(1)
AGDP	0.0929	0.9596	-5.8633	0.0073	I(1)
GEA	-3.3456	0.0796	-5.3242	0.0087	I(1)
PT	-3.2234	0.0291	-4.9582	0.0005	I(0)

Source: Author's computation

Model I

4.2. ARDL Bound Cointegration Test Results

The ARDL Bound Test for the manufacturing sector reported in Table 2 reveals that there is a long-run relationship among the variables in the model. The F-statistic of 5.016280 exceeds the upper bound critical values for I(1) at all significance levels (1%, 2.5%, 5%, and 10%), indicating that the null hypothesis of no cointegration (I(0)) is rejected. This suggests that the variables, including trade openness, interest rates, exchange rates, energy consumption, and capital goods imports, are cointegrated and have a long-run equilibrium relationship.

Table 2: ARDL Bound Test for the Manufacturing Sector

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.016280	10%	1.95	3.06
K	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1

Source: Author's computation

The results validate the use of the ARDL approach for further analysis, highlighting the importance of considering both short-run and long-run dynamics in understanding the manufacturing sector's performance.

4.3. Short-run ARDL Estimate for the Manufacturing Sector

The short-run ARDL estimate for the manufacturing sector in Table 3 reveals that several variables have an insignificant impact on manufacturing output. Specifically, the lagged Manufacturing Output (MO(-1)), Trade Openness (TOP(-1)), Interest Rate (INT(-1)), Energy Consumption (EC(-1)), and Capital Goods Imports (CGM(-2)) all have positive but insignificant effects on manufacturing output, with p-values ranging from 0.2798 to 0.9888. These results align with previous literature that suggests the short-term effects of these variables on manufacturing growth can be weak, particularly in developing economies (Kalu et al., 2016; Okoye et al., 2016). The lagged Exchange Rate (EXRT(-2)) has a positive but marginally significant effect (p-value = 0.0558), which suggests that exchange rate fluctuations may have some influence on manufacturing output, supporting findings from studies like Mireku et al. (2017), which highlight the importance of exchange rate stability in developing countries.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

Table 3: Short-run ARDL Estimate for the Manufacturing Sector

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1636.500	274.8693	5.953737	0.0000
MO(-1)	-37.26496	96.63498	-0.385626	0.7049
TOP(-1)	-75.74315	108.6907	-0.696869	0.4959
D(INT(-1)	0.000109	9.79E-05	1.118572	0.2798
D(EXRT(-2)	39.72668	19.26040	2.062609	0.0558
D(EC(-1)	1.001262	70.20646	0.014262	0.9888
D(CGM(-2)	9.951250	21.11161	0.471364	0.6437
CointEq(-1)*	-0.464262	0.088986	-5.217258	0.0001
R-squared	0.770483	Mean dependent var		466.0806
Adjusted R-squared	0.709414	S.D. dependent var		475.6331
S.E. of regression	365.5220	Akaike info criterion		14.88046
Sum squared resid	3206552.	Schwarz criterion		15.32939
Log likelihood	-242.9678	Hannan-Quinn criter.		15.03356
F-statistic	3.541861	Durbin-Watson stat		2.070070
Prob(F-statistic)	0.006345			

Source: Author's computation

The Error Correction Term (ECT) is statistically significant with a p-value of 0.0001, indicating that the manufacturing sector adjusts to long-run equilibrium at a rate of 46.43% per period. This result supports the presence of a significant long-run relationship and a quick adjustment from short-term disequilibrium, consistent with the literature that emphasizes the role of the error correction mechanism in restoring long-term equilibrium (Egbulonu & Adaku, 2018). Overall, while some short-run effects are not significant, the adjustment towards long-term equilibrium is strong, reinforcing the importance of the long-run relationships in shaping manufacturing sector growth.

4.4. Long-run ARDL Estimate for the Manufacturing Sector

In Table 4, long-run ARDL estimates for the manufacturing sector reveal that several key variables significantly influence Manufacturing Output (MO)**.** Trade Openness (TOP) has a positive but marginally significant effect on manufacturing output, with a p-value of 0.0743. This suggests that increased trade openness can boost manufacturing output, though the effect is weaker than expected at the 0.05 significance level, aligning with studies that highlight the role of trade liberalization in promoting industrial growth (Kalu et al., 2016). Similarly, Interest Rate (INTR) has a positive and statistically significant impact on output (p-value = 0.0033), indicating that easier access to credit, reflected by lower interest rates, fosters manufacturing growth, which aligns with findings from Okoye et al. (2016).

Table 4: Long-run ARDL Estimate for the Manufacturing Sector

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MO	-73.01346	451.0776	-0.161865	0.8734
TOP	809.3105	389.3580	2.078577	0.0743
INTR	0.000656	0.000209	3.138366	0.0033
EXRT	112.7200	60.79851	1.853992	0.0823
EC	469.5473	237.2908	1.978784	0.0653
CGM	43.72861	119.2078	0.366827	0.7186

Source: Author's computation

The Exchange Rate (EXRT) shows a positive relationship with manufacturing output (p-value = 0.0823), though it is only marginally significant. This suggests that exchange rate depreciation could benefit the manufacturing sector by improving export competitiveness and lowering input costs, consistent with studies like Mireku et al. (2017) that

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

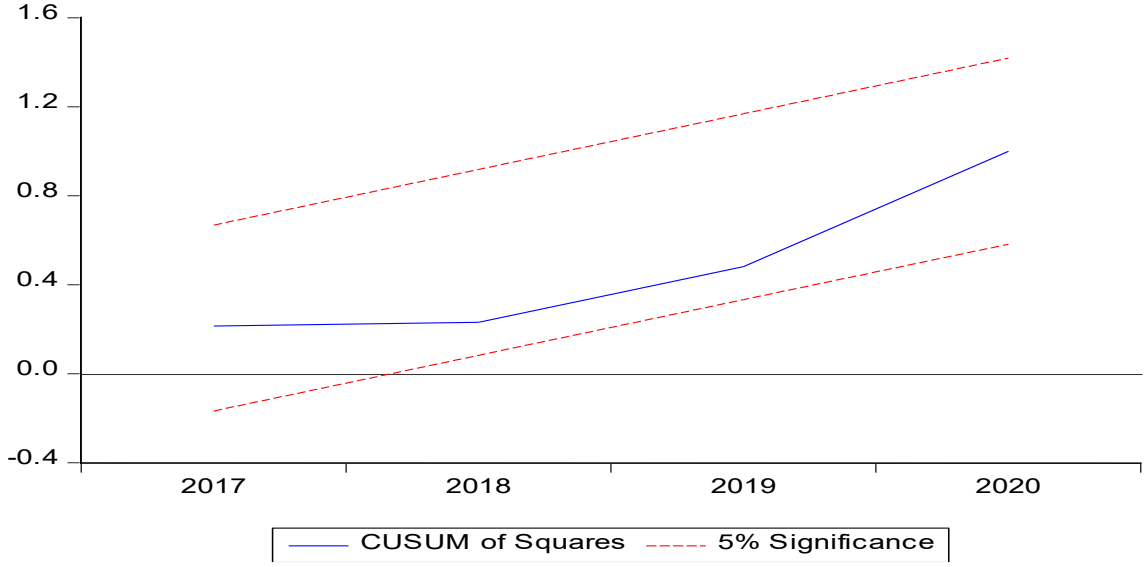
emphasize exchange rate fluctuations' impact on export-driven sectors. Additionally, Energy Consumption (EC) is positively related to manufacturing output (p-value = 0.0653), indicating that greater energy consumption supports industrial growth, which aligns with literature that underscores the importance of energy for industrial development (Olaitan, 2016).

However, Capital Goods Imports (CGM), while positive, has an insignificant effect on manufacturing output (p-value = 0.7186), suggesting that, in the long run, imports of capital goods do not significantly drive manufacturing growth. This result could be due to inefficient absorption or underutilization of imported capital goods in the short-run, as suggested by studies such as Onakoya et al. (2012). Overall, the findings highlight the significant long-term impact of trade openness, interest rates, exchange rates, and energy consumption on manufacturing growth, while capital goods imports appear to have a less direct influence.

4.5. ARDL Stability Test

To assess the stability of the ARDL model, this study utilized the CUSUM (Cumulative Sum) and CUSUM of Squares tests. These tests are crucial for determining whether the estimated coefficients of the ARDL model remain stable over time, or if there are structural breaks in the model, which could suggest issues with model reliability and validity. Both tests are used to check for any instability in the relationship between the variables in the long-run and short-run.

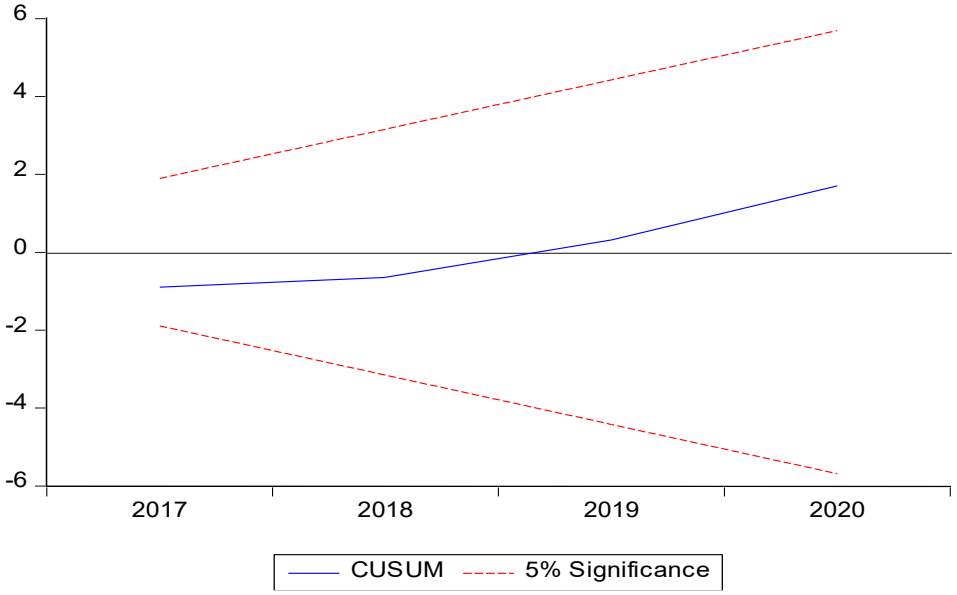
Figure 1: ARDL CUSUM of Squares



The CUSUM of Squares test examines the stability of the variance of the regression model. The test results are presented in Figure 1. In the graph, if the CUSUM of squares statistic stays within the critical bounds (typically represented by two straight lines), it indicates that the model coefficients are stable over time. If the CUSUM of Squares line exceeds the critical bounds, it suggests that the model has suffered from structural instability. Based on the results of the CUSUM of Squares test for this study, the statistic stays within the bounds throughout the sample period, which indicates that the ARDL model for the manufacturing sector is stable and does not exhibit any significant structural breaks.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

Figure 2: ARDL CUSUM



The CUSUM test, shown in Figure 2, evaluates the cumulative sum of residuals to check for the stability of the regression coefficients over time. A stable model is characterized by the CUSUM curve remaining within the critical bounds. If the curve moves outside these bounds, it would imply instability and potential issues with the model's parameters. The results from the CUSUM test in this study show that the curve remains within the critical bounds, suggesting that the model is stable and the coefficients of the ARDL model for the manufacturing sector are not subject to significant shifts over time.

In conclusion, the stability tests, including both the CUSUM and CUSUM of Squares, confirm that the ARDL model used in this study for the manufacturing sector is stable and appropriate for drawing reliable conclusions. These results provide assurance that the relationships estimated in the model are consistent and not influenced by structural changes or instability, further strengthening the validity of the findings.

Model II

4..6. ARDL Bound Test for the Agricultural Sector

The ARDL Bound Test for the agricultural sector indicates the presence of a long-run relationship between the variables. The F-statistic of 4.930644 exceeds the upper bound critical values for I(1) at the 5%, 2.5%, and 1% significance levels, suggesting that the null hypothesis of no cointegration (I(0)) can be rejected. Specifically, the F-statistic surpasses the critical values for I(1) at 1% (4.1), 2.5% (3.7), and 5% (3.39), indicating a cointegration relationship among the variables.

Table 5: ARDL Bound Test Result Agricultural Sector

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	4.930644	10%	1.95	3.06
K	8	5%	2.22	3.39
		2.5%	2.48	3.7
		1%	2.79	4.1

Source: Author's computation

This implies that there is a long-run equilibrium relationship in the agricultural sector model, supporting the use of the ARDL approach for further analysis of both short-run and long-run dynamics in understanding the sector's growth.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

4.7. Short-run ARDL Estimate for the Agricultural Sector

The Short-Run ARDL Estimate for the Agricultural Sector in Table 6 presents several key findings regarding the factors influencing Agricultural GDP (AGDP). The constant term (C) is statistically significant with a p-value of 0.0003, indicating a positive baseline level of agricultural output. The lagged value of Agricultural GDP (AGDP(-1)) has a significant negative effect on current output with a coefficient of -160.5569 and a p-value of 0.0000, suggesting that past agricultural output has a strong negative impact on current output in the short run. This could be attributed to cyclical adjustments or policy changes that may affect growth patterns in the short term.

Trade Openness (TOP(-1)) has a significant negative effect on AGDP with a coefficient of -233.9182 and a p-value of 0.0000, indicating that trade openness, in this case, might have a detrimental impact on the agricultural sector in the short run. This result could be explained by the potential exposure to external competition or shifts in domestic policies that may affect agricultural performance, which aligns with some empirical studies that suggest mixed effects of trade liberalization on agriculture (Kalu et al., 2016). Conversely, Precipitation (PT(-1)) has a significant positive effect on AGDP, with a coefficient of 37.1506 and a p-value of 0.0000. This result is consistent with the literature, which highlights the critical role of rainfall and weather patterns in agricultural productivity, particularly in developing economies dependent on rain-fed agriculture.

Table 6: Short-run ARDL Estimate for the Agricultural Sector

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	854.2689	186.5244	4.579932	0.0003
D(AGDP(-1))	-160.5569	15.72956	-10.20734	0.0000
D(TOP(-1))	-233.9182	18.2986	-12.83160	0.0000
D(INTR(-2))	-24.12667	96.19278	-0.250816	0.8051
D(EXRT(-1))	-80.58647	109.0973	-0.738666	0.4708
D(GEA(-2))	0.000115	9.77E-05	1.174349	0.2574
PT(-1)	37.15060	1.914071	19.40921	0.0000
CointEq(-1)*	-0.494539	0.096869	-5.105262	0.0001
R-squared	0.759822	Mean dependent var		429.1332
Adjusted R-squared	0.694756	S.D. dependent var		467.2823
S.E. of regression	363.5336	Akaike info criterion		14.86955
Sum squared resid	3171761.	Schwarz criterion		15.31848
Log likelihood	-242.7823	Hannan-Quinn criter.		15.02265
F-statistic	3.391495	Durbin-Watson stat		2.056784
Prob(F-statistic)	0.008047			

Source: Author's computation

Several other variables, including Interest Rates (INTR(-2)), Exchange Rates (EXRT(-1)), and Government Expenditure on Agriculture (GEA(-2)), are statistically insignificant, with p-values above 0.05, suggesting that they do not have a significant short-term impact on agricultural output in this model. The Error Correction Term (CointEq(-1)) is negative and highly significant (p-value = 0.0001), indicating that any short-term deviations from long-run equilibrium are corrected at a rate of 49.45% per period, suggesting a strong adjustment back to long-run equilibrium. The R-squared of 0.7598 and the Adjusted R-squared of 0.6948 suggest that the model explains a significant portion of the variation in Agricultural GDP (AGDP), with the F-statistic of 3.3915 and its p-value of 0.0080 indicating that the overall model is statistically significant. The Durbin-Watson statistic of 2.0568 indicates that there is no significant autocorrelation in the residuals, confirming the model's validity for drawing conclusions.

In conclusion, the short-run ARDL estimates suggest that trade openness and precipitation have significant effects on the Agricultural Sector, while other factors like interest rates, exchange rates, and government expenditure do not appear to have a strong short-term impact. The significant Error Correction Term, confirms the presence of a long-run relationship and a relatively fast adjustment to equilibrium, highlighting the importance of considering both short- and long-term dynamics in agricultural policy analysis.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

4.8. Long-run ARDL Estimate for the Agricultural Sector

The Long-Run ARDL Estimate for the Agricultural Sector, as shown in Table 7, provides insights into the key factors affecting Agricultural GDP (AGDP)**.** Trade Openness (TOP) has a negative but insignificant effect on agricultural output in the long-run, with a coefficient of -826.7169 and a p-value of 0.2436. This result suggests that, although trade openness may have a negative relationship with agricultural output, the effect is not statistically significant. This could be due to external competition or import competition, but it also reflects the mixed findings in the literature regarding the long-term impact of trade liberalization on agriculture, where some studies have shown both positive and negative effects (Kalu et al., 2016).

The Interest Rate (INTR), however, has a highly significant negative effect on agricultural output with a coefficient of -78.4618 and a p-value of 0.0000. This finding suggests that higher interest rates, which often lead to higher borrowing costs, negatively affect agricultural productivity in the long run. This is consistent with the literature that shows how high interest rates can reduce investment in the agricultural sector, limit access to credit, and hinder growth (Okoye et al., 2016).

Exchange Rate (EXRT) and Energy Consumption (EC) have insignificant effects on agricultural output with p-values of 0.8930 and 0.1564, respectively. The exchange rate has a negative relationship with agricultural output, but the effect is statistically insignificant, indicating that exchange rate fluctuations may not significantly affect agricultural productivity in the long-run. Similarly, energy consumption has a positive but insignificant effect, suggesting that energy consumption is not a major driver of agricultural growth in the long-term, at least in the context of this model. Finally, Capital Goods Imports (CGM) has a positive and statistically significant effect on agricultural output, with a coefficient of 0.000625 and a p-value of 0.0005. This indicates that imports of capital goods, which could include machinery and equipment, significantly contribute to agricultural productivity in the long-run. This is consistent with studies that emphasize the role of modern agricultural technology and equipment in improving productivity and fostering long-term growth in the sector (Onakoya et al., 2012).

Table 7: Long-run ARDL Estimate for the Agricultural Sector

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TOP	-826.7169	682.8723	-1.210646	0.2436
INTR	-78.46182	4.577624	-17.14029	0.0000
EXRT	-57.38622	419.7924	-0.136701	0.8930
EC	72.39802	36.22668	1.998472	0.1564
CGM	0.000625	0.000195	3.209103	0.0005

Source: Author's computation

In conclusion, the long-run ARDL estimates show that interest rates and capital goods imports have significant long-term effects on agricultural growth, while trade openness**,** exchange rates, and energy consumption do not have a strong or statistically significant impact. These findings highlight the importance of access to credit and modern capital goods in promoting long-term agricultural productivity, while also pointing to the need for targeted policies to manage trade openness and interest rates for sustained growth in the agricultural sector.

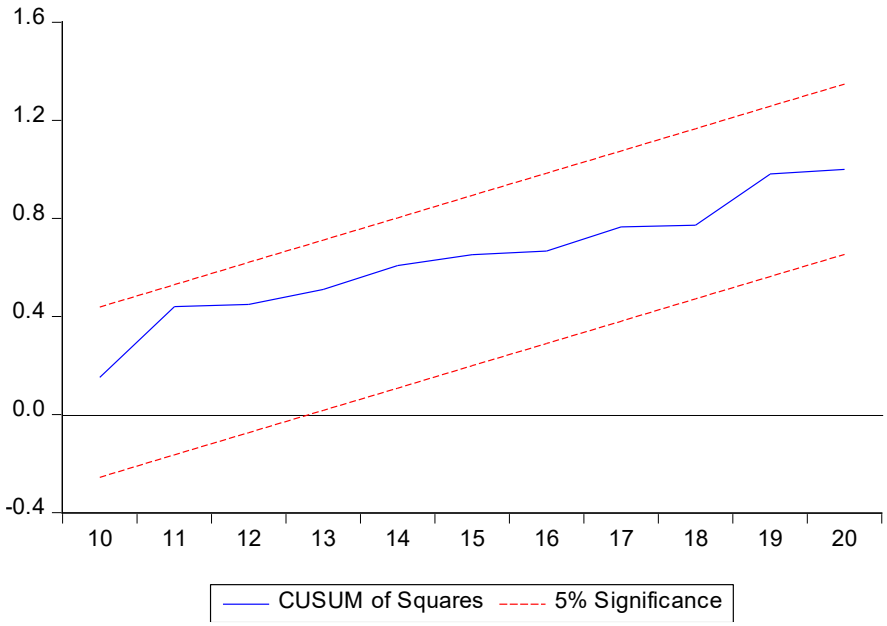
4.9. Stability Test for the Agricultural Sector ARDL model

To assess the stability of the ARDL model for the agricultural sector, this study applied the NARDL CUSUM (Cumulative Sum) and NARDL CUSUM of Squares tests. These tests are widely used to check for any structural instability in the model by analyzing whether the estimated coefficients remain stable over time.

The NARDL CUSUM of Squares test (shown in Figure 3) evaluates the stability of the variance of the regression model. If the CUSUM of Squares statistic stays within the critical bounds, it indicates that the model coefficients are stable over time, and there are no significant structural breaks. In the case of the Agricultural Sector ARDL model, the plot of the NARDL CUSUM of Squares falls within the two straight lines, confirming that the model is stable and does not suffer from any major structural instability over the sample period.

EPRA International Journal of Economic Growth and Environmental Issues- Peer Reviewed Journal
ISSN: 2321-6247
Volume: 13 | Issue: 6 | June 2025 | Journal DOI: 10.36713/epra0713 | SJIF Impact Factor (2025): 8.825

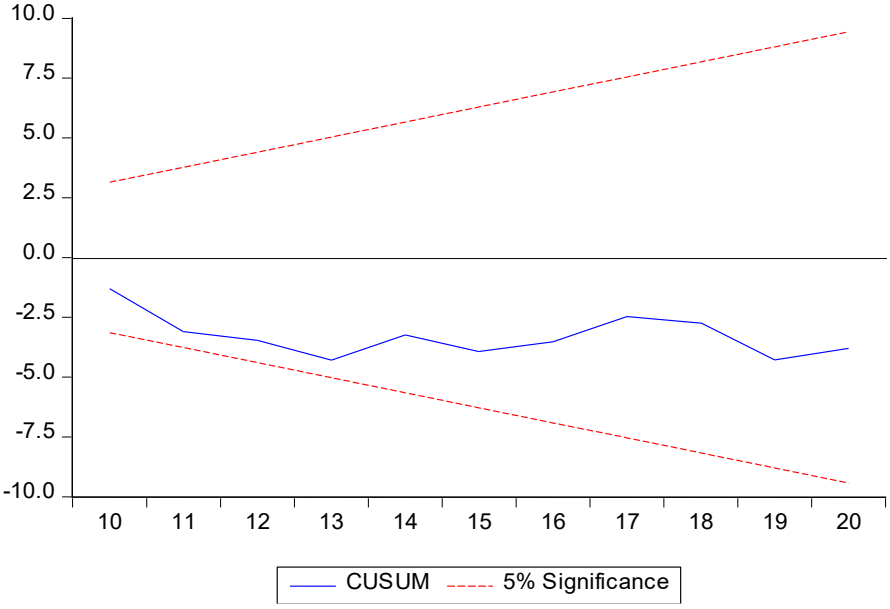
Figure 3: NARDL CUSUM of Squares



Similarly, the NARDL CUSUM test (presented in Figure 4) checks for the cumulative sum of residuals to evaluate the stability of the regression coefficients over time. The plot of the NARDL CUSUM also falls within the critical bounds, which indicates that the model coefficients are stable and that no significant changes or instability in the relationships between the variables occur throughout the sample period. This further strengthens the reliability of the model and supports the robustness of the findings.

In conclusion, both the NARDL CUSUM and NARDL CUSUM of Squares tests confirm that the Agricultural Sector ARDL model is stable. The model does not exhibit any structural instability, and the estimated coefficients remain consistent over time, providing confidence in the validity and reliability of the results for understanding the long-run and short-run dynamics in the agricultural sector.

Figure 4:NARDL CUSUM



In conclusion, both the NARDL CUSUM and NARDL CUSUM of Squares tests confirm that the Agricultural Sector ARDL model is stable. The model does not exhibit any structural instability, and the estimated coefficients remain consistent over time, providing confidence in the validity and reliability of the results for understanding the long-run and short-run dynamics in the agricultural sector.

5.0. CONCLUSION

This study examined the impact of trade openness on the real sector growth in Nigeria, with a focus on the agricultural and manufacturing sectors. The analysis utilized the ARDL-ECM approach to investigate both the short-run and long-run effects of trade openness and other relevant economic variables on sectorial growth. The results revealed that trade openness has mixed effects across both sectors. For the manufacturing sector, the short-run analysis suggested weak impacts from trade openness, interest rates, and capital goods imports, whereas the long-run estimates indicated significant effects from trade openness, interest rates, and energy consumption on manufacturing output. This highlights the importance of trade liberalization and a stable trade environment in fostering industrial growth.

In the agricultural sector, the short-run analysis showed significant effects of precipitation and trade openness on Agricultural GDP (AGDP)**,** while the long-run results indicated that interest rates and capital goods import significantly influence agricultural growth. The study emphasized the critical role of capital goods imports in boosting agricultural productivity in the long-run. The results underscore the importance of both short-term and long-term factors in understanding sectorial growth and suggest that tailored policies are needed to maximize the benefits of trade liberalization. Stability tests conducted on the ARDL models for both sectors confirmed the models' reliability, showing that the CUSUM and CUSUM of Squares tests indicated stable relationships between the variables over time. The ARDL Bound Test for both the agricultural and manufacturing sectors further confirmed the existence of long-run equilibrium relationships among the variables, justifying the use of the ARDL approach for modelling the dynamic relationships in both sectors.

Based on the findings of this study, the following policy recommendations are proposed to enhance the positive impacts of trade openness on Nigeria's real sector, with a particular focus on the agricultural and manufacturing sectors:

1. **Promote Targeted Trade Policies for Manufacturing and Agriculture**: Given the mixed effects of trade openness on the manufacturing sector, it is crucial to design trade policies that protect nascent industries while gradually encouraging competition. These policies should focus on export promotion, improved trade facilitation, and the reduction of trade barriers for strategic sectors like manufacturing and agriculture. For agriculture, policies should ensure that trade liberalization does not harm local farmers, particularly in the short-run.
2. **Strengthen Access to Credit for Manufacturers and Farmers**: The study showed that interest rates have a significant impact on both manufacturing and agricultural growth. Policymakers should focus on reducing interest rates or providing targeted subsidized loans to small and medium-sized businesses in both sectors to stimulate investment and production. Financial institutions should also be incentivized to offer favourable credit terms, especially for agro-industries and manufacturing firms investing in technological advancements.
3. **Enhance Infrastructure and Energy Supply**: Both the manufacturing and agricultural sectors benefit from energy consumption and the availability of infrastructure. Policies that improve energy supply and promote energy efficiency (especially renewable energy) will have long-term positive effects on sectorial growth. Additionally, investing in transportation infrastructure and logistics networks is critical to reducing costs and improving the competitiveness of Nigerian manufacturers and agricultural exporters in global markets.
4. **Encourage Capital Goods Imports and Technology Transfer**: Given the positive impact of capital goods imports on agricultural productivity, it is essential to create policies that encourage the importation of advanced agricultural machinery and manufacturing equipment. These policies could include tax incentives**,** import duty reductions**,** and public-private partnerships aimed at facilitating technology transfer to enhance sectorial efficiency and productivity.
5. **Implement Long-Term Structural Reforms**: To ensure the long-term benefits of trade openness, structural reforms are needed in the regulatory and business environments. This includes improving market access**,** business climate, and governance in both sectors. Reforms should focus on reducing bureaucracy, enhancing **tax incentives**, and creating a more conducive environment (most especially favourable legal framework, infrastructure and security) for foreign direct investment in manufacturing and agriculture.

REFERENCES

1. *Abad, L. A. & Khalifa, K. (2015). What are stylized facts? Journal of Economic Methodology, 22(2).*
2. *Abinabo, P. & Abubakar. A. (2023). Trade openness and economic growth in Nigeria. Nigerian Journal of Management Sciences in Nigeria, 24(2a).*
3. *Ali, M., Aliero, H. & Abubakar, M. (2015). An empirical analysis of the effect of monetary policy on the manufacturing sector in Nigeria. CBN Economic and Financial Review, 53(2).*
4. *Anowor, F. O., Ukweni, N. O., Ikeme, M. (2013). The impact of trade liberalization on Nigerian agricultural sector. Journal of Economics and Sustainable Development, 4(8).*
5. *Basu, K. (1998). Analytical Development economics, The Less Developed Economy Revisited. MIT Press,USA.*
6. *Bilgin, C. & Seker, A. (2021). Trade liberalization, openness and economic growth: A panel times series analysis for global economy. METU Studies in Development, 48.*
7. *Brahmbhatt, M. & Dadush, U. (1996). Disparities in global integration. Finance and Development.*
8. *Calderon, C. & Kubota, M. (2009). Does Higher Openness Cause More Real Exchange Rate Volatility? World Bank Policy Resaarch Working Paper, No. 4896*
9. *Central Bank of Nigeria (2015). Annual Report.*
10. *Edwards, S. (2001). Openness, productivity and growth: what do we really know? The Economic Journal, 108(44).*
11. *Egbulonu, K. G. & Adaku,J. E. (2018). Trade openness and Nigeria's economic growth (1990-2015). International Journal of Development Economic Sustainability, 6(3). 1-11.*
12. *Fujii, E. (2017). What does trade openness measure? Cesifo Working Paper Series, No 6656. Cesifo group, Munich.*
13. *Hye, Q., Wizarat, S. & Lau,W. P. (2016). The impact of trade openness on economic growth in China: an empirical analysis. The Journal of Asian Finance, Economics and Business, 3(3).*
14. *Hyun-Jung, N. & Doojin Ryu (2024). Does trade openness promote economic growth in developing nations? Journal of International Financial Markets, Institutions and Money. 93*
15. *Imoisi, A. I., (2018) Is trade openness suitable for growth of Nigerian manufacturing sector? ARDL approach. Academic Journal of Economics Studies, 4(2).*
16. *Iyoha, M. A. (2003). The global patterns of development in the 20th century and their lessons. In A.G. Garba (ed) Development Thought, Policy Advice and Economic Development in Africa in the 20th Century: Lessons for the 21st Century.*
17. *Kalu, E. U., Nwude, C.E., & Nwonye, N. (2016) Can trade openness engineer economic growth in Nigeria? Global Journal of Management and Business Research, 16(4).*
18. *Keho, Y. (2017). The impact of trade openness on economic growth: the case of Cote d'Ivoire. Journal of Cogent Economics and Finance, 5(1).*
19. *Lotfalipour, M. R., Montazeri, S., & Sedighi, S. (2019). Trade openness and inflation: evidence from MENA region countries. Economics Insights-Trends and Challenges, 11(LXV). 1-11.*
20. *Mireku, K., Agyei, E. A. & Domeher, D. (2017). Trade openness and economic growth volatility: an empirical investigation. Journal of Cogent Economics and Finance, 5(1).*
21. *Nirodha, S.D., Malaga, J. & Johnson, J. (2014) Trade liberalization effects on agricultural production growth: the case of Sri Lanka. Journal of Agricultural Economics and Development, 3(9).*
22. *Obembe, O. B. (2011). Financing real sector for sustainable economic growth in Nigeria: performance, challenges and prospects. CBN Economic and Financial Review, 49(4)*
23. *OECD, (2011). "Trade openness" in OECD science technology and industry scoreboard. OECD Publishing, Paris*
24. *Ohwofasa, B. O. & Ekaruwe M. (2023). Trade openness and economic growth in Nigeria. Lafia Journal of Economics and Management Sciences, 8(1).*
25. *Ogu, C., Aniebo, C. & Elekwa, P. (2016). Does trade liberation hurt Nigeria's manufacturing sector? International Journal of Economics and Finance, 8(6).*
26. *Oikhenan, H. E. & Aigheyisi O.S. (2015). Factors explaining exchange rate volatility in Nigeria: theory and empirical evidence. CBN Economic and Financial Review, 53(2).*
27. *Okoye, L. U. & Nwakoby, C. & Okorie, U. (2016) Economic openness and industrial development in Nigeria. Journal of Policy and Development Studies,10 (1).*
28. *Olaitan M. A. (2016). Real sector financing for inclusive growth and economic development. CBN Bullion, 40(3).*
29. *Omoregbee, G., Abata, M. A., Babatunde, O. A. & Akinsulire, O. (2025). The impact of trade openness on sectoral performance in Nigeria: insight for sustainable economic growth. International Journal of Research, Innovation and Social Sciences (IJRISS), IX (1)*
30. *Onakoya, A. B. O., Fasanya, I.O. & Babalola, T. (2012) Trade openness and manufacturing sector growth: an empirical analysis for Nigeria. Mediterranean Journal of Social Sciences, 3(11).*

31. *Onakoya, A., Johnson, B. & Ogundajo, G. (2019). Poverty and trade liberalization: empirical evidence from 21 African countries. Economic Research-Ekonomska Istrazivanja, 32(1).*
32. *Onimode, B. (2003). External indebtedness, unequal exchange, structural adjustment and economic development. In A.G. Garba (ed) Development Thought, Policy Advice and Economic Development in Africa in the 20th Century: Lessons for the 21st Century.*
33. *Romer, D.O. (1991) Openness and inflation: theory and evidence. NBER Working Paper, No. 3936.*
34. *Saibu, O. M. (2004). Trade openness and economic growth in Nigeria: further evidence on the causality issue. South African Journal of Economics and Management Sciences (SAJEMS), 7(2).*
35. *The global economy.com (2018). Business and Economic data for 200 countries. https://www.the globaleconomy.com>rankings.trade.*
36. *Thirlwall, A. P. (1999). Growth and development, with special reference to developing economies. 6th edition, Macmillan Publishers, London.*
37. *Todaro, M. P. & Smith S. C. (2020). Economic Development. 13th edition, Pearson Education Limited, United Kingdom.*
38. *Umoh, J. O. Effiong, L. E. (2013). Trade openness and manufacturing sector performance in Nigeria. Journal of Applied Economic Research, 7 (2).*
39. *World Bank (1993). The East Asian Miracle: Economic Growth Public Policies, Washington DC, World Bank.*