TRADE OPENNESS AND MANUFACTURING SECTOR PERFORMANCE IN NIGERIA

BY

IRABOR MARYANN ABIEYUWA

SSC2008457

DEPARTMENT OF ECONOMICS

FACULTY OF SOCIAL SCIENCES

UNIVERSITY OF BENIN, EDO STATE

MAY, 2025

TRADE OPENNESS AND MANUFACTURING SECTOR PERFORMANCE IN NIGERIA

BY

IRABOR MARYANN ABIEYUWA

SSC2008457

A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS IN PARTIAL FULFILLMENT OF THE AWARD OF BACHELOR OF SCIENCE DEGREE IN ECONOMICS

MAY, 2025

CERTIFICATION

This is to certify that this project work "Trade openness and manufacturing sector performance in Nigeria: From 1981-2021" was carried out by Irabor Maryann Abieyuwa with matriculation number SSC2008457 in the Department of Economics, Faculty of Social Sciences, University of Benin.

_____ _____

Mrs. E.J. Sowemimo **Date**
Project Supervisor

_____ _____

Dr S.O Igbinedion **Date**
Project Coordinator

_____ _____

Dr Nosakhare Arodeye **Date**
Head of Department

DEDICATION

This project is dedicated to God Almighty, who has given me the grace to complete this project and to my parents, Mr. and Mrs. Lawrence Irabor for their overall support to my academic journey.

ACKNOWLEDGEMENT

I give great thanks to my creator, God Almighty for the successful completion of this project.

I am sincerely grateful to my parents; Mr. and Mrs. Lawrence Irabor, for the care, love, and all round support towards me.

I want to specially thank my amazing supervisor, Mrs. Sowemimo, for her proper guidance and thorough supervision in making sure this project become a successful one.

To my course mate and now friend, Joy Omeh, thanks for not getting tired of my many questions during the time this project was undertaken.

I am also grateful to the faculty and staff of the Economics department for providing the necessary resources that enabled me to pursue this project with confidence.

Lastly, I appreciate everyone who contributed, directly or indirectly, to the successful completion of this project. Your support has been crucial, and I am truly thankful.

TABLE OF CONTENT

CHAPTER THREE: METHODOLOGY

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

CHAPTER FIVE: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

ABSTRACT

The broad objective of this study is to examine impact of trade openness on manufacturing sector performance in Nigeria. This study investigates the intricate relationships among manufacturing value added (MAN), trade openness (TOP), exchange rate (LNEXR), interest rate (LNIR), imports (IMP), and exports (LNXPT) over a 41-year period from 1981 to 2021, employing various econometric techniques. Descriptive statistic was conducted to know the raw nature of all variables, the unit root test using the Augmented Dicky-fuller test to check for stationarity of the variables. The co-integration analysis using the bounds test was used to check if there is a long run relationship between the variable and the ARDL-ECM approach was used to analyze the data for both the short run and long run analysis. The Augmented Dickey-Fuller test confirms that all variables are non-stationary at levels but stationary after first differencing, indicating they are integrated of order one, I(1). The ARDL Bound Test establishes a long-run equilibrium relationship among the variables, with a computed F-statistic of 10.76345 exceeding the upper bound critical value, confirming co-integration. The Error Correction Model (ECM) indicates that approximately 17% of the previous period's disequilibrium is corrected in the current period. The AutoRegressive Distributed Lag (ARDL) model reveals that trade openness, interest rates, and exports significantly negatively impact manufacturing value added in the short run, while the exchange rate shows no immediate significant effect. However, past increases in the exchange rate positively influence manufacturing value added in the long run. The findings underscore the complex dynamics of trade and economic policy on domestic manufacturing, highlighting the need for strategic interventions to bolster the manufacturing sector amidst increasing trade openness and fluctuating economic conditions.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The industrial sector has been called the "heart" of every successful economy because it involves large-scale output production and manufacturing, which effectively opens up the economy to the outside world. Producing goods and services by the use of raw materials, labour, capital, land, and other production aspects, or through the use of a production process, is the focus of the manufacturing sector, which is a subsector of the industrial sector. Capital formation occurs frequently as a result of increased economic output brought about by mass production of goods and services using better materials, labour, and technological capabilities. This inevitably improves the nation's economic performance. Trade openness is a crucial issue that needs to be addressed if developing countries like Nigeria choose to embrace and use agricultural export commerce as a means of supporting economic progress. Both the unfavourable terms of trade associated with the export of primary commodities and the convergence of export-led growth plans by most of the world's countries result in unequal participation in international trade. Furthermore, even in the face of regional and international accords, powerful states are more inclined to employ trade barriers, which obstruct the free flow of commerce (Nteegah & Olubiyi, 2022).

Some nations have made the decision to reorganize their national strategy and economic policies in an effort to open up their nations to foreign trade. Some countries, especially developing ones, have established and executed policies aimed at improving the climate in which international trade could occur as part of a larger restructuring of their macroeconomic policies. One of the primary focus areas in the policy-making processes of some of these

nations has been the shift toward more open trade (Malefane, 2018). The key to a nation's financial stability is its economic production. It modifies the economy through increasing employment, decreasing absolute poverty, increasing national income, increasing public service spending, increasing national output per capita, and elevating the material standard of living. Trade openness is crucial for enhancing international trade and integrating with global marketplaces in order to accomplish this. A popular statistic used to measure economic growth is the gross domestic product (GDP), which is the value of goods and services generated in a country less the value of goods and services used in production. Trade openness refers to how accommodating a host nation is and how easily foreign investors can engage in international trade. Trade volume and imports and exports are two notions used to measure trade openness. Exports are an important component of a nation's economy and are a part of international trade, which involves moving items made in one nation to another for trade or sale. It promotes exporting nations' economic expansion. An import is a form of international trade in which a nation buys commodities and services for domestic use from another nation. Trade is the exchange of products or services between parties; it is an economic notion. It could involve two or more countries, or it could happen inside one. When two nations exchange goods and services, this is known as international trade.

1.2 Statement of the Study

Economic openness has been shown to enhance the economic level both theoretically and experimentally. The reason for this is that in a competitive market, prices fall and a variety of products creates consumer surplus. Other benefits of economic openness include the advantages of efficiency and specialization. The desire of the majority of economies to be open to commerce is therefore understandable. In order to eradicate or drastically reduce

market distortions that were mostly caused by government interference in the productive sector after the country's independence, Nigeria has implemented considerable economic reforms throughout the past few decades. The question is which particular institutions are required for the country to benefit from transparency, as there are many different types of institutions (legal systems, social structures, property use regulations, etc.). Nigeria has a large population, but instead of using this advantage to further its growth, the country has fostered an imbalance that has widened the gap between the rich and the poor. The lack of strong, anti-corruption agencies in the country has caused corruption to seem to have seeped into the very core of the economy.

Extant literature shows mixed results between of trade openness on manufacturing sector performance in Nigeria. For example, some studies show a positive relationship between trade openness on manufacturing sector performance (Abinabo & Abubakar, 2023; Akpere & Uche, 2020; Nteegah & Olubiyi, 2022). While another studies report a negative relationship between trade openness on manufacturing sector performance (Adofu & Ojonugwa, 2021 ; Parsi, 2024 ; Saurai, 2021)

1.3 Research Questions

The following questions are expected to have been answered.

i. What is the relationship between openness and manufacturing sector performance in Nigeria?
ii. What is the relationship between imports and manufacturing sector performance in Nigeria?
iii. What is the relationship between exports and manufacturing sector performance in Nigeria?

iv. What is the relationship between interest rate and manufacturing sector performance in Nigeria?
v. What is nature of the relationship between exchange rate and manufacturing sector performance in Nigeria?

1.4 Objective of the Study

The broad objective of this study is to examine impact of trade openness on manufacturing sector performance in Nigeria. The specific objectives of the study are to:

i. examine the relationship between openness and manufacturing sector performance in Nigeria;
ii. investigate the relationship between imports and manufacturing sector performance in Nigeria;
iii. examine the relationship between export and manufacturing sector performance in Nigeria;
iv. determine the relationship between interest rate and manufacturing sector performance in Nigeria; and
v. ascertain the relationship between rate of exchange and manufacturing sector performance.in Nigeria.

1.5 Statement of Research Hypothesis

Based on the objectives of this research, the subsequent hypotheses are developed to guide the research:

Ho_1: There is no significant relationship between openness and manufacturing sector performance in Nigeria.

Ho_2: There is no significant relationship between imports and manufacturing sector performance in Nigeria.

Ho_3: There is no significant relationship between exports and manufacturing sector performance in Nigeria.

Ho_4: There is no significant relationship between interest rate and manufacturing sector performance in Nigeria.

Ho_5: There is no significant relationship between exchange rate and manufacturing sector performance in Nigeria.

1.6 Scope of the Study

The objective of the study is to examine the relationship between trade liberalization and economic development. The variable scope: The independent variables include exchange rate, export and import while dependent variable is manufacturing performance proxied by GDP. The study employed secondary data, specifically time series data, for its objectives. The scope of this study covers effect of trade liberalization on the economic development in Nigeria using variables like Export, Import, Exchange Rate and GDP within the period 2001-2022.

1.7 Significance of the Study

Nigeria is a part of the global community, so it is included in this global development. The study would examine the impact of trade liberalization on the process of economic growth in order to determine its relevance. The study would broaden our understanding of trade liberalization, especially its justification. The importance of international trade in the growth of an economy cannot be overstated, especially in light of the current globalization trend.

CHAPTER TWO

Literature Review

2.1 Conceptual Clarification

2.1.1 Manufacturing Sector Performance

Nigeria's manufacturing sector includes a wide range of industrial activities, from huge capital goods corporations in the automotive and electrical equipment sectors to tiny, informal businesses utilizing basic technologies. However, the manufacturing profile is dominated by the production of consumer goods such wood and wood-based products, beverages, textiles, detergents, and soaps. A perverse structure of incentives has favoured the rise of import-intensive consumer products versus the capital goods sector, as well as the localization of assembly and final processing of relatively basic items. As a result, the industrial sector has remained heavily dependent on imports (Umoh & Effiong, 2013). During the manufacturing process, raw materials are changed into intermediate or finished commodities. Value addition, production, and item processing are the main priorities of the manufacturing industry (Adebayo, 2011). It also includes the creation of brand-new goods. According to Dickson (2010), the industrial sector in developed nations is largely composed of the manufacturing sector. Furthermore, the industrial sector is essential to the modern economy's shift. The manufacturing sector is housed inside the industrial sector. Through the creation of prospective foreign exchange revenue, which in turn creates employment and per capita income with project-specific consumption patterns, the experiment aims to increase productivity in relation to import substitution and export growth. The manufacturing sector plays a crucial role in the GDP and has been restructured by the service sector in several

Organization for Economic Co-operation and Development (OECD) member countries (Ugwanyi, Utazi, Micheal & Umedike, 2015).

The primary premise that the manufacturing sector's increased labour productivity and productivity-reviving innovations technologies lead to a higher proportion of economies of scale and technical progress than other sectors (Thirlwall, 2013; Onakoya, Ogundajo & Johnson, 2017) is further supported by Szirmai (2012), who believed that the manufacturing sector's emergence as a significant activity in many developing countries has a pattern and frames the fundamental aspect of economic growth and development. Omankhanlen and Owonibi (2012) noted that this sector is beset with a number of obstacles, including a high rate of inflation and bank reluctance to lend to the manufacturing sector despite the monetary authorities ranking it as the priority sector. These uncertainties and irregularities in the inflation rate have caused serious problems to the utilization of manufacturing sector capacity. All of these factors may be the cause of the manufacturing sector's failure to increase productivity related to import replacement and export expansion, creating foreign exchange earning capacity, increasing unemployment and capital income, and resulting in unusual consumption patterns.

The subsector of manufacturing comprises major, medium, small, and micro businesses. The policy transition to small-scale industrialization policy was motivated by the incapacity of large-scale industrialization strategy to drive the expansion of Nigeria's industrial sector. At the moment, small businesses continue to be highly prevalent in the economy and are essential to the nation's industrial growth (Bank-Ola et al., 2020).

2.1.2 Trade Openness

Trade openness refers to how much an economy depends on foreign trade and financial flows (Akintunde et al., 2021). Trade openness plays a significant role in productivity growth, skill

transfer, and advancement in many countries. For this reason, Khalid (2016) offers data on the importance of trade openness for public spending, income distribution, economic growth, and the environment. Trade liberalization increases the amount of wealth and income earned by economic participants as well as industrial output. Higher living standards and the ability to lead healthier lifestyles and take better care of one's health are the results of increased trade earnings, which eventually lead to longer life expectancies. Globalization enables free trade. As a result of the expansion of economic ties between nations, globalization is a continuous process that is typified by an increase in the volume of international trade, money flows, and labour movements (Pigka-Balanika, 2013).Trade openness increases the amount of wealth and income earned by economic participants as well as industrial output. Higher living standards and the ability to lead healthier lifestyles and take better care of one's health are the results of increased trade earnings, which eventually lead to longer life expectancies. Globalization enables free trade. The growth of economic connections between countries is reflected in the volume of international trade, the volume of international financial flows, and the flow of labour. Globalization is a continuous process. For many African nations, one of the main causes of concern has been the extent of openness to international trade. Actually, increased market integration and international trade are made possible by more open economies (Osei et al., 2019). In many nations, trade openness has a major impact on development, skill transfer, and productivity growth. Khalid (2016) provides information on the benefits of trade openness for the environment, economic growth, income distribution, and public spending because of this.

2.1.3 Imports

Imports are the total estimated value of goods and services acquired from other nations. An economy with a high quantity of imports would be expected to grow at a slow rate (Ogbu, 2019). An item that is brought into a country from outside, usually across a national border, is

said to be imported. An importer is a person who brings products into the country. An export from the sending country is equivalent to an import into the receiving nation. Imports and exports are the two financial transactions that make up international trade. Import limits and directions from the customs authority limit the import and export of items in international trade. The countries that import and export the commodities have the authority to put a tax on them. Additionally, the import and export of goods are governed by trade agreements between the importing and exporting authorities (Koroma et al., 2023). Additionally, imports include the exchange of products and services from non-residents to citizens of a jurisdiction (like a nation). Certain borderline situations are included and excluded from the precise definition of imports in national accounts.

2.1.4 Export

Export is the total amount of goods and services sold to foreign countries. Economies with higher export levels also have higher rates of economic growth because exports are fundamentally an indicator of high levels of production, commerce, and income (Ogbu, 2019). Export refers to the movement of items and services outside of a nation's borders. The foreign-based client is called an "importer," whereas the company that sells these products and services is called an "exporter" and has its headquarters in the country that is exporting the commodities. The selling of products and services produced domestically to foreign markets is known as exports or international trade. Customs officials in both the exporting and receiving nations usually need to be involved when substantial amounts of commodities are exported (Koroma et al., 2023).

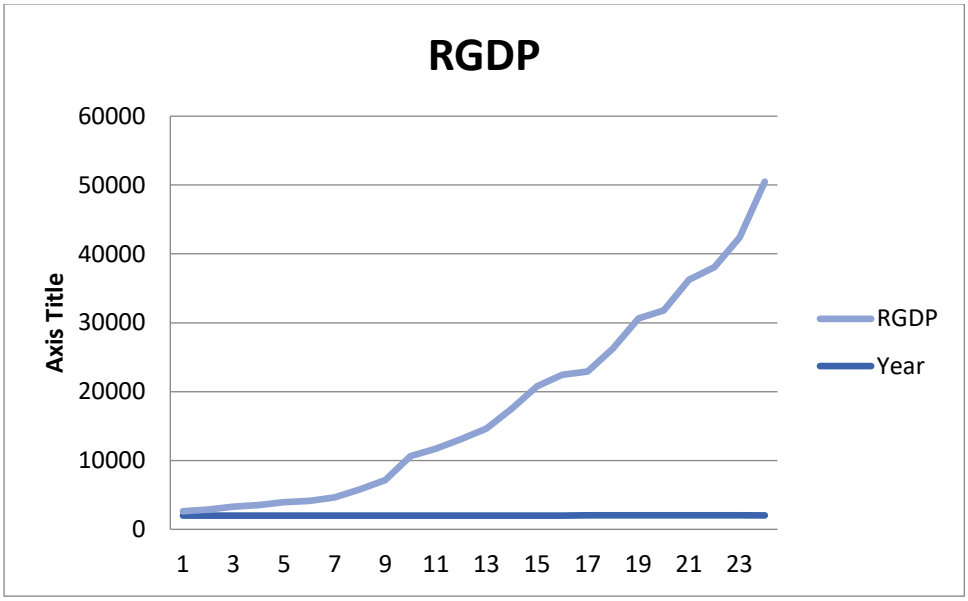
2.1.5 Exchange Rate

The exchange rate is a representation of the value of the Nigerian Naira relative to other currencies, as well as the many policies that Nigeria has put in place. It is expected that trade

volume will rise and Nigeria's growth rate will quicken when the Naira exchange rate is low (Ogbu, 2019). The global financial system is strategically centered on the exchange rate, which sets the terms under which countries trade products and services with one another. Within the framework of general economic policy making and reform programs, the exchange rate is one of the most significant essential microeconomic indicators. It is a critical component in determining the rate of expansion of a country's economic activity. The exchange rate is the cost of a nation's currency stated in terms of other nations' currencies. It establishes the proportionate pricing of domestic goods as well as the level of external sector involvement in domestic trade. Interest rates and exchange rate regimes continue to be hot themes in economics, emerging countries, and international finance (Ani & Udeh, 2021). More people are beginning to recognize that trade liberalization is necessary for economic expansion. The exchange rate is the total value of a country's currency in respect to other currencies on an equal footing. It is the worldwide equivalent of a country's currency. Usually, it acts as the basis for payments made across borders. The dynamics of a currency's supply and demand drive exchange rates. Governments can also have an impact on it in a number of ways. Alternative exchange rate systems are defined by the degree and kind of government intervention in the currency markets, and these systems have distinct effects on the economy. The concept of exchange rate can be defined in two ways; the real and nominal exchange rates. First off, the price of one currency relative to another is known as the nominal exchange rate. Furthermore, the rate at which goods and services are traded between the home economy and the global economy is referred to as the exchange rate under the real exchange rate. We are establishing the exchange rate for this study using the actual exchange rate (Koroma et al., 2023).

2.2 Trend Analysis/Background

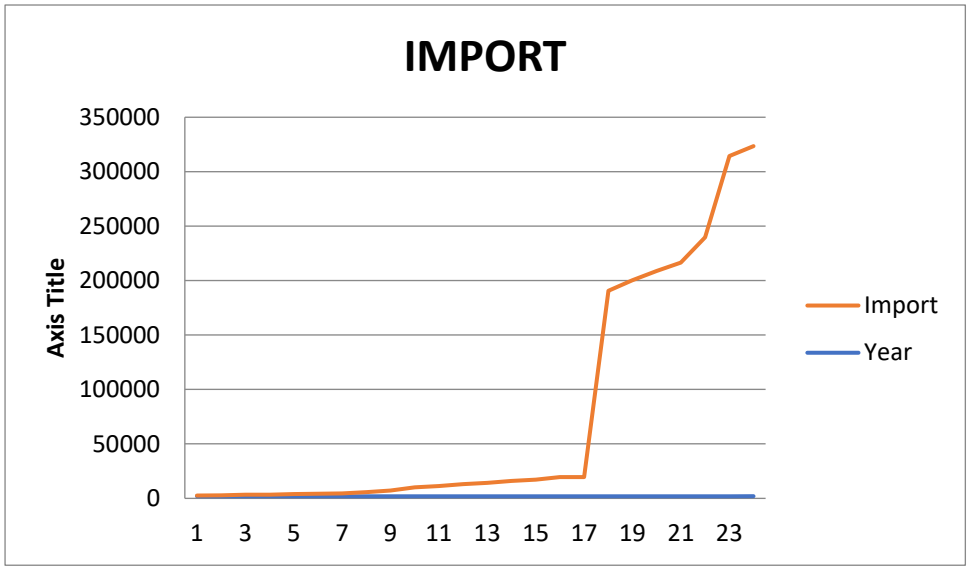
Table: GDP



Source:National Bureau of Statistic (2001-2023)

In table 1,there is stable growth of exchange rate between 1 and 9,there is high growth of exchange rate between 11 and 15 while there is high growth rate between 17and 23.

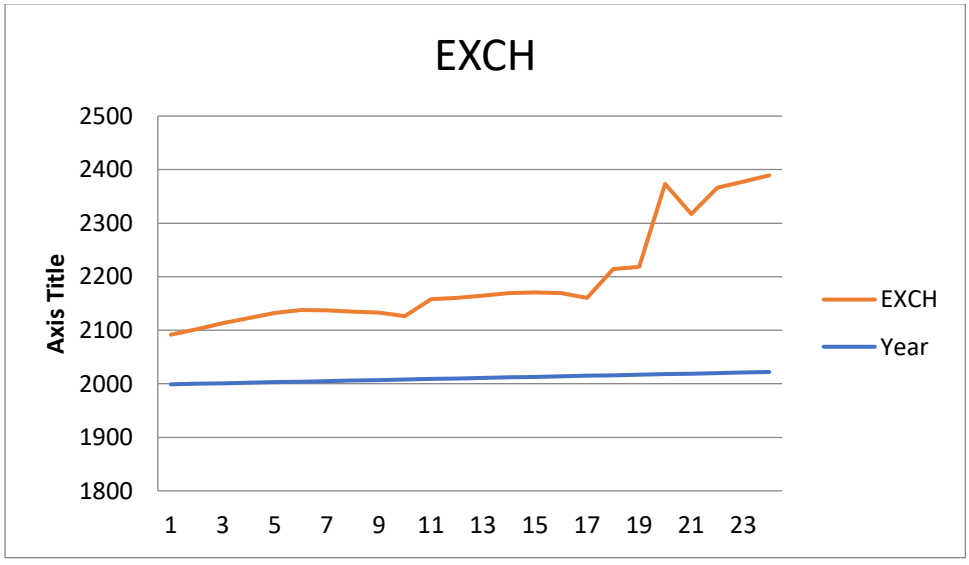
Table2: Import



Source: National Bureau of Statistic (2001-2023)

In table 2,there is stable growth of exchange rate between 1 and 15,there is high growth of exchange rate between 17 and 19 while there is high growth rate between 21and 23.

Table 3: Exchange Rate



Source: National Bureau of Statistic (2001-2023)

In table 3, there is stable growth of exchange rate between 1 and 9, there is a moderate growth of exchange rate between 13 and 17 while there is high growth rate between 19 and 23.

2.3 Theoretical Review

2.3.1 The Neoclassical Growth Theory

The neoclassical growth theory is developed by (Solow, 1956). This theory holds that the economy allows for the free substitution of capital and labour to produce composite goods. In theory, the exogeneity of technological innovation implies that the rate of economic growth is unaffected by decisions made by the government. As per the idea, economic growth can be dissected into its constituent elements, namely labour and capital, which are assigned weights based on their relative contributions, and the remaining Researchers who link growth and commerce in line with the tenets of the neoclassical theory have employed economies of scale (Lee, 1993). According to Bhagwati (1988), trade openness promotes industry specialization, which raises productivity and accelerates economic expansion. Additionally, Lee (1993) contends that trade liberalization fosters growth by making it easier for the least developed nations (LDCs) to acquire crucial intermediate inputs and capital needed for their manufacturing. According to the neoclassical view, trade openness serves as a means of facilitating the entry of capital-intensive inputs that are necessary for production and directly support economic growth. However, the neoclassical growth theory falls short of offering a comprehensive framework that would allow trade policy changes to promote sustained economic growth. According to Young (1991), the method via which trade openings can endogenously support long-term economic growth is provided by the development of the endogenous growth theory. The variable that was absent from the neoclassical growth theory

is the endogenous growth model, which endogenizes technological advancement. Romer (1990), the recipient of the 2018 Nobel Prize, asserts that trade openness has a crucial role in fostering growth through advancements in technology. According to this growth theory, trade openness promotes innovation and technological transfer by allowing the entry of high-tech goods that are often lacking in the importing nations. Importing cutting-edge technology items promotes technical spillovers that boost R&D investment efficiency through elimination. According to this view, commercial openness also promotes the growth of human capital and the transfer and accumulation of knowledge.

2.3.2 Heckscher-Ohlin Trade Theory

Countries and producers would decide which items they could manufacture more efficiently if markets were free and open. Eli Heckscher and Bertil Ohlin, two Swedish economists, concentrated on how a nation could obtain a comparative advantage by manufacturing goods that made use of domestically available resources in the early 1900s (Nwakoh,2017). According to their thesis, a nation's production factors—land; labor, and capital—are what generate the money needed to invest in machinery and plants. They concluded that supply and demand dictated the price of any given factor or resource. When supply outpaces demand, factors would be more affordable; when demand outpaces supply, factors would be more costly. According to their idea, which is also known as the factor proportions theory, nations would manufacture and export things that needed resources or factors that were abundant and, thus, less expensive. On the other hand, nations would import commodities that needed resources that were more in demand but less available.

2.3.3 Configurational Theory

Two study streams seem to predominate in studies on competitiveness in manufacturing industries, according to the tenets of configurational theory. In an effort to determine which

models work best in various contexts, the first one focuses on the "strategic fit" . This approach's central claim is that there are inherent congruencies between manufacturing strategy, competitive strategy, environment, and structure because of their configuration or interconnection. The majority of these studies came to the conclusion that businesses typically choose more cautious tactics when the market is stable. On the other hand, more inventive and enterprising businesses perform better under extremely unpredictable circumstances. One of the subjects that have lately drawn interest in this field of study is the search for models of high-performance techniques to deal with the changing environmental circumstances throughout the world. These studies search for commonalities across different organizations to determine the most competitive patterns of strategic action. Such patterns are found by examining the company's position along the different dimensions that comprise the multidimensional structure of the strategy. In the business-to-business and durable goods industries, this model is distinguished by its competitive scope, which is founded on worldwide niches with superior goods and services. Second, the model includes a search for operational efficiency while keeping a suitable balance between outsourcing and local manufacturing. Integrated with the research and development departments, the most productive operations are conducted in the place of origin and focus on ongoing improvements to goods and processes in partnership with customers. Since these businesses are motivated by the desire to be nearer to the markets, they frequently do not stop local production when they outsource. In order to maintain a suitable balance between local manufacturing and outsourcing, the model includes a search for operational efficiency. Integrated with the research and development departments, the most productive operations are conducted in the place of origin and focus on ongoing improvements to goods and processes in partnership with customers. Since these businesses are motivated by the desire to be nearer to the markets, they frequently do not stop local production when they outsource.

2.3.4 Comparative Advantage Theory

Ricardo (1817) identifies a weakness in the absolute advantage model and proposed the idea of comparative advantage, which states that a nation can produce goods that it can produce more effectively than another nation. Ricardo took opportunity cost into account rather than financial cost. He underlined that a nation can specialize in the effective manufacturing of a good by using comparative advantage. In practice, specialization based on comparative advantage raises global productivity and raises everyone's level of life. Building on Adam Smith's theory, Ricardo (1817) created the model of comparative advantage and came to the conclusion that countries should produce items at which they are superior to those of other countries. Ricardo argued that nations that specialize in a particular good might attain a more efficient production through comparative advantage, which is why he opposed tariffs and other trade restrictions (Henderson 1993). The trade of cloth and wine between Portugal and England served as the main example of Ricardo's comparative advantage theory. He used the example of England, which required 100 men to make fabric and 120 men to make wine. Therefore, while Portugal might employ 80 men to manufacture wine and 90 to produce cloth, England would profit from importing wine and exporting cloth.

2.3.5 New Trade Theory

Originally created in the late 1970s and early 1980s, new trade theory (NTT) is a group of economic models in international trade theory that emphasize the importance of network effects and growing returns to scale. Contrary to what traditional trade models (also known as "old trade theory") would imply, the bulk of global commerce occurs between nations that are comparable in terms of development, structure, and factor endowments. This was the primary driving force behind the creation of NTT. In order to explain international commerce,

traditional trade models either used factor endowment disparities (Heckscher–Ohlin model) or productivity differences (Ricardian model of comparative advantage). The assumption of constant returns to scale was loosened by new trade theorists, who demonstrated that trade flows between comparable nations might be driven by rising returns even in the absence of variations in productivity or factor endowments. Even identical nations have an incentive to trade with one another due to growing returns to scale. Certain nations' industries focus on particular specialized items in order to achieve economies of scale in those markets. Countries that specialize in different industries or specialized items then trade these products with one another. Through trade, the nations can take advantage of greater economies of scale.

2.3.6 Endogenous Growth Theory

An economic theory known as endogenous growth theory describes how internal variables are the main drivers of economic growth. It implies that investments in information, human capital, and innovation are what propel economic progress. According to the endogenous growth theory, internal factors rather than external ones are largely responsible for economic growth. The idea also emphasizes how a knowledge-based economy will spur economic growth through positive externalities and spillover effects (Martin & Sunley, 1994).. The endogenous growth theory essentially maintains that policy actions determine an economy's long-term growth rate. For instance, in certain endogenous growth models, subsidies for education or research and development boost the incentive for innovation, which in turn raises the growth rate. Policies that support openness, competition, change, and innovation will spur growth, according to the endogenous growth theory.[Reference required] On the other hand, policies that restrict or slow change by favoring or defending specific established industries or businesses are likely to eventually slow growth to the detriment of the community.

2.3.7 Structuralist Theory

According to Terry Eaglaton, literary structuralism advances as an effort to implement the ideas and practices of Ferdinand de Saussure, who established the modern structuralist linguistic movement in 1916 with his linguistic workshops. Although the major goal of conventional linguistics is to explain the changes in language since its inception with historical themes, Saussure's structuralist theory brought about the biggest transformation in the linguistic world by presenting language as a social system. That is, in his explanation of the nature of linguistic signals, Saussure proposes the use of the terms "sign," "signifier," and "signified," and he highlights the arbitrary character of the relationship between these terms and the linguistic components. Therefore, he suggests that in order for the language to become acceptable and useful, the community must define it and supply it. A system of this kind cannot be coordinated by an individual. Saussure (1990), page 649 Accordingly, Saussure asserts that language must be thoroughly examined, isolated from the outside world, due to the arbitrary connection between the letters that make up language and linguistic structure (1990, p. 650).The pioneering Russian formalists Victor Shklovsky and Roman Jakobsan are impacted by Saussure's aforementioned mindset.

2.3.8 Dependency Theory

The 1950s saw the emergence of a new set of development theories that focused on structure, or the international framework that nations operated within, in response to modernization theory (Moseley, 2017). One of the most prominent examples of this new structuralist way of thinking was dependency theory. This is because of this focus on structure; international relations were just as significant as or even more significant than domestic policies in influencing a nation's future course. Dependency theory is a development method that gained popularity in the 1960s, mostly due to the efforts of a group of social scientists who worked

in or with Latin America (Hout, 2023). The idea questioned the prevalent Western conceptions of development, which held that the continued existence of traditional institutions and structures in the global South was the reason for the underdevelopment of these nations. The so-called modernization strategy states that if nations embraced "modern" institutions, perspectives, and values and emulated the industrialized, "developed" West, the global South would advance.

2.4 Empirical Literature

Onakoya et al.(2012) examine how trade openness affects the manufacturing sector's performance in the Nigerian economy using time series data from 1975 to 2010. The effects of stochastic shocks on each endogenous variable are examined using the Error Correction Model (ECM). The information shows that trade openness has a positive impact on the manufacturing sector's performance, but inflation and currency rates have a negative impact. The error correction coefficient also shows that the pace of adjustment for disequilibrium of the variables is modest, indicating that the manufacturing sector's expansion in the economy adapts slowly. Nigeria's lack of economic clout can be attributed to their failure to take seriously the expansion of the industrial sector or its effective promotion. Numerous variables, such as low-capacity utilization and a weak technological foundation, could be to blame for this. An important conclusion drawn from this research is that trade liberalization has substantial benefits. This report consequently suggests that government should avoid short-term fixes and front-loaded partnerships with other countries and move beyond arrangements that focus only on the petroleum sector. In order to encourage the import of capital goods, open supervision that is closely supervised by regulatory bodies is also necessary.

Akuffo (2012) examine the effect of trade openness on economic growth: the case of African Countries. A modified Cobb-Douglas production function, as in Miller & Upadhyay (2000), was used to determine the Returns to Scale (RTS) of the different economies and the impact of trade variables on GDP. Among the contributing factors are trade openness, the capital-labor ratio, currency rates, and foreign direct investment (FDI). Trade openness was determined by dividing total imports and exports by total exports. Alternative panel models, including the One-Way Fixed/Random Effects model and the Two-Way Fixed/Random Effects model, were constructed using time series and cross-sectional data from 1980 to 2008.Based on the summary data for each panel model, the Two-Way Random Effects Model was selected using the Hausman test results, mean square error, and root mean square error as selection criteria.

Umoh and Effiong (2013) examine trade openness and manufacturing sector performance in Nigeria. The autoregressive distributed lag approach to cointegration, a contemporary econometric technique, is used in this article to try and determine the relationship between Nigerian industrial performance and trade openness between 1970 and 2008. The findings imply that trade openness significantly raises Nigeria's industrial productivity over the long and short terms. These estimations of the coefficients are reliable and consistent across time. As a result, as a long-term strategy, trade liberalization should be used to emphasize more open policies for Nigeria's manufacturing sector. Reviving the industry's performance requires lowering trade barriers and putting in place suitable incentives. In this regard, decision-makers ought to take use of transparency's advantages over the relative advantages in the liberalized industry.

Gray (2014) examines the effect of trade openness on foreign direct investment into emerging market countries. The paper uses panel data techniques and a comprehensive sample of emerging market countries from 1990 to 2010 to empirically investigate the impact of trade openness on primary, secondary, and tertiary FDI inflows at the sectoral level of the economy. The primary conclusions indicate that increasing trade openness in emerging market nations increases foreign direct investment (FDI) inflows overall and inflows specific to secondary sectors. Ceteris paribus, a 10% improvement in an EMC member's trade openness (i.e., fewer trade obstacles) led to an increase in FDI in the secondary sector of 4.01% and FDI in the overall sector of 8.43%. Therefore, trade liberalization is a key driver of foreign direct investment in the EMC manufacturing industry. This is in line with the philosophies of efficiency seeking (vertical FDI) and export-oriented market searching (horizontal FDI).

Hye and Lau (2015) examine trade openness and economic growth in India. This study determines the short- and long-term links between trade openness and economic growth using the auto-regressive distributive lag model, the rolling window regression approach, and a new endogenous growth model for theoretical support. The Granger causality test is used to determine the short- and long-term causal directions. The results demonstrate the positive long-term link between human and physical capital and economic growth. On the other hand, as time goes on, the trade openness index negatively impacts economic expansion. The results of the rolling window regression provide new evidence, namely that the impact of the trade openness index on economic development varies over the sample. In the near run, there is a positive association between the trade openness index and economic growth. The results of the Granger causality test support the short- and long-term feasibility of the growth theories driven by human capital and trade openness.

Okoye et al.(2016) examine economic openness and industrial development in Nigeria. Using an econometric technique based on the Vector Error Correction Model, data from 1986 to 2014 were examined. The study demonstrates that the rate of change in lending rates, trade openness, and currency rates has a major detrimental effect on industrial output. Additionally, there is proof that financial deepening has a major positive influence on industrial output. The Granger causality estimate demonstrates both the bidirectional causal relationship between trade openness and industrial output as well as the limited causal effect of financial deepening on industrial output. There is proof that industrial expansion creates a demand for financial resources, as evidenced by the causal relationship between industrial output and loan rates.

Adofu and Okwanya (2017) examine trade openness, productivity and industrialization in Nigeria. The analysis's data set spans the years 1981–2015. The VAR model is used in the study to calculate how trade openness affects industrial production. The reaction of industrial output to shocks in trade openness and total factor productivity is investigated using the impulse response function and the variance decomposition. The findings indicate that while total factor productivity has a negligible impact on industrial output, trade openness has a positive, growing effect on it in Nigeria. The impulse response function indicates a negative impact on Nigeria's industrial output over the long term (tfP). The results of this study undoubtedly have significant policy consequences; they imply that, as trade openness tends to increase industrial output, policies aimed at doing so should be supported. This study adds to the body of knowledge in economics by examining the relationship between Nigeria's industrial output and trade openness and total factor productivity.

Babatunde (2017) examine This study examined the connection between Nigerian inflation and trade openness from 1980 to 2015.It used the traditional theoretical and empirical

literature on the trade openness-inflation relationship as the basis for the nonlinear auto-regressive distributed lag (NARDL) modeling technique to co-integration. With the help of our method, we can evaluate the long- and short-run nonlinearities simultaneously using positive and negative partial sum decompositions of the chosen explanatory variables. The direction of the association between inflation and openness is time-specific, according to empirical research. The analysis indicated a large and robust negative association between openness and inflation in the short term, despite the significant favorable long-run relationship between inflation and trade openness. I

Yakubu and Akanegbu (2018) examine the effect of trade openness on economic growth in Nigeria from 1981 to 2017 has been objectively investigated in this study. The ordinary least squares method was applied to series data to investigate the relationship between trade openness and GDP (gross domestic product), with the degree of openness serving as the independent variable. The World Bank data for 2017 was where the series data were taken from. The analysis's findings indicate that the variables Real Gross Domestic Product (RGDP), Degree of Openness (DOP), Foreign Exchange (FX), and Per Capita Income (PCI) are all cointegrated, and that there is unidirectional causality between RGDP and DOP. All of the variables were found to be positive and statistically significant at first difference. Thus, in order to enable the economy to grow at remarkable rates, the study advises policy makers to pursue trade liberalization measures like lowering tariffs, removing non-tariff obstacles, and lowering or doing away with quotas.

Malefane (2018) examine trade openness and economic growth: experience from three South African Customs Union (SACU) countries. Using annual data for South Africa, Botswana,

and Lesotho from 1975 to 2014 and 1979 to 2013, respectively, this study empirically investigates the relationship between trade openness and economic growth in these three SACU nations. The common agreement for the union that regulates the movement of commodities that enter the SACU territory serves as the driving force behind this study. Despite being a common union, these nations' states of development are very different from one another. Lesotho is classified as a least developed and lower middle-income country, while Botswana and South Africa have upper middle-income economies. Therefore, it is anticipated that the differences in the economic development of SACU nations will have varying effects on the degree to which trade openness influences economic growth. Given this, the current study looks into how trade openness and economic growth are related in each of the three countries that were selected. In order to evaluate the robustness of the empirical results, this study looks at the relationship between trade openness and economic growth using four equations based on four different trade openness measures. While Equations 1, 2, and 3 use trade-based indices of openness, Equation 4, which accounts for differences in nation size and location, uses a modified version of the UNCTAD (2012a) trade openness index. Utilising the autoregressive distributed lag (ARDL) bounds testing method for cointegration and error-correction modeling, the research discovered that the three SACU nations have different trade openness effects on economic growth. The study concluded that trade openness had a favourable effect on economic growth in South Africa and Botswana, but no discernible effect on economic growth in Lesotho, based on the answers to the first three equations. Based on the results of Equation 4, the study concludes that trade openness contributes to economic growth in Botswana but has negligible effects in South Africa and Lesotho when accounting for differences in country size and location. The study's primary suggestion for South Africa and Botswana is that in order to boost economic growth over the long term, policymakers should work toward measures that encourage total trade. The report

makes several recommendations for Lesotho, including expanding exports and implementing policies to advance infrastructure and human capital development in order to get the country's economy to the point where major trade gains can be realized.

This study examines how labour market reforms that enable a nation to benefit from trade openness may have an impact on the impact of trade openness on economic growth for Latin American nations. A GMM estimator and an expansion of the Solow growth equation are employed to do it. The study examines panel data from 14 Latin American nations from 2005 to 2012. As a result of more flexible labor market regulations in participating nations, trade openness volume—that is, imports + exports over GDP—has a long-term positive effect on economic growth for the Latin American and Caribbean region. When all other factors are held constant, empirical findings indicate that trade openness volume is more likely to benefit LACs where it is permissible to terminate a worker's employment contract due to redundancy than it is in those where it is not.

Mizan (2019) examines trade openness and economic growth - a panel data analysis of selected developing countries from 1998-2017.This study's primary goal is to investigate how trade openness affects the economic expansion of the 15 emerging nations in South Asia, South East Asia, and Africa. Twenty years, from 1998 to 2017, have been evaluated for the panel data analysis. The population, official exchange rate, FDI, unemployment, trade openness index, and unemployment have all been taken into consideration as explanatory variables for this study. The conclusion of the fixed effects model implied that trade liberalization has little bearing on economic expansion. However, the results of the individual trade zone regression indicated three distinct outcomes. According to empirical data, trade openness may therefore have varying consequences depending on the geography and other policies of a given nation. Furthermore, the Granger Causality test has been utilized to

examine the causal relationship between economic growth, imports, and exports. There is a unidirectional relation found from Export to GDP and GDP to import.

Maoro (2019) examines effects of trade openness on economic growth and investment in Kenya The research examines yearly data from World Development Indicators (WDI) and KNBS Economic Surveys spanning the years 1980 to 2017. For econometric analysis, the study used the Error Correction Model (ECM). It was discovered that trade liberalization has a negative and substantial impact on economic growth over the long and short terms. The study found that human capital and real capital formation both boosted Kenya's economic growth over the long and short terms. Regarding trade's impact on investments, the study found that trade liberalization boosts foreign investment in the nation. These findings have policy implications and provide insights into how best to ensure that the benefits of trade liberalization are realized and that the readjustment costs incurred by businesses as a result of Kenya's economic liberalization are kept to a minimum.

Cheung and Ljungqvist (2021) impact of trade openness on economic growth a panel data analysis across advanced OECD countries. The recent COVID-19 epidemic, rising trade frictions, geopolitical tensions, nations leaving unions, and pressure from global financial crises have all attracted attention to the importance of trade flows in the modern economy. Therefore, between 2000 and 2018, we set out to investigate the relationship between trade openness and economic development among 31 advanced OECD nations. Based on a linear regression model with fixed factors and panel data analysis, the results demonstrated that trade openness significantly affects economic growth positively.

Akintunde et al. (2021) examine trade openness and manufacturing sector performance in Some Selected West African Countries. It examined in detail how, between 1980 and 2019, trade, employment, investment, exchange rates, and inflation rates affected the manufacturing

sector's performance in the selected countries. While time series analysis was the primary method utilized in earlier studies, this study is distinct in that it evaluated the panel data series using econometric approaches including Fully Modified Ordinary Least Square (FMOLS) and Dynamic Ordinary Least Square (DOLS). This was done to find out how much the manufacturing sector was impacted by the explanatory factors. The results of FMOLS and DOLS show that all of the coefficients are positively related and significant with manufacturing sector output, with the exception of trade openness, which is not significant, and inflation rate, which is negatively significant. Therefore, this research, which is based on the study's findings, suggests that in order to increase foreign direct investment (FDI) inflows, the region should maintain its support foreign policies and increase its role in trade liberalization.

Adofu and Ojonugwa (2021) examine trade openness and industrial output growth in Nigeria. The study evaluates Nigeria's industrial output growth and trade openness from 1986 to 2019. The purpose of the study was to ascertain if trade openness contributes to the increase of industrial output in Nigeria, using the new trade theory as the theoretical foundation. The study employed the Toda-Yamamoto (T-Y) causality approach to achieve this. Results from the T-Y estimation showed that there was no causal relationship between trade openness and industrial output growth in Nigeria, using trade-to-GDP ratio as a proxy for trade openness and industrial output growth as a proxy for trade openness. Accordingly, the study concluded that, throughout the examined period, trade openness had no effect on Nigeria's industrial output growth. The study suggests that further opening trade in the nation would be necessary to allow for import discipline, which would spur competitiveness and support the expansion of Nigeria's industrial sector. This would ensure that trade openness leads to an increase in industrial output.

Saurai (2021) examines determinants of trade openness in transitional economies: does the complementarity between foreign direct investment and human capital development matter. Using panel data from 2000 to 2018, the study employed panel data analysis techniques, including fixed effects, random effects, pooled ordinary least squares (OLS), and dynamic generalized methods of moments (GMM). In transitional economies, it was discovered that the development of human capital, the relationship between foreign direct investment and this development, economic growth, and the expansion of the mining sector all significantly benefited trade openness. Therefore, if transitional economies hope to increase trade openness and reap its benefits, they must design and execute policies targeted at enhancing FDI inflows, human capital development, economic growth, and mining sector expansion.

Nteegah and Olubiyi (2022) examine external sector and the performance of manufacturing sector in Nigeria. The World Bank data base was used to gather information on trade openness, foreign direct investment, foreign debt, and the exchange rate of the naira to the US dollar. The Parsimonious Vector Error Correction model (VECM) method was then used to regress the manufacturing sector's share of GDP. The outcome of the Hansen Cointegration Test demonstrated that there is a long-term correlation, or cointegration, between the performance of Nigeria's manufacturing sector and the external sector. The Parsimonious Vector Error Correction Model's findings demonstrated that, during the study period (1985–2020), trade openness and external debt had positive effects on Nigeria's manufacturing sector's performance, while foreign direct investment and exchange rates had negative effects. These uncertainties and irregularities in the inflation rate have caused serious problems to the utilization of manufacturing sector capacity. All of these factors may be the cause of the manufacturing sector's failure to increase productivity related to import replacement and export expansion, creating foreign exchange earning capacity, increasing unemployment and capital income, and resulting in unusual consumption patterns.

Omotayo and Odeleke (2022) examine impact of trade and industrial policies on manufacturing sector in Nigeria (1980-202). Information was taken from secondary sources. The study employs a range of variables, including capital, labour, trade openness, currency rates, tariffs, and manufacturing output (MO), which serves as a proxy for the manufacturing sector's performance. After verifying the series' stationarity features and considering any structural discontinuities in the series. According to the short-term results, the past and present lags in tariffs do not align with theoretical predictions. A 1% rise in tariffs will cause the manufacturing subsector to grow by 0.88% and 0.19% respectively. From 18.0% in the first year to 62% in the tenth, the impact increased. The impulse response function's result showed that manufacturing productivity had a positive reaction to capital, tariffs, currency rates, and shocks of its own. In Nigeria, it was shown that devaluing tariffs and currency rates had an expansionary impact on manufacturing productivity. The results point to a strong correlation between free trade on the African continent and Nigeria's trade and industrial policies, which in turn boost manufacturing production. The outcome also showed that historical exchange rates had no bearing on manufacturing productivity, suggesting that a 1% increase in both present and past exchange rates would simultaneously cause manufacturing output to decline by 0.04% and 0.05%. The variance decomposition finding reveals that, with a progressive increase evident over time, shocks to tariffs accounted for the second most significant fluctuations in manufacturing productivity.

Elekwa (2022) examine trade openness and agricultural export in Nigeria. This study looked at how trade liberalization affected Nigeria's exports of agricultural products between 1970 and 2018. The analysis, which employed the ARDL approach, showed that trade openness had a positive but statistically insignificant impact on agricultural export in the long run, but a positive and significant impact in the short run. Based on this result, it was suggested, among

other things, that the government impose certain trade obstacles so that the agriculture sector might profit from trade openness.

Abinabo and Abubakar (2023) investigate trade openness and economic growth in Nigeria between 1990 and 2021 was experimentally examined in this study. The study used descriptive statistics, the Error Correction Mechanism (ECM) model as the estimate method, the Johansen Cointegration test for long-run relationships, and the Augmented Dickey Fuller (ADF) unit root test for stationarity. Secondary sources such as the CBN Statistical Bulletin provided the data for the empirical analysis for the time period that was being studied. The findings suggest that trade openness—that is, the amount of export, import, and international commerce—and economic growth in Nigeria are related over the long term. Additionally, the results show that imports significantly harm Nigeria's economic growth whereas trade openness has a favourable and statistically significant impact on the country's economic growth. The study concludes that since Nigeria's economy has profited from that of other nations, it should open its borders to the import of products.

Ohwofasa and Ekaruwe (2023) investigate trade openness and economic growth in Nigeria. The study employs the Autoregressive Distributed Lag (ARDL) model and included data from 1986 to 2020. The outcome of the bound test thus demonstrated the existence of long-term equilibrium linkages between Nigeria's economic development and all four sectoral export variables. The study found that economic growth is significant and positively responsive to changes in agriculture and crude oil exports in the short term, in contrast to its noticeable and negative reaction to changes in solid mineral exports. However, it was shown that industrial exports had a statistically insignificant short-term impact on economic growth. Over a longer time frame, the study also showed that exports of manufacturing and agricultural products had a significant positive impact on growth, whereas exports of solid minerals and oil had a statistically significant negative impact. According to the report, the

federal government ought to consider enacting legislation requiring exports to go through export processing zones. This would raise the exportables' value, provide a market for the products, and raise government revenue.

Apere and Uche (2023) examine the effect of economic openness on economic performance in Nigeria. This study uses time series data and the Error Correction Model approach as the analytical technique to investigate the effects of economic openness on Nigeria's microeconomic performance between 1981 and 2021, with a focus on the manufacturing and agricultural sectors. The findings indicate that MS responds positively to DOP and ER within the lags of DOPt-2, DOPt-3, and ERt-2, but AOP reacts adversely and promptly to DOP and ER. AOP and MS variations are not explained by ER, according to both the short-run and long-run models (ERt and ERt-2). The findings also demonstrate that, whereas Manufacturing Sector Output (MS) reacts significantly and negatively to NE within the lags of NEt-2 and NEt-3, but significantly and positively to NE within the lag of NEt-4, Agricultural Output (AOP) reacts immediately to Net Export (NE) in a significant and positive manner. Based on these results, the study indicates that Nigeria's economic openness, as measured by its Degree of Openness (DOP), significantly influences the optimal performance of the real sector in the short- and long-term. The study's conclusions led to the following recommendations: in order to avoid stifling domestic output, the Nigerian economy should be cautiously opened to more foreign trade; additionally, in order to reap the benefits of economic openness, it is critical to boost the productivity and capacity of the manufacturing and agricultural sectors by providing sizable loan assistance at low interest rates.

Parsi (2024) examines trade openness and inflation dynamics. We provide a nuanced viewpoint on the subject by utilizing recently established dynamic heterogeneous panel methods and building an extensive panel dataset that includes two proxies for openness in

addition to a spectrum of financial, political, and economic indicators. The crucial role that cross-sectional dependence in panel data plays, which has often been disregarded in previous research, lies at the heart of our findings. Our research shows a complex relationship in which trade openness has a dynamic and ambiguous impact on inflation. Although multidimensional proxies, like the KOF trade openness index, have the potential to offer deeper insights, traditional openness indicators are still valuable. Our findings highlight the significance of applying rigorous methodology and in-depth analysis when examining this economic link, indicating that the dynamics of trade and inflation are more intricate than previously thought.

The study's secondary data came from the Central Bank of Nigeria (CBN) statistical bulletin, and it covered the 24-year period from 1999 to 2022. To assess the study's data, we employed the Ordinary Least Square (OLS) regression technique.The following results were noted from the test of hypotheses utilizing the Ordinary Least Square regression estimates: Export trade has a positive and significant impact on Nigeria's manufacturing sector (p-value = 0.0088); import trade, on the other hand, has a negative and significant impact (p-value = 0.0145); the balance of payments has a negative and significant impact (p-value = 0.0092) on the manufacturing sector's gross domestic product.

CHAPTER THREE

METHODOLOGY

This chapter outlines the research methodology and data source for this study. It addresses the study's research design, data collection and analysis methodologies, and model formulation.

3.1 Theoretical Framework

The neoclassical growth theory is developed by (Solow, 1956). This theory holds that the economy allows for the free substitution of capital and labour to produce composite goods. In theory, the exogeneity of technological innovation implies that the rate of economic growth is unaffected by decisions made by the government. As per the idea, economic growth can be dissected into its constituent elements, namely labour and capital, which are assigned weights based on their relative contributions, and the remaining Researchers who link growth and commerce in line with the tenets of the neoclassical theory have employed economies of scale (Lee, 1993). According to Bhagwati (1988), trade openness promotes industry specialization, which raises productivity and accelerates economic expansion. Additionally, Lee (1993) contends that trade liberalization fosters growth by making it easier for the least developed nations (LDCs) to acquire crucial intermediate inputs and capital needed for their manufacturing. According to the neoclassical view, trade openness serves as a means of facilitating the entry of capital-intensive inputs that are necessary for production and directly support economic growth. However, the neoclassical growth theory falls short of offering a comprehensive framework that would allow trade policy changes to promote sustained economic growth.

The three elements required for an expanding economy are described by neoclassical growth theory. They are technology, capital, and labor. Neoclassical growth theory makes it clear that short-term equilibrium is not the same as long-term equilibrium, which does not depend on

any of these three elements. According to this growth hypothesis, economic growth depends on how individuals employ the capital that has accumulated inside an economy. Furthermore, an economy's output is determined by the interaction between its labor and capital. Last but not least, technology is believed to boost worker productivity and raise labor's production potential. Therefore, the production function of neoclassical growth theory is used to measure the growth and equilibrium of an economy.

The production function is a mathematical representation of the relationship between inputs and outputs in the production process. The simplest form is:

$Y = F (K, L)$

Where:

(Y) = Output (Manufacturing)

(K) = Capital

(L) = Labor

This function indicates that the output (Y) is a function of the inputs (K) and (L). Trade openness can be quantified using various indicators, such as the ratio of trade (exports + imports) to GDP. The inclusion of trade openness in the production function reflects how international trade affects domestic manufacturing; therefore the production function is expanded to include trade openness:

$Y = F (K, L, T)$

Where:

(T) = Trade Openness

The interest rate (r) is a critical economic variable that influences investment decisions. It affects the cost of borrowing and the return on savings, which in turn impacts capital investment in manufacturing. Lower interest rates reduce the cost of borrowing, encouraging manufacturers to invest in new capital (machinery, technology). Higher interest rates may deter investment, leading to slower growth in manufacturing capacity; therefore the production function is expanded to include interest rate:

$Y = F(K, L, T, r)$

Where:

(r) = Interest Rate

The exchange rate plays a crucial role in the production function by influencing the costs of inputs, the competitiveness of exports, and the overall economic environment for manufacturing. A weaker currency can enhance the competitiveness of domestic manufacturers in international markets, potentially leading to increased production and sales. Therefore the production function is expanded to include exchange rate:

$Y = F(K, L, T, r, E)$

Where:

(E)= Exchange Rate

Exports (X) and imports (M) are essential components of a country's trade dynamics. Higher exports directly increase demand for manufactured goods, leading to higher production levels. Imports can provide manufacturers with access to cheaper or higher-quality raw materials and components, enhancing production efficiency. They are included in the production function to capture their direct effects on manufacturing output:

$Y = F (K, L, T, r, E, X, M)$

Where:

(X) = Exports

(M) = Imports

Combining all these elements, we arrive at a comprehensive production function that captures the multifaceted influences on manufacturing output:

$Y = F (K, L, T, r, E, X, M)$

$Y = AK^{\alpha}L^{\beta}(TOP)^{\gamma}(IR)^{\delta}(EXR)^{\varepsilon}(IMP)^{\zeta}(XPT)^{\theta}$

Where:

Y = Output (MAN)

A = Total Factor Productivity (TFP)

K = Capital

L = Labor

TOP = Trade Openness

IR= Interest Rate

EXR= Exchange Rate

IMP= Import

XPT= Export

α = Output elasticity of capital

β = Output elasticity of labor

γ = Output elasticity of trade openness

δ = Output elasticity of interest rate

ε = Output elasticity of exchange rate

ζ = Output elasticity of import

θ = Output elasticity of export

3.2 Model Specification

In this research work; A Multiple Linear Regression model was adopted to analyze the response of selected economic variables to manufacturing in Nigeria. The Regression model is expressed as:

MAN =f (Trade Openness, Interest rate, Exchange Rate, Import, Export)

$MAN = b_{0+} b_1TOP + b_2IR + b_3EXR + b_4 IMP + b_5EXP + +\mathcal{E}$

Where;

MAN= Manufacturing Sector Performance

OP =Openness

IR = Interest Rate

EXR = Exchange Rate

IMP = Import

EXP = Export

$\mathcal{E}$ = Error Term

3.3 ESTIMATION TECHNIQUE

This study employed a variety of analytical methods which includes, descriptive statistics, unit root testing for stationarity of variables, cointegration test for long-run relationship, error correction mechanism and autoregressive distributed lagged models.

3.3.1 Descriptive Statistics

This study will utilize descriptive statistics to analyze the central tendency (mean and median), dispersion (standard deviation), and shape (skewness and kurtosis) of the variables. The mean will provide a measure of the average value, while the standard deviation will quantify the variability around the mean. Skewness will indicate the asymmetry of the data distribution, with positive values suggesting a right-skewed distribution and negative values indicating a left-skewed distribution. Kurtosis will measure the peakedness of the distribution, with higher values reflecting a more peaked distribution. The Jarque-Bera test will be employed to assess the normality of the data, determining whether the skewness and kurtosis align with a normal distribution. A probability value greater than 5% will suggest that the variables are normally distributed.

3.3.2 Unit Root Test

This study will conduct unit root tests to assess the stationarity of the time series data. At this stage, we will verify the sequence of integration within each series and determine whether they are stationary. Various techniques have been developed to ensure the correct order of integration. The Augmented Dickey-Fuller (ADF) test, established by Dickey and Fuller in 1983, is currently regarded as the gold standard. The ADF test is based on rejecting the unit

root null hypothesis (which posits that the series are non-stationary) in favor of the alternative hypothesis of no unit root (indicating that the series are stationary). Each series will be analyzed both with and without a deterministic trend (t). The Augmented Dickey-Fuller model for each variable in this study, specified for an intercept without trend, is as follows:

Ho: There is a unit root (the time series data is non-stationary).

H1: There is no unit root (the time series data is stationary).

3.3.3 Cointegration Test

Cointegration is a statistical concept that indicates a long-term relationship between non-stationary variables that become stationary when differenced once. Engel and Granger (1987) noted that cointegration analysis allows for non-stationary individual variables to form a stationary linear combination. This implies that, although the variables may fluctuate independently in the short term, they tend to move together in the long run. Cointegration analysis is typically applied to time series data. If a linear combination of two or more non-stationary time series is stationary, then the series are said to be cointegrated. The Johansen cointegration technique, developed by Johansen in 1991, will be used to test whether the variables converge to equilibrium in the long run. Additionally, the Ramsey RESET test will be employed to check for model misspecification.

3.3.4 Autoregressive Distributed Lag (ARDL)

The study will utilize the Autoregressive Distributed Lag (ARDL) bounds testing framework to estimate the long-run equilibrium relationship. The ARDL model incorporates lagged values of the dependent variables (autoregressive) and lagged values of the independent

variables (distributed lag) as explanatory variables. The ARDL cointegration approach is used to determine whether there is a long-run equilibrium relationship among the variables when they are integrated of both order zero I(0) and order one I(1). Furthermore, the ARDL method circumvents the need to configure a larger number of specifications in the standard cointegration test, which includes decisions regarding the number of endogenous and exogenous variables to be included and the treatment of deterministic elements. Additionally, the ARDL approach allows for the use of different optimal lags for different variables, which is not feasible in the standard cointegration test. Given that time series data may be susceptible to unit root issues, the Augmented Dickey-Fuller (ADF) unit root test will be implemented on the series to avoid spurious regressions. Unit root tests will first be conducted to ascertain the stationarity of the variables, which must consist of a combination of I (0) and I (1) series.

3.3.5 Error Correction Mechanism

The Error Correction Mechanism (ECM) is a statistical method employed to rectify deviations from long-run equilibrium relationships among economic variables. It operates on the premise that economic variables tend to revert to their equilibrium values over time. In the context of ECM, the error term signifies the deviation from this long-run equilibrium relationship. The ECM model estimates the rate at which the variables return to their equilibrium values, referred to as the error correction term. The ECM comprises two components: the short-run dynamics and the long-run equilibrium relationship. The short-run dynamics capture temporary deviations from the equilibrium, while the long-run equilibrium relationship reflects the fundamental structural relationship between the variables. The ECM can be expressed as follows:

$\Delta yt = \gamma + I = 1 \sum p \beta i \Delta xt - i + \alpha(yt - 1 - \beta 0 - \beta 1 xt - 1) + \nu t$

Where:

Δyt and Δxt are the first differences of the variables.

α is the error correction term coefficient.

νt is the white noise error term.

It can further be specified as;

$\Delta MANt = \phi 0 + \phi 1 \Sigma \Delta TOPt + \phi 2 \Sigma \Delta IRt + \phi 3 \Sigma \Delta EXRt + \phi 4 \Sigma \Delta IMPt + \phi 5 \Sigma \Delta EXPt + \psi \, ecm(-1) + \nu t$

3.3.6 Justification of the Model

The model is justified through economic theory and empirical evidence regarding the performance of the manufacturing sector in Nigeria. The selection of independent variables is based on their expected impact on manufacturing output. Trade Openness is anticipated to have a positive effect on manufacturing performance, as increased access to international markets can enhance competitiveness, stimulate production, and facilitate technology transfer. Interest Rate is expected to exert a negative impact on manufacturing output. Higher interest rates can increase the cost of borrowing, thereby discouraging investment in the manufacturing sector and limiting production capacity. Exchange Rate is also expected to have a negative effect on manufacturing performance. A volatile or unfavorable exchange rate can increase the cost of imported raw materials and components, which may hinder production efficiency and profitability. Imports are expected to positively influence manufacturing by providing essential raw materials and components that manufacturers need to produce goods. However, excessive reliance on imports may also pose risks to domestic production. Exports are anticipated to have a positive impact on manufacturing output, as

they represent the demand for domestically produced goods in international markets, thereby encouraging manufacturers to increase production.

3.3.7 Diagnostic Test

Diagnostic tests are crucial for assessing the validity and reliability of the linear regression model. These tests help identify potential issues within the model, such as non-linearity, non-normality, heteroscedasticity, autocorrelation, and multicollinearity.

a. Test for Multicollinearity

This test will assess the linear collinearity among the explanatory variables. When two or more explanatory variables in a regression model are highly correlated, it distorts the estimation of coefficients. Multicollinearity undermines the reliability of the regression coefficients, making it challenging to ascertain the true effect of each variable. The Variance Inflation Factor (VIF) will be utilized to detect multicollinearity in the model. If the VIF value exceeds 10, it indicates the presence of multicollinearity. This study will also employ a simple correlation matrix for this assessment.

b. Autocorrelation Test

This test is designed to determine whether the errors corresponding to different observations are correlated, thereby assessing the randomness of the error term. The Durbin-Watson (DW) statistic will be used for this test. A DW statistic close to 2 suggests the absence of autocorrelation.

c. Heteroskedasticity Test

This test aims to determine whether the error term of the explanatory variables in the estimated model exhibits equal variance.

d. Ramsey RESET Test

The Ramsey RESET test is employed to check for model misspecification (Ramsey, 1969).

3.4 Variable Description and Data Sources

Secondary data is information that was collected by a different party than the primary user. Information that has previously been obtained by another entity is referred to as secondary data. The main advantages of using secondary data are economical.

Table 3.1 **Nature and Sources and Description of Data**

S/N	Variable	Symbol	Description and Definition of Variable	Sources
1	Manufacturing sector performance	MAN	Manufacturing sector is very germane to the development of any nation most especially the underdeveloped ones.	World Development indicators(WDI) Statistical Bulletin for various years
2	Interest Rate	IR	Interest rate plays a crucial role in influencing various aspects of production, investment, and overall economic activity.	World Development indicators(WDI) Statistical

				Bulletin for various years
3	Exchange Rate	EXR	Exchange rate is the rate at which one currency will be exchanged for another currency.	World Development indicators(WDI) Statistical Bulletin for various years
4	Import	IMP	Import is part of the International Trade which involves buying and receiving of goods or services produced in another country.	World Development indicators(WDI) Statistical Bulletin for various years
5	Export	EXP	In international trade, an export is a product made in one nation and sold in another or a service rendered in one nation to a citizen or resident of another nation.	World Development indicators(WDI) Statistical Bulletin for various years

CHAPTER FOUR

DATA PRESESENTATION AND ANALYSIS

4.1 Introduction

This chapter provides a descriptive analysis of the model, including a correlation analysis to explore the relationships among the model's variables. Additionally, a unit root test is conducted to assess the stationarity of each variable. An ARDL bound co-integration test is then employed to investigate the long-term equilibrium relationship among the variables and to determine whether they meet the convergence property. The Error Correction Model (ECM) is utilized to analyze the short-term dynamics of the variables in relation to the long-term trends. Finally, residual and stability diagnostics are performed to confirm the empirical results. The variables included in this model are the manufacturing value added as a percentage of GDP, trade openness, exchange rate, interest rate, import and export, with the observation period covering 41 years from 1981 to 2021.

4.2 Descriptive Statistics

Descriptive statistics involves the use and analysis of summary statistics that provide a statistical overview of the features of a data collection. Table 1 presents the summary statistics for the manufacturing value added (MAN), trade openness (TOP), exchange rate (LNEXR), interest rate (LNIR), import (IMP), and export (LNXPT).

Table 4.1

Descriptive Statistics	MAN	TOP	LNEXR	LNIR	IMP	LNXPT
Mean	14.31992	31.67439	4.794886	1.781389	51.55888	3.907702
Median	13.93340	33.71975	5.036059	1.975584	27.53339	3.581701
Maximum	21.09825	53.27796	6.054390	2.403712	130.4251	5.442422
Minimum	6.552817	9.135846	2.293493	-1.149905	9.367213	2.305291
Std. Dev.	5.036123	12.42937	1.004135	0.713820	41.64782	0.895229
Skewness	-0.028369	-0.260261	-1.014436	-2.823771	0.664860	0.194094
Kurtosis	1.408465	2.128505	2.948145	10.62941	1.869539	1.749346
Jarque-Bera	4.332679	1.760347	7.036642	153.9254	5.203753	2.929492
Probability	0.114596	0.414711	0.029649	0.000000	0.074134	0.231137
Sum	587.1165	1298.650	196.5903	73.03694	2113.914	160.2158
Sum Sq. Dev.	1014.501	6179.570	40.33149	20.38156	69381.64	32.05740
Observations	41	41	41	41	41	41

Source: Author's Computation using E-views 12, 2025.

The descriptive results in table 4.1 revealed that, manufacturing value added (MAN) showed an average of 14.31992 while the median is 13.93340. The data ranges from 21.09825 to 6.552817. Trade openness (TOP) averages 31.67439 while the median is 33.71975. The data ranges from 53.27796 to 9.135846. Exchange rate (LNEXR) averages 4.794886 while the median is 5.036059. The data range from 6.054390 to 2.293493. Interest rate (LNIR) averages 1.781389 while the median is 1.975584. The data ranges from 2.403712 to -

1.149905. Import (IMP) averages 51.55888 while the median is 27.53339. The data ranges from 130.4251 to 9.367213. Export (LNXPT) averages 3.907702 while the median is 3.581701. The data ranges from 5.442422 to 2.305291. To gain deeper insights, the time series properties of these variables will be examined in the following sections.

4.3 Correlation Analysis

Table 2

	MAN	TOP	LNEXR	LNIR	IMP	LNXPT
MAN	1.000000	-0.431141	-0.769887	-0.391969	-0.769801	-0.912250
TOP	-0.431141	1.000000	0.661353	0.465745	0.135306	0.377536
LNEXR	-0.769887	0.661353	1.000000	0.537099	0.583679	0.731050
LNIR	-0.391969	0.465745	0.537099	1.000000	0.287617	0.383050
IMP	-0.769801	0.135306	0.583679	0.287617	1.000000	0.906690
LNXPT	-0.912250	0.377536	0.731050	0.383050	0.906690	1.000000

Source: Author's Computation using E-views 12, 2025.

Table 2 presents the results of a Spearman rank-order correlation analysis, which measure the strength and direction of the relationship between pairs of variables. The analysis covers a sample from 1981 to 2021, with 41 observations. The correlation between manufacturing value added (MAN) and trade openness (TOP) is -0.431, indicating a weak negative relationship. This implies that as the manufacturing value added grows in unit, it decreases the level of trade openness. Theoretically, this contradicts the a prior expectation, as trade openness is expected to lead to increase in manufacturing value added growth. The correlation between manufacturing value added (MAN) and exchange rate (LNEXR) is -0.77, indicating a strong negative correlation. This supports the expectation that an overvalued

exchange rate can negatively impact manufacturing value added growth. The correlation between manufacturing value added (MAN) and interest rate (LNIR) is -0.39, indicating a negative weak relationship. This is supports the expectation that a higher interest rates can negatively impact manufacturing value added growth. The correlation between manufacturing value added (MAN) and import (IMP) is -0.77, indicating a strong negative relationship, suggesting that imports is competing with domestic manufacturing, therefore, reducing manufacturing value added growth. Finally, the correlation between manufacturing value added (MAN) and export (LNXPT) is -0.91, indicating a strong negative relationship. This contradicts the expected positive relationship between manufacturing value added and exports.

4.4 Pre-Test Assessments

These are the tests that involves evaluation and testing of certain conditions or assumptions before estimating the model to ensure that the model will produce valid and reliable results. This step is crucial in econometrics and statistical modeling as it helps to identify potential issues that might affect the accuracy of the model's estimates.

This test includes unit root test for testing the model stationarity and ARDL bound co-integration test for determining whether two or more of our time series variables have a long-run equilibrium relationship.

4.5 Unit Root Test

The unit root test comprises of unit root tests at levels and first difference

Null hypothesis (H0): There is no unit root

Decision rule: If the probability of the ADF test statistics is lesser than the critical value at 5% we fail to reject the null hypothesis

TABLE 4.3: Unit Root Test					
Variable name	**ADF Statistics**	**5% Level**	**ADF Prob. Value**	**Order of integration**	**Comment**
MAN	-7.146920	-2.938987	0.0000	I(1)	Stationary
TOP	-7.760101	-2.938987	0.0000	I(1)	Stationary
LNEXR	-5.934247	-2.938987	0.0000	I(1)	Stationary
LNIR	-4.800290	-2.941145	0.0004	I(1)	Stationary
IMP	-7.264496	-2.938987	0.0000	I(1)	Stationary
LNXPT	-6.630884	-2.938987	0.0000	I(1)	Stationary

Source: Authors' computation ussing E-views 12, 2025.

The results of the Augmented Dickey-Fuller (ADF) Test for stationarity at levels are summarized as follows. The test examines whether each variable is stationary or non-stationary by comparing their probability values (p-values) with critical values at the 5% significance. The analysis indicate that all variables are integrated of order one, I (1), meaning they are non-stationary in levels but become stationary after taking the first difference.

4.6 Co-integration Test

Having established that the variables are characterized by a unit root process and integrated of order one I (1), we then proceed to carry out the co-integration test using the ARDL Bound Test, Thus, given the series are stationary, the presence of significant co-integrating relationship among the variables of interest could be established.

Co-integration test is used to determine the existence of a long-run equilibrium relationship among the variables in a multivariate model. Once the co-integration is established, then a long-run relationship exists among the variables of interest in the model. The co-integration tables are given below:

4.6.1 Ardl Bound Test

Table 4.4: Test for cointegration

Test Statistic	Value	K
F- Statistic	10.76345	5

Critical value Bound		
Significance	I(0) Bound	I(1) Bound
10%	2.75	3.79
5%	3.12	4.25
2.50%	3.49	4.67
1%	3.93	5.23

Source: Author's Computation using E-views 2025.

H0: There is no co-integration equation.

Decision rule: If the calculated F-statistics is greater than the value for upper bound I (1), then we fail to accept the null hypothesis and conclude that there is co-integration or long run relationship and vice versa.

From the analysis in table 4.4 the study finds out that the computed F-statistics value (10.76345) is greater than the critical value at 5% (4.25) meaning that we reject the null hypothesis of no co-integration (No long-run relationships exist) that is; there is a presence of co-integration, meaning the variables have a long-term equilibrium relationship.
Since the variables are cointegrated using bounds test, both short run and long run models have to be specified.

4.7 Error Correction Model Analysis

Table 4.5: ARDL ECM and Long Run Form

ECM Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.690816	0.878676	7.614654	0.0000
D (MAN (-1))	-0.304583	0.100735	-3.023612	0.0065
D (TOP)	-0.057861	0.019103	-3.028850	0.0064
D (LNEXR)	-0.536311	0.503938	-1.064239	0.2993
D(LNEXR (-1))	-2.602156	0.496653	-5.239387	0.0000
D (LNIR)	-1.145298	0.206817	-5.537725	0.0000
D (LNIR (-1))	0.813936	0.256798	3.169559	0.0046
D (LNIR (-2))	0.861241	0.247556	3.478967	0.0022
D (LNXPT)	-2.517792	0.511674	-4.920693	0.0001
D (LNXPT (-1))	2.345804	0.482935	4.857388	0.0001
CointEq (-1))	-0.178588	0.019972	-8.941869	0.0000

R-squared	0.845879
Adjusted R-squared	0.780674
S.E. of regression	0.715036
Sum squared resid	13.29318
Log likelihood	-33.96330
F-statistic	12.97262

Prob(F-statistic)	0.000000
Mean dependent var	-0.170725
S.D. dependent var	1.526803
Akaike info criterion	2.419121
Schwarz criterion	2.936254
Hannan-Quinn criterion	2.603113
Durbin-Watson stat	2.059360

Source: Author's Computation using E-views 2025.

This term represents the error correction mechanism. The significant and negative coefficient on the lagged error correction term (CointEq(-1)) (-0.178588) with a p-value of 0.0000 confirms the presence of a long-run equilibrium relationship between the variables included in the model. This means that approximately 17% of the disequilibrium from the previous period is corrected in the current period.

The coefficient on the first lag of D (MAN (-1)) is negative and statistically significant (p-value = 0.0065), suggesting that the immediate past change in manufacturing value added does have a negative significant impact on its current change.

The coefficient on the first difference of subsidy D (TOP) is negative and statistically significant (p-value = 0.0064), suggesting that an increase in trade openness has a negative impact on manufacturing value added in the short run. A 1 unit increase in trade openness would lead to 0.0064 decreases in manufacturing value added.

The coefficient on the first difference of exchange rate D (LNEXR) is negative and not statistically significant (p-value = 0.2993), A 1% increase in the change in exchange rate

leads to a 0.2993% decrease in the current change in manufacturing value added. The coefficient on the first lag of D (LNEXR (-1)) is negative and statistically significant (p-value = 0.0000), indicating that a percentage increase in exchange rate has a negative impact on manufacturing value added in the short run. A 1% increase in the change in the lag period of exchange rate leads to a 0.0000% increases in the current change in manufacturing value added.

The coefficient on the first difference of interest rate D (LNIR) is negative and statistically significant (p-value = 0.0000), suggesting that an increase in interest rate has a negative impact on manufacturing value added in the short run. A 1% increase in interest rate would lead to 0.0000% manufacturing value added. The coefficient on the first lag of D (LNIR (-1)) is positive and statistically significant (p-value = 0.0046), indicating that an increase in one lag period of interest rate has a positive impact on manufacturing value added in the short run. A 1% increase in the change in one lag period interest rate leads to a 0.0046% decrease in the current change in manufacturing value added. The coefficient on the second lag of D (LNIR (-2)) is positive and statistically significant (p-value = 0.0022), indicating that an increase in two lag period of interest rate has a positive impact on manufacturing value added in the short run. A 1% increase in the change in two lag period interest rate leads to a 0.0046% decrease in the current change in manufacturing value added.

The coefficient on the first difference of subsidy D (LNXPT) is negative and statistically significant (p-value = 0.0001), suggesting that an increase in exports has a negative impact on manufacturing value added in the short run. A 1% increase in exports would lead to 0.0001% decreases in manufacturing value added. The coefficient on the first lag of D (LNXPT (-1)) is positive and statistically significant (p-value = 0.0001), indicating that a percentage increase in the one lag period of exports has a positive impact on manufacturing value added in the

short run. A 1% increase in the change in one lag period of exports leads to a 0.0001% increases in the current change in manufacturing value added.

The value of the R-squared is 0.845879, meaning that approximately 84.6% of the variation in manufacturing value added is explained by the independent variables included in the model. The adjusted R-squared is 0.780674, indicating that after accounting for the degrees of freedom, about 78.07% of the variation in manufacturing value added is attributed to the independent variables. This value reflects a very strong model fit, even when adjusted for model complexity.

4.8 Interpretation of ARDL Model Estimate

Table 4.5: Raw output Analysis

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.690816	5.436619	1.230694	0.2320
MAN (-1)	0.516829	0.154396	3.347435	0.0031
MAN (-2)	0.304583	0.154777	1.967881	0.0624
TOP	-0.057861	0.026158	-2.211979	0.0382
TOP (-1)	-0.052693	0.024631	-2.139335	0.0443
LNEXR	-0.536311	0.765377	-0.700714	0.4912
LNEXR (-1)	0.911645	0.819515	1.112420	0.2785
LNEXR (-2)	2.602156	0.585134	4.447109	0.0002
LNIR	-1.145298	0.369978	-3.095583	0.0055
LNIR (-1)	0.540087	0.388153	1.391426	0.1787
LNIR (-2)	0.047304	0.383740	0.123272	0.9031
LNIR (-3)	-0.861241	0.434360	-1.982783	0.0606
IMP	0.034357	0.015299	2.245702	0.0356
LNXPT	-2.517792	0.791939	-3.179277	0.0045
LNXPT (-1)	1.398531	0.761939	1.835489	0.0806
LNXPT (-2)	-2.345804	0.642560	-3.650716	0.0015

R-squared 0.985028

Adjusted R-squared 0.973620

S.E. of regression	0.795618
Sum squared resid	13.29318
Log likelihood	-33.96330
F-statistic	86.34846
Prob(F-statistic)	0.000000
Mean dependent var	13.82690
S.D. dependent var	4.898545
Akaike info criterion	2.682279
Schwarz criterion	3.414883
Hannan-Quinn criter.	2.942934
Durbin-Watson stat	2.059360

Source: Author's Computation based on output from E-VIEWS10 software.

ARDL INTERPRETATION

From the regression result above, the R-squared is the coefficient of determination, indicating the goodness of fit of the model. It measures the percentage of the variations in the dependent variable (MAN) that is explained by the independent variables. Here, the value of the R-squared is 0.985028, meaning that approximately 98.50% of the variation in MAN is explained by the independent variables included in the model. The adjusted R-squared is 0.973620, indicating that after accounting for the degrees of freedom, about 97.4% of the variation in MAN is attributed to the independent variables. Since, the adjusted R-squared takes into account the number of predictors in the model and provides a more realistic

measure of model fit, the value 0.973620 reflects a moderately strong model fit, even when adjusted for model complexity.

The constant is 6.690816 with a t-statistic of 1.230694 and a p-value of 0.2320. This suggests that when all the independent variables are zero, the baseline value of MAN when all the independent variables (TOP, LNEXR, LNIR, IMP, and LNXPT) are equal to zero is 6.690816, and this value is not statistically significant.

The coefficient for TOP is -0.057861, indicating that a 1unit increase in the trade openness would lead to a 0.0579 unit decrease in MAN. This variable is statistically significant at the 5% level as its t-value is -2.211979 and its p-value is 0.0382. The standard error of the coefficient for TOP is 0.026158. The coefficient for TOP (-1) is -0.052693, indicating that a 1unit increase in the trade openness would lead to a 0.0527 unit decrease in MAN. This variable is statistically significant at the 5% level as its t-value is -2.139335 and its p-value is 0.0443. The standard error of the coefficient for TOP (-1) is 0.024631.

The coefficient for LNEXR is -0.536311, indicating that a 1% increase in the exchange rate would lead to a 0.5363% decrease in MAN. This variable is not statistically significant at the 5% level as its t-value is -0.700714 and its p-value is 0.4912. The standard error of the coefficient for LNEXR is 0.765377. The coefficient for LNEXR (-1) is 0.911645, indicating that a 1% increase in the one lag period of exchange rate would lead to a 0.5363% increase in MAN. This variable is not statistically significant at the 5% level as its t-value is 1.112420 and its p-value is 0.2785. The standard error of the coefficient for LNEXR (-1) is 0.819515. The coefficient for LNEXR (-2) is 2.602156, indicating that a 1% increase in the two lag period of exchange rate would lead to a 2.6022% increase in MAN. This variable is

statistically significant at the 5% level as its t-value is 4.447109 and its p-value is 0.0002. The standard error of the coefficient for LNEXR (-2) is 0.585134.

The coefficient for LNIR is -1.145298, indicating that a 1% increase in the interest rate would lead to a 1.1453% decrease in MAN. This variable is statistically significant at the 5% level as its t-value is -3.095583 and its p-value is 0.0055. The standard error of the coefficient for LNIR is 0.369978. The coefficient for LNIR (-1) is 0.540087, indicating that a 1% increase in the one lag period of interest rate would lead to a 0.54% increase in MAN. This variable is not statistically significant at the 5% level as its t-value is 1.391426 and its p-value is 0.1787. The standard error of the coefficient for LNIR (-1) is 0.388153. The coefficient for LNIR (-2) is 0.047304, indicating that a 1% increase in the two lag period of interest rate would lead to a 0.0473% increase in MAN. This variable is not statistically significant at the 5% level as its t-value is 0.123272 and its p-value is 0.9031. The standard error of the coefficient for LNIR (-2) is 0.383740. The coefficient for LNIR (-3) is -0.861241, indicating that a 1% increase in the three lag period of interest rate would lead to a 0.8612% decrease in MAN. This variable is not statistically significant at the 5% level as its t-value is -1.982783 and its p-value is 0.0606. The standard error of the coefficient for LNIR (-3) is 0.434360.

The coefficient for IMP is 0.034357, indicating that a 1unit increase in the imports would lead to a 0.0344 unit decrease in MAN. This variable is statistically significant at the 5% level as its t-value is 2.245702 and its p-value is 0.0356. The standard error of the coefficient for IMP is 0.015299.

The coefficient for LNXPT is -2.517792, indicating that a 1% increase in the exports would lead to a 2.5178% decrease in MAN. This variable is statistically significant at the 5% level as its t-value is -3.179277 and its p-value is 0.0045. The standard error of the coefficient for LNXPT is 0.791939. The coefficient for LNXPT (-1) is 1.398531, indicating that a 1% increase in the one lag period of exports would lead to a 1.399% increase in MAN. This variable is not statistically significant at the 5% level as its t-value is 1.835489 and its p-value is 0.0806. The standard error of the coefficient for LNXPT (-1) is 0.761939. The coefficient for LNXPT (-2) is -2.345804, indicating that a 1% increase in the two lag period of exports would lead to a 2.346% decrease in MAN. This variable is statistically significant at the 5% level as its t-value is -3.650716 and its p-value is 0.0015. The standard error of the coefficient for LNXPT (-2) is 0.642560.

The F-statistic of 86.34846 with a p-value of 0.000000 indicates that the overall model is statistically significant and that the independent variables collectively influence MAN.

4.9 Post-Estimation Assessments

Post-estimation assessments are critical steps in econometric analysis, performed to evaluate the adequacy and reliability of an estimated model. These diagnostic tests ensure that the model satisfies the underlying assumptions required for valid statistical inference and robust predictions. In this context, three key post-estimation tests are conducted.

4.9.1 Heteroskedasticity Test

This test evaluates whether the variance of the error term is constant (homoscedastic) or varies across observations. Heteroskedasticity, if present can lead to inefficient estimates and unreliable hypothesis tests. This study will utilize the use of the Breusch-Pagan-Godfrey heteroskedasticity test to detect the presence of heteroskedasticity.

Heterskedasticity Test Breusch-Pagan-Godfrey

F –statistic	0.372218	Prob. F(16,21)	0.9759
Obs*R-squared	8.395646	Prob. Chi-Square(28)	0.9362
Scaled explained SS	3.556109	Prob. Chi-Square(28)	0.9995

Source: Author's computation using E-views

H_0: There is no heteroskedasticity

H_1: There is heteroskedasticity

Decision Rule:

If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

The result in Table 4.7 shows that the probability of F-statistics is 0.372218, greater than 0.05 at a 5% significant level and therefore, the null hypothesis is accepted. This therefore, confirms the absence of heteroskedasticity in the model.

4.9.2 Autocorrelation Test

This examine whether residuals from the model are serially correlated. The presence of autocorrelation may indicate that the model fails to capture important dynamics, leading to biased standard errors and unreliable inferences. This study will utilize the Breusch-Godfrey Serial Correlation LM Test to check for the presence of autocorrelation.

Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.228687	Prob. F(3,18)	0.8752
Obs*R-squared	1.395175	Prob. Chi-Square(3)	0.7067

Source: Author's computation using E-views 12.

H_0: The residuals are not serially correlated

H_1: The residuals are serially correlated

Decision Rule:

If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

From the result in the above table, the probability of F-statistics is 0.228687, which is greater than 0.05 at a 5% significant level and therefore, the null hypothesis is accepted. This therefore confirms the absence of serial correlation in the model.

4.9.3 Ramsey Reset Test

This test investigates whether the functional form of the model is correctly specified. It identifies potential omitted variables or incorrect model structures that could distort the estimation results. Ramsey RESET Test is used to check for model stability.

	Value	df	Probability
t-statistic	0.972354	20	0.3425
F-statistic	0.945472	(1,20)	0.3425
Likelihood ratio	1.755227	1	0.1852

Source: Author's computation using E-views (2025)

H0: The model is not misspecified

Decision Rule:

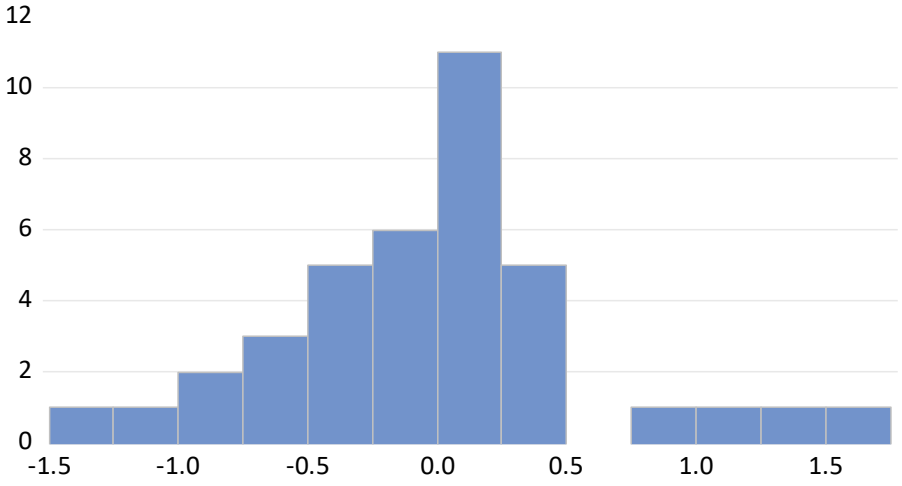
If Prob F value > 0.05 accept the null hypothesis

If Prob F value < 0.05 reject the null hypothesis

From the result in the table, the probability of F statistics is 0.945472 which is greater than 0.05 at a 5% significant level and therefore the null hypothesis is accepted. This therefore confirms that the model is not misspecified.

4.9.4 Normality Test

This assesses whether the residuals follow a normal distribution, a critical assumption for many econometric methods to ensure the validity of t-tests and confidence intervals.



Series: Residuals	
Sample 1984 2021	
Observations 38	
Mean	-4.47e-15
Median	0.022961
Maximum	1.517644
Minimum	-1.281585
Std. Dev.	0.599396
Skewness	0.450710
Kurtosis	3.773828
Jarque-Bera	2.234665
Probability	0.327151

Source: Author's computation using E-views.

H0: The residuals are normally distributed.

Decision Rule:

If Prob Jarque Bera > 0.05 accept the null hypothesis

If Prob Jarque Bera < 0.05 reject the null hypothesis

From the result in the table, the p-value is 0.327151 which is greater than 0.05 at a 5% significant level, and therefore, the null hypothesis is accepted. This, therefore, confirms that the residuals are normally distributed.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a comprehensive summary of the empirical findings from the analysis conducted in Chapter Four. It synthesizes the key results, discusses their implications, and draws conclusions based on the findings. Furthermore, the chapter offers policy recommendations aimed at enhancing the manufacturing sector's performance in relation to trade openness, exchange rates, interest rates, imports, and exports. The insights derived from this study are intended to inform policymakers and stakeholders in the manufacturing industry.

5.2 Summary of empirical findings

The study employed various econometric techniques to explore the relationships among manufacturing value added (MAN), trade openness (TOP), exchange rate (LNEXR), interest rate (LNIR), imports (IMP), and exports (LNXPT) over a 41-year period from 1981 to 2021. The key findings from the analysis are summarized as follows:

The descriptive statistics revealed that manufacturing value added had a mean of 14.32% of GDP, with trade openness averaging 31.67%. The exchange rate, interest rate, imports, and exports exhibited varying degrees of volatility, indicating diverse economic conditions over the study period. The Spearman rank-order correlation analysis indicated several significant relationships. A strong negative correlation between manufacturing value added and exports

(-0.912), suggesting that increased exports does not necessarily lead to higher manufacturing value added. A strong negative correlation between manufacturing value added and imports (-0.769), indicating that imports is competing with domestic manufacturing. A negative correlation between manufacturing value added and trade openness (-0.431), which contradicts the expectation that trade openness enhances manufacturing growth. The Augmented Dickey-Fuller (ADF) test confirmed that all variables were non-stationary at levels but became stationary after first differencing, indicating that they are integrated of order one, I (1).

The ARDL Bound Test established a long-run equilibrium relationship among the variables, as the computed F-statistic (10.76345) exceeded the upper bound critical value at the 5% significance level (4.25). This finding suggests that the variables are co-integrated. The ECM analysis revealed that approximately 17% of the disequilibrium from the previous period is corrected in the current period. The coefficients for trade openness, interest rates, and exports were statistically significant, indicating their negative impact on manufacturing value added in the short run. The model passed several diagnostic tests, including tests for heteroskedasticity, autocorrelation, model specification, and normality of residuals. These results confirm the robustness and reliability of the model

The AutoRegressive Distributed Lag (ARDL) model estimation provides valuable insights into the relationships between manufacturing values added (MAN) and its determinants, including trade openness (TOP), exchange rate (LNEXR), interest rate (LNIR), imports (IMP), and exports (LNXPT). The R-squared value of 0.985028 indicates that approximately 98.50% of the variation in manufacturing value added (MAN) is explained by the independent variables included in the model. This suggests a very high level of explanatory

power.

Trade Openness (TOP); the results indicated that trade openness has a statistical significant impact on manufacturing values added (MAN) suggesting that increased trade openness negatively impacts manufacturing value added.

Exchange Rate (LNEXR); the results indicated that exchange rate does not have a statistical significant impact on manufacturing values added (MAN) suggesting that exchange rate does not impact manufacturing value added. Indicating that the immediate effect of exchange rate changes on manufacturing value added is not robust. The lagged coefficient for exchange rate (LNEXR (-1)) results indicated that one period lag in exchange rate does not have a statistical significant impact on manufacturing values added (MAN) suggesting that exchange rate does not impact manufacturing value added and the immediate effect of exchange rate changes on manufacturing value added is not robust. In contrast, the coefficient for the second lag (LNEXR (-2)) is statistically significant indicating that past increases in the exchange rate positively influence MAN in the long run.

Interest Rate (LNIR); the results indicated that interest rate has a statistical significant impact on manufacturing values added (MAN) and higher interest rates negatively affect manufacturing value added.

The lagged coefficient for interest rate (LNIR (-1)) , (LNIR (-2)) indicated that a potential delayed negative impact of interest rates on MAN.

Imports (IMP); the results indicated that imports has a statistical significant impact on manufacturing values added (MAN) suggesting that increased imports negatively impact domestic manufacturing value added while the result for Exports (LNXPT) shows that an increase in exports leads to a decrease in MAN

5.3 Conclusion

The findings of this study underscore the complex dynamics between manufacturing value added and its determinants, including trade openness, exchange rates, interest rates, imports, and exports. The negative relationships observed between manufacturing value added and both trade openness and exports challenge conventional economic theories that posit a positive correlation. The results suggest that increased trade openness and export activities may not necessarily translate into enhanced manufacturing performance, potentially due to competitive pressures from imports.

The presence of a long-run equilibrium relationship among the variables indicates that policymakers should consider these interdependencies when formulating economic policies. The significant impact of interest rates on manufacturing value added highlights the importance of maintaining favorable monetary conditions to support the sector's growth.

5.4 Policy Recommendations

Based on the empirical findings, the following policy recommendations are proposed to enhance the performance of the manufacturing sector. The government should implement measures to strengthen domestic manufacturing capabilities, such as providing subsidies, tax

incentives, and support for research and development. This can help mitigate the adverse effects of imports on local production. Given the negative correlation between trade openness and manufacturing value added, it may be beneficial to reassess trade agreements and policies. Government should ensure that trade liberalization does not disproportionately harm domestic manufacturers and consider implementing protective measures where necessary.

This study also recommends that government should foster a conducive environment for manufacturing growth, it is crucial to maintain stable and low-interest rates. This can be achieved through prudent monetary policy that balances inflation control with the need to support economic growth. While the analysis indicated a negative relationship between exports and manufacturing value added, it is essential to enhance support programs for exporters. This includes providing access to financing, market information, and export training to help manufacturers compete effectively in international markets.

Lastly, improving infrastructure, such as transportation and logistics, can reduce production costs and enhance the competitiveness of the manufacturing sector. Investments in technology and innovation should also be prioritized to boost productivity.

REFERENCE

Abinabo, P., & Abubakar, A. (2023). Trade openness and economic growth in Nigeria. *Nigerian Journal of Management Sciences,24*(2a), 217-228.

Adebayo, R. I. (2011). Zakat and poverty alleviation: a lesson for the fiscal policy makers in Nigeria. *Journal of Islamic economics, banking and finance, 7*(4),26-41.

Adofu, I., & Okwanya, I. (2017). Linkages between Trade Openness, Productivity and Industrialization in Nigeria: A Co-integration Test. Research in World Economy,8(2),78-87.

Adofu, I., & Ojonugwa, A.M. (2021). Trade openness and industrial output growth in Nigeria. *Journal of Economics and Allied Research,6*(2),23-34.

Akintunde, T.S., Akanbi, B. E., Oladipo, A.D., & Adedokun, D. (2021). Trade openness and manufacturing sector performance in some selected West African Countries: A panel study approach. *Audoe,17*(3),286-300.

Akuffo, A.S. (2012). the effect of trade openness on economic growth: The case of African Countries. North Carolina Agricultural & Technical State University.

Ani, G. A., & Udeh, S.N. (2021). Exchange rate and economic growth in Nigeria. *Advance Journal of Management and Social Sciences,5*(5),18-26.

Apere, T.O., & Uche,W.J. (2023). A sectoral analysis of the effect of economic openness on economic performance in Nigeria. *International Journal of Economics, Commerce and Management,11*(11),63-80.

Babatunde, M.A. (2017). Trade openness and inflation in Nigeria: A nonlinear ardl analysis. *Journal of Economics and Sustainable Development,8*(24),129-148.

Bank-Ola, R. F., Alao-Owunna, I., & Agelebe, I.B. (2020). Inflation and manufacturing capacity utilization in Nigeria: An ARDL. *Jalingo Journal of Social and Management Sciences,3*(1),26-41.

Cheung, J., & Ljungqvist, Z, (2021). The impact of trade openness on economic growth: A panel data analysis across advanced OECD countries. Souderton University.

Dickson, D. (2010). The Trends and Patterns in Nigeria's Industrial Development. Council for the Development of Social Sciences Research in Africa.

Gray, G. (2014).The economic impact of trade openness on foreign direct investment into emerging market countries(An unpublised MSc. Thesis) . University of kwazulu-natal.

Hye, Q.M.A., & Lau,W.Y. (2015). Trade openness and economic growth: empirical evidence from India. *Journal of Business Economics and Management, 16(*1),188–205.

Koroma, P.S., Jalloh, A., & Squire, A. (2023).An Empirical examination of the impact of exchange rate fluctuation on economic growth in Sierra Leone. *Journal of Mathematical Finance, 13,* 17-31.

Malefane,M.R. (2018). trade openness and economic growth: experience from three SACU countries (An unpublised Ph.D thesis). University of South Africa.

Maoro, F.O. (2019). Effects of trade openness on economic growth and investment in Kenya (An unpublished M.Sc. thesis). University of Nairobi.

Mizan, A.N. (2019). Trade openness and economic growth - a panel data analysis of selected developing countries from 1998-2017(An unpublished MSC. Thesis). Hochschule Rhein-Waal Rhine-Waal University of Applied Sciences.

Nteegah, A., & Olubiyi, O.I. (2022). External sector and the performance of manufacturing sector in Nigeria. *International Journal of Research and Innovation in Social Science,5*(5),775-784.

Ogbu, E.D. (2019). Trade Liberalization and Economic Growth in Nigeria (1982-2012) (An unpublished M.SC. thesis). National College of Ireland.

Ohwofasa, B.O., & Ekaruwe, M.(2023). Trade openness and economic growth in Nigeria. *Lafia Journal of Economics and Management Sciences,8*(1), 23-47.

Okoye, L.U., Nwakoby,C.I.N., & Okorie,E.U. (2016). Economic openness and industrial development in Nigeria. *Journal of Policy and Development Studies ,10*(1),12-26.

Omotayo, L.W., & Odeleke, O.B. (2022).In examining the impact of trade and industrial policies on manufacturing sector in Nigeria (1980-2020): Do African Continental free trade matters? *Gusau International Journal of Management and Social Sciences, 5*(1),176-194.

Onakoya, A.B.O., Fasanya, I.O., & Babalola,M.T .(2012). Trade openness and manufacturing sector growth: An empirical analysis for Nigeria. *Mediterranean Journal of Social Science, 3* (11),637- 646.

Osei, D. B., Sare, Y. A., & Ibrahim, M. (2019). On the determinants of trade openness in low- and lower–middle-income countries in Africa: How important is economic growth. *Future Business Journal,5*(1), 2-6.

Parsi, R.(2024). Trade openness and inflation dynamics: A panel data analysis (An unpublised M.SC. thesis). University of Victoria.

Paul O. Elekwa, P.O. (2022). Trade openness and agricultural export in Nigeria. *Madonna Journal of Economics and Finance, 1*(1),1-9.

Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics, 70*(1), 65-94.

Tsaurai, K.(2021). Determinants of trade openness in transitional economies: Does the complementarity between foreign direct investment and human capital development matter? *International Journal of Economics and Business Administration* (1), 318-330.

Ugwanyi, C.U., Utazi, P.C., Micheal. O., & Umedike (2015). Impact of commercial bank credit on manufacturing sector. SAGE Publishing.

Umoh, O. J., & Effiong, E. L. (2013). Trade Openness and Manufacturing Sector Performance in Nigeria. *Margin: The Journal of Applied Economic Research, 7*(2), 147–169.

Yakubu, M.M., & Akanegbu, B.N. (2018). Trade openness and economic growth: Evidence from Nigeria. *European Journal of Business, Economics and Accountancy, 6*(4),30-44.

Martin, R., & Sunley, P.(1994).Slow Convergence? The New Endogenous Growth Theory and Regional Development. *Economic Geography, 74*(3), 201-227.

Hout, W. (2023). Dependency Theory. In M. Clarke, & X. Zhao (Eds.), Elgar Encyclopedia of Development (pp. 162-166).Edward Elgar Publishing.

Moseley, W.G. (2017). Dependency theory, The International Encyclopedia Geography,Edited by Douglas Richardson, Noel Castree, Michael F. Goodchild, Audrey Kobayashi, Weidong Liu, and Richard A. Marston.

APPENDIX
DESCRIPTIVE STATISTIC

	MAN	TOP	LNEXR	LNIR	IMP	LNXPT
Mean	14.31992	31.67439	4.794886	1.781389	51.55888	3.907702
Median	13.93340	33.71975	5.036059	1.975584	27.53339	3.581701
Maximum	21.09825	53.27796	6.054390	2.403712	130.4251	5.442422
Minimum	6.552817	9.135846	2.293493	-1.149905	9.367213	2.305291
Std. Dev.	5.036123	12.42937	1.004135	0.713820	41.64782	0.895229
Skewness	-0.028369	-0.260261	-1.014436	-2.823771	0.664860	0.194094
Kurtosis	1.408465	2.128505	2.948145	10.62941	1.869539	1.749346
Jarque-Bera	4.332679	1.760347	7.036642	153.9254	5.203753	2.929492
Probability	0.114596	0.414711	0.029649	0.000000	0.074134	0.231137
Sum	587.1165	1298.650	196.5903	73.03694	2113.914	160.2158
Sum Sq. Dev.	1014.501	6179.570	40.33149	20.38156	69381.64	32.05740
Observations	41	41	41	41	41	41

APPENDIX 2
UNIT ROOT TEST AT LEVELS

MANUFACTURING

Null Hypothesis: D(MAN) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.146920	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

TRADE OPENNESS

Null Hypothesis: D(TOP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.760101	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

EXCHANGE RATE

Null Hypothesis: D(LNEXR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.934247	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

INTEREST RATE

Null Hypothesis: D(LNIR) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.800290	0.0004
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

IMPORT

Null Hypothesis: D(IMP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.264496	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

EXPORT

Null Hypothesis: D(LNXPT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.630884	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

APPENDIX 3
ERROR CORRECTION MODEL

ARDL Error Correction Regression
Dependent Variable: D(MAN)
Selected Model: ARDL(2, 1, 2, 3, 0, 2)
Case 5: Unrestricted Constant and Unrestricted Trend
Date: 04/16/25 Time: 17:46
Sample: 1981 2021
Included observations: 38

ECM Regression
Case 5: Unrestricted Constant and Unrestricted Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.690816	0.878676	7.614654	0.0000
@TREND	-0.036237	0.013598	-2.664980	0.0145
D(MAN(-1))	-0.304583	0.100735	-3.023612	0.0065
D(TOP)	-0.057861	0.019103	-3.028850	0.0064
D(LNEXR)	-0.536311	0.503938	-1.064239	0.2993
D(LNEXR(-1))	-2.602156	0.496653	-5.239387	0.0000
D(LNIR)	-1.145298	0.206817	-5.537725	0.0000
D(LNIR(-1))	0.813936	0.256798	3.169559	0.0046
D(LNIR(-2))	0.861241	0.247556	3.478967	0.0022
D(LNXPT)	-2.517792	0.511674	-4.920693	0.0001
D(LNXPT(-1))	2.345804	0.482935	4.857388	0.0001
CointEq(-1)*	-0.178588	0.019972	-8.941869	0.0000

R-squared	0.845879	Mean dependent var	-0.170725
Adjusted R-squared	0.780674	S.D. dependent var	1.526803
S.E. of regression	0.715036	Akaike info criterion	2.419121
Sum squared resid	13.29318	Schwarz criterion	2.936254
Log likelihood	-33.96330	Hannan-Quinn criter.	2.603113
F-statistic	12.97262	Durbin-Watson stat	2.059360
Prob(F-statistic)	0.000000		

* p-value incompatible with t-Bounds distribution.

F-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	10.76345	10%	2.75	3.79
k	5	5%	3.12	4.25
		2.5%	3.49	4.67
		1%	3.93	5.23

t-Bounds Test — Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
t-statistic	-8.941869	10%	-3.13	-4.21
		5%	-3.41	-4.52
		2.5%	-3.65	-4.79
		1%	-3.96	-5.13

APPENDIX 4
ARDL MODEL

Dependent Variable: MAN
Method: ARDL
Date: 04/16/25 Time: 17:45
Sample (adjusted): 1984 2021
Included observations: 38 after adjustments
Maximum dependent lags: 3 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (3 lags, automatic): TOP LNEXR LNIR IMP LNXPT
Fixed regressors: C @TREND
Number of models evaluated: 3072
Selected Model: ARDL(2, 1, 2, 3, 0, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
MAN(-1)	0.516829	0.154396	3.347435	0.0031
MAN(-2)	0.304583	0.154777	1.967881	0.0624
TOP	-0.057861	0.026158	-2.211979	0.0382
TOP(-1)	-0.052693	0.024631	-2.139335	0.0443
LNEXR	-0.536311	0.765377	-0.700714	0.4912
LNEXR(-1)	0.911645	0.819515	1.112420	0.2785
LNEXR(-2)	2.602156	0.585134	4.447109	0.0002
LNIR	-1.145298	0.369978	-3.095583	0.0055
LNIR(-1)	0.540087	0.388153	1.391426	0.1787
LNIR(-2)	0.047304	0.383740	0.123272	0.9031
LNIR(-3)	-0.861241	0.434360	-1.982783	0.0606
IMP	0.034357	0.015299	2.245702	0.0356
LNXPT	-2.517792	0.791939	-3.179277	0.0045
LNXPT(-1)	1.398531	0.761939	1.835489	0.0806
LNXPT(-2)	-2.345804	0.642560	-3.650716	0.0015
C	6.690816	5.436619	1.230694	0.2320
@TREND	-0.036237	0.050220	-0.721575	0.4785

R-squared	0.985028	Mean dependent var	13.82690
Adjusted R-squared	0.973620	S.D. dependent var	4.898545
S.E. of regression	0.795618	Akaike info criterion	2.682279
Sum squared resid	13.29318	Schwarz criterion	3.414883
Log likelihood	-33.96330	Hannan-Quinn criter.	2.942934
F-statistic	86.34846	Durbin-Watson stat	2.059360
Prob(F-statistic)	0.000000		

APPENDIX 5
DIAGNOSTIC TEST
BREUSH-GODFREY AUTOCORRELATION

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 3 lags

F-statistic	0.228687	Prob. F(3,18)	0.8752
Obs*R-squared	1.395175	Prob. Chi-Square(3)	0.7067

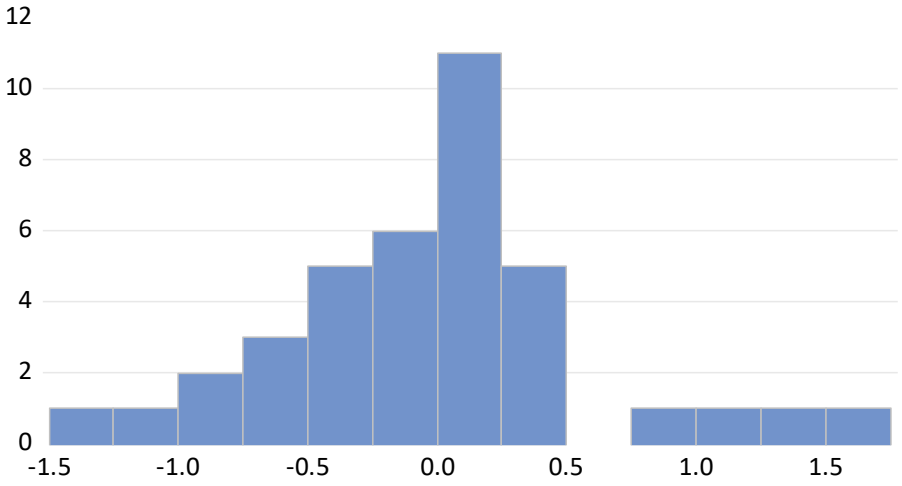
APPENDIX 6
BREUSCH-PAGAN-GODFREY HETEROSKEDASTICITY

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.372218	Prob. F(16,21)	0.9759
Obs*R-squared	8.395646	Prob. Chi-Square(16)	0.9362
Scaled explained SS	3.556109	Prob. Chi-Square(16)	0.9995

APPRNDIX 7

NORMALITY TEST



Series: Residuals	
Sample 1984 2021	
Observations 38	
Mean	-4.47e-15
Median	0.022961
Maximum	1.517644
Minimum	-1.281585
Std. Dev.	0.599396
Skewness	0.450710
Kurtosis	3.773828
Jarque-Bera	2.234665
Probability	0.327151

APPENDIX 8
MODEL SPECIFICATION TEST

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: MAN MAN(-1) MAN(-2) TOP TOP(-1) LNEXR LNEXR(-1) LNEXR(-2) LNIR LNIR(-1) LNIR(-2) LNIR(-3) IMP LNXPT LNXPT(-1) LNXPT(-2) C @TREND

	Value	df	Probability
t-statistic	0.972354	20	0.3425
F-statistic	0.945472	(1, 20)	0.3425
Likelihood ratio	1.755227	1	0.1852

APPENDIX 9
CORRELATION

	MAN	TOP	LNEXR	LNIR	IMP	LNXPT
MAN	1.000000	-0.431141	-0.769887	-0.391969	-0.769801	-0.912250
TOP	-0.431141	1.000000	0.661353	0.465745	0.135306	0.377536
LNEXR	-0.769887	0.661353	1.000000	0.537099	0.583679	0.731050
LNIR	-0.391969	0.465745	0.537099	1.000000	0.287617	0.383050
IMP	-0.769801	0.135306	0.583679	0.287617	1.000000	0.906690
LNXPT	-0.912250	0.377536	0.731050	0.383050	0.906690	1.000000