
Effect of International Seaborne Trade on Unemployment Rate in Nigeria

ENYIOKO, Newman C ¹

PhD Research Scholar

(newman.enyioko@rsu.edu.ng)

AMADI, S. N. ²

Professor of Economics

(amadi.sonny@ust.edu.ng)

&

NWIKINA, C. G. ³

(christian.nwikina@ust.edu.ng)

^{1, 2, 3} Department of Economics, Rivers State University, Port Harcourt, Nigeria
Corresponding author's email: newmanenyioko@gmail.com

Abstract

This study examines the effect of seaborne trade on unemployment rate in Nigeria between 1981 and 2024. The specific objectives were to ascertain the effects of crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time on unemployment rate. Time series data for each variable were obtained from annual reports and accounts of the Nigerian Ports Authority, the National Bureau of Statistics, the Central Bank of Nigeria, United Nation Development Programmes (UNDP) and the World Development Indicators (WDI). The ADF unit root test results showed that the variables were mixed-integrated, with cargo throughput being integrated of order zero, $I(0)$, while the other variables were integrated of order one, $I(1)$. The study found that crude oil trade positively influences unemployment rates in both the short and long term. Although the short-term impact is significant at the 5% level, the long-term effect is not. This suggests that an increase in crude oil trade is associated with higher unemployment in Nigeria. The study revealed that dry bulk trade negatively affects unemployment in both the short- and long-run. The study revealed that vessel turnaround time exhibits varying effects on unemployment in both the short and long-run. Specifically, the short-term results show that an increase in vessel turnaround time significantly lowers unemployment. The study found that there is evidence of a mixed effect of vessel turnaround time on unemployment rate in both the short and long run. The study revealed that in the short-run results, vessel turnaround time significantly reduced the unemployment rate, indicating that a percentage increase in vessel turnaround time is associated with a 0.5595 decrease in the unemployment rate. On the other hand, the unemployment rate is positively and significantly influenced by the vessel turnaround time in the long run. Given the findings, this study concluded that seaborne trade (especially the use of dry bulk trade and cargo throughput), presents an important enabler of economic development in Nigeria. Based on the findings and conclusion, this study recommends that government should ensure that dry bulk trade and cargo throughput growth policies are consistent with economic development objectives towards reducing unemployment in Nigeria. Government should

provide incentives (tax holidays, export rebates) for businesses engaged in dry bulk exports, promote crude oil trade for agricultural and manufactured goods and work assiduously to achieve the global best practices for vessel turnaround time in Nigeria ports.

Keywords: International Seaborne Trade, Crude Oil Trade, Dry Bulk Trade, Cargo Throughput, Vessel Turnaround Time on Unemployment Rate

1. INTRODUCTION

Seaborne trade is the exchange of goods (cargoes) and services from and to supply and demand countries and its carriage and/or transportation by sea using ocean going tanker vessels (Monday et al. 2021). Nigeria's seaborne trade is predominantly driven by crude oil exports, which account for a significant portion of government revenues and foreign exchange earnings. However, the volatility of global oil prices, coupled with logistical inefficiencies such as prolonged vessel turnaround time at Nigerian ports, often hinders the optimal contribution of trade to economic growth. On the other hand, the dry bulk trade sector has been gaining momentum as part of the government's diversification efforts, aiming to reduce dependency on oil and promote broader economic development. Nwankwo *et al.* (2024) submitted that for Nigerian economy to be on the path of sustainable growth, increased exports, reduced imports and enhanced trade openness, government should harness and better coordinate trade policy.

Crude oil trade dominates the export profile of many developing countries, contributing significantly to national income and public investment. Similarly, dry bulk trade (including commodities such as grains, cement, and coal) supports critical domestic sectors like agriculture, manufacturing, and construction (Ewubare & Onuchukwu, 2022). The volume of cargo throughput at ports reflects a country's level of trade activity and integration into the global economy, while vessel turnaround time serves as a key indicator of port efficiency and logistics performance. Efficient ports lower the cost of trade, attract investment, and increase competitiveness in international markets (Shiro *et al.*, 2023). Oil comprised approximately 87%

of Nigeria's export earnings and 77% of federal revenue (Bamaiyi, 2024).

Dry bulk trade represents one of the most veritable models to export and import cargoes. Dry bulk trade is divided into major bulk transport (iron ore, coal and grain) and minor bulk transport (phosphate, bauxite, soya, rice, sugar, fertilizers, metal and minerals, steel products and forest products). Dry bulk trade is very impactful in improving not only the GDP per capita, poverty rate and unemployment rate but also, human capital development and wellbeing of people in Nigeria (Onyeche & Ewubare, 2025).

The impact of these seaborne trade activities on economic development is multidimensional. An increase in trade volume often correlates with higher per capita income, driven by enhanced production, export earnings, and investment flows (Onyeche & Enyioko, 2025). However, beyond GDP growth, seaborne trade can also influence broader development indicators. A robust and inclusive trade sector can contribute to improvements in the human development index (HDI) by providing the resources for better education, healthcare, and living standards. Likewise, trade-induced growth has the potential to reduce the poverty rate and unemployment, especially if linked with domestic value chains and job creation in logistics, manufacturing, and services (Adenigbo *et al.*, 2023).

Cargo throughput is the totality of cargo that leaves and enters the nation's port through waterway transportation (Denamiel, 2024). It is an important indicator to measure the port's efficiency and performance level. In the last ten decades, it has been widely established that over 90% of the volume of commodities in world trade is conveyed through sea and the

economic growth of any country depends heavily on seaborne trade performance in the international market (Egole, 2022).

Nigeria is yet to be exceedingly productive, effective, and remarkable in the activity of seaborne trade and global shipping (Zhang *et al.*, 2023). According to the United Nations conference on trade and development (UNCTAD, 2022) statistics, 291 ships were berthed in the seaports of Nigeria in the year 2020. This raises an all-embracing need to determine the effect of international seaborne trade and economic development in Nigeria. The demand for international seaborne trade has necessitated the curiosity to measure its influence on the economic development in Nigeria. Ultimately, efficient international seaborne trade, characterized by improved crude oil and dry bulk trades, shortened vessel turnaround time and dwell times, and diversified cargo throughput have clear potential to drive Nigeria's economic development via higher GDP per capita, improved human development, employment generation and poverty reduction. Yet, persistent inefficiencies, institutional bottlenecks, and uneven policy implementation have constrained these gains (Onyeche & Ewubare, 2025).

This study, therefore, investigated the effect of international seaborne trade (examined through crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time) on unemployment rate in Nigeria.

2. LITERATURE REVIEW

This chapter has been used to review the literature relevant to the study. The study critically examined the theoretical foundation of the study such as comparative advantage theory and theory of international trade. Also, the literature review has captured concepts like-international seaborne trade, crude oil trade, dry bulk trade, cargo throughput, vessel turnaround time economic development, per capita income and empirical studies on the area of the study as well as the summary of the literature review with evidence of gaps in literature.

2.1 Theoretical Framework

This study examines the effect of international seaborne trade on economic development in Nigeria. In this section the theoretical framework underpinning the study has been explored. Theories such as: theory of international trade have been x-rayed in this section.

2.2 Resource Curse Theory

The Resource curse theory was introduced by Richard Auty in his book "Sustaining Growth in Mineral economies" (Auty, 1993). The Resource Curse refers to the phenomenon of worse economic performance in resource-abundant countries comparing to resource-poor countries (Auty, 1993, p.1). It can be seen that the definition of the Resource Curse is quite loose, and this causes loopholes in the whole theory of the Resource Curse. There is no neither universally accepted Resource Curse theory nor explanation of this phenomenon. After the extensive literature review, three main Resource Curse models were identified: the Dutch Disease, Rent-seeking and Institutions models. The majority of the relevant research is based on these three models or their modified versions. The models will be analyzed in chronological order, to see the development of the Resource Curse theory.

The resource curse is a paradoxical situation in which countries with an abundance of non-renewable natural resources experience stagnant economic growth or even economic contraction (Duru et al., 2020). Although there may be multiple reasons to explain why a resource curse happens, the phenomenon mainly occurs when a country begins to focus all of its production means on a single industry, such as mining or oil production, and neglects investment in other major sectors.

Also called a resource trap or paradox of plenty, it may also result from government corruption. If a large share of national wealth is concentrated in just a few industries, the government might abuse its regulatory powers, such as by awarding valuable contracts based on bribes. An overabundance of labor and capital that flow into just a small handful of

sectors may weaken the rest of the economy and harm the country overall (Adekoya *et al.*, 2025).

Resource Curse refers to a paradox of plenty in which resource-rich countries lag behind in their political, economic, and social development (Ajayi & Olasehinde, 2020). An important driver of the curse appears to be trade. A substantial literature suggests that natural resource windfalls allow for high levels of trade and rent-seeking behaviors, and hence impede growth in economies (Onyuku & Nwokah, 2025). Yet, how abundance in natural resources facilitates trade and rent-seeking activities remains unclear.

In addition to crude oil trade, this thesis also discusses resource-to-real gross development products, which are increasingly and widely regarded as a measure to handle the issues of trade control and the natural resource curse as well as have been adopted and implemented by several countries; and identifies their advantages in theory and limitations in applicability. Overall, the thesis indicates that developing economies bestowed with plentiful natural resources must first devote themselves to the reestablishment of crude oil trade systems and reinforcing the regulatory and monitoring capacities within the public sector before adopting a resource-to-real gross development product (Idemobi, 2019)

Researches have shown that different levels of economic growth across countries are mainly determined by the quality of institutions. Indeed, the management of natural resource wealth is strongly associated with institutional quality. For example, Norway had established political, social, and economic institutions well before the discovery of oil off its coast, resulting in that country successfully avoiding the resource curse (El-Yaqub *et al.*, 2024). On the other hand, countries like Nigeria which lack strong institutional discipline have been vulnerable to the curse. Governments of these countries fail to manage large natural resource revenues because of their weak governance capacity.

2.3 Heckscher-Ohlin Theory (Factor Endowments Theory or Theory of International Trade)

The Heckscher-Ohlin (H-O) theorem holds that trade between countries arise because different countries have different factor endowments. Thus, countries which are rich in labour will export labour intensive goods and those which are rich in capital will export capital intensive goods. According to the H-O theorem, for instance, Nigeria will specialize on production of goods and services that require cheap labour available in the country, while USA will specialize on production of goods and services using cheap capital. The theory assumes that there are two commodities, two countries, no transport cost, no qualitative difference in factors of production, identical production functions, constant return to scale and full employment, among others (Tyokosu & Abakpa, 2025). Leontief, however, negated the H-O theorem as he found that the US exports labour intensive goods and services and imports capital intensive goods and services, contrary to the theorem and this is the popular Leontief Paradox. From the foregoing discussion, it is worthy to note that both the Ricardian and HO theories are important to this study. This is because for a country to maximise the benefits of international seaborne trade, both comparative advantage and specialisation are key (Onuorah, 2018).

Muhammad and Akanegbu (2015) argued that a general perspective of the theory of international trade is interchange of goods capital and services across international territories. Martin (1992) wrote that in many international markets it reveals an ample share of gross domestic product (GDP). While international trade has been present throughout much of history its economic social and political significance has been increasing in recent centuries. Iyoha and Adamu (2011) opine that industrialization advanced transportation globalization multinational corporations and outsourcing are all having major impact on the international trade system. They argued further that rising foreign trade is

critical to the continuance of globalization. International trade is a major source of economic revenue for any nation that is considered a world power. Without foreign trade countries would be restricted to the goods and services produced within their own borders (Martin 1992).

This study is adopting the theory of international trade because it provides a valuable insight into the nature of the link between international seaborne trade and economic development. It is of a demand-driven link whereby oil and dry bulk shipment growth stimulates seaborne trade that add up to the growth and development of the economy. The theory of international trade allows for effective and efficient participation in crude oil and dry bulk shipment and it permits economies of scale not open to small protected economies. By introducing greater market competition of oil, non-oil and dry bulk shipment internationally, greater efficient utilization of resources and greater economic development in GDP per capita.

2.4 Export-Led Growth Theory

The Export-Led Growth (ELG) Theory proposes that a country's economic growth is significantly driven by its success in expanding exports to international markets. This outward-oriented trade policy stimulates development by efficiently using resources, generating foreign exchange for capital goods, and fostering productivity gains through larger markets and specialization (Pratama & Hastiadi, 2024). While the theory is supported by evidence from countries like China and Costa Rica, its validity varies across nations, and empirical studies have produced mixed results, showing different causal relationships between exports and growth or no relationship at all in some contexts (Wamalwa

& Were, 2021). The Export-Led Growth (ELG) theory is rooted in classical and neoclassical trade theories and suggest that exports expansion influence economic growth. There are several ways that export expansion can enhance economic growth. For instance, export expansion can influence growth by enhancing local productivity (Shu & Steinwender, 2019), fostering technological advancement (Wamalwa & Were, 2021), and creating economies of scale (Davit, 2021). According to An and Iyigun (2014), the learning-by-doing process in global competition can also lead to human capital development and innovation. Further, exportation opens up global markets for the exporting nation, which inherently increase foreign exchange earnings, improve balance of trade, Foreign direct Investments (FDI), and promote internal competitiveness and efficiency (Uchechukwu, 2019). All these stimulate broader economic development and forms the basis of the Export-Led Growth (ELG) theory. The Export-Led Growth (ELG) theory /strategy gained prominence in the post-World War II period.

The export-led growth theory provides the theoretical basis for this study. This theory holds that exports are the result of economic growth and one of its key driving forces. Especially in the context of developing countries, exports have become an important channel for promoting capital accumulation and technological progress through paths such as expanding international markets, attracting foreign capital, creating jobs, and promoting industrial upgrading (Shu & Steinwender, 2019).

2.5 Conceptual Review

The conceptual review covers such subtopics as international seaborne trade, crude oil trade, dry bulk trade, cargo throughput, vessel turnaround time an unemployment rate as proxies.

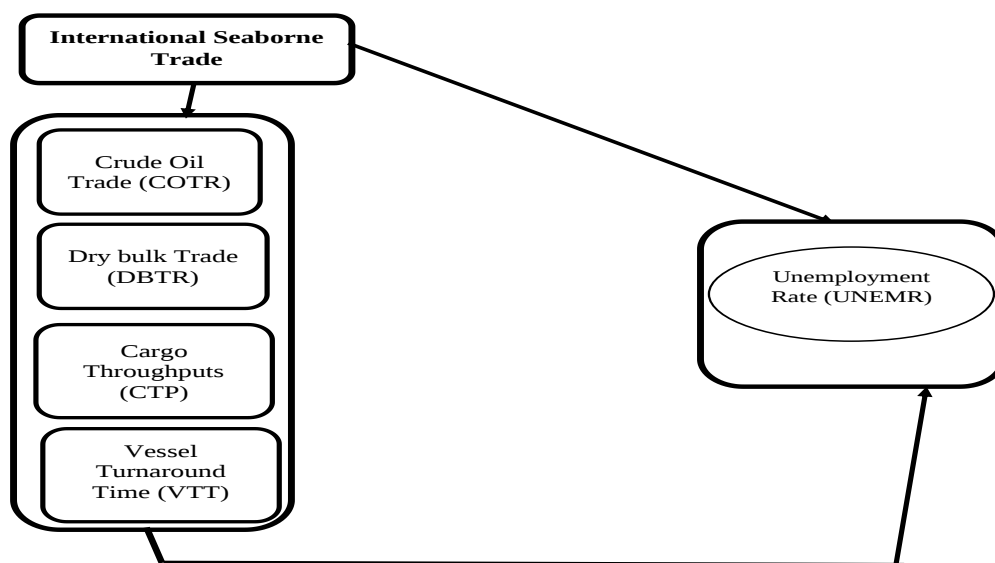


Figure1: Conceptual Framework of the Effect of International Seaborne Trade on Unemployment Rate in Nigeria

Sources: Modified with the works of UNCTAD (2024d); UNCTAD (2023); Nicita (2023) and Adenigbo et al. (2023).

2.6 International Seaborne Trade

International seaborne trade is the one transacted by persons, companies, agencies or governments through the sea. Stopford (2009) defines international seaborne trade as the movement of merchandise by vessels between the port of origin where merchandise is received from the exporter at the port of origin to the port of destination where merchandise is claimed by the importer. Nigeria's location and population make it a country of diverse economic capabilities with large investment opportunities as its international seaborne trade. The country has a coastline of over 750km and eight major ports excluding oil terminals with a cargo handling capacity of 35million tones per annum (WTO, 2023). At present about 5284 wells have been drilled mostly in the Niger Delta region of Nigeria (Odiegwu & Enyioko 2022b).

Global shipping continues to confront multiple challenges, including heightened trade policy and geopolitical tensions and is dealing with changes in globalization patterns. Additionally, shipping must transition to a more sustainable future, decarbonize and embrace digitalization. Being at the intersection of these forces will influence how the sector adapts to the evolving

operational and regulatory landscape while continuing to effectively service global trade (Winckler, 2022). Maritime trade volume contracted marginally by 0.4 per cent in 2022, but UNCTAD projects it will grow by 2.4 per cent in 2023. Indeed, the industry remains resilient and UNCTAD expects continued but moderated growth in maritime trade volume for the medium term (2024–2028) (Adenigbo et al., 2023).

During 2022, containerized trade, measured in metric tons, declined by 3.7 per cent. UNCTAD projects it will increase by 1.2 per cent in 2023 and expand by over 3 per cent during the 2024–2028 period, although this rate is below the long-term growth of about 7 per cent over the previous three decades. Starting in early 2022, seaborne trade, in particular dry bulk and tanker shipments, has been impacted by the war in Ukraine (UNCTAD, 2024a). The war led to changes in shipping patterns and increased the distances travelled for commodities, especially oil and grain. Growth in ton-miles exceeds growth in tons in 2022, 2023 and for 2024 projections. In 2022, oil and gas trade volumes witnessed robust annual growth rates, of 6 per cent and 4.6 per cent, respectively. The increase can be attributed to heightened demand for fuel

as the pandemic eased and related restrictions were lifted. As spending on energy-intensive services like transport and travel gradually recovered, a return to normalcy contributed to the surge in oil demand. In contrast, containerized and dry bulk shipments declined in 2022. Weakened containerized trade reflects the slowdown in global economic growth, high inflation and normalizing of demand after the unusual surge during the COVID-19 pandemic (Zhang et al., 2023).

In 2023, oil cargo distances reached long-term highs, driven by disruptions from the war in Ukraine. Crude oil and refined products travelled longer distances, as the Russian Federation sought new export markets for its cargo and Europe looked for alternative energy suppliers. Shipments of grains travelled longer distances in 2023 than any other year on record. Although grain shipments from Ukraine resumed in 2022 thanks to the Black Sea Initiative, several grain-importing countries had to rely on alternative grain exporters. They are instead buying from the United States of America, or Brazil, which requires longer hauls (Enyioko & Momodu, 2026).

International seaborne trade volumes reached 12,292 million tons in 2023, an increase of 2.4 per cent, after contracting in 2022. Global seaborne trade outperformed expectations in 2023 due to easing pressures on the global economy and better-than-expected economic performance in large economies. International seaborne trade in terms of ton-miles is estimated to have grown by 4.2 per cent in 2023—faster than trade in tons—due to shifts in trade patterns from the ongoing impacts of the war in Ukraine, the disruptions in the Red Sea and reduced water levels in the Panama Canal, all of which extended ship journeys and distances. These shifting trade patterns remain in focus (UNCTAD, 2024)

2.7 Crude Oil trade

Oil trading involves the exchange of crude oil, one of the world's most essential and highly valued commodities. Crude oil and its refined products serve as the backbone of the global economy, acting as both a primary energy

source and a critical raw material (Sani & Nwoye, 2023). The pursuit of oil has historically led to conflicts, and much of the world's oil is still produced in politically sensitive areas. The level of oil demand is often viewed as a yardstick for measuring the health of the global economy (UNCTAD, 2024).

This combination of fluctuating yet persistent demand, economics, and geopolitics means that oil prices are almost always in motion, making oil highly attractive to speculators and traders. Oil prices are sensitive to global economics and geopolitics, acting as barometers for both. This sensitivity means that oil prices can be volatile and move sharply when major news breaks or unexpected events occur (Odiegwu & Zeb-Obipi, 2023). Changes in the dynamics of supply and demand can also cause oil prices to experience sharp movements.

Crude oil and petroleum products are widely traded all over the world. The trade relationships among the countries are not evenly distributed. Some countries are closely related, while some others are loosely related, thus form a global pattern of international trade. Researchers found that the international trade network is clustering into communities (or groups) according to factors such as geography or GDP rather than by regional-trade agreements (Halkos & Tsilika, 2015).

In 2022, oil and gas trade volumes witnessed robust annual growth rates, of 6 per cent and 4.6 per cent, respectively. The increase can be attributed to heightened demand for fuel as the pandemic eased and related restrictions were lifted. As spending on energy-intensive services like transport and travel gradually recovered, a return to normalcy contributed to the surge in oil demand. In contrast, containerized and dry bulk shipments declined in 2022. Weakened containerized trade reflects the slowdown in global economic growth, high inflation and normalizing of demand after the unusual surge during the COVID-19 pandemic. Port calls follow these trends in trade, dropping significantly at the start of the COVID-19 pandemic. Following a year-to-year drop in the first half of 2022, vessel port calls increased in

the second half of 2022. Port calls by tankers reached historical highs while calls by bulk carriers returned to their pre COVID-19 levels; port calls by container ships are yet to return to their 2019 level (UNCTAD, 2023).

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2.8 Dry Bulk Trade

Dry bulk trade in Nigeria involves the import and export of large, unpackaged, raw, and semi-finished materials like grains, coal, and minerals, transported via sea by specialized vessels to support the nation's industrial, construction, and food production sectors. As an import-driven economy, Nigeria relies heavily on dry bulk imports for raw materials and finished goods, which necessitates significant port activity and maritime transport to facilitate the flow of these essential

commodities for domestic consumption and manufacturing (Onyeche & Enyioko, 2025).

Several ports in Nigeria are involved in international dry bulk trade. These include the Lagos Port Complex, Tin Can Island Port, and Lekki Port in Lagos, as well as Port Harcourt Port, Onne Port, Delta Ports (Warri), and Calabar Port. These ports handle various dry bulk commodities like coal, cement, grains, and other raw materials. In addition to these, there are also numerous private jetties and terminals that handle dry bulk cargo, particularly within the vicinity of the major ports. The development of inland dry ports (Inland Container Depots) like those in Kaduna and Kano also helps to decongest the seaports and improve logistics.

Dry bulk trade is the trading on large quantities of unpackaged solid materials, such as grains, ores, coal and metal. These materials are crucial to agriculture, construction, and manufacturing and are often granular or powdered, and are transported by specialized ships called bulk carriers. (Adenigbo, et al., 2023). A dry bulk commodity is a raw material that is shipped in large unpackaged parcels. Dry bulk consists of mostly unprocessed materials that are destined to be used in the global manufacturing and production process. The commodities, which can include grain, metal, and energy materials, are transported long distances in bulk by sea in large cargo vessels by companies that specialize in dry bulk delivery (Adepoju, 2020). The dry bulk trade outlook is expected to be stable and prosperous through the end of the decade. However, supply is expected to grow faster than demand in 2025 and 2026, which could weaken market conditions (Abdulrahman, 2021).

Dry bulk freight rates were highly volatile in 2022 and 2023 due to shifts in demand, port congestion (namely in the first half of 2022), heightened geopolitical tensions, weather-induced disruptions and macroeconomic headwinds, including in China. The war in Ukraine reshaped maritime trade flows, increasing cargo distances and ton-miles. The Baltic Dry Index, which measures shipping

prices, fluctuated significantly, with rates peaking in May 2022. Rates fell to pre-pandemic levels by December 2022. In early 2023, freight rates declined further due to a seasonal slowdown and adverse weather conditions disrupting commodity production. A surge in demand for dry bulk cargo in the second quarter of 2023, triggered by post-pandemic industrial growth in China, led to a rebound in freight rates by mid-year (UNCTAD, 2024).

2.9 Cargo Throughput

Cargo throughput means the volume of cargo handled at the Terminal in the period of one financial year. Port throughput measures reflect the amount of cargo or number of vessels the port handles over time. These measures are affected by many variables beyond physical capacity (UNCTAD 2021). Cargo throughput is the total volume of cargo (such as containers or metric tons) handled by a port or terminal over a specific period, like a financial year. It serves as a crucial indicator of a port's economic performance, operational capacity, and regional development, directly reflecting the scale of economic activity and trade in the surrounding area. Factors influencing cargo throughput include macroeconomic indicators like GDP, industrialization levels, international trade activities, and port infrastructure (Ajayi & Omotunde, 2022).

Nigeria's port cargo throughput saw significant growth in 2024, increasing by 45.1% to 103.3 million metric tons from 71.2 million metric tons in 2023, a dramatic reversal from a previous decline seen between 2015 and 2022. This surge is attributed to heightened trade activities and improved efficiency, with Lekki Port experiencing a 2,160.8% increase in throughput. While liquid bulk cargo dominates, containerized cargo also contributes significantly (Onyeche & Enyioko, 2025).

2.10 Vessel Turnaround Time

Vessel turnaround time in the port is the primary indicator to judge the quality of service being given by the port to the ships (Monday et al., 2021). Vessel turnaround time is the total

time spent by a vessel at the port from its arrival at reporting station till its departure from the reporting station. It thus includes pre berthing waiting time navigation time (inward movement and outward movement time) stay at working and non-working berth and shifting time (Odiegwu & Adiele, 2023). However, the detention/idle time due to litigation fire repair/drydocking delay in the decision regarding dismantling etc. are not to be included in their vessel turnaround time. Monday et al. (2021) maintains that ship turn-around time (VTT) constituents: time at sea and time in the port. Ship turn-around time (VTT) comprises of the time it takes to attach mooring lines secure ships at the berth provide ship supplies bunkering unloading loading containers between ship and shore which all depends on the efficiency of port infrastructure and operations. Turnaround times directly impacts performance of ports from both economic and operational point of view (Lloyd & Odiegwu, 2019). The higher the turnaround time the lower the container performance and the higher the port congestion. In this case the salient feature of any port is to optimize its throughput and eventually to decrease the turnaround times of vessels or ships. The vessel or ship turn-around time is an accumulation of the two critical times ship service time at berth and waiting time or the time the ship spends in port from its arrival within the limits of the port up to its departure (Adepoju, 2020). The shortest ship turn-around time is the most advantageous for the ship-owners because their profits are highly influenced by the time spent in port. Thus, the shorter the staying time of ships in ports the higher the profit. Based on Onyuku et al. (2025) time in port is approximately 18% of distribution of port expenses. The study found that ship turnaround time however includes waiting time manoeuvring time between the entrances to the berth or mooring point ship service time at berth shifting time between berths and manoeuvring time to leave the port.

Odiegwu and Enyioko (2022b) view the concept of vessel turnaround time measured in hours or days, as the operational indicator of productivity which measure the time at which a

vessel leaves the port completely, i.e. the difference between the arrival time of vessel at the port and the departure time of vessel from the port. Apparently, this indicator measures how time efficient a port/terminal is when rendering services to vessels i.e., loading and discharging. Similar studies by Odiegwu and Zeb-Obipi (2023) view vessel turnaround time as the aggregate of the times a vessel spent in port, commencing from when the vessel arrived at the port, got handled (discharged or loaded) at the berth and departed the port.

2.11 Unemployment Rate (UNEMR)

Nigeria's unemployment rate rose to 5% in the third quarter of 2023, up from 4.2% in the previous period. The jobless rate among young people aged 15-24 rose to 8.6% from 7.2%. Unemployment in the urban areas also increased marginally to 6% from 5.9% in the previous quarter (Itah & Bidemi, 2022). Unemployment is when people are ready, able and willing to work, but do not find work. By the International Labour Organization definition, a person is employed when they work at least 40 hours a week (Akidi et al., 2025). The working age is regarded as between 15 and 60. Currently, 33.3% or 23.2 million of the about 70 million people who should be working in Nigeria are out of work. An acceptable level of unemployment would be 4%-6%. The country's underemployment rate – people who work less than 20 hours a week – is also high at 22.8%. One factor is the critically poor state of the economy. The economy has not been in good shape for the past five years and first went into a recession in 2016. In 2020 in the wake of the COVID-19 pandemic it plunged into another recession – its worst in four decades. It recorded gross domestic product contraction of 3.62% in the third quarter of 2020 (Akinlo, 2024). Unemployment is one of the key macroeconomic indicators used to assess the health of an economy. It provides insights into labour market dynamics and the efficacy of policy interventions. Governments and policymakers alike often use unemployment rates to make informed decisions about which sectors to invest in, what types of jobs to prioritise, and which

programmes to implement to address employment challenges (Akpa et al., 2022). In April 2023, the National Bureau of Statistics (NBS) announced it was changing the way it calculates the unemployment rate in Nigeria. The NBS adopted a new methodology for computing labour statistics, aligning with the International Labour Organisation (ILO) guidelines. Under the old methodology, Nigeria's unemployment rate stood at 33.3 percent at the end of Q4 2020. However, the adoption of the new methodology drastically reduced this figure to 4.1 percent in Q1 2023 (Alvik, 2024).

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2.12 Empirical Review

Yakubu and Akanegbu (2018) examined trade openness and economic growth: Evidence from Nigeria. The study used multiple regression of ordinary least square estimation. The study findings revealed that trade liberalization did not cause growth during the period of the study. Agbo et al. (2018) examined the impact of international trade on the economic growth of Nigeria in Enugu Nigeria. The results of the study showed that there is a significant impact of export trade on the Nigerian economic growth. The study also revealed that there is no

significant impact of import trade on the Nigerian economic growth. Osabohien et al. (2019) investigated the impact of agricultural export on Nigeria's economic growth. The results from the ARDL technique revealed that agricultural exports significantly affect Nigeria's economic growth this suggests that a 1percent increase in - agricultural export will boost economic growth in Nigeria by approximately 25 percent. Onuorah (2018) examined trade liberalization and economic growth in Nigeria. The results/findings revealed that the independent variables: DOP, INF, FDI, BOT and NEXP have positive significant impact on GDP while EXR and BOP shows a negative impact.

Adeleye *et al.* (2021) assessed the impact of government policies on Nigerian economic growth. The study used Autoregressive Distributive Lag (ARDL) bound test. The study discovered that fiscal policies stimulate economic growth while trade policies impel economic growth in Nigeria. However, fiscal policies have inconsistent impact on Nigeria. Besides, monetary policies via interest rate and money supply deterred economic growth in Nigeria. it is concluded that the government policies changes deterred economic growth in Nigeria. Obasi (2022) examined the influence of international trade on Nigeria's development from 1986 to 2018 through multiple regression with OLS. The study established a significant positive association between trade openness and GDP, with both exchange rate and FDI being statistically significant at the 5% level. The study concluded by recommending robust trade liberalization and exchange rate management to enhance productivity, lower inflation, and strengthen political stability. Nwagu (2022) explored the effect of international trade on Nigeria's economic development from 1986 to 2018 using annual data from the World Bank and CBN. Applying multiple linear regression with ordinary least squares (OLS), the study found a significant and positive relationship between trade openness and GDP growth, with exchange rate and FDI serving as major contributors. The author proposed the adoption of effective trade liberalization and stable exchange rate policies to foster low inflation,

productivity growth, and political stability. Ewubare and Onuchukwu (2022) examined the effect of trade policy indicators on macro-economic performance in Nigeria from 1985-2021. The study adopted three distinct models by specifically investigating the effect of trade openness, exchange rate, quota and tariff on GDP per capita, unemployment rate and balance of payment in Nigeria using Autoregressive Distributed Lag (ARDL) technique with bound test approach to cointegration and Granger causality test. The time series data showed stationarity and long run relationship between the variables. Findings in the first model showed a strong positive and significant relationship between trade policy indicators and macro-economic performance The Prob. F-stat. (0.0162) showed that the overall model was significant at 5% level Findings in the second model revealed that the effect of trade policy indicators on balance of payment (BOP) was negative and significant at 5% level on the long run analysis with the R2 of (0.878961) indicating that 87% of the variation of balance of payment (BOP) was explained by the autonomous factors, while Prob. F-stat.(0.0000) implies the overall model was significant at 5% level. The implication of this finding is that trade policy indicators help to mitigate macroeconomic shocks by fostering convergence and as demonstrated in the short run dynamics to long run equilibrium annually. Findings in the third model showed that the effect of trade policy indicators on unemployment rate was negative but significant at 5% level with Prob. (F-stat. 0.016238) indicating that the overall model was significant at 5% level while the R2 (0.720981) implies that 88% of the variations of balance of payment was explained by the autonomous factors and the CointEq (--0.322587) was negative which indicates the short run disequilibrium converged at the speed of 32 % in the long run annually.

Nwankwo et al. (2024) examined the impact of international trade on economic growth in Nigeria. The techniques of data analysis used were Augmented Dickey-Fuller (ADF) unit root statistic, Johansen Cointegration test and Error Correction Model (ECM) approach. The study

revealed that exchange rate is significant and negatively affect GDP per capita in Nigeria. Besides, the policy change has a significant and positive influence on GDP per capita in Nigeria. The study concluded that international trade has significant impact on economic growth in Nigeria.

Onyema *et al.* (2024) investigated the impacts of infrastructural investment on Nigeria's economic growth from 1990 to 2022. The study utilized time series data sourced from the CBN Statistical Bulletin and the World Development Indicators. The specific objectives of the study included to investigate the impact of investment in road and construction on Nigeria's GDP growth; assess the effect of investment in transport and communication on GDP growth; evaluate the influence of telecommunication developments on GDP growth; and to examine the impact of access to electricity on GDP growth in Nigeria. The dependent variable in the study is the GDP growth rate (annual %), while the independent variables include investment in roads and construction, access to electricity (% of population), investment in transport and communication, and fixed telephone subscriptions (per 100 people). The data analysis techniques utilized included the ADF unit root test, bounds cointegration, the autoregressive distributed lag (ARDL) estimation method and the residual diagnostic tests. The study revealed that investment in roads and construction exhibits a negative relationship with economic growth, which is not statistically significant; access to electricity has a positive relationship but is not statistically significant with economic growth; investment in transport and communication has a positive and statistically significant impact on Nigeria's economic growth; and fixed telephone subscriptions have a positive but not statistically significant impact on economic growth in Nigeria.

2.13 Effect of Crude Oil Trade on Unemployment Rate

Sani and Nwoye (2023) investigated the effect of international crude oil trade on Nigeria's gross domestic product from (1985-2020). The study found that International seaborne trade in

Nigeria generally leads to reduced unemployment by creating jobs in the maritime sector and boosting overall economic growth through increased cargo throughput. Specifically, dry bulk trade has shown a significant positive effect on employment, while crude oil transport has a less clear, potentially negative or positive relationship depending on the study. High cargo throughput in ports is linked to economic growth and job creation, though more investment in port infrastructure is needed to optimize operations and maximize employment benefits. Vessel turnaround time affects port productivity and attractiveness to shippers but its specific impact on unemployment is less direct, with bottlenecks in customs and clearing processes having a more significant negative effect on jobs.

Adenigbo *et al.* (2023) investigated the effect of shipping trade on economic growth in Nigeria. The study used the Vector Error Correction Model, to carry out the analyses. The cointegration test established a short- and long-term causality from import, export and exchange rates to GDP. The result showed that Nigeria's economic growth is import dependent and that, in the long run, import and exchange rates significantly affect GDP. The study further indicates that the present export volume does not significantly contribute to GDP growth. The results imply that building an economic system on an import-dominated trade system is not sustainable for future development. The study recommended strategic initiatives to maintain the economic growth rate while promoting export through local production. Habanabakize and Dickason-Koekemoer (2023) looked at how industrialization affects employment and economic growth. They used the Autoregressive Distributed Lag (ARDL) model and the Error Correction Model (ECM) to analyse time series data from 1998 to 2019. The findings showed that industrialization had a strong positive impact on both economic growth and employment creation in South Africa. Based on the above review the study hypothesizes that: H_{01} : Crude oil trade has no

significant effect on unemployment rate (UNEMR).

2.14 Effect of Dry Bulk Trade on Unemployment Rate

Egbetunde and Obamuyi (2018) investigated foreign trade and economic growth: A study of Nigeria and India. The study chose real income and relative prices as determinants of maritime imports and exports. The results showed that the existence of a long-term and short-term equilibrium relationship among the variables. Ahmed (2019) examined the impact of trade liberalization on economic development in Nigeria. The study used ARLD testing approach was utilized for the analysis. The results found that trade flows of many countries are affected by export duty volatility in the short term, but only a few countries are affected in the long term in both imports and exports. Lane and Pretes (2020) investigated maritime dependency and economic prosperity: why access to oceanic trade matters and found a significant relationship between maritime dependency, which is characteristic of coastal nations, and Gross Domestic Product (GDP) per capita, which depicts that most countries that have access to the ocean benefit from shipping. The finding suggests the importance of import and export shipping to the economic growth of maritime nations. Yusuff et al. (2020) evaluated the impact of the foreign trade on economic growth in Nigeria. The study used Ordinary Least Square (OLS) approach. The result revealed that a negative nexus existed between foreign trade and economic growth of Nigeria.

Akidi *et al.* (2025) examined the relationship between fiscal deficits financing and unemployment rate in Nigeria from 1990 to 2022, utilizing time series data from the World Development Indicators and the CBN Statistical Bulletin. The specific objectives of the study included to determine the impact of debt servicing, assess the effect of domestic debt, investigate the influence of external debt, and examine the impact of money supply on the unemployment rate in Nigeria. Data analysis techniques used included descriptive statistics, unit root tests, bounds cointegration, the

autoregressive distributed lag (ARDL) estimation method, and post-estimation tests. The study revealed that in the long-run debt servicing has a positive but statistically insignificant effect on the unemployment rate; domestic debt has a significant negative relationship with the unemployment rate; external debt has a positive but statistically insignificant effect on unemployment; and money supply has a positive and statistically significant impact on unemployment. The study concluded that domestic debt positively contributes to reducing unemployment in Nigeria. Based on the above review the study hypothesizes that: Ho₂: Dry bulk trade has no significant effect on unemployment rate (UNEMR).

2.15 Effect of Cargo Throughput on Unemployment Rate (UNEMR)

Odiegwu and Adiele (2023) examined the effect of international seaborne trade on cargo throughputs of ports in Nigeria. The study used descriptive and inferential statistical tools to analyse the data. Specifically, multiple regression analysis of ordinary least square estimation to test the hypotheses with the aid of SPSS 26.0. The study found that oil trade has significant effect on cargo throughputs ($t = 8.079$), non-oil trade has negative and significant effect on cargo throughputs ($t = -2.869$), oil import has negative and insignificant effect on cargo throughputs ($t = -0.485$) and non-oil import has significant effect on cargo throughputs ($t = 4.059$). Shi *et al.* (2023) researched on port throughput based on VAR model. In Sixth International Conference on Traffic Engineering and Transportation System (ICTETS 2022) and found that exports have a negative significant impact on the trade index along the Persian Gulf and European shipping routes, while the freight index has a negative significant impact on exports in the Southeast Asian and Taiwanese shipping routes.

Onyeche and Ewubare (2025) examined the effect of maritime transport on economic development in Nigeria, 1980-2023. The study adopted the ex-post factor research design. Data for the study were generated from National Bureau of statistics, central bank of Nigeria,

Nigeria port authority Statistical Bulletins. The Augmented Dickey Fuller unit root test was used to test for the stationarity of the variables. The findings of study revealed that crude oil transport is useful in achieving effective and efficient economic development. The study revealed that dry bulk transports represent the most common movement models and that the dry bulk transport is divided into major bulk transport (iron ore, coal and grain) and minor bulk transport (phosphate, bauxite, soya, rice, sugar, fertilizers, metal and minerals, steel products and forest products). The study observed that dry bulk transport is very impactful in improving the economic wellbeing of people in Nigeria. The study found that non-oil transportation in Nigeria contribute to the country's Gross Domestic Product (GDP) annually, injects values added to GDP, industry revenue and profits. Based on the above review the study hypothesizes that: H_0_3 : Cargo throughput no significant effect on unemployment rate (UNEMR).

2.16 Effect of Vessel Turnaround Time on Unemployment Rate

Maduechesi (2023) evaluated the ship turnaround time and cargo trade delays of Nigerian ports in the post privatization regime. The objectives of the study were, among other things, to investigate the existence of delays in ship turnaround time (STRT) operations and processing of shipping (cargo) trade in Nigerian seaports. The study used ex-facto research design, employing secondary data sourced from different sources. The Net Output Model approach for estimating value of time lost, the paired sample-test, and the log-linear multiple regression analysis methods were used to analyze the data obtained. It was found that there were disproportionate levels of delay in ship turnaround time operations in the individual seaports of Nigeria, such that, in each of the Onne, Lagos Apapa, Warri, Rivers, and Calabar ports, the delays encountered by ship operators in shipping operations were 1.878, 5.340, 3.470, 2.810, and 2.440 days, respectively. The Nigerian port sector average delay in ship turnaround time operations was 9.20 days. The result of the study also indicated the existence of 9.00, 16.73, 14.10, 15.60, and

13.40 days - delays in the processing of shipping trade in each of the Onne, Lagos Apapa, Warri, Rivers, and Calabar ports, respectively. The study recommended that Port Authorities and Terminal operators, in collaboration with the Nigerian Shippers Council, should develop delay reduction policies and strategies in the ports, in order to ensure that trade processing and ship turnaround time operations in Nigerian ports comply with the global benchmark of 1.20 days for ship turnaround time and 4.00 days for shipping trade.

Onyeche and Enyioko (2025) examined the effect of maritime transport on unemployment rate in Nigeria, 1980-2023. The study adopted the ex-post factor research design. Data for the study were generated from National Bureau of statistics, central bank of Nigeria, Nigeria port authority Statistical Bulletins. The Augmented Dickey Fuller unit root test was used to test for the stationarity of the variables. Based on the outcome of the bounced co integration test result, the auto distributed lag model estimation technique was adopted for the study. The findings of study revealed that crude oil transport is useful in achieving effective and efficient economic development. The study revealed that dry bulk transports represent the most common movement models and that the dry bulk transport is divided into major bulk (iron ore, coal and grain) and minor bulk transport (phosphate, bauxite, soya, rice, sugar, fertilizers, metal and minerals, steel products and forest products). The study observed that dry bulk transport is very impactful in improving the economic wellbeing of people in Nigeria. Finally, the study has revealed that crude oil transport has positive and insignificant effect on unemployment rate, dry bulk transport has positive/ and significant effect on unemployment rate and non-oil transport has negative and significant effect on unemployment rate in Nigeria. Based on the above review the study hypothesizes that: H_0_4 :

Vessel turnaround time has no significant effect

on unemployment rate (UNEMR).

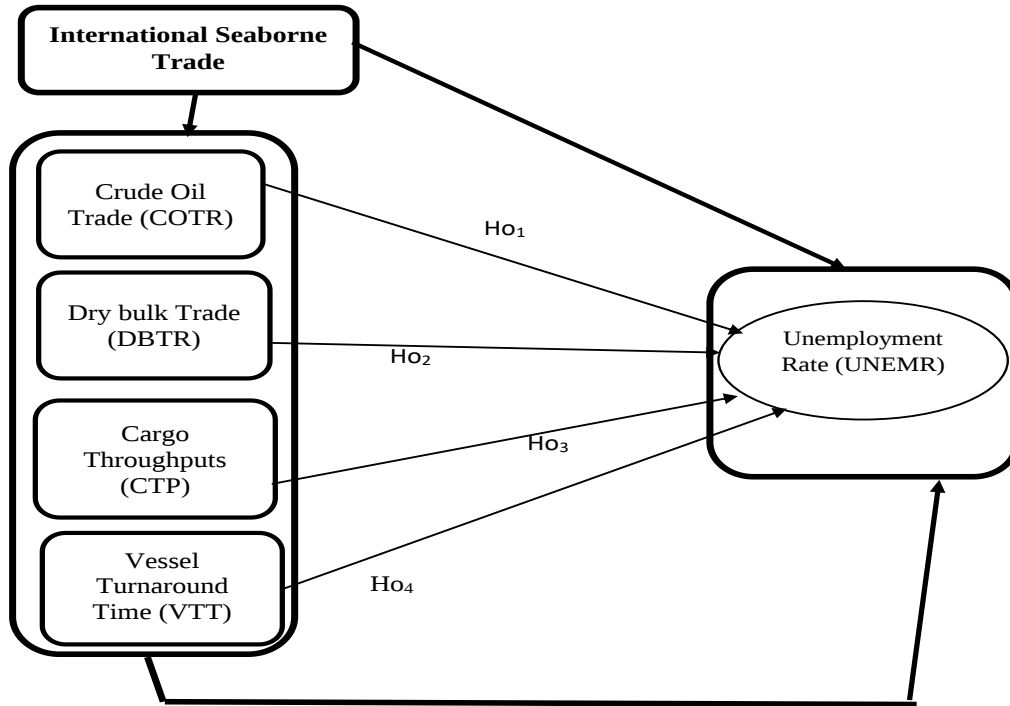


Figure 2: Operationalized Framework of the Effect of International Seaborne Trade on Unemployment Rate in Nigeria

Sources: Modified with the works of UNCTAD (2024d); UNCTAD (2023); Nicita (2023) and Adenigbo et al. (2023).

3. METHODOLOGY

3.1 Research Design

This study adopted the ex-post facto research design which required the usage of historical data to forecast future trends employing regression techniques. The focus of an ex-post facto research design is to effectively explain the characteristics of a population or a social phenomenon in the past (Akujuru & Enyioko, 2018 and Saeed et al. 2021).

3.2 Method of Data Collection

Secondary sources of data were used as the main data collection bases. Relevant data for this study were generated from the annual reports and accounts of Nigerian Ports Authority, National Bureau of Statistics and Central Bank of Nigeria Annual Statistical Bulletins from their official website. The data for the study were from the period of 1981 to 2024.

3.3 Model Specification

$$UNEMR = \beta_0 + \beta_1 COTR + \beta_2 DBTR + \beta_3 CTP + \beta_4 VTT + \mu_t \dots \quad (3.1)$$

{for testing H_{01} , H_{02} , H_{03} and H_{04} }

$$UNEMR = f(COTR, DBTR, NOTR)$$

Where;

UNEMR = Unemployment Rate

COTR = Crude Oil Transport

DBTR = Dry Bulk Transport

CTP = Cargo Throughput

VTT = Vessel Turnaround Time

Pre-Estimation Test: The following pre-estimation tests will be carried out in this study:
Unit not Test

Following Dickey and Fuller (1979, 1981), Levin, Lin and. Chu (2002) considered a panel extension of the null hypothesis that each individual time series in the panel contains a unit root against the alternative hypothesis that all individual series are stationary. The ADF

test involves estimating the model, obtaining the test statistic, and comparing it with critical values in order to decide on the rejection of the null hypothesis or otherwise.

3.4 Cointegration Test

To empirically analyze time series using traditional methods such as ordinary least squares, an assumption is usually made: the series' means and variances are constants which are independent of time (i.e. the processes are stationary). Unit root variables (or non-stationary time series) do not meet this assumption; hence, any hypothesis tested will produce skewed, biased or misleading results.

3.5 Data Analysis Techniques

The Autoregressive Distributive Lag (ARDL) model was used as analytical technique. All the data series under consideration do not need to have the same order of integrations, regardless of whether the regressors have an I (0) or I (1) order of cointegration.

All these analyses were computed through the use of E-view statistical package version 10.

3.6 Post Estimation Test

The study conducted the following post estimation tests:

Normality Test: Normality tests are statistical procedures used in ascertaining whether the errors or residuals in a regression model follow a normal distribution or not.

4. RESULTS

4.1 Presentation of Data

Time series data on annual unemployment rate (UNEMR), crude oil trade (COTR), dry bulk trade (DBTR), cargo throughput (CTP) and vessel turnaround time (VTT) for Nigeria, 1981 to 2023 used for this study are presented in Table 1:

4.2 Data Presentation

The annual time series data used for this study, comprising economic development and seaborne trade indicators, are presented in Table 1:

Table 1: Annual time series on unemployment rate (UNEMPR), crude oil trade (COTR), dry bulk trade (DBTR), cargo throughput (CTP) and vessel turnaround time (VTT) in Nigeria, 1981 – 2024

Year	UN EM PR (%)	COTR (M/T (000000))	DBTR (M/T (000000))	CTP M/T (000000)	VTT (Days)
1981	4.1	10800.3	13062.6	109995.25	35
1982	4.2	8228.7	10748.2	14405246	37
1983	5.3	7372.8	9033.4	18114772	32
1984	7.9	9123	7143.3	20075237	38
1985	6.1	11275.5	7507.9	17957195	33
1986	5.3	9282.4	5621.8	23642716	36
1987	7	31378.7	16843.6	22611229	34
1988	5.1	32238.5	20400	18741209	31
1989	4.1	59688.4	29143	13376187	29
1990	3.5	112700	42904.4	83036000	7.4
1991	3.1	124630	86393.3	86658000	5.31
1992	3.5	220945	127818	79953000	3.75
1993	3.4	254915	129485	95174000	4.59
1994	3.2	243060	125788	94273000	6.55
1995	1.9	1083391	622398	98474000	6.17
1996	2.8	1448395	423775	94332000	6.34
1997	3.4	1379402	707977	11146000	6.71
1998	3.5	893641	695635	113265000	7.31
1999	17.5	1381139	670347	22232936	6.31
2000	18.1	2141718	789028	28932880	7.01
2001	13.7	2077052	1149082	35940692	7.91
2002	12.2	2011156	1245717	36987241	11.34
2003	14.8	3392032	1776089	39765945	7.89
2004	11.8	4807587	1782240	40816947	6.44
2005	11.4	7937878	2109513	44952078	7.4
2006	13.4	7901769	2531431	49173324	6.1
2007	14.6	8878727	3342984	57473350	4.3
2008	15.9	1.1E+07	4803508	65192919	4.41
2009	19.7	9174200	4912776	66908322	4.68
2010	21.1	1.3E+07	7117788	76744727	3.72
2011	23.9	1.7E+07	8865778	83450032	4.68
2012	10.6	1.7E+07	7581636	77092625	4.89
2013	10	1.7E+07	8140219	78281634	5.65
2014	9.9	1.4E+07	9278810	84900588	4.81
2015	10.4	9909705	1E+07	77387638	4.3
2016	14.2	1.1E+07	7752748	70365036	4.75
2017	18.8	1.6E+07	9264293	71535636	3.63
2018	23.1	2.1E+07	1.1E+07	74677504	5.79
2019	25.3	2E+07	2E+07	81276508	5.89
2020	22.4	1.4E+07	1.9E+07	96400000	6.18
2021	35	2.3E+07	1.9E+07	81300000	5.44
2022	5.3	3.4E+07	2E+07	75270000	2.8
2023	5.0	4.4E+07	2.5E+07	70470000	4
2024	4.3	6.5E+07	3.2E+07	103336863	4.5

Source: Nigerian Ports Authority, the National Bureau of Statistics, Central Bank of Nigeria, and the World Development Indicators (WDI)

The trends of the series which spanned through the study period (1981-2024) are presented to provide more insights into the data distribution in Figure 3:

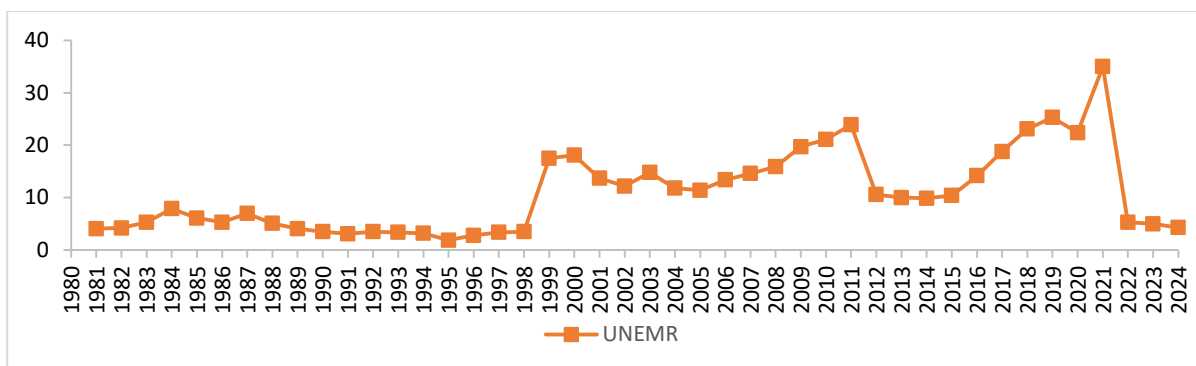


Figure 3: Trend of Unemployment rate in Nigeria (1981-2024)

Source: National Bureau of Statistics (NBS)

The unemployment rate in Nigeria exhibits cyclical volatility over the 1981–2024 period. Between 1981 and 1984, unemployment increased from 1 percent to 7.9 percent, reflecting labour market stress during the mid-1980s economic downturn. From 1985 to 1988, the rate fluctuated between 5 percent and 7 percent before declining to about 4.1 in 1989. Unemployment oscillated. From 2016 to 2019, unemployment rose again, reaching 25 percent in 2019. The most dramatic spike occurred in 2021, when the rate reached 35 percent, the highest in the series — reflecting severe

macroeconomic contraction likely due to economic disruptions of the COVID-19 pandemic. However, between 2022 and 2023, unemployment fell abruptly to about 5 percent, and further declined to 4.3 percent in 2024. The magnitude of this decline strongly suggests methodological reclassification rather than instantaneous labour market transformation. Overall, unemployment in Nigeria is characterized by structural volatility, periodic measurement breaks, and persistent labour absorption constraints.

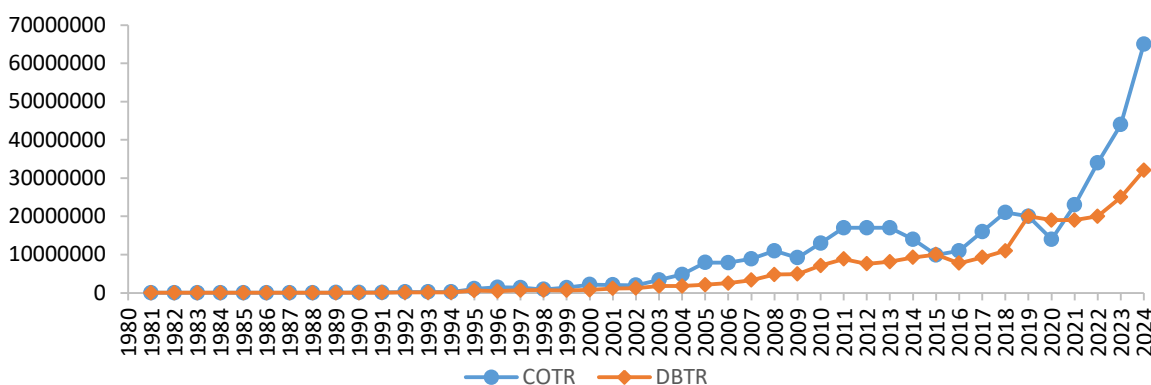


Figure 4: Trend of Crude Oil Trade and Dry Bulk Trade in Nigeria (1981-2024)

Sources: Central Bank of Nigeria (CBN) and Nigerian Ports Authority (NPA)

Crude oil trade, Nigeria's dominant export component, displays pronounced cyclical behaviour and strong exposure to global commodity dynamics. Between 1981 and 1991, crude oil trade remained relatively low and stable, reflecting limited expansion in external

trade volumes. From 1992 to 2002, the series entered a gradual upward phase, marking the beginning of sustained external sector growth. From 2021 to 2024, the series expanded dramatically, the surge represents the most pronounced expansion in the entire series,

reaffirming Nigeria's continued heavy dependence on crude oil.

Dry bulk trade, representing non-oil commodities such as agricultural products and solid minerals, exhibits steadier but smaller-scale expansion relative to crude oil trade. Between 1981 and 1994, dry bulk trade remained minimal with marginal fluctuations, reflecting weak diversification. From 1995 onward, the series began a gradual upward movement, with more visible increases between 1999 and 2002. A sustained expansion occurred between 2003 and 2011, peaking around 2011. This phase suggests growing participation of non-oil commodities in seaborne trade. A moderate decline followed between 2012 and

2013, with stabilization in 2014–2015. Between 2016 and 2019, dry bulk trade expanded significantly, reaching one of its highest pre-2020 levels in 2019. A contraction occurred in 2020, which may be attributed to external disruptions. From 2021 to 2024, dry bulk trade rose sharply, with 2024 recording the highest level in the series. Although still smaller in magnitude than crude oil trade, the upward post-2021 trajectory indicates strengthening non-oil trade participation. Overall, dry bulk trade demonstrates gradual diversification potential, though its scale remains substantially below that of crude oil exports, underscoring the continued structural dominance of hydrocarbons in Nigeria's external trade composition.

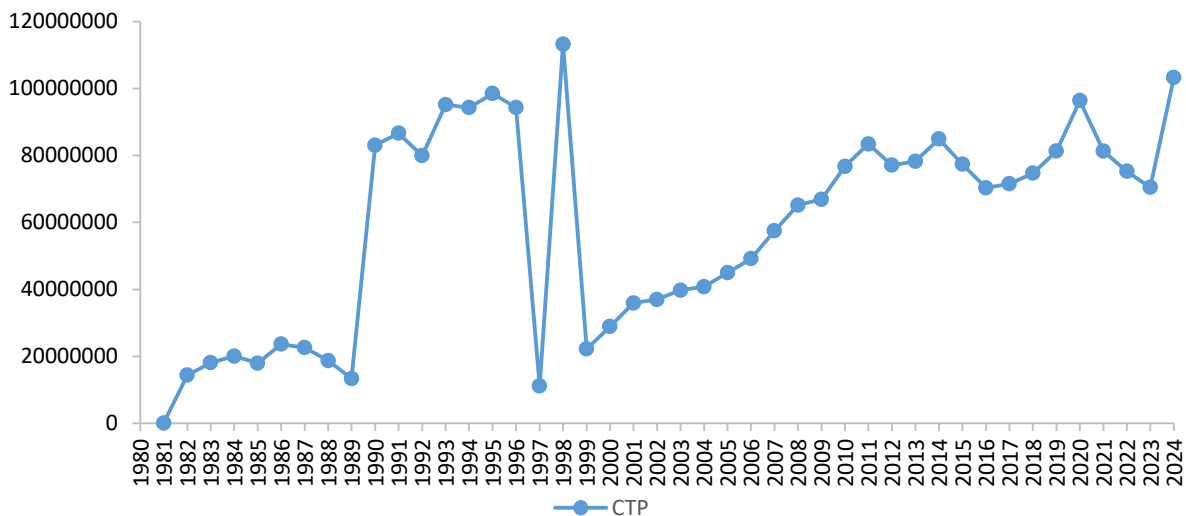


Figure 5: Trend of Cargo Throughput in Nigeria (1981-2024)

Source: Nigerian Ports Authority (NPA)

Cargo throughput in Nigeria, measured as the total volume of goods handled at seaports, exhibits clear structural breaks, cyclical volatility, and long-run expansion. Figure 5. Between 1981 and 1986, throughput rose significantly from low levels of 0.11 million metric tons to 23.64 million metric tons before declining to 22.61 million metric tons in 1987 and further to 13.37 million metric tons in 1989, reflecting limited port capacity and instability in trade flows. A major structural shift occurred in 1990, when cargo throughput surged to above 8 million metric tons. Between 1992 and 1996, volumes remained elevated (80

–100 million metric tons), marking a transformation in port utilization and trade intensity. The period 1997–1999 shows extreme volatility as cargo throughput fell sharply in 1997 to 11.14 million metric tons, surged in 1998 to above 113 million metric tons, and declined again in 1999 to 22.23 million metric tons, which may be attributed to structural disruptions or exceptional trade shocks. From 2000 to 2007, throughput increased steadily from 28.93 million metric tons to above 50 million metric tons, reflecting normalization and gradual strengthening of maritime activity.

A stronger expansion followed between 2008 and 2014, when cargo throughput rose to approximately 85 million metric tons. Between 2015 and 2016, volumes declined moderately to around 70 million metric tons, suggesting reduced trade flows or operational constraints. Recovery occurred from 2017 to 2020, with cargo throughput reaching 96.4 million metric

tons in 2020. After a decline in 2021–2023 (around 70–80million), a sharp rebound occurred in 2024, with volumes exceeding 100 million metric tons. Overall, cargo throughput demonstrates long-run upward movement despite episodic shocks, indicating expanding maritime trade capacity but persistent exposure to cyclical disturbances.

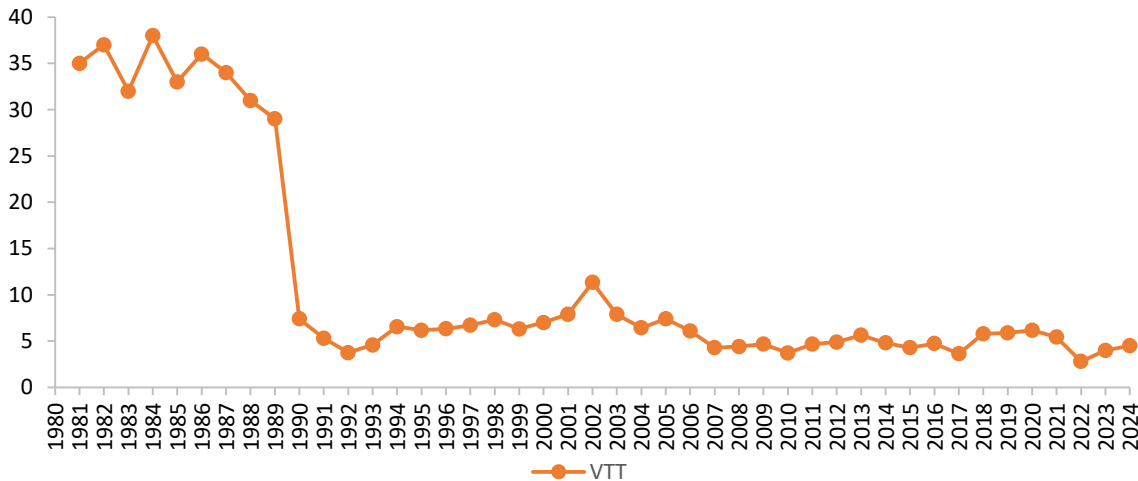


Figure 6: Trend of Vessel Turnaround Time in Nigeria (1981-2024)

Source: Nigerian Ports Authority (NPA)

Vessel Turnaround Time, a proxy for port efficiency, reveals a dramatic structural improvement over the sample period. Between 1981 and 1988, VTT remained excessively high (30–38 days), peaking above 35 days in 1984 and 1986. This phase reflects severe congestion, administrative delays, and infrastructural bottlenecks. A major structural break occurred between 1989 and 1990, when VTT fell sharply from about 29 days to approximately 7 days. By 1991–1992, it declined further to 3.75 days, marking a significant efficiency transformation. Between 1993 and 1999, VTT stabilized around 6–7 days, though a temporary increase occurred in 2000–2001, peaking above 11 days in 2002,

likely reflecting congestion pressures. From 2003 to 2007, VTT declined again to 4.3 days. Between 2008 and 2017, turnaround time remained consistently low (3.5–5.7 days), with the lowest levels observed around 2010 and 2017 (below 4 days), indicating sustained operational efficiency.

In 2022, VTT declined sharply to 2.8 days, one of the lowest levels recorded, before rising slightly to 4–4.5 days in 2023–2024. Overall, VTT shows a long-run structural decline, indicating substantial efficiency gains in port operations, with only mild cyclical congestion episodes in recent years.

4.3 Data Analysis

4.3.1 Descriptive Statistics

The descriptive statistics for each variable, including mean distribution, minimum and

maximum values, standard deviation, skewness and kurtosis, among others are shown in Table 2:

Table 2: Summary of Descriptive Statistics for the Variables

Statistics	UNEMR	COTR	DBTR	CTP	VIT
Mean	12.94	9156021.	5504234.	59004778	11.45
Median	11.00	2766875.	1510903.	70417518	6.18
Maximum	37.70	6478154	3164589	11300000	38.00
		2	2		
Minimum	1.90	7372.800	5621.800	109995.3	2.80
Std. Dev.	9.67	1310528	7789390.	30975337	11.66
		4			
Skewness	0.95	2.347609	1.659500	-0.265648	1.45
Kurtosis	3.12	9.437097	5.044947	1.749940	3.26
Jarque-Bera	6.68	116.3824	27.86220	3.382364	15.59
Probability	0.035	0.000000	0.000001	0.184302	0.000
Obs	44	44	44	44	44

Source: EViews 12 Software Output (2026)

The descriptive statistics showed that the unemployment rate and income inequality averaged 12.94% and 42.93%, respectively. The unemployment rate varied between the minimum value of 1.90% and the maximum value of 37.70%. Similarly, the minimum and maximum values of income inequality are 35.10% and 56%, respectively. This highlights the growing income inequality within Nigeria. The standard deviations for the unemployment rate and income inequality are less than their corresponding mean values, indicating that the observations for the variables are clustered around their means.

Furthermore, the results showed that crude oil trade averaged 9156021 with minimum and maximum values of 7372.8 and 64781542, respectively. This shows that Nigeria has witnessed significant trade in crude oil. The standard deviation of 13105284 for the crude oil trade indicates that the observations for the crude oil trade converged around the mean value. It is also evident from the results that dry bulk trade and cargo throughput averaged 5504234 and 59004778, respectively. The minimum and maximum values for dry bulk trade are 5621.8 and 31645892, respectively. However, the standard deviations showed that the observations for dry bulk trade deviated from its mean, while those of cargo throughput clustered around the mean. The results also showed that the vessel turnaround time averaged 11.45, ranging from 2.80 to 38.00. The standard deviation of 11.66 for vessel turnaround time indicates that the observations for the variable deviated from the mean. This could be attributed to changes in the dimensions of seaborne trade, which affect vessels' turnaround times. However, the probability values of the Jarque-Bera statistics for the other variables are less than 0.05, indicating that they are not normally distributed at the 5% level.

4.3.2 Unit Root Test

As previously explained, the ADF method was employed for the unit root test. The results are presented in Table 3:

Table 3: Summary of Unit Root Test Results

Variable	ADF stat. at levels	ADF stat. at 1st diff.	5% critical value	Order of integration
LOG(UNEMPR)	-1.123	-6.318***	-2.931	I(1)
LOG(COTR)	-1.1215	-6.734***	-2.931	I(1)
LOG(DBTR)	-1.009	-7.934***	-2.931	I(1)
LOG(CTP)	-3.838***	-	-2.931	I(0)
LOG(VTT)	-1.927	-6.112***	-2.931	I(1)

Source: EViews 12 Software Output (2026)

The unit root test results showed that only cargo throughput is stationary at levels 1(0). This is because its ADF statistic (-3.838) at levels is greater than the corresponding 5% critical value (-2.931), in absolute terms. This indicates that the null hypothesis of unit root for cargo

throughput is rejected. The evidence of stationarity at levels for cargo throughput implies that it is integrated of order zero, I(0). The ADF unit root test results further showed that the other variables were not stationary, given that their ADF statistics at levels are less

than the corresponding 5% critical value (-2.931). Hence, the null hypotheses of unit root cannot be rejected for the variables at the 5% level. However, the first difference test results showed that the variables became stationary after difference. In other words, they are integrated of order one, I(1). The evidence of first difference stationary process suggests that data transformation through first difference can be relied upon to achieve stationarity among non-stationary time series. In sum, the unit root

test results showed that the variables are mixed integrated, thereby necessitating the cointegration test using the bounds method.

4.3.3 Cointegration Test

The evidence of mixed integration in the series from the ADF unit root test results prompted the adoption of bounds cointegration method for the cointegration test among the variables in each of the model. The results are presented in Tables 4.

Table 4: Bounds Cointegration Test Result for Unemployment Model

Series: UNEMPR COTR DBTR CTP VTT		Null Hypothesis: No levels relationship		
F-Bounds Test				
Test Statistic	Value	Sig. level	I(0)	I(1)
F-statistic	5.589	10%	2.2	3.09
K	4	5%	2.56	3.49
		1%	3.29	4.37

Source: EViews 12 Software Output (2026)

Note: K denotes the number of regressors

Table 4 shows the bounds cointegration test results for model 4, with the unemployment rate as the dependent variable. The results showed that the F-statistic (5.589) exceeds the 5% upper bound critical value (3.49). This necessitated rejecting the null hypothesis of no cointegration among the variables. This implies that the unemployment rate has a long-run relationship with crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time during the study period. This finding provides the basis for estimating the long and short-run effects of seaborne trade indicators on the unemployment rate in Nigeria.

4.4 Model Estimation

4.4.1 Estimation of the Autoregressive Distributed Lag (ARDL) Model

Following evidence of mixed order of integration and the presence of long run relationship amongst the variables examined, the autoregressive distributed lag ARDL model was estimated to analyse the behaviour of the variables in the long run and short run and the speed of adjustment to long run equilibrium. The results are presented in Tables 4.9 - 4.13.

Table 5: ARDL Short and Long-Run Results for Unemployment Model

Dependent Variable: LOG(UNEMPR)				
Short-run Estimates				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(UNEMPR(-1))	0.6968	0.2614	2.6650	0.0158
DLOG(COTR)	0.4871	0.2131	2.2852	0.0346
DLOG(COTR(-1))	-0.0753	0.2171	-0.3469	0.7327
DLOG(DBTR)	-0.4522	0.2459	-1.8383	0.0826
DLOG(CTP)	-0.0221	0.1681	-0.1319	0.8965
DLOG(VTT)	0.4260	0.2375	1.7937	0.0897
DLOG(VTT(-1))	-0.5595	0.2547	-2.1963	0.0414
CointEq(-1)	-0.9291	0.2087	-4.4511	0.0003
Long-run estimates				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(COTR)	0.5979	0.3159	1.8926	0.0746
LOG(DBTR)	-0.0915	0.3049	-0.3000	0.7676
LOG(CTP)	0.4543	0.4394	1.0339	0.3149
LOG(VTT)	1.5186	0.4045	3.7542	0.0015
C	-16.130	8.9151	-1.8093	0.0871
R-squared	0.9630		Prob(F-stat.)	0.0000

Source: EViews 12 Software Output (2026)

Table 5 shows the short and long-run results for the unemployment rate model as the dependent variable. This followed the evidence of cointegration among the mixed integrated variables in the model. The results showed that unemployment lagged for one period positively affected its current value. This finding is significant at the 5% level, indicating that the unemployment rate in the previous period can serve as a basis for the future level of unemployment. The results also show that crude oil trade has a positive effect on the unemployment rate in the short and long run. While the short-run positive effect of crude oil trade on the unemployment rate is significant at the 5% level, the long-run effect is not statistically significant. Thus, the estimated parameter indicated that a percentage increase in crude oil trade led to a 0.487% increase in the unemployment rate in the short run. This finding suggests that an increase in crude oil trade is associated with an increase in the unemployment rate in Nigeria. This could be attributed to the capital-intensive nature of the oil sector, which limits the employment of labour. The results further showed that dry bulk trade negatively affects the unemployment rate in both the long and short run. This finding is not significant at the 5% level, indicating that an increase in dry bulk trade has not significantly reduced Nigeria's unemployment rate. This could be attributed to the dominance of primary commodities in non-oil exports, with limited labour employment potential in Nigeria.

Furthermore, the effect of cargo throughput on unemployment is mixed. While the short-run results showed that cargo throughput negatively affected the unemployment rate in the short run, it was observed from the long-run results that the effect of cargo throughput on the unemployment rate is positive, but not

significant at the 5% level. These findings indicate that an increase in the flow of goods through the ports has not translated into a significant reduction in unemployment in Nigeria. Similarly, there is evidence of a mixed effect of vessel turnaround time on unemployment rate in both the short and long run.

As shown in the short-run results, vessel turnaround time significantly reduced the unemployment rate, indicating that a percentage increase in vessel turnaround time is associated with a 0.5595 decrease in the unemployment rate. On the other hand, the unemployment rate is positively and significantly influenced by the vessel turnaround time in the long run. The results showed that a percentage increase in the vessel turnaround time is associated with 1.5187% increase in unemployment rate in the long run. The R-squared of 0.9630 indicates that about 96.30 percent of the total variations in unemployment rate are collectively explained by the changes in the regressors, such as crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time. The probability value (0.0000) of the F-statistic is below 0.05, indicating that crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time are jointly significant in affecting unemployment rate over the study period. These findings authenticate the statistical reliability of the estimated unemployment rate model.

4.4.2 Post-Estimation Tests

The study carried out post diagnostic test to ascertain whether the empirical results are reliable and suitable for policy application and recommendation.

Table 6: Post-estimation Test Results for Unemployment Rate Model

Test type	Test Statistic	Prob. Value	Inference
Breusch-Godfrey Serial Correlation LM Test	1.240	0.5378	No serial correlation
White Heteroskedasticity Test	14.458	0.8065	Homoscedastic
Ramsey RESET	0.275	0.7629	No misspecification
Jarque-Bera Normality Test	0.5241	0.7694	Normally distributed

Source: EViews 12 Software Output (2026)

The Breusch-Godfrey serial correlation LM test result showed that the probability value (0.5378) of the test statistic (1.240) is greater than 0.05. This implies that there is no serial correlation in the residuals at the 5% level. Similarly, the residual is homoscedastic at the 5% level, given that the probability value (0.8065) of the test statistic (14.458) for the White heteroskedasticity test is greater than 0.05. This finding validates the reliability of the estimated model. Additionally, there is no functional misspecification in the model at the

5% level, given that the p-value (0.7629) for the F-statistic (0.2752) is greater than 0.05.

The Jarque–Bera statistic is 0.5241 with a probability value of 0.7694. Since the probability exceeds 0.05, the null hypothesis of normality is accepted. This indicates that the residuals are normally distributed, confirming that the model satisfies the normality assumption.

Thus, the post-estimation test results showed that the results are reliable for both policy and macroeconomic prediction.

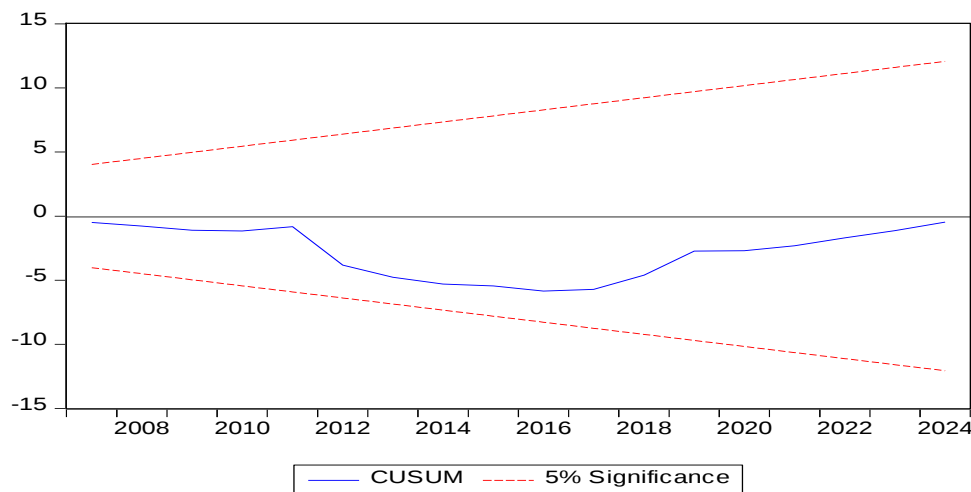


Figure 7: Plot of Cumulative Sum (CUSUM)

Source: EViews 12 Software Output (2026)

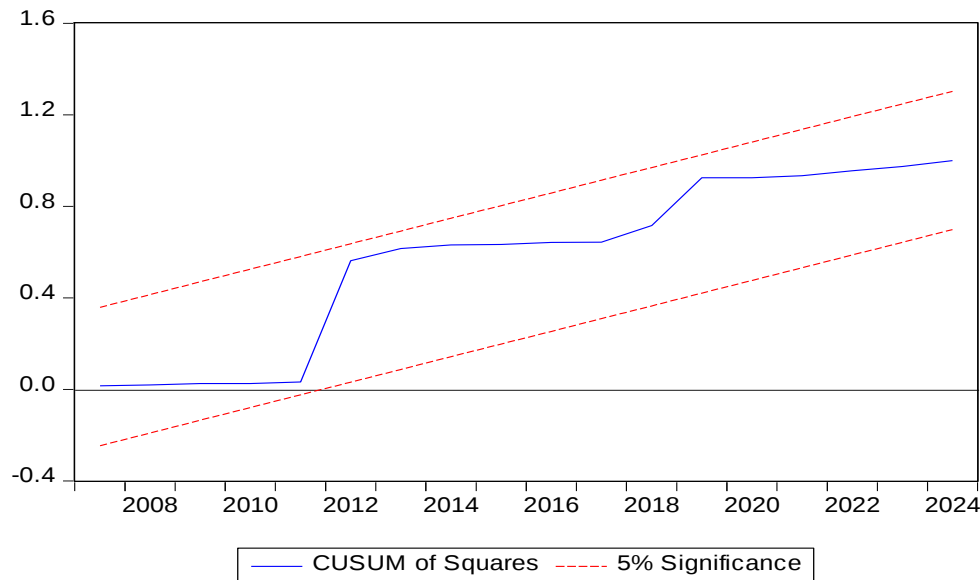


Figure 8: Plot of Cumulative Sum (CUSUM) of Squares

Source: EViews 12 Software Output (2026)

The stability test conducted using the cumulative sum (CUSUM) and cumulative sum (CUSUM) of squares indicate that the parameters are stable and no structural breaks exist in the series. Figure 7 and 8 show that the respective plots of the cumulative sum (CUSUM) and cumulative sum (CUSUM) of squares lie within the 5 percent critical level.

4.5 Discussion

This section focused on the findings from empirically investigating the effect of international seaborne trade on economic development in Nigeria covering the period between 1981 -2024. The ARDL model's short- and long-run analysis offers crucial insights into how seaborne trade indicators; crude oil trade (COTR), dry bulk trade (DBTR) and Cargo throughput (CTP) and vessel turnaround time (VTT) affect Nigeria's unemployment rate (UNEMR). The empirical results were discussed to ascertain if the specified objectives of the study were successfully accomplished and also link the findings with the theoretical expectations. The findings were equally discussed in line with the stated hypotheses to ascertain if the null hypotheses are to be rejected or not.

4.5.1 Effect of Crude Oil Trade on Unemployment Rate

The findings indicate that crude oil trade positively influences unemployment rates in both the short and long term. Although the short-term impact is significant at the 5% level, the long-term effect is not. This suggests that an increase in crude oil trade is associated with higher unemployment in Nigeria, possibly because the oil industry is capital-intensive, limiting employment opportunities. This finding corroborates the results of Wang et al. (2022), who reported that changes in oil prices and exports worsen the unemployment problem. Crude oil trade increases unemployment in Nigeria because it generates growth without jobs, undermines labour-intensive sectors through Dutch Disease and import dependence. This finding underscores the growing income disparity associated with the growing crude oil activities, driven by rent-seeking behaviours and widespread corruption. The positive and statistically significant impact of crude oil trade on income inequality further suggests that the gains from crude oil trade are highly concentrated among a few individuals. This aligns with the resource curse theory and the findings of Bamaïyi (2024), who found that oil resources exacerbate income inequality in resource-rich countries. The results further

showed that dry bulk trade has a significant negative effect on income inequality in both the short- and long-run. This finding is consistent with a priori expectation of the study and aligns with the findings of Edy and Edy (2024), who found that crude oil exports contributed significantly to economic growth. This finding highlights the critical position of the oil sector in the Nigerian economy. Also, the positive effect of crude oil trade was found to be statistically significant at 0.05 significance level given the probability value of 0.0200

4.5.2 Effect of Dry Bulk Trade on Unemployment Rate

On the other hand, the findings indicate that dry bulk trade negatively affects unemployment in both the short- and long-run. The findings of the study revealed that dry bulk trade negatively affects the unemployment rate in both the long and short run. This finding is not significant at the 5% level, indicating that an increase in dry bulk trade has not significantly reduced Nigeria's unemployment rate. This could be attributed to the dominance of primary commodities in non-oil exports, with limited labour employment potential in Nigeria.

This finding aligns with theoretical expectations and could be attributed to dry bulk trade creating direct and indirect employment across ports, transport corridors, agriculture, mining, and manufacturing. This is in line with the findings of Usoro et al. (2020) and Chukwu-ekwueme (2023), who found that non-oil trade significantly improved employment generation, thereby reducing the unemployment rate. This finding is consistent with the a priori expectation, indicating that an increase in dry bulk trade is not associated with an increase in employment generation or income. This finding is consistent with previous results by Abinabo and Abubakar (2023), who reported that non-oil trade significantly reduces income. This finding highlights the potential of dry bulk exports to reduce unemployment rate within the population.

Theoretical implication indicates that Trade theory (Heckscher-Ohlin) predicts trade increases demand and wages for abundant

factors (labor in labor-abundant economies). In Nigeria, unskilled labor is abundant—trade should raise unskilled wages. However, oil and dry bulk sectors are capital-intensive, muting this effect. Also, the theoretical implication of international seaborne trade on income inequality in Nigeria is **complex** and depends on which trade segments dominate, how benefits are distributed across sectors, regions, and populations as well as institutional quality governing redistribution and market access. Practical implication for Nigeria is that oil seaborne trade tends to amplify unemployment rate unless accompanied by robust redistribution and diversification policies. Practically, trade can both widen and narrow inequality, and in Nigeria's context—with dominant oil exports and infrastructural bottlenecks—the risk of increased unemployment is higher unless structural reforms promote inclusivity and diversification.

4.5.3 Effect of Cargo Throughput on Unemployment Rate

The influence of cargo throughput on unemployment presented mixed results. Short-term findings indicate that cargo throughput negatively affects the unemployment rate, whereas long-term findings suggest a positive, though statistically insignificant, effect at the 5% level. The short-run decrease in unemployment aligns with the findings of Alvik (2024) and Onyeche and Enyioko (2025), who found that dry bulk transport significantly enhances Nigeria's economic well-being. The study revealed that vessel turnaround time exhibits varying effects on unemployment in both the short and long-run. Specifically, the short-term results show that an increase in vessel turnaround time significantly lowers unemployment. This is consistent with the a priori expectation, indicating that the operational efficiency of vessels has the potential to enhance employment generation.

Cargo throughput likely captures broader economic expansion, industrial linkages, employment generation, and income growth, which collectively contribute to long-term improvements in human development

outcomes. Accordingly, the study submits that cargo throughput has a positive and statistically significant long-run effect on HDI in Nigeria (Odiegwu & Enyioko, 2022a). Trade-Led Growth theory argues that increased trade openness enhances productivity, encourages specialization and promotes economic growth. The practical implications are that higher cargo throughput increases employment in ports, transport, warehousing, and manufacturing. Rising incomes improve access to healthcare, education, and decent living conditions. Government revenue from port activities expands fiscal space for social spending.

4.5.4 Effect of Vessel Turnaround Time on Unemployment Rate

The study found that there is evidence of a mixed effect of vessel turnaround time on unemployment rate in both the short and long run. The study revealed that in the short-run results, vessel turnaround time significantly reduced the unemployment rate, indicating that a percentage increase in vessel turnaround time is associated with a 0.5595 decrease in the unemployment rate. On the other hand, the unemployment rate is positively and significantly influenced by the vessel turnaround time in the long run. The study showed that a percentage increase in the vessel turnaround time is associated with 1.5187% increase in unemployment rate in the long run. The R-squared (R^2) of 0.9630 indicates that about 96.30 percent of the total variations in unemployment rate are collectively explained by the changes in the regressors, such as crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time. The probability value (0.0000) of the F-statistic is below 0.05, indicating that crude oil trade, dry bulk trade, cargo throughput, and vessel turnaround time are jointly significant in affecting unemployment rate over the study period. These findings authenticate the statistical reliability of the estimated unemployment rate model. These finding are in consonance with the works of Onyuku *et al.* (2025), who found that containerized trade has positive and significant effect on vessel turnaround time of ports in Nigeria. The *theoretical implications* of international seaborne trade on unemployment

in Nigeria show a complex mix to the extent that oil trade alone is unlikely to reduce unemployment significantly. Dry bulk trade, increased cargo throughput, and efficient ports have the greatest potential to lower unemployment through direct and indirect job creation—provided that policies ensure inclusive access and skill development.

4.5 Conclusion

In this study, the effect of seaborne trade on unemployment rate in Nigeria was analysed, with particular attention to the configuration of seaborne trade and its broader composition, including crude oil trade, dry bulk trade, cargo throughput and vessel turnaround time. The long run effect of the study revealed that seaborne trade is very essential for employment generation. The study concludes that international seaborne trade is a vital driver of economic development and by extension helps to reduce unemployment in Nigeria.

Recommendations

- i. Policymakers, including the Nigerian Port Authority (NPA), should prioritise dry bulk trade development by expanding and modernising dry bulk port infrastructure, promoting export diversification through Dry Bulk Commodities and expanding labour-intensive activities within the dry bulk value chain to create more opportunities for employment generation
- ii. The government should ensure that dry bulk trade and cargo throughput growth policies are consistent with economic development objectives towards reducing poverty, unemployment and income inequality as well as improving human development.
- iii. Governments and private stakeholders should invest in maritime education, training, and capacity building to create employment opportunities in shipping, logistics, port management, and related sectors.
- iv. Port authorities should implement measures such as port automation, improved scheduling systems, and better coordination among shipping

agencies to minimize vessel waiting time and enhance operational efficiency and as well reduce unemployment rate in maritime sector.

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