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Effect of Maritime Transport on Economic Development in Nigeria, 1980-2023

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ABSTRACT

The study examined the effect of maritime transport on economic development in Nigeria, 1980-2023. The objectives were to determine the effect of: i). crude oil, ii). dry bulk and iii). non-oil transport on real gross domestic product in Nigeria. 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 regressive distributed lag (ARDL) 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 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. Conclusively, the study has revealed that crude oil transport has positive and significant effect on real GDP, dry bulk transport has positive/ and insignificant effect on real GDP and non-oil transport has negative and insignificant effect on real GDP in Nigeria. Conclusively, it is evident that: Crude oil transport has positive and significant effect on real gross domestic products (t = 11.028 @ p0.000 <0.05); dry bulk transport has positive and insignificant effect on real gross domestic products (t = 1.903 @ p0.064>0.05); non-oil transport has negative and insignificant effect on real gross domestic products in Nigeria (t = -1.210@p0.234>0.05). The study therefore recommended that: Government should harness the effective and efficient use of the mixed-policy approach involving monetary, fiscal and trade policies to reduce import and encourage consumption of local products and motivate exporters to use non-oil and dry bulk transport thereby boosting the development of Nigeria economy. Government should throw its searchlight in the maritime sector with a view to creating the enabling environment for investments to thrive. Maritime transport has the capacity to take over from oil as a revenue earner

Keywords: Maritime Transport, Human Capital Development, Crude Oil Transport, Non-Oil Transport, Dry Bulk Transport, Economic Development, Real Gross Domestic Products

INTRODUCTION

Maritime transport is the backbone of international trade and the global economy; over 80% of the volume of international trade in goods is carried by sea, and the percentage is even higher for most developing countries (UNCTAD, 2023). Maritime transport is an age-long transport system that has over the years been used for the movement of humans and tangible properties, especially bulky objects and liquid objects which may be too heavy or delicate for other forms of transport (Onyenucheya, 2022). Maritime transport is the mainstay of world trade and globalization. Twenty-four hours a day and all year round, ships carry cargoes to all corners of the globe. This role will continue to grow with the anticipated increase in world trade in the years to come as millions of people are expected to be lifted out of poverty through improved access to basic materials, goods and products. Maritime transport's essential role in facilitating international trade is critical to the global economy and globalization.

Maritime transport is the movement of people and merchandise by vessels between the port of origin where people and merchandise received from the businesspersons at the port of origin to the port of destination where they disembarked and claimed by the owners. Maritime transport involves the physical transport of people and cargoes from an area of supply to an area of demand for passengers and certain types of goods, together with all the activities required to support and facilitate such transport (Owoputi &, Owolabi, 2020).

Maritime transport is a critical element of an economic structure, encompassing everything from shipbuilding to port development to maritime logistics services. World trade and maritime transport are, therefore, fundamental to sustaining economic development and spreading prosperity throughout the world, thereby fulfilling a critical social as well as an economic function (United Nations, 2022).

Owing to the critical importance of maritime transport in global trade and economic development in general, it has drawn extensive research from a variety of disciplines, including operations research, management and environmental science (Sakyi & Immurana, 2021). With the rapid growth of maritime transportation, economic researchers and policymakers face a significant challenge in synthesizing data timely, accurate, and effective to evaluate operational performance. A country's maritime efficiency can be increased by optimizing its outputs from various inputs. Additionally, it can assist a country in enhancing its competitive advantages in global markets and improve the country's resource utilization position relative to other countries (Owoputi &, Owolabi, 2020). In contrast, when a country's factors of production are inefficient, the country's economic resources are wasted. The unit's cost will eventually rise if it is kept in the same conditions (Okoye, 2021a).

The maritime transport's role in nations' economic development is essential for research consideration. The shipping operations support global trade with their capacity to facilitate the exchange of enormous volumes of goods across countries of the world. The maritime industry encompasses diverse components of shipping operations that ensure the successful handling and transhipment of goods from the sea to the hinterlands and vice versa. The roles of the shipping industry in global trade are huge, having the capacity to influence product sales and price shocks (Egole, 2022).

Maritime transport is of great importance for the global economy, as it accounts for around 80% of worldwide trade, highly affecting economic development (UNCTAD, 2021) both maritime transport and its related activities have a great overall impact on the economy, influencing a lot of industries, directly or indirectly. While maritime transport is considered the lynchpin of global trade a lot of other industries rely heavily on it, as an array of resources are transported to manufacturing centres (Lane & Pretes, 2020).

The Nigerian maritime transportation industry is designed in accordance with the country's national economic development plan targeted at ensuring that the sector becomes a strong and viable public/private going concern with the government as regulator. This is in view of the fact that Nigeria accounts for over 60% of total sea borne traffic in volume and values in West and Central African regions (Owoputi &Owolabi, 2020). The Nigerian maritime sector therefore should create a link between maritime transportation and economic development as the source provider of logistics. Global shipping operations have been recording substantial growth over the years due to the symbiotic relationship between globalization and shipping. The shipping trade represents the global exchange of goods within the maritime industry, which is expected to grow by 2.4% from 2022 to 2026 (UNCTAD, 2021). Similarly, Michail (2020), a search for literature on shipping trade and economic development in Nigeria revealed few studies on this aspect of the maritime industry. Osadume and Okuoyibo (2020), Owoputi and Owolabi (2020), and Ekpo (2012) employed a descriptive technique to discuss maritime shipping trade and economic development in Nigeria. Njoku et al. (2020) and Elias et al. (2018) applied a non-time series regression technique to examine external debt, foreign exchange rate, and export and import values and their effects on economic development in Nigeria. However, Osadume and Uzoma (2020) applied the Autoregressive Distribution Lag (ARDL) to study economic development proxied by the HDI—human development index and the effect of trade, exchange rate and inflation rate.

One gap in the literature is the lack of analysis of the long-term effect of maritime transport on economic development. Most studies on maritime transport and economic growth in Nigeria have focused on short-term or intermediate-term effects. Still, there is a need for more research on moderating effect of foreign exchange rate on maritime transport and economic development in Nigeria. This study analyzed the effect of crude oil transport, non-oil transport, dry bulk transport on economic development in Nigeria.

Objectives of the Study

The aim of this study is to examine the effect of maritime transport on economic development in Nigeria. Specifically, the study seeks to:

i). determine the effect of crude oil transport on real gross domestic products in Nigeria.

ii). investigate the effect of dry bulk transport on real gross domestic products in Nigeria.

iii). examine the effect of non-oil transport on real gross domestic products in Nigeria.

Research Questions

The study is guided by the following research questions:

i). What is the effect of non-oil transport on real gross domestic products in Nigeria?

ii). Does dry bulk transport affect real gross domestic products in Nigeria?

iii). To what extent has crude oil transport affected real gross domestic products in Nigeria?

Research Hypotheses

This research investigates the effect of maritime transport on economic development in Nigeria. Accordingly, the following hypotheses relating to the purpose and problems of the study have been formulated and for investigation:

Ho_1: Crude oil transport has no significant effect on real gross domestic products in Nigeria.

Ho_2: Dry bulk transport has no significant effect on real gross domestic products in Nigeria.

Ho_3: Non-oil transport) has no significant effect on real gross domestic products in Nigeria.

LITERATURE REVIEW

Theoretical Foundation

This study was anchored on two theoretical models. Each model introduces a unique theoretical lens. They are queuing theory and planned behaviour theory.

Queuing Theory (Birth-and-Death Process Theory)

In the context of queuing theory, the term birth refers to the arrival of a new customer into the queuing system, and death refers to the departure of a served customer (Hillier & Gerald, 2014). Only one birth or death may occur at a time: therefore, transitions always occur to the "next higher" or "next lower" state. The rates at which births and deaths occur are prescribed precisely by the parameters of the exponential distributions that describe the arrival and service patterns (Enyioko, 2016). The state of the system at time t ($t \geq 0$), denoted by N(t), is the number of customers in the queuing system at time t. The birth-and-death process describes probabilistically how N(t) changes as t increases.

A fundamental flaw in the birth-and-death process structure is a reliance on equilibrium between birth and death rates. This assumes the overall population shall remain constant at long run (Enyioko, 2016). The approach is based on the rate-equality principle (Medhi, 2005) or balanced population model. Rate-Equality Principle states that the rate at which a process enters a state n (≥ 0) equals the rate which the process leaves that state n. In other words, the rate of entering and the rate of leaving a particular state are the same for every state. Rate in = rate out principle. This principle implies that for any state of the system can be expressed by an equation which is called the balance equation for state n ($n = 0, 1, 2\ldots$), and mean entering rate = mean leaving rate (Michail, 2020).

Ibrahim (2022) pointed out the application of Queuing theory to curb port congestion problem at Tin Can Island Port in Nigeria, Hillier and Gerald (2014) observed that there are many queuing models that can be formulated and used to analyze problems of port congestion in maritime transport. The maritime transportation system uses queuing model to handle the vessels berth on the modality of First Come First Serve (FCFC) which helps to reduce dwell time, and ship turnaround time. It is advised that the model be tailored with computer systems and information technology in assigning vessels, berths and cranes to ease maritime transportation traffic.

Planed Behaviour Theory

Theory of planed behaviour maintains that its adoption on the maritime transport and economic development is correlated with the company's attitude, where attitude is the reflection of the firm's beliefs on the outcome of the selection (Sakyi & Immurana, 2021). The notion firms have towards economic development is aligned to what academia poses and is reflected around the triple bottom line of people-planet-profit (Ajzen, (1991). In this context the people aspect is reflected with the provision of safety, while the planet aspect is connected with the environmental integrity and resource preservation. Lastly the profit aspect is an operational derivative under the two previous lenses through a dynamic relationship among them, along with the reciprocal relationships coming from the outer environment of the firm.

The proactive approach that was showed by the shipping firms, along with the perception that there will be no field for conducting business unless it is secured, preserved and sustainable is aligned with Jiang and Gong (2018). Kang (2016) posits that managerial philosophy towards economic development and the viewpoint of incorporating economic development into the values, goals, and objectives of the firm as suitable solutions, rather than a must-do trade-off. Examined shipping firms supported such a statement since they positioned themselves in the center of the responsibility and perceive the conduction of business and operations as an outcome with respect to the first two aspects of the triple bottom line (people and planet).

Egole (2022) submits that the norms an entity is encountering are influenced by the approval or disapproval of specific behaviors by the outer environment. Newswire (2022) extended it to the maritime transport context by posing stakeholders as the outer environment that approved or reject a certain behavior. The position as a central actor showed by shipping firms, combined with the proactive strategy towards regulation compliance and the development of normative behavior when referring to the outer environment contradicts the notion of approval or disapproval. Though the solutions offered and suggested from various stakeholders in the shipping industry are operational, technical and market-based, the approval or disapproval derives from the central actor, in this instance the ship owner. The evaluation of each proposed choice is filtered and as posed in the results, the already developed normative and proactive approach endorses straightforward and real-life applicable solutions. Such a behavior is also supported by the fact that the expansion and further development of the implemented measures is correlated with ensuring actual results in terms of emission reduction and resource preservation. Hence, the market-based mechanisms were not supported and were instead disregarded.

Conceptual Review

In this section of conceptual review, the concepts used in the study, such as maritime transport, crude oil, dry bulk, non-oil transport, and human development index.

Concept of Maritime Transport

Maritime transport (ocean transport) refers to the transportation of people and goods via sea routes (Onyenucheya, 2022). The Maritime transport sector consists of a national registry, flagging, and cargo handling whereas while maritime manufacturing has to do with the building of marine vessels, rig and ship repair, and includes offshore oil and gas services. Maritime transport has a system that is integrated which includes the design, construction, operation, management, servicing, and maintenance of merchant, leisure, and other ships in the service of seaborne trade. It also involves the conducting of offshore

operations, port construction, shipbuilding, maritime services, and the transporting of people and cargo from point A to B by sea or via inland waterways. In addition, effective domestic demand and employment, which make a great contribution to a country's human capital development (Kramer, 2022).

According to Stopford (2009) during the1960s maritime transport began, on a global scale, primarily using containers for large loads of cargo, and found these to be a useful and cost-effective cargo transportation mode over any distance by large boats or ships, and over oceans and lakes. This transport mode has since proved to be the most popular among people and companies engaged in international trade. However, while it is the least expensive and relatively environmentally friendly option, it is also the most time-consuming one. Its benefits also include transportation of large volumes of goods with low costs and the most used in modern societies.

The United Nations Conference on Trade and Development (UNCTAD) of 2023, maritime transport remains the backbone of global trade and manufacturing supply chains. UNCTAD (2023a), reports that more than a quarter of world trade volume is done via ocean transport. Further, maritime transport handles 80 percent of trade by volume with approximately 70 percent of its value. According to the UNCTAD (2023a) report, this trade has been linking global economics and has acted as a critical enabler of trade, an engine of growth, and a driver of social development. According to United Kingdom Parliament (2023) over centuries, maritime transport has played a major role in trade. Apart from representing a co-dependence between trade, shipping services, and the supply chain, it has generated measurable social and economic gains. Further, it also plays a vital role in bringing together maritime transport providers and users, and all the parties in the international supply chain to work together for the benefit and profitability of a trade.

Maritime transport is not only faced with rapid growth in demand and pressure from transport services, but also technical challenges which include outdated infrastructure which results in congestion and causes delays. Further, this includes a lack of investment for upgrading and maintaining ports infrastructure (Maersk, 2022). In addition, according to Gaskell (2022), maritime transport and manufacturing in Nigeria are challenged by outdated, insufficient, and expensive infrastructure, lack of skills, limited support for market growth from public procurement, and limited support for a national ship registry or flagging of Nigeria ship which hinders growth in the industry. These challenges in the maritime sector have increased a need to be addressed because the sector is crucial in the human capital development of Nigeria. Traditionally, the public sector plays a key role in financing maritime transport infrastructure, however, public sector investment is not enough to cater to the growing finance gap in maritime transport. To ensure consistent growth demand and ensure proper services delivery mobilizing public and private is necessary which also includes FDI, development aid to participate in a partnership (Elias et al., 2018).

The ability of Nigeria to carry its import and export trade has suffered a negative growth since the 1980s. Nigeria does not have a national shipping carrier. This sector has the potential to offer significant employment opportunities for thousands of Nigerians across the diverse expertise required in the various disciplines of the sector that include marine manufacturing and related services, seafaring, maritime law, research, marine engineering, etc (Atakpa,2021).

A review of the existing literature has shown other studies to have investigated the impact of port infrastructure and trade or economic growth and whilst other literature focus on the impact of investing on port infrastructure and international trade and economic growth and few studies that focused on marine transport and international trade (Carrasco et al., 2021). There is limited literature on marine transport in the Nigeria context and more especial that focusing on investing in maritime transport. Therefore, this study examines the impact of maritime transport financing on total trade in Nigeria using the autoregressive distributed lag (ARDL) model. In this instance, this study fills a gap in the existing literature in the sense that a large number of studies in this area used models of analysis such as structural equation modeling (SEM), Generalised Method of Moments (GMM), and pooled mean group (PMG) estimator. None of these studies have attempted the use of ARDL (Dentons, 2022).

Crude Oil Transport

The crude oil transportation system is an important support for every country in providing industrial production materials, promoting human capital development and guaranteeing military security. The international transportation of crude oil is dominated by marine shipping, which, as a foundation for the large-volume and long-distance transportation, has greatly enriched international economic cooperation in crude oil resources (Kalouptsidi, 2021). Crude oil plays a critical role in all modern economies and its transportation is a vital element of the global energy supply chain (Kramer, 2022). Crude oil is a mixture of comparatively volatile liquid hydrocarbons (compounds composed mainly of hydrogen and carbon), though it also contains some nitrogen, sulfur, and oxygen. Those elements form a large variety of complex molecular structures, some of which cannot be readily identified (Newswire, 2022). Crude oil, liquid petroleum that is found accumulated in various porous rock formations in Earth's crust and is extracted for burning as fuel or for processing into chemical products.

Possibly the most important physical property is specific gravity (i.e., the ratio of crude oil the weight of equal volumes of a crude oil and pure water at standard conditions). In laboratory measurement of specific gravity, it is customary to assign pure water a measurement of 1; substances lighter than water, such as crude oil, would receive measurements less than 1 (Njoku et al., 2020). The petroleum industry, however, uses the American Petroleum Institute (API) gravity scale, in which pure water has been arbitrarily assigned an API gravity of 10°. Liquids lighter than water, such as oil, have API gravities numerically greater than 10. On the basis of their API gravity, crude oils can be classified as heavy, medium, and light as follows: Heavy: 10–20° API gravity, Medium: 20–25° API gravity and Light: above 25° API gravity (Coşar & Demir, 2018).

Crude oil also is categorized as "sweet" or "sour" depending on the level of sulfur, which occurs either as elemental sulfur or in compounds such as hydrogen sulfide. Sweet crudes have sulfur contents of 0.5 percent or less by weight, and sour crudes have sulfur contents of 1 percent or more by

weight. Generally, the heavier the crude oil, the greater its sulfur content. Excess sulfur is removed from crude oil during refining, because sulfur oxides released into the atmosphere during combustion of oil are a major pollutant (Carrasco &Tovar-Garcia, 2021).

Crude oil occurs underground, at various pressures depending on depth. It can contain considerable natural gas, kept in solution by the pressure. In addition, water often flows into an oil well along with liquid crude and gas. All these fluids are collected by surface equipment for separation. Clean crude oil is sent to storage at near atmospheric pressure, usually aboveground in cylindrical steel tanks that may be as large as 30 metres (100 feet) in diameter and 10 metres (33 feet) tall (Corbett & Winebrake, 2018). Often crude oil must be transported from widely distributed production sites to treatment plants and refineries. Overland movement is largely through pipelines. Crude from more isolated wells is collected in tank trucks and taken to pipeline terminals; there is also some transport in specially constructed railroad cars. Overseas transport is conducted in specially designed tanker ships. Tanker capacities vary from less than 100,000 barrels to more than 3,000,000 barrels (Kramer, 2022).

In Nigeria, the conventional practice for the petroleum industry is to measure capacity by volume and to use the English system of measurement. For this reason, crude oil in the United States is measured in barrels, each barrel containing 42 gallons of oil. Most other areas of the world define capacity by the weight of materials processed and record measurements in metric units; therefore, crude oil outside the United States is usually measured in metric tons. A barrel of API 30° light oil would weigh about 139 kg (306 pounds). Conversely, a metric ton of API 30° light oil would be equal to approximately 252 imperial gallons, or about 7.2 U.S. barrels (Onuoha, 2021).

Dry Bulk Transport

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 three major bulk transports are the driving force behind the dry bulk movement (Stopford, 2009). Major bulk trades are still mentioned as five major bulk (iron ore, coal, grain, phosphate rock, and alumina-bauxite). The import demand of emerging developing economies, in particular China and India, remained the main driver of growth in dry bulk cargo shipments in 2014. During the year, the increase in world seaborne dry bulk shipments was estimated at 5.0 percent, as lower rate than the previous four years (Psaraftis, 2021). Dry bulk commodity demand is relatively complex to analyze with over 40 different commodities or commodity groups included, each having arrange of different factors influencing their overall demand for transport (Elias et al., 2018).

Dry bulk carriers, which carry iron ore, coal, grain and similar cargo, account for the largest share of the world fleet in dead-weight tonnage and the largest share of total cargo-carrying capacity, at 42.5 percent. They are followed by oil tankers, which carry crude oil and its products, and accountfor29.2 percent of total dead-weight tonnage. The third largest fleet is container ships, which account for 13.1 percent of the total. As container ships carry goods of higher unit value than dry and liquid bulk ships and usually travel at higher speeds, they effectively carry more than half of total sea borne trade by monetary value (Osadume & Uzoma, 2020).

The international dry bulk shipping industry is highly fragmented and is divided among state controlled and independent dry bulk vessel owners. As a general principle, the smaller the cargo-carrying capacity of a dry bulk vessel, the more fragmented is its market, both with regard to charterers and vessel owners/operators. There remains significant potential for industry consolidation within each vessel type, especially in the Handysize, Handymax and Panamax sectors in which we currently operate. Charter market dry bulk carriers are employed in the market via a number of different chartering options (Elias et al., 2018).

A "bareboat charter" involves the use of a vessel usually over longer periods of time ranging over several years. In this case all voyage related costs, including vessel fuel and port dues as well as all vessel-operating expenses such as day-to- day operations, maintenance, crewing and insurance, transfer to the charterer's account. The owner of the vessel receives monthly charter hire payments on a per-day basis and is responsible only for the payment of capital costs related to the vessel. A "time charter" involves the use of the vessel, either for a number of months or years or for a trip between specific delivery and redelivery positions, known as a trip charter. The charterer pays all voyage-related costs. The owner of the vessel receives semi-monthly charter hire payments on a per-day basis and is responsible for the payment of all vessels operating expenses and capital costs of the vessel.

Dry bulk freight rates fluctuated during most of 2022 before returning close to their pre-COVID-19 pandemic levels by the end of the year. Until May 2022, there was a surge in dry bulk freight rates caused by a rise in demand for dry bulk cargo (namely coal) and port congestion, limiting the effective supply. However, this upward trend reversed in the latter part of the year due to a combination of factors, including a deceleration in macroeconomic conditions, weak trends in China, namely reduced demand for steel, weather-induced disruptions (notably in Brazil), escalating geopolitical tensions, and the normalization of port congestion, which subsequently led to an increase in available tonnage. This, in turn, had a further downward impact on freight rates (UNCTAD, 2023).

Non-Oil Transport

Non-oil goods transportation simply expressed are items other than crude oil (petroleum products) that are sold in the foreign exchange market only to generate cash are conveyed to the selling points. Farm products exports construction and manufacturing exports solid mineral exports and place in the international appear to be the four primary parts of Nigeria's non-exports industry. Agricultural commodities goods produced solid minerals entertainment and vacation services and other non-oil export commodities are limitless (Onuorah 2018).

Non-oil goods transport comprises the movement of agricultural products, solid minerals, textiles, manpower, etc. to where they be sold (Rivero, 2021). Non-oil good is made up of every other thing we export from Nigeria except petroleum products. Manufacturing exports consist of textiles, beer,

cocoa butter, plastic products, processed timber, tyres, soap, detergent and fabricated iron rods. Agricultural, export merchandise includes cocoa, groundnut, palm oil, cotton, rubber (natural), yam, palm products, fish and shrimps (Yohanna et al. 2019). Generally, the transportation of non-oil products is the conveyance of those commodities excluding crude oil (petroleum products), which are sold in the international market for the purpose of revenue generation.

Exports are one of the oldest forms of economic transfer and occur on a large scale between nations that have fewer restrictions on international trade such as tariffs or subside. According to Osidipe et al. (2018) the term export derives from the goods and services out of the port of a country. The seller of such goods and services is referred to as an exporter whereas the overseas based buyer is referred to as an importer. Also, international flows of illegal services must be included. Exports also include the distribution of information that can be sent in the form of an e-mail fax or can be shared during a telephone conversation (UNCITRAL, 2023). Thus, in economics an export refers to any good or commodity transported from one country to another in a legitimate fashion typically for use in trade. Many countries engage in export trade.

Agriculture'sdominationofthenon-oilindustryhasresultedinthemineralsub-sectorbeingoverlooked despite the fact that it has the opportunity to be second only to petroleum in terms of revenue earnings (Joseph & Chukwuedozie 2019).

This represents the largest telecommunications market in Africa according to Nwaogbe et al. (2020). In addition, this industry has helped to create jobs by employing 300000 people each year. Meanwhile the tourism industry has a revenue and manpower generation capability of more than N1trillion and it now generates roughly N150 billion per year. The four (4) primary sectors that are involved in exporting are described in the preceding paragraphs for a better grasp of the subject matter:

Economic Development in Nigeria

Nigeria's economic potential is constrained by many structural issues, including inadequate infrastructure, tariff and non-tariff barriers to trade, obstacles to investment, lack of confidence in currency valuation, and limited foreign exchange capacity. Sustained broad-based economic growth and poverty reduction are critical to its economic stability. Nigeria supports the government's poverty alleviation efforts to improve agricultural productivity and expand jobs in rural areas. It also works to improve market access, increase the country's energy supply, reduce obstacles to trade, and expand access to clean water (Dentons, 2022).

Economic development is the process whereby simple, low-income national economies are transformed into modern industrial economies. Although the term is sometimes used as a synonym for economic growth, generally it is employed to describe a change in a country's economy involving qualitative as well as quantitative improvements. The theory of economic development—how primitive and poor economies can evolve into sophisticated and relatively prosperous ones—is of critical importance to underdeveloped countries, and it is usually in this context that the issues of economic development are discussed (Jhingan, 1997).

The goal of being economically developed is to raise the per capita income to improve material living standards. Therefore, understanding economic development, especially in its policy dimensions, is crucial for policymakers and economists working to fulfill their governments' goals. Furthermore, it is believed that political stability can only be guaranteed with minimum economic development (Carrasco, et al., 2021).

Consequently, Owoputi and Owolabi (2020) argued that economic development involves the passage of a society through five evolutionary stages. The first stage is the "traditional stage," where it is difficult to expand production, because the society's economy is agrarian, and have hierarchical social structures that allows for only a small degree of social mobility. The second stage is the "Preconditions for Take-off," which was attained in Europe when the findings of modern science are applied to agricultural and industrial production; and attained in the Third World Countries, as a result of the impact or intervention of more advanced societies in their economy. The third stage is the "Take-off," and is characterized by the rise and expansion of new industries yielding profit that is reinvested in new plants and ventures. The fourth stage is the "Drive to Maturity Stage" where the economic maturity and development is completed. At this stage, the base of the economy is broadened to include more sophisticated technology and work processes and shifts beyond the original industries that propelled its take-off phase. The fifth stage is the "Age of Mass Consumption," where the advanced sectors of the economy are increasingly dominated by the manufacture of consumer goods and the provision of services. This stage of economic development is only attained, when real per capita income has risen to a level at the consumption requirements of bulk of the populace had extended beyond the basic need of food, clothing, and shelter (Padder & Mathavan, 2021).

Real Gross Domestic Product

Real gross domestic product is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year. It is expressed in base-year prices and is often referred to as constant-price, inflation-corrected, or constant-dollar GDP. Real gross domestic product (GDP) is an inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year. Real GDP is expressed in base-year prices. It is often referred to as constant-price GDP, inflation-corrected GDP, or constant-dollar GDP. Put simply, real GDP measures the total economic output of a country and is adjusted for changes in price (Egole, 2022).

This adjustment transforms the money-value measure, nominal GDP, into an index for quantity of total output. Although GDP is total output, it is primarily useful because it closely approximates the total spending: the sum of consumer spending, investment made by industry, excess of exports over imports, and government spending. Due to inflation, GDP increases and does not actually reflect the true growth in an economy. That is why the GDP must be divided by the inflation rate (raised to the power of units of time in which the rate is measured) to get the growth of the real GDP. Different

organizations use different types of 'Real GDP' measures, for example, the UNCTAD uses 2015 Constant prices and exchange rates while the FRED uses 2009 constant prices and exchange rates, and recently the World Bank switched from 2005 to 2010 constant prices and exchange rates (Elias et al., 2018).

Real GDP is an example of the distinction between real and nominal values in economics. Nominal gross domestic product is defined as the market value of all final goods produced in a geographical region, usually a country; this depends on the quantities of goods and services produced, and their respective prices (Dentons, 2022).

Empirical Review

Maritime Transport and Real Gross Development Products

Generally, well-developed transport infrastructure ensures returns through certain macroeconomic drivers of productivity, such as "expansion of business activity, innovations, investments, labour market, competition, domestic and international trade global mobile activity, regional economic development, population wellbeing, environment safety, and health" ((Padder & Mathavan, 2021). Maritime transport is an important component of the transportation system, and it accounts for a large part of world trade. Moreover, it is considered that participating in the global maritime trade is a very important factor for attracting global capital (Dumre, 2019).

Given its great importance, maritime transport is highly discussed within the literature and, in the past decades, many papers regarding all kinds of topics related to maritime transport have been published. While major academic concerns related to maritime transport regard the micromanagement of ports and liner shipping, over the past decades, the overall research trends shifted towards efficient and sustainable maritime transport, from regulations and policy management that had formerly been of interest (European Commission, 2020). Therefore, a lot of research papers analyse the impact of maritime transport on economic growth and development and emphasize the importance of maritime transport for international trade, economic success, and global development patterns.

For instance, Akbulaev and Bayramli (2020) study the relationship between maritime transport development and the dynamics of economic growth for several countries on the Caspian Sea (Russia, Azerbaijan, Turkmenistan, Kazakhstan, and Iran) and find that the development of maritime transport through better management promotes sustainable economic development. Gherghina et al. (2018) evaluated the impact of different transport infrastructure systems (including maritime transport) on economic growth. They used panel data regressions with fixed effects for EU countries from 1990 to 2016. The authors obtained a positive link between maritime transport, related investments, and economic growth and a negative link between air pollutants and economic growth. Khan et al. (2018) obtained, also, a positive link between container port traffic and income per capita, using a panel of 40 heterogeneous countries.

Likewise, Saidi et al. (2018) concluded that transport infrastructure positively influences economic growth, by using the generalized method of moments.

Niavis et al. (2017) estimate the importance of maritime transport for the economy, society, and environment of the Adriatic–Ionian region through value estimation methodologies to develop an integrated assessment tool for a comparative evaluation of maritime transport against other drivers of the region. The authors find that maritime transport is the second most important factor of change in the Adriatic–Ionian region, after coastal tourism. Likewise,

Song and Geenhuizen (2014) examined the effects of port infrastructure investment in China on the growth of the regional economies by applying panel data analysis from 1999 to 2010. Their results indicate positive effects of port infrastructure investment in all regions. These results are also confirmed by Shan et al. (2020), who studied the impact of seaports on the economy of an associated port city in China, using data from 41 major port cities between 2003 and 2010. Hong, Chu, and Wang (2011) conducted a study on 31 Chinese provinces and concluded that water transport infrastructure investment positively influences economic growth only after the investment scale goes above a threshold point. Song and Mi (2016) investigated the relationship between port investments and economic growth. In their study, they found bidirectional causality between port investment and economic growth over the short run, and a unidirectional causality running from port investment to economic growth in the long run (Xie et al., 2021).

A lot of research papers focus on maritime transport pollution. This kind of pollution is highly discussed in literature, academia, and international institutional circles, focusing on both impact assessment and the measures to effectively reduce pollution from maritime transport. Among the different ways of transport (aviation, road, navigation and railway), maritime transport is considered to be the most environmentally friendly (Psaraftis & Kontovas, 2022).

For instance, Bagoulla and Guillotreau (2020) evaluate the impact of several types of air pollutants and greenhouse gas emissions (SO_2, NOx, CO_2, $PM_{2.5}$, PM_{10}) resulting from shipping transport and find that SO_2 and NOx are the most polluting air pollutants, as they obtain the larger multipliers of all industries for these two types of air pollutants. The authors state that assessing the gas emissions caused by maritime transport is very important in the context of the implementation of more stringent regulations regarding the SO_2 emissions of the shipping sector, by imposing the SO_2 Emission Control Areas limits. Ben-Jebli and Belloumi (2017) concluded in a study on the Tunisian transportation network that over the short run, a bidirectional causality occurred between CO_2 emissions and maritime transport, whilst a unidirectional causality occurred running from real GDP, combustible renewables, waste consumption, and rail transport to CO_2 emissions. In the long run, GDP drives a reduction in CO_2 emissions, whereas combustible renewables and waste consumption and maritime and rail transport exhibit positive effects on emissions. Taghvaee et al. (2017) examined the relationships among maritime transport, environmental pollution, and economic growth by using a dynamic log-linear model in Iran. The authors obtained a positive relationship between maritime transport, environmental pollution, and economic growth, confirming the Pollution Haven Hypothesis.

Serra et al. (2020) conducted a study on an innovative two-hub freight network for shipping services in the Mediterranean Sea compared to the existing connections within that region and concluded that the redesign of the networks used in shipping transport would help to diminish air pollutants and the greenhouse gas emissions and would promote the emergence of more sustainable transport networks within the Mediterranean Sea. Based on the above empirical studies, the study hypothesized that: Ho_1: Crude oil transport has no significant effect on real gross domestic products in Nigeria. Ho_2: Dry bulk transport has no significant effect on real gross domestic products in Nigeria. Ho_3: Non-oil transport) has no significant effect on real gross domestic products in Nigeria

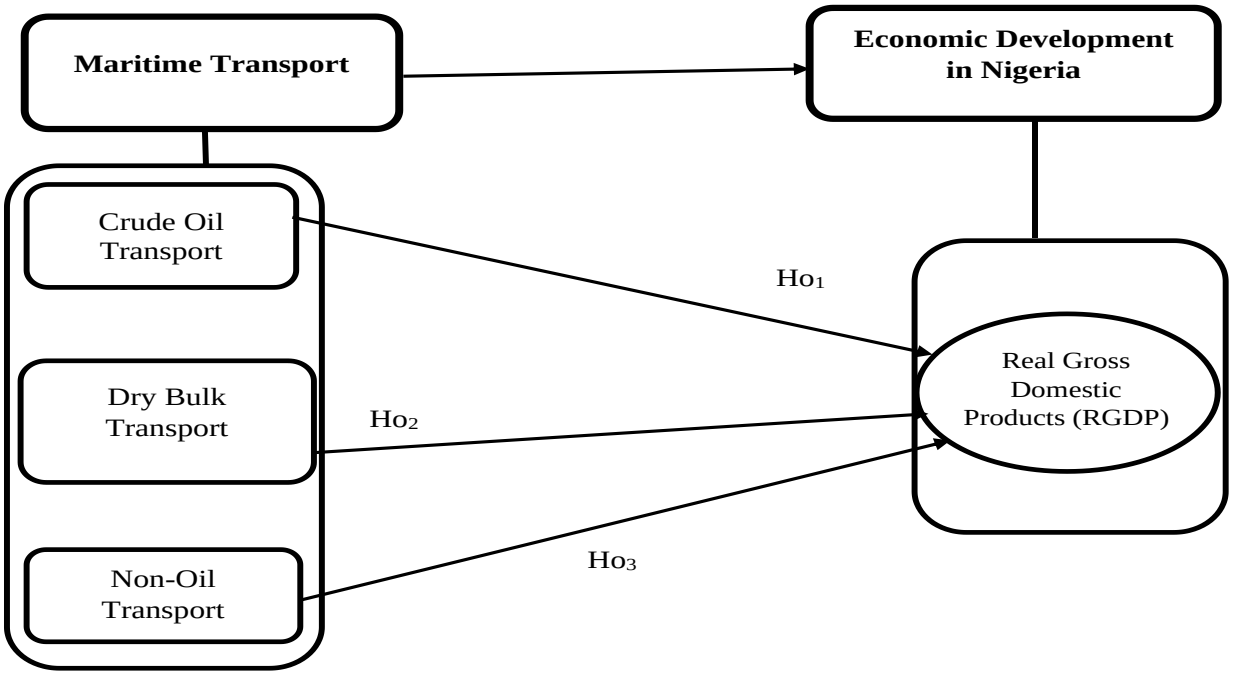


Figure 1: Operationalized Framework of the Effect of Maritime Transport on Economic Development in Nigeria (1990-2023)

Sources: UNCTAD (2023b); Atoyebi (2022). Egole (2022); Desk Research (2024).

Summary of Literature Review and Gap in Knowledge

This literature review carried out provided a position on the conceptualization of the variables of interest – maritime transport and economic development. This vein, this research reinforces the position of maritime transport and its necessity in bridging the operational gaps in the maritime transport and economic development in Nigeria. Key insights, reflected in the review of literature in this chapter are such that identify with the significance of maritime transport and by that, its significance to the economy of Nigeria This observation emphasizes the imperatives of economic development and well-being, as being important improved trading activities and the development of related contexts or markets. Another major insight, put forward, anchored and conceptualised on the review of literature are the measures of Economic development which are conceptualized as real gross domestic product, human development index, and unemployment rate, The review of literature shows gabs in literature in certain areas and issues that are very pertinent in maritime transport and economic development. From the literature, it is revealed that maritime transport with respect to dry bulk, passengers and containerization and economic development in Nigeria proxied by human development index and unemployment rate, has not been studied extensively. One gap in the literature is the lack of analysis of the long-term effect of maritime transport on economic development. Most studies on maritime transport and economic growth in Nigeria have focused on short-term or intermediate-term effects. Still, there is a need for more research on moderating effect of foreign exchange rate on maritime transport and economic development in Nigeria to fill the knowledge gap identified in this Study.

MATERIALS AND METHODS

Research Design

Research design is the blueprint that guides the researcher in acquiring and generating necessary data for the study; so, this study adopted the ex-post facto research design which requires 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; Saeed et al. 2021 and Saunders et al. 2009).

Method of Data Collection

Secondary sources of data were used as the main data collection sources in which accuracy, availability, adequacy, authority, scope, suitability and sources of data were considered for relevance (Kiabel, 2020). So, the 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 of the various years in question from their official website. The data for the study shall be from the period of 1990 – 2023.

Model Specification

$Y = bo + b_1x_1 + b_2x_2 + b_3x_3 + e$ --------- {for testing Ho_1, Ho_2 and Ho_3}

RGDP = f (COTR, DBTR, NOTR)

Where;

RGDP = Real Gross Domestic Products

COTR = Crude Oil Transport

DBTR = Dry Bulk Transport

NOTR = Non-Oil Transport

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.

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.

Data Analysis Techniques

The Autoregressive Distributive Lag (ARDL) model was used as analytical technique. Researchers employ the ARDL estimator owing to its numerous benefits, including the fact that 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.

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.

DATA ANALYSIS AND RESULTS

Presentation of Data

Time series data on annual Human development index (HDI), crude oil transport (COTR), dry bulk transport (DBTR) and non-oil transport (NOTR)for Nigeria, 1980 to 2023 used for this study are presented in Table 1:

DATA PRESENTATION AND ANALYSIS

Presentation of Data

Time series data on annual real GDP (RGDP), crude oil transport (COTR), dry bulk transport (DBTR), non-oil transport (NOTR) for Nigeria, 1980 to 2023 used for this study are presented in Table 1:

Table 1: Data on Maritime Transport and Economic Development in Nigeria (1980-2023)

YEAR	COTR	DBTR	NOTR	RGDP
1980	1476.170	1037	13062.60	18173.92
1981	10680.50	1965.24	10748.20	19748.53
1982	8003.20	2172.15	9033.40	18404.96
1983	7201.20	27192.8	7143.30	16394.39
1984	8840.60	2575123	7507.90	16211.49
1985	11223.70	3243751	5621.80	17170.08
1986	8368.50	3022148	16843.60	17180.55
1987	28208.60	3121724	20400.00	17730.34
1988	28435.40	3262373	29143.00	19030.69
1989	55016.80	4343278	42904.40	19395.96
1990	106626.50	4022218	86393.30	21680.20
1991	116858.10	8553527	127817.50	21757.90
1992	201383.90	9397988	129484.60	22302.24
1993	213778.80	9377242	125788.20	22765.55
1994	200710.20	7368492	622397.90	21897.47
1995	927565.30	5022272	423775.40	21881.56
1996	1286215.90	4543878	707977.40	22799.69
1997	1212499.40	3002846	695634.70	23469.34
1998	717786.50	4316408	670346.80	24075.15
1999	1169476.90	4479593	789027.60	24215.78
2000	1920900.40	6022251	1149082.10	25430.42
2001	1839945.25	9553569	1245717.18	26935.32
2002	1649445.83	9397988	1776089.40	31064.27
2003	2993109.95	10377285	1782239.90	33346.62
2004	4489472.19	10368487	2109513.27	36431.37
2005	7140578.92	2335850	2531431.31	38777.01
2006	7191085.64	11334417	3342983.73	41126.68
2007	8110500.38	12082132	4803508.09	43837.39
2008	9861834.43	11212278	4912775.80	46802.76
2009	8105455.12	19116321	7117787.92	50564.26
2010	11300522.12	12968497	8865778.24	55469.35
2011	14323154.65	13082771	7581636.04	58180.35
2012	14259990.90	10102158	8140219.13	60670.05
2013	14131843.08	9693134	19334	63942.85
2014	12006965.05	9651053	14245	67977.46
2015	8184480.52	9170517	8814	69780.69

2016	8178817.96	9704453	9418	68652.43
2017	12913241.32	9818494	12243	69205.69
2018	17281953.13	8729495	11729	70536.35
2019	16703434.07	8887067	17338	72094.09
2020	11058151.84	9971872	15278	73219.90
2021	16737339.63	10873561	16921	74083.40
2022	24221595.93	12182522	19918	75109.25
2023	25132359.78	17873532	25871	76121.72

Sources: National Bureau of Statistics (NBS) NNPC PPPRA and CBN Statistical Bulletin and World Bank Indicators

Descriptive Statistics

Table 2: Summary of Descriptive Statistics of the Variables

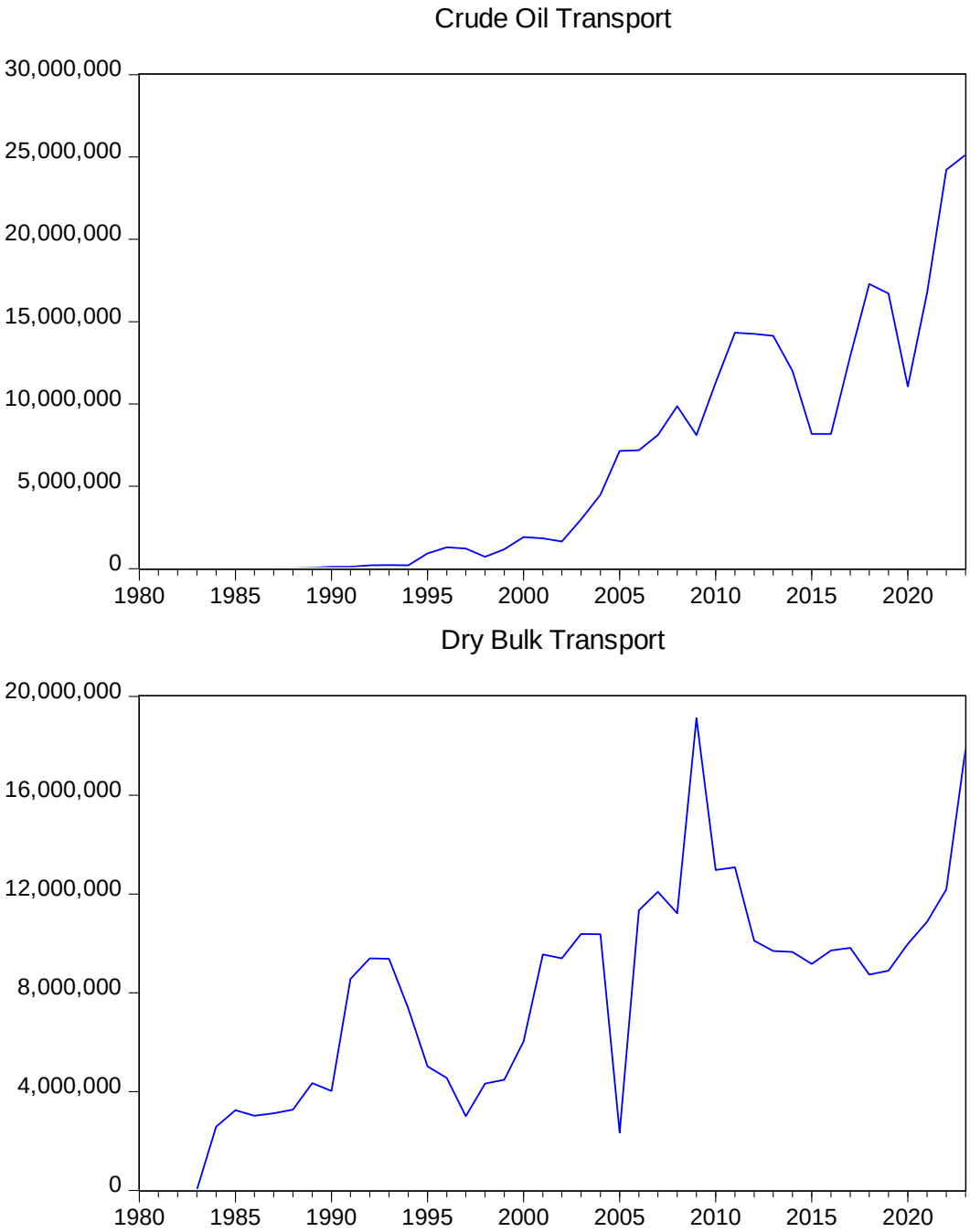
	RGDP	**COT**	**DBT**	**NOTR**
Mean	39446.49	6046739.	7644657.	1365248.
Median	28999.80	1880423.	9028792.	106090.8
Maximum	76121.72	25132360	19116321	8865778.
Minimum	16211.49	1476.170	1037.000	5621.800
Std. Dev.	21698.41	7065665.	4467845.	2421467.
Skewness	0.519230	1.017977	0.235336	1.983175
Kurtosis	1.618504	3.110336	2.794991	5.715088
Jarque-Bera	5.476038	7.621683	0.483194	42.35666
Probability	0.064698	0.022130	0.785373	0.000000
Observations	44	44	44	44

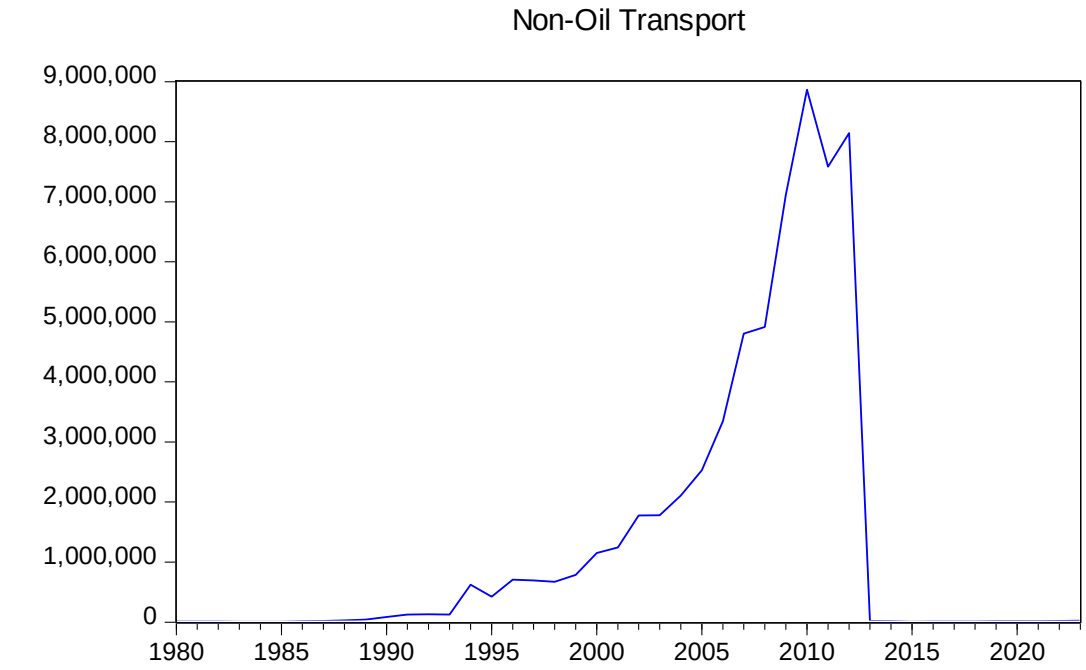
Source: Author's computation using E-views 12

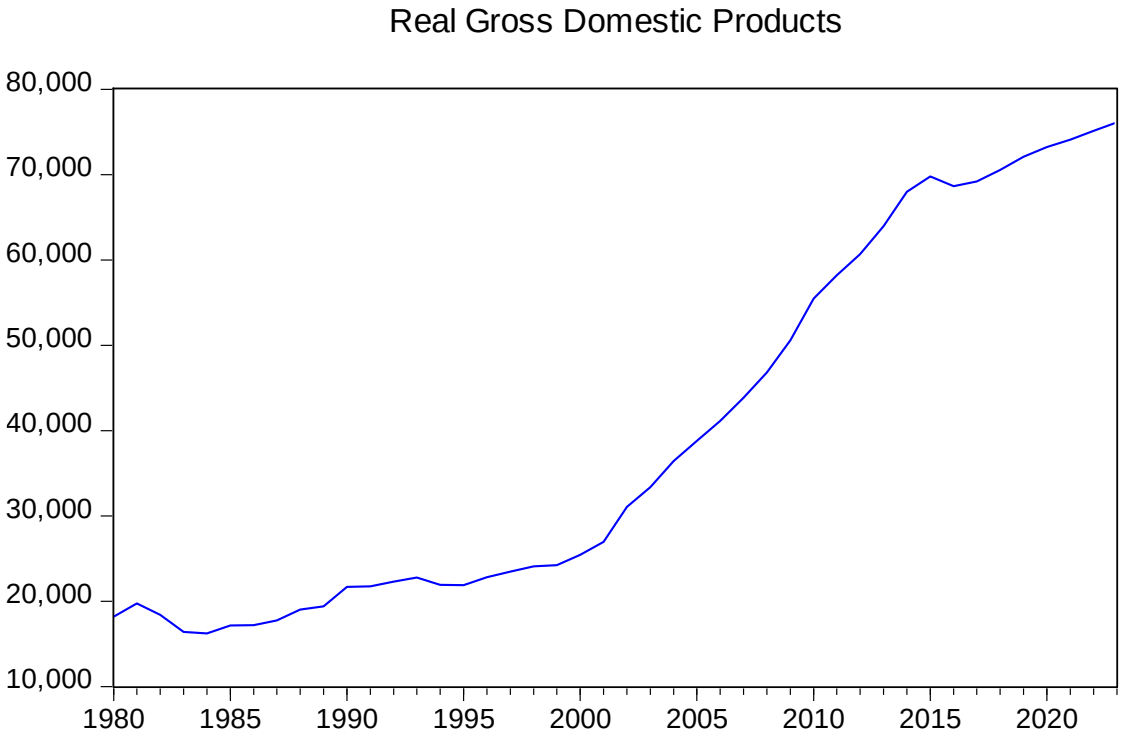
According to Table 2 results, real GDP has a mean value of 39446.49, a minimum value of 16211.49, a maximum value of 76121.72, and a standard deviation of 21698.41, demonstrating that the data is convergent to its mean because the standard deviation is lower than the mean value. Similarly, the descriptive statistics for the variables show that crude oil transport, dry bulk transport, non-oil transport and foreign exchange rate are associated with mean values of 6046739, 7644657, 1365248 and 125.1900 respectively. Their standard deviations show that all the variables are dispersed around their respective mean values with the exception of dry bulk transport whose standard deviation is lower than its mean value, implying that the data is convergent to its mean.

Furthermore, the data of variables real GDP, crude oil transport, dry bulk transport and non-oil transport are skewed to the right of the normal distribution curve, as indicated by the fact that all of the variables' skewness values are positive whereas the data of unemployment rate is skewed to the left of the normal curve because the skewness value is negative. Additionally, the kurtosis value for unemployment rate is approximately 3 which implies that the distribution has a similar kurtosis to a normal distribution. Also, the kurtosis values for crude oil transport, non-oil transport and foreign exchange rate are all higher than 3, indicating that their curves are more peaks. On the other hand, real GDP, human development index and dry bulk transport have kurtosis values below 3, which indicates that their curves are less peaked. Furthermore, the probability values of the Jarque-Bera statistics revealed that real GDP, unemployment rate and dry bulk transport are normally distributed at 5 per cent level while human development index, crude oil transport, non-oil transport and foreign exchange rate are not.

Trend Analysis of the Studied Variables







Data Analysis

Unit Root Test

The cradle of a dynamic estimation starts with unit root test in order to ascertain the stationary states of the variables examined in the model, going by the random walk of time series data. Also, macroeconomic time series data by nature are prone to be non-stationary overtime (Gujarati, 2005; Koutsoyiannis, 1997). The need for stationary assessment is born out of the quest to ensure that the risk of running a spurious regression is avoided as much as possible and to guide against the loss of vital information linked to the random walk of the modeled variables (Granger & Newbold, 1976). Hence, this study employed the Augmented Dickey-Fuller (ADF) unit root test to examine the integration order of the variables.

The result of the augmented Dickey-Fuller test of stationarity at level and first difference are presented in Table 3.

Table 3: Unit Root Test Results

Variables	ADF Level	1st_diff.	Critical Value at 5%	Decision I(d)
$logrgdp_t$	0.2700	-4.1022	-2.9331	I(1)
$logcot_t$	-4.3173	-	-2.9331	I(0)
$logdbt_t$	-5.2302	-	-2.9331	I(0)
$lognotr_t$	-1.4121	-6.0808	-2.9331	I(1)

Source: Author's compilation from output of E-Views 12

The unit root test results depicted in Table 3 is based on the augmented Dickey-Fuller procedure. It was found from the test results that most of the variables which include real GDP (RGDP), crude oil transport (COT) and non-oil transport (NOTR) were non-stationary in their level form. The series became stationary at first difference and integrated of order one I(1). Also, the result shows that unemployment rate and dry bulk transport were stationary at level as the ADF statistics, in absolute term, is greater than the critical value at 5 percent level of significance. The estimation of the autoregressive distributed lag (ARDL) model requires that the employed variables have mixed orders of I(0) and I(1) and this is satisfied following the confirmation of the order of integration of the variables using the augmented Dickey-Fuller approach of unit root test.

ARDL Bounds Cointegration Test

With the verification of the order of integration of the variables, the co-integration test of long run relationship was carried out. Based on the integrated properties of the variables which resulted in the use of the ARDL method of estimation, this paper employed the bounds cointegration test method to establish whether there is a co-movement between the variables in the long run. The result of the bounds test based on the f-statistics is presented in Tables 4.4.

Table 4: Bounds cointegration tests results for the models

Null hypothesis: No cointegrating relationship

	F-STATISTICS	K	Critical value Lower bound 5%	Critical value Upper bound 5%
RGDP	14.995	3	3.23	4.35
RGDP(MOD)	8.6685	7	2.32	3.5

Source: Researcher's computation using Eviews 12

The table 4 gives the summary of the ARDL bounds test of cointegration for models Real GDP, and real GDP (moderating effect). As advised by Pesaran et al., (2001), the study should reject the null hypothesis of no long run association between the examined variables in a situation whereby the calculated F-statistics is greater than the upper bound critical value and vice versa. The results reveal that the F-statistics for these models, specifically 14.995, 9.4884, 8.9790 and 8.6685 respectively, exceed the upper bound critical values at a 5 percent significance level. This shows that there is a strong indication of a long-run relationship between the dependent variable and the independent variables in each of these models. This, therefore, provides the empirical basis for estimating the ARDL model.

Model Estimations

General Model Estimate for Model

Table 5: Summary Results of Model

Model Summary[b]

					Change Statistics					
Model	R	R Square	Adjused Square	RStd. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.937[a]	.879	.870	7834.	.879	96.619	3	40	.000	.606

a. Predictors: (Constant), NOTR, COT, DBT

b. Dependent Variable: RGDP

Source: Researcher's computation using Eview 12

Table 5 shows that the model is statistically significant as the F. Statistics Change is 96.619 @p0.000 < 0.05. Also, the R^2 of 0.87 implies that 87 percent of the variations in the model is explained by the independent variables examined (crude oil transport, dry bulk transport and non-oil transport).

Table 6: Effect of Maritime Transport on Real Gross Domestic Products in Nigeria

(Test of Hypotheses 1, 2, and 5)

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	18930.293	2407.177		7.864	0.000		
	COT	.003	.000	.840	11.028	0.000	.523	1.913
	DBT	.001	.000	.162	1.903	0.064	.420	2.383
	NOTR	-.001	.001	-.077	-1.210	0.234	.739	1.354

a. Dependent Variable: RGDP

Source: Researcher's computation using Eview 12

Table 6 shows the results of the test of hypotheses 1, 2 and 3. The result shows positive and significant effect of crude oil transport on real GDP with t-value of 11.028@ p0.000<0.05. The result additionally revealed that positive and insignificant effect of dry bulk transport on real GDP with t- value of t = 1.903@ p0.064> 0.05. Also, Table 4.6 revealed negative and insignificant of non- oil transport on real GDP rate with t-value of -1.210@ p0.234>0.05. Conclusively, the study has revealed that crude oil transport has positive and significant effect on real GDP, dry bulk transport has positive/ and insignificant effect on real GDP and non-oil transport has negative and insignificant effect on real GDP in Nigeria.

Short-Run and Long-Run ARDL Model Estimates for the Model

The behaviour of the variables in the long- and short-run and the speed of adjustment or convergence to long run equilibrium were estimated using the autoregressive distributed lag (ARDL) method and the result of the estimation presented in Table 7.

Table 7: ARDL Estimates (Sample: 1990-2023)

Dependent Variable: LRGDP

Variable	**Coefficient**	**Std. Error**	**t – Stats**	**Prob.**
Short Run Estimates				
D(LOG(COT))	0.0276	0.010	2.7384	0.014
D(LOG(DBT))	0.0105	0.008	1.2797	0.2178
D(LOG(NOTR))	0.0023	0.0031	0.7420	0.4682
CointEq(-1)	-0.0281	0.0033	-8.4005	0.0000
Variable	**Coefficient**	**Std. Error**	**t – Stats**	**Prob.**
Long Run Estimates				
LOG(COT)	0.4730	0.4191	1.1286	0.2747
LOG(DBT)	-1.2056	1.9323	-0.6239	0.5410
LOG(NOTR)	0.3739	0.5615	0.6659	0.5144
C	0.5481	0.0614	8.9176	0.000
R-Squared	0.8607	Prob.(F-Stat.)	0.000021	

Source: Author's compilation from output of E-Views 12

Short Run Results

The short run results from table 4.7 revealed that crude oil transport has a positive and significant effect on real GDP in Nigeria. This implies one percent increase in crude oil transport will lead to 0.0276 percent increase in real GDP. This result conforms to the a priori expectation of the study. The findings also showed that dry bulk transport in the current period has positive and non-significant effect on real GDP which indicates that a percentage increase in dry bulk transport in the current period leads to an increase in real GDP by 0.0105 percent. Additionally, the results showed that the relationship between dry bulk transport and real GDP is consistent with the a priori expectation of the study. Furthermore, the short run estimated coefficient of non-oil transport shows that it has a positive effect on real GDP in Nigeria. This implies that a one percent rise in non-oil transport increases rea1 GDP by 0.0023 percent. This result conforms to the a priori expectation of the study. However, the positive effect of non-oil transport on real GDP was found to be non-significant.

Long Run Results

The long run results revealed that crude oil transport has a positive effect on real GDP which corresponds with the short run outcome. Also, the findings showed that dry bulk transport has negative effect on real GDP in Nigeria. This implies that a percentage increase in dry bulk transport leads to a decline in real GDP by 1.2056 percent. This finding is in contrast with the behaviour of dry bulk transport in the short run. Furthermore, the estimated coefficient of non-oil transport shows it has a positive effect on human development index in Nigeria. This implies that one percent increase in non-oil transport increases human development index by 0.3739 percent. However, the positive impact of non-oil transport on real GDP is higher in the short run compared to its impact in the short run. The coefficient of determination (R^2) is estimated at 0.8607 which implies that 86 percent of the variations in real GDP are explained by the independent variables examined in the model (crude oil transport, dry bulk transport and non-oil transport). The difference of 14 percent variation in real GDP are due to changes in other variables that affect economic growth, not included as variable(s) but is captured by the error term.

Additionally, the probability value of the F-statistics (0.000021) indicates that the explanatory variables are collectively significant in explaining changes in real GDP. Furthermore, the ECM factor appeared to be statistically significant at 0.05 level with the expected negative sign (-0.0281). This implies that the model can adjust to long run equilibrium position at a speed of 2.8 percent which signifies a relatively slow adjustment process with approximately 2.8 percent of short run deviations being corrected before the end of one year to attain long run equilibrium level.

Post-estimation Tests

The study carried out post diagnostic test to ascertain whether the empirical results are reliable and to also ensure the model meets the assumption of the classical linear regression model.

Inspection of CLRM Assumptions

Table 8: Real GDP Model

Tests	CLRM Problem	Test Stats.	Prob.	Decision
Breusch-GodfreyLM	Serial Correlation	0.0104	0.9188	Serial independence
Breusch-Pagan-Godfrey	Heteroscedasticity	21.106	0.3310	Constant Variance
Jarque Bera	Normality Test	2.1168	0.3470	normally Distributed
Ramsey RESET	Model Specification	0.5525	0.4680	Model is not misspecified

As presented in Table 8, the Breusch-Godfrey Serial correlation LM test result shows there is complete absence of autocorrelation in the estimated stochastic term. The test illustrated that; the chi-square statistics value is 0.0104 with a probability value of 0.9188 for model 1 are greater than 0.05 significance level. Hence, the null hypothesis is accepted at 0.05 significance level. Hence, this implies that serial autocorrelation is not present in the stochastic term.

The heteroscedasticity analysis based on the Breusch-Pagan-Godfrey method demonstrated that there is no existence of heteroscedasticity in the stochastic term as the null hypothesis is upheld. The chi-square value 21.106 and probability value of 0.3310 for model 1 led to the study failing to reject the null hypothesis.

The Jarque-Bera Normality test results indicate that the residuals are normally distributed. Hence the null hypothesis is not rejected as the Jarque Bera test statistic values in the examined model exceed 0.05 significance level.

The Ramsey's reset test result shows that there is no functional or specification error, given the F-Statistic of 0.5525 and a probability value of 0.4680 for model 1.

5. DISCUSSION

5.1 Interpretations

This study examined the effect of maritime transport on economic development in Nigeria. The data used for the study were time series data sourced from the National Bureau of Statistics (NBS) Annual Abstract, Central Bank of Nigeria (CBN) Statistical Bulletin, World Development Indicator (WDI) and NNPC PPPRA. The data for the employed variables covered the period from 1980 to 2023. The study utilized real GDP, unemployment rate and human development index as proxies for economic development and the regressors for the model were crude oil transport, dry bulk transport and non-oil transport and foreign exchange rate which served as a moderating variable. The method used in analyzing the data were Augmented Dickey Fuller unit root test and bounds cointegration test and the model was estimated using the autoregressive distributed lag (ARDL) method. The unit root test revealed that all the variables, except unemployment rate and dry bulk transport were non-stationary and integrated of order one I (1). This prompted the use of the ARDL bounds test to confirm cointegration to which the result indicated the presence of a long run relationship between regress and the independent variables examined in the models (real GDP, unemployment rate and human development index). To ensure the results are prediction worthy, post diagnostic tests were carried out. These tests include serial correlation, heteroscedasticity, normality and linearity test. The study failed to reject all the null hypothesis of the tests and concludes that the model is fit for prediction and policy formulation.

The major findings from this study are summarized as follows:

i. The short run ARDL results show that crude oil transport has a positive and statistically significant impact on real GDP in Nigeria.

ii. In addition, the short run results indicate that dry bulk transport has insignificant positive effect on real GDP in Nigeria.

iii. Furthermore, the short run and long run results showed that non-oil transport has insignificant positive effect on real GDP in Nigeria.

iv. The results of the moderating model revealed that foreign exchange rate has significant effect on the relationship between crude oil transport and real GDP in the short run. Also, the short run result showed that foreign exchange rate significantly moderates the effect of dry bulk transport on real GDP.

Discussion

This section focused on the findings from empirically investigating the effect of maritime transport on economic development in Nigeria covering the period between 1980 -2023. The ARDL model's short- and long-run analysis offers crucial insights into how maritime transport components; crude oil transport (COT), dry bulk transport (DBT) and non-oil transport affect Nigeria's economic development, measured by real GDP (RGDP.

Significant Effects of Crude Oil, Dry Bulk and Non-Oil Transport on Real Gross Domestic Products in Nigeria

The estimated ARDL model results showed that crude oil transport has positive effect on real GDP in Nigeria both in the short run and long run. It explained that a percent increase in crude oil transport will boost real GDP by 0.0276 percent and 0.4730 percent in short run and long run respectively. These findings are consistent with a priori expectation of the study and also in line with the findings of Akbulaev and Bayramli (2020) and Gherghina et al. (2018) which indicate that increase in crude oil transport boost Nigeria's real GDP. This result is supported by Onyenucheya (2022) who asserts that maritime shipping industry plays a significant role in the economic emancipation of nations by influencing the pace of growth in other industries and has great potential to generate huge revenue, being a goldmine with the capacity to drive economic growth In addition, the positive effect of crude oil transport on real GDP in the short run was found to be statistically significant at 0.05 significance level given the probability value of 0.014. Hence, we reject the null hypothesis since the probability value is less than 0.05. In effect, the findings indicate that changes in crude oil transport determines the extent of increase or decrease in Nigeria's real GDP. Based on the short run result, the study submits that there exist a positive and significant relationship between crude oil transport and real GDP in Nigeria.

Also, the short run result showed that dry bulk transport has positive effect on real GDP which indicates that a percentage increase in dry bulk transport in the leads to an increase in real GDP by 0.0105 percent. This finding conforms to the theoretical expectation of the study and aligns with Jiang et al. (2018) who argue that dry bulk transport is a key link in global economic development because it is the main transportation medium for intercontinental industrial raw materials, primary grain products, and other basic primary products and semi-finished products. Contrariwise, the long run result showed that dry bulk transport has insignificant negative effect on real GDP which may be due fluctuations in dry cargo freight rate driven by demand and supply shocks (Sunghwa, Hyunsok & Jangha, 2023). In addition, the positive effect of dry bulk transport on real GDP in the short run was found not to be statistically significant at 0.05 significance level given the probability value of 0.2178. Hence, we fail to reject the null hypothesis since the probability value is greater than 0.05. In effect, the findings indicate that changes in dry bulk transport does not determine the extent of increase or decrease in real GDP. Based on the short run result, the study submits that dry bulk transport has positive but non-significant effect on real GDP in Nigeria.

Furthermore, the short run and long run estimated coefficient of non-oil transport revealed it has positive effect on real GDP in Nigeria which is consistent with a priori expectation of the study. This implies that a one percent rise in non-oil transport increases rea1 GDP by 0.0023 percent and 0.3739 percent in the short run and long run respectively. However, the positive effect of non-oil transport on real GDP was found not to be statistically significant given

the associated probability values of 0.4682 and 0.5144 respectively. Hence, they failed to reject the null hypothesis and submit that non-oil transport has insignificant positive effect on real GDP both in the short run and long run.

Conclusion

The conclusion of this study provides all-inclusive outcomes of the study. Maritime transport has a close interrelation with the historical progression and level of economic growth of a nation. The economy in Nigeria may be termed as 'mixed', and maritime transport has contributes as a major sector and role player in shaping the economy of the country; this is more so considering the fact that maritime transport serves as a major contributor to the value chain and supply chain of the main exported commodity (oil) of Nigeria. Where and when maritime transport is adequate and effective, it serves as a tool of economic growth and plays a significant role -making impacts in the development of the nation's market, especially concerning international trade.

. Conclusively, it is evident that: Crude oil transport has positive and significant effect on real gross domestic products (t = 11.028 @ p0.000 <0.05); dry bulk transport has positive and insignificant effect on real gross domestic products (t = 1.903 @ p0.064>0.05); non-oil transport has negative and insignificant effect on real gross domestic products in Nigeria (t = -1.210@p0.234>0.05).

Recommendations

Based on the findings of the study and conclusions reached the following recommendations have been made:

1. Government and transportation authorities, should put in place strategic options to create an effective policy framework for effective management of indicators of maritime transport with a view to enhancing sustainable productivity and the overall transformation of the Nigerian economy.
2. The study therefore recommended that: Government should harness the effective and efficient use of the mixed-policy approach involving monetary, fiscal and trade policies to reduce import and encourage consumption of local products and motivate exporters to use non-oil and dry bulk transport thereby boosting the development of Nigeria economy.
3. Government should throw its searchlight in the maritime sector with a view to creating the enabling environment for investments to thrive. Maritime transport has the capacity to take over from oil as a revenue earner

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APPENDICES

Table 1: Data on Maritime Transport and Economic Development in Nigeria (1980-2023)

YEAR	COTR	DBTR	NOTR	RGDP
1980	1476.170	1037	13062.60	18173.92
1981	10680.50	1965.24	10748.20	19748.53
1982	8003.20	2172.15	9033.40	18404.96
1983	7201.20	27192.8	7143.30	16394.39
1984	8840.60	2575123	7507.90	16211.49
1985	11223.70	3243751	5621.80	17170.08
1986	8368.50	3022148	16843.60	17180.55
1987	28208.60	3121724	20400.00	17730.34
1988	28435.40	3262373	29143.00	19030.69
1989	55016.80	4343278	42904.40	19395.96
1990	106626.50	4022218	86393.30	21680.20
1991	116858.10	8553527	127817.50	21757.90
1992	201383.90	9397988	129484.60	22302.24
1993	213778.80	9377242	125788.20	22765.55
1994	200710.20	7368492	622397.90	21897.47
1995	927565.30	5022272	423775.40	21881.56

1996	1286215.90	4543878	707977.40	22799.69
1997	1212499.40	3002846	695634.70	23469.34
1998	717786.50	4316408	670346.80	24075.15
1999	1169476.90	4479593	789027.60	24215.78
2000	1920900.40	6022251	1149082.10	25430.42
2001	1839945.25	9553569	1245717.18	26935.32
2002	1649445.83	9397988	1776089.40	31064.27
2003	2993109.95	10377285	1782239.90	33346.62
2004	4489472.19	10368487	2109513.27	36431.37
2005	7140578.92	2335850	2531431.31	38777.01
2006	7191085.64	11334417	3342983.73	41126.68
2007	8110500.38	12082132	4803508.09	43837.39
2008	9861834.43	11212278	4912775.80	46802.76
2009	8105455.12	19116321	7117787.92	50564.26
2010	11300522.12	12968497	8865778.24	55469.35
2011	14323154.65	13082771	7581636.04	58180.35
2012	14259990.90	10102158	8140219.13	60670.05
2013	14131843.08	9693134	19334	63942.85
2014	12006965.05	9651053	14245	67977.46
2015	8184480.52	9170517	8814	69780.69
2016	8178817.96	9704453	9418	68652.43
2017	12913241.32	9818494	12243	69205.69
2018	17281953.13	8729495	11729	70536.35
2019	16703434.07	8887067	17338	72094.09
2020	11058151.84	9971872	15278	73219.90
2021	16737339.63	10873561	16921	74083.40
2022	24221595.93	12182522	19918	75109.25
2023	25132359.78	17873532	25871	76121.72

Sources: National Bureau of Statistics (NBS) NNPC PPPRA and CBN Statistical Bulletin and World Bank Indicators

Eviews Results Outputs

Descriptive Statistics

	COT	DBT	NOTR	RGDP
Mean	6187175.	7771925.	1396788.	39935.83
Median	1920900.	9170517.	125788.2	31064.27
Maximum	25132360	19116321	8865778.	76121.72
Minimum	1476.170	1037.000	5621.800	16211.49
Std. Dev.	7086878.	4439288.	2440963.	21708.17

Skewness	0.987907	0.203769	1.947576	0.484522
Kurtosis	3.053641	2.852484	5.564328	1.586116
Jarque-Bera	6.999542	0.336561	38.96514	5.264124
Probability	0.030204	0.845117	0.000000	0.071930
Sum	2.66E+08	3.34E+08	60061889	1717241.
Sum Sq. Dev.	2.11E+15	8.28E+14	2.50E+14	1.98E+10
Observations	43	43	43	43

Unit Root Test at Level

Null Hypothesis: LRGDP has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.270074	0.9739
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LRGDP)

Method: Least Squares

Date: 11/21/24 Time: 23:41

Sample (adjusted): 1982 2023

Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRGDP(-1)	0.003338	0.012358	0.270074	0.7885
D(LRGDP(-1))	0.412815	0.145594	2.835379	0.0072
C	-0.016629	0.128214	-0.129698	0.8975

R-squared	0.182510	Mean dependent var	0.032125
Adjusted R-squared	0.140588	S.D. dependent var	0.045599
S.E. of regression	0.042272	Akaike info criterion	-3.420623
Sum squared resid	0.069691	Schwarz criterion	-3.296504
Log likelihood	74.83308	Hannan-Quinn criter.	-3.375128
F-statistic	4.353513	Durbin-Watson stat	1.598747
Prob(F-statistic)	0.019652		

Null Hypothesis: LCOT has a unit root

Exogenous: Constant

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.472574	0.1291
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LCOT)

Method: Least Squares

Date: 11/21/24 Time: 23:59

Sample (adjusted): 1981 2023

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LCOT(-1)	-0.061082	0.024704	-2.472574	0.0177
C	1.062918	0.345340	3.077889	0.0037
R-squared	0.129763	Mean dependent var		0.226569
Adjusted R-squared	0.108538	S.D. dependent var		0.483492
S.E. of regression	0.456500	Akaike info criterion		1.314940
Sum squared resid	8.544090	Schwarz criterion		1.396856
Log likelihood	-26.27121	Hannan-Quinn criter.		1.345148
F-statistic	6.113621	Durbin-Watson stat		2.057976
Prob(F-statistic)	0.017652			

Null Hypothesis: LDBT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.230251	0.0001
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LDBT)

Method: Least Squares

Date: 11/22/24 Time: 00:03

Sample (adjusted): 1981 2023

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LDBT(-1)	-0.462960	0.088516	-5.230251	0.0000
C	7.276309	1.359659	5.351568	0.0000

R-squared	0.400195	Mean dependent var	0.226855
Adjusted R-squared	0.385565	S.D. dependent var	1.497550
S.E. of regression	1.173868	Akaike info criterion	3.203880
Sum squared resid	56.49657	Schwarz criterion	3.285796
Log likelihood	-66.88342	Hannan-Quinn criter.	3.234088
F-statistic	27.35552	Durbin-Watson stat	3.091293
Prob(F-statistic)	0.000005		

Null Hypothesis: LNOTR has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.412178	0.5676
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(LNOTR)

Method: Least Squares

Date: 11/22/24 Time: 00:06

Sample (adjusted): 1981 2023

Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNOTR(-1)	-0.086973	0.061588	-1.412178	0.1654
C	1.052815	0.750053	1.403655	0.1680

R-squared	0.046384	Mean dependent var	0.015892
Adjusted R-squared	0.023125	S.D. dependent var	1.015403
S.E. of regression	1.003593	Akaike info criterion	2.890446
Sum squared resid	41.29519	Schwarz criterion	2.972362
Log likelihood	-60.14459	Hannan-Quinn criter.	2.920654
F-statistic	1.994247	Durbin-Watson stat	1.845870
Prob(F-statistic)	0.165443		

General Model Estimate for Model

Model Summary [b]

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.937[a]	.879	.870	7834.27722	.879	96.619	3	40	.000	.606

a. Predictors: (Constant), NOTR, COT, DBT

b. Dependent Variable: RGDP

ANOVA [a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17790273622.851	3	5930091207.617	96.619	.000[b]
	Residual	2455035984.817	40	61375899.620		
	Total	20245309607.667	43			

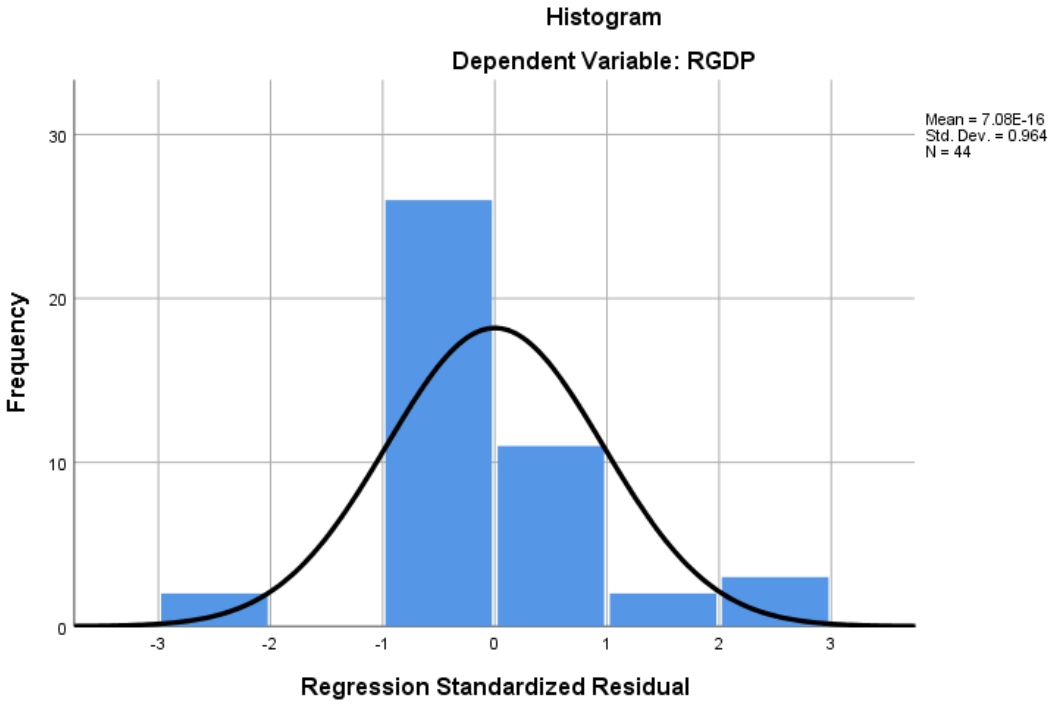
a. Dependent Variable: RGDP

b. Predictors: (Constant), NOTR, COT, DBT

Coefficients [a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	18930.293	2407.177		7.864	.000		
	COT	.003	.000	.840	11.028	.000	.523	1.913
	DBT	.001	.000	.162	1.903	.064	.420	2.383
	NOTR	-.001	.001	-.077	-1.210	.234	.739	1.354

a. Dependent Variable: RGDP


Histogram
Dependent Variable: RGDP
Mean = 7.08E-16
Std. Dev. = 0.964
N = 44
Frequency
30
20
10
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual