Maritime Sector and Macroeconomic Performance in Nigeria

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Abstract
This study examined the effect of the maritime sector on macroeconomic performance in Nigeria from 1990 to 2024. The study disaggregated the maritime sector into maritime import, marine export, maritime transportation and maritime tourism, while macroeconomic performance was proxied by Gross Domestic Product. Annual time series data used were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the World Development Indicators (WDI) of the World Bank, and United Nations Conference on Trade and Development (UNCTAD) reports, and the Autoregressive Distributed Lag (ARDL) technique was employed to estimate the short-run and long-run interactions among the variables. Empirical results revealed that maritime import, marine export and maritime transportation have positive and statistically significant effects on Gross Domestic Product in Nigeria in both the short run and the long run, while maritime tourism has a positive but statistically insignificant effect in both periods. The study concluded that the maritime sector plays a vital role in enhancing macroeconomic performance in Nigeria. It was recommended, among others, that government should intensify investment in port infrastructure and maritime trade facilitation, given the significant contribution of maritime import, export and transportation to national output.

Keywords: *Maritime Sector, Macroeconomic Performance, Gross Domestic Product, Nigeria, ARDL*

1. Introduction

The maritime sector occupies a central position in the global economy, serving as the backbone of international trade and economic integration. Globally, more than 80 percent of the volume of world trade is transported by sea, making maritime transport indispensable for the movement of raw materials, intermediate goods, and finished products across continents. The sector encompasses shipping, port operations, shipbuilding and repair, maritime logistics, offshore services, and related auxiliary industries such as marine insurance and freight forwarding (Ikenna & Paul, 2021). As global trade volumes expand, the maritime industry has evolved into a complex and technology-driven sector that influences supply chain efficiency, trade competitiveness, and overall economic productivity (UNCTAD, 2023; Johnson & Eze, 2020).

The growing relevance of the maritime sector has attracted significant research attention from scholars in economics, transportation studies, and international trade. Empirical studies suggest

that improvements in port efficiency and maritime connectivity reduce trade costs, stimulate export diversification, and enhance foreign direct investment inflows (Korinek & Sourdin, 2021). Through multiplier effects, maritime activities stimulate other sectors such as manufacturing, agriculture, and wholesale trade, thereby contributing to Gross Domestic Product (GDP) growth. Consequently, scholarly discourse has increasingly focused on the sector's role in enhancing macroeconomic performance, particularly its influence on Gross Domestic Product expansion in both developed and developing economies (Ifegha, Aruwei & Etugbo, 2023). In Nigeria, the maritime sector plays a particularly vital role given the country's strategic location along the Gulf of Guinea and its reliance on seaborne trade for crude oil exports and the importation of capital goods and consumer products. As a coastal nation with over 850 kilometers of shoreline, Nigeria depends heavily on maritime transport for international trade, with over 80 percent of its external trade by volume conducted through seaports (UNCTAD, 2023). The sector contributes directly to Gross Domestic Product through port operations, shipping services, marine logistics, and maritime tourism. Revenues generated from port charges, customs duties, and shipping-related services form a significant component of government income, while efficient maritime operations reduce trade costs, facilitate export expansion, and stimulate domestic production, thereby strengthening overall economic growth (Imide & Osadume, 2024). Beyond direct Gross Domestic Product contributions, the maritime sector enhances Nigeria's macroeconomic performance by stimulating trade expansion and improving balance of payments stability. According to the World Bank (2020), enhanced logistics performance and port efficiency are strongly associated with increased trade volumes and economic growth in developing countries. For Nigeria, maritime sector reforms such as port concessioning and modernization have attracted private investment, improved service delivery, and strengthened trade facilitation, all of which positively influence macroeconomic stability.

Statement of the Problem

Nigeria is strategically positioned along the Gulf of Guinea with an extensive coastline and access to major international shipping routes, making the maritime sector a potentially powerful driver of economic growth. Given that over 80 percent of Nigeria's international trade is conducted through sea transport, the maritime industry is expected to significantly contribute to Gross Domestic Product. However, despite this strategic importance, Nigeria continues to experience fluctuating GDP growth rates, raising concerns about whether the maritime sector is effectively contributing to macroeconomic performance or whether its potential remains underutilised. Over the years, the Nigerian maritime sector has been characterised by infrastructural deficiencies, port congestion, high shipping costs, bureaucratic bottlenecks, and security challenges such as piracy and cargo theft. These structural inefficiencies increase transaction costs, discourage foreign direct investment, and reduce trade competitiveness, such that the expected multiplier effects of maritime activities on national output may not be fully realised. Although reforms such as port concessioning and private sector participation were introduced to improve efficiency, empirical evidence on the extent to which these reforms have translated into measurable improvements in GDP growth remains inconclusive. Despite the recognised importance of the maritime sector in trade facilitation and revenue generation, there is still insufficient empirical clarity regarding its direct effect on Gross Domestic Product in Nigeria. Many existing studies focus broadly on transportation or trade without isolating the maritime sector's specific impact on macroeconomic performance. Therefore, there is a need for a comprehensive investigation into how maritime

sector activities influence Gross Domestic Product growth over time. It is against this background that this study examined the effect of the maritime sector on macroeconomic performance in Nigeria. The specific objectives of the study are to examine the effect of maritime import on Gross Domestic Product in Nigeria; to determine the effect of marine export on Gross Domestic Product in Nigeria; to ascertain the effect of maritime transportation on Gross Domestic Product in Nigeria; and to analyse the effect of maritime tourism on Gross Domestic Product in Nigeria.

2. Literature Review

Theoretical Review

In this section, the two theories that served as the theoretical background for this study are reviewed and discussed in details:

i. New Trade Theory

New Trade Theory was primarily developed by Paul Krugman in 1979, with further major contributions in 1980, particularly through his seminal papers "Increasing Returns, Monopolistic Competition, and International Trade" (1979) and "Scale Economies, Product Differentiation, and the Pattern of Trade" (1980), work that later earned him the Nobel Memorial Prize in Economic Sciences in 2008. Unlike earlier trade models such as those of Ricardo, Heckscher, and Ohlin, which focused on comparative advantage and factor endowments, Krugman incorporated increasing returns to scale and imperfect competition into international trade analysis. New Trade Theory argues that international trade can arise not only from differences in resources or technology between countries, but also from economies of scale, product differentiation, and network effects. The theory rests on the assumptions that markets are not perfectly competitive, that goods are differentiated rather than homogeneous, that countries with similar resource endowments can still benefit from trade through scale economies, and that firms experience internal economies of scale such that average costs decline as output increases (Krugman, 1979; 1980). New Trade Theory is relevant to this study because it explains how industries characterised by economies of scale and imperfect competition, such as the maritime sector, can drive trade expansion and economic growth. In the Nigerian context, the maritime sector, comprising shipping, port operations, marine logistics, and offshore services, exhibits strong scale economies: as port throughput increases and shipping networks expand, the average cost of cargo handling and maritime transport declines, improving trade efficiency and competitiveness. Larger and more efficient ports such as those in Lagos can serve as regional hubs, attracting higher trade volumes from neighbouring West African countries. This expansion enhances export capacity, reduces transaction costs, and stimulates domestic production, thereby increasing Gross Domestic Product and strengthening overall macroeconomic performance, outcomes that align closely with the predictions of New Trade Theory regarding trade-driven macroeconomic improvement.

ii. Endogenous Growth Theory

Endogenous Growth Theory was principally developed in the mid-1980s and early 1990s, with foundational contributions from Paul Romer in 1986 and 1990, and Robert Lucas Jr. in 1988. Romer's 1986 paper, "Increasing Returns and Long-Run Growth," introduced the idea that technological change results from intentional investment decisions made by firms and individuals, rather than arising from forces outside the economic system, while Lucas (1988) highlighted the central role of human capital accumulation in sustaining long-term economic expansion. These

scholars challenged the earlier neoclassical growth model of Robert Solow (1956), which treated technological progress as an exogenous factor. Endogenous Growth Theory posits that long-run economic growth is generated from within the economy through deliberate investment in human capital, innovation, research and development, and knowledge creation, and it rests on the assumptions that growth is driven by investment in human capital and technology, that returns to investment in capital do not necessarily diminish due to knowledge spillovers, and that government policies promoting infrastructure and education play a crucial role in stimulating growth (Romer, 1986; 1990; Lucas, 1988).

Endogenous Growth Theory is relevant to this study because it explains how internally generated advancements within the maritime sector can drive sustained macroeconomic growth. In the Nigerian maritime sector, investments in port modernisation, digital logistics platforms, maritime training institutions, and research in marine technology generate productivity improvements that are self-reinforcing; for instance, upgrading port infrastructure and adopting smart port technologies increase efficiency, reduce cargo dwell time, and enhance trade competitiveness. These improvements expand output, stimulate exports, and raise Gross Domestic Product, demonstrating how internally generated advancements within the maritime sector, rather than externally imposed technological change, can drive sustained macroeconomic performance in Nigeria.

Empirical Review

Idoko, Nkoro and Oladosu (2025) examined the effect of maritime entrepreneurship on economic development in Nigeria from 1990 to 2022. In order to achieve the objectives of the study, annual time series data used were sourced from CBN Statistical Bulletin, WDI of the World Bank as well as UNCTAD reports. The data obtained were tested for stationarity using Augmented Dickey-Fuller (ADF) approach. ARDL bounds cointegration test was used to establish cointegration or long run relationship among the variables. Lastly, the study employed Autoregressive Distributed Lag Model (ARDL) to investigate the long-run and the short-run parameters among the variables. The major results emanating from this study showed that maritime import, marine export and maritime transportation have positive and significant effect on Human Development Index in Nigeria. Also, maritime tourism has a positive and significant effect on Human Development Index in Nigeria in short run while its effect on Human Development Index in Nigeria in the long run is positive but insignificant.

Imide and Osadume (2024) investigated the impact of port efficiency on the performance of the maritime sector in Nigeria. The study employed econometric techniques, including multiple regression analysis and co integration tests, to examine the relationships between these variables and the maritime sector's contribution to gross domestic product. The findings of the study indicated a significant and positive correlation between cargo handling equipment capacity and maritime sector performance in Nigeria. This suggests that investments in modern and efficient cargo handling equipment can enhance the efficiency of port operations and contribute to the growth of the maritime sector. However, the study did not find a significant relationship between berthing capacity and maritime sector performance, contrary to expectations. The results of this research have important implications for policymakers in Nigeria and other emerging markets.

Baafi (2024) investigate the impact of seaport efficiency on economic growth in Ghana over the period 2006–2020. Augmented Dickey–Fuller tests, autoregressive distributed lag (ARDL) modeling and Granger Causality, were applied to explore the intricate relationship between

Seaport Efficiency and Economic Growth. The findings reveal a statistically significant and positive association between seaport efficiency and GDP, underscoring the crucial role of efficient seaport operations in actively stimulating economic growth.

Nyeche and Enyioko (2023) examined the effect of maritime transport on unemployment rate in Nigeria, 1980-2023. Data for the study were generated from National Bureau of statistics, central bank of Nigeria, Nigeria port authority Statistical Bulletins. 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. 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.

Ogoun (2022) assessed maritime transport as a tool of economic growth in Nigeria, adopting a qualitative desk-review approach. The study found that maritime transport contributes positively to the GDP of Nigeria, which is a major determinant of the rate of economic growth in the nation, and that maritime transport facilitates other sectors of the economy as a major component in the value chain, thereby serving as a tool of economic growth.

Bashiru, Muse and Lawal-Fagbo (2021) examined the effect of maritime import logistics factors, that is, vessel movement and cargo throughput costs, on Nigeria's Gross Domestic Product, using an ex-post facto research design with data from the Nigeria Port Authority and the Central Bank of Nigeria. The results showed a positive though weak association between bulk cargo import and cargo throughput costs and GDP, and the study recommended that government augment cargo handling infrastructure at the seaports to increase cost efficiency and improve Nigeria's GDP

Matekenya and Ncwadi (2022) explored the impact of maritime transport financing on trade in South Africa from 1994 to 2019 using the Autoregressive Distributed Lag (ARDL) model. The results confirmed a long-run and short-run positive relationship between maritime transport financing and total trade, and the study recommended increased investment towards maritime transport infrastructure to promote trade flows and stimulate economic development.

Yıldız (2022) examined the relationship between Gross Domestic Product, maritime exports, and the construction sector in Turkey, using unit root and Granger causality tests. The results showed that GDP is the Granger cause of maritime exports, maritime imports, and the construction industry, while no correlation could be established between maritime imports and other variables, and the study concluded that the construction industry is the Granger cause of maritime exports.

Viljoen, Maister and Chasomeris (2020) explored the development of maritime export clusters in South Africa, identifying critical challenges including infrastructural constraints, regulatory hurdles, and limited access to finance, alongside opportunities such as technological advancement and public-private partnerships. The study concluded with policy recommendations aimed at fostering a conducive environment for maritime cluster development, including improving infrastructure and streamlining regulatory processes.

Richard and Azuka (2020) examined the determinants of maritime export in Nigeria through a theoretical approach, establishing the conceptual and theoretical constructs that determine maritime trade. The findings showed that maritime trade contributes to economic growth, and the

study recommended the full and speedy implementation of port reforms to open up Nigerian seaports for increased trading activities and maritime revenue.

Naidoo and Andrews (2021) analysed maritime transport and port development in South Africa using a mixed-methods approach combining quantitative trade data with qualitative stakeholder interviews. The findings revealed that port development and maritime transport efficiency are strongly correlated with economic growth, and the study recommended modernising port infrastructure and fostering public-private partnerships to mobilise the necessary investments.

Amankwah and Opoku (2021) examined the relationship between port infrastructure development and economic growth in Ghana using econometric modelling combined with qualitative stakeholder insights. The findings indicated that port infrastructure development has a significant positive impact on Ghana's economic growth, with improved port facilities leading to increased trade volumes and higher GDP contributions, and the study recommended continuous investment in modernising port infrastructure.

Osei and Boateng (2020) examined the role of maritime transport in Ghana's economic development using a mixed-methods approach. The quantitative findings indicated that maritime transport is a critical driver of economic growth in Ghana, facilitating a significant portion of the country's international trade and contributing to increased GDP, with the study also highlighting the multiplier effects of maritime transport on related sectors such as logistics and manufacturing.

Ovuakporoye (2019) examined the relationship between maritime environmental pollution, maritime transport, and economic growth in Nigeria from 2000 to 2018 using the Autoregressive Distributed Lag (ARDL) model. The findings revealed a significant long-run causal impact of maritime transport on economic growth, alongside a bi-directional causal relationship between maritime transport and economic growth, and the study recommended that Nigeria improve both environmentally and economically given the dominance of environmental pollution's negative role over its economic benefits.

Chasomeris (2018) examined the role of maritime transport in South Africa's economic growth through a detailed analysis of trade data spanning several decades. The study revealed the significant contribution of maritime transport to South Africa's GDP and found that maritime transport has a substantial multiplier effect on the economy, stimulating growth in related sectors such as manufacturing, logistics, and services, and recommended investing in modernising port infrastructure and promoting skill development within the maritime workforce.

Igbodo (2018) studied the performance of the maritime import subsector and economic growth in Nigeria from 1995 to 2015 using an ex-post facto research design with secondary data from the Central Bank of Nigeria and the National Bureau of Statistics. The findings showed a positive relationship between indicators of maritime subsector performance and indicators of economic growth, and the study recommended that government shift policy emphasis from the oil sector to the maritime subsector through massive investment and control of customs duty evasion.

Humayun, Rezwana and Mohammad (2020) explored the prospects of sea-based tourism in promoting Bangladesh's economic development through the sustainable use of marine resources, based on secondary data analysis. The study found that Bangladesh can accelerate its economic progress through effective use of sea resources and maritime tourism, contributing significantly to the country's overall socio-economic progress, particularly in coastal zones.

Okeke and Adebayo (2019) explored the impact of maritime tourism on the growth and success of maritime entrepreneurship in Nigeria using a mixed-methods approach combining structured questionnaires with in-depth interviews. The findings indicated that maritime tourism is pivotal to

the development of successful maritime entrepreneurs, with entrepreneurs exposed to maritime tourism more likely to innovate, expand their businesses, and achieve higher levels of performance.

Smith and Peters (2019) examined the role of tourism activities within the South African maritime sector and their impact on economic development, using a mixed-methods approach integrating economic data analysis with stakeholder interviews. The quantitative findings revealed that entrepreneurial activities in maritime tourism significantly drive economic growth, leading to higher trade volumes, substantial contributions to GDP, and improved international competitiveness.

3. Methodology

The research design adopted for this study is the ex-post facto research design. The study made use of secondary annual time series data spanning from 1990 to 2024. The data were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the World Development Indicators (WDI) of the World Bank, and United Nations Conference on Trade and Development (UNCTAD) reports.

Model Specification

To effectively capture the effect of the maritime sector on macroeconomic performance in Nigeria, in line with the research objectives, the study employed the Autoregressive Distributed Lag (ARDL) model. This study was anchored on New Trade Theory, given its relevance to the trade-driven dimensions of the maritime sector examined in this study. The model for this research was adapted from the work of Ogoun (2022), who examined maritime transport as a tool of economic growth in Nigeria, and modified to suit the purpose of this present study.

Functional Model Specification

$$GDP = f(MIM, MEX, MTS, MTR) \quad \ldots\ldots (3.1)$$

Mathematical Model Specification

$$GDP_t = \beta_0 + \beta_1 MIM_t + \beta_2 MEX_t + \beta_3 MTS_t + \beta_4 MTR_t \quad \ldots\ldots (3.2)$$

Econometrical Model Specification

$$GDP_t = \beta_0 + \beta_1 MIM_t + \beta_2 MEX_t + \beta_3 MTS_t + \beta_4 MTR_t + \mu t \quad \ldots\ldots (3.3)$$

Where: GDP = Gross Domestic Product, MIM = Maritime Import, MEX = Marine Export, MTS = Maritime Transportation, MTR = Maritime Tourism, β_0 = Intercept, $\beta_1 - \beta_4$ = Coefficients of the respective explanatory variables, μt = Disturbance or error term.

A Priori Expectation: The a priori expectations for each of the independent variables are presented based on economic theory and insights from previous empirical literature. The parameters of maritime import, marine export, maritime transportation and maritime tourism are all expected to have a positive relationship with Gross Domestic Product, since increased maritime trade activity, transportation efficiency and tourism inflows are expected to stimulate trade expansion, industrial production and national output. This is mathematically stated as: $\beta 1 > 0$; $\beta 2 > 0$; $\beta 3 > 0$; $\beta 4 > 0$.

Method of Data Analysis

The data analysis technique employed in this study was the Autoregressive Distributed Lag (ARDL) approach. This is because the result of the unit root test generated a mixed order of

integration, that is, a combination of variables stationary at level, I(0), and variables stationary after first differencing, I(1), a condition under which the ARDL bounds testing approach remains valid and appropriate.

4. Results and Discussion

Descriptive Analysis

The descriptive statistics for the study variables are summarised in Table 4.1:

Table 4.1: Descriptive Statistics for the Research Variables

	GDP	MIM	MEX	MTS	MTR
Mean	64634.56	4955.724	2522.600	138.1571	255.2771
Median	34675.94	2806.900	635.4000	93.10000	179.0100
Maximum	287805.5	18115.33	14890.30	510.2200	884.2000
Minimum	494.6400	35.40000	10.40000	4.840000	10.67000
Std. Dev.	75162.88	5504.859	3674.338	127.8519	253.9095
Skewness	1.297040	1.130773	1.979149	1.291515	0.931278
Kurtosis	3.941244	3.046584	6.408234	3.852722	2.787633
Jarque-Bera	11.10548	7.461944	39.78942	10.79046	5.124891
Probability	0.003877	0.023970	0.000000	0.004538	0.077116
Sum	2262210.	173450.4	88291.00	4835.500	8934.700
Sum Sq. Dev.	1.92E+11	1.03E+09	4.59E+08	555767.9	2191982.
Observations	**35**	**35**	**35**	**35**	**35**

Source: Researcher's Computation, 2026 (EViews 12 Output).

Table 4.1 presents the descriptive statistics of Gross Domestic Product, maritime import, marine export, maritime transportation and maritime tourism in Nigeria for the period 1990 to 2024.

Gross Domestic Product (GDP) recorded a mean value of ₦64,634.56 billion, indicating that Nigeria recorded an average economic output of about ₦64.63 trillion during the study period. The maximum GDP value of ₦287,805.5 billion and minimum value of ₦494.64 billion reveal a substantial increase in economic activities over time, while the standard deviation of ₦75,162.88 billion indicates high volatility. The skewness value of 1.297 confirms a positively skewed distribution, and the kurtosis value of 3.941 indicates a leptokurtic distribution. The Jarque-Bera probability value of 0.003877, being less than 0.05, suggests that GDP is not normally distributed during the study period. Maritime import (MIM) recorded a mean value of ₦4,955.724 billion, with a maximum of ₦18,115.33 billion and minimum of ₦35.40 billion, reflecting substantial growth in import activities through Nigerian seaports. The Jarque-Bera probability value of 0.023970 indicates that the series is not normally distributed. Marine export (MEX) recorded a mean value of ₦2,522.600 billion, with a maximum of ₦14,890.30 billion compared with a minimum of ₦10.40 billion, reflecting remarkable growth in export activities over time. The Jarque-Bera probability value of 0.000000 confirms that the series is not normally distributed, indicating significant irregularities and fluctuations in marine export activities during the study period. Maritime transportation (MTS) recorded a mean value of ₦138.1571 billion, with a maximum of ₦510.22 billion and minimum of ₦4.84 billion, indicating significant expansion in maritime transportation services in Nigeria. The Jarque-Bera probability value of 0.004538 indicates non-normality of the series. Maritime tourism (MTR) recorded a mean value of ₦255.2771 billion, a maximum value of ₦884.20 billion, and a minimum value of ₦10.67 billion, reflecting increased maritime tourism activities over time. Unlike the other variables, the Jarque-

Bera probability value of 0.077116, being greater than 0.05, suggests that maritime tourism is normally distributed. Overall, the descriptive statistics reveal that the maritime sector variables experienced significant growth and fluctuations over the study period, justifying the need for further econometric analysis to determine their effect on macroeconomic performance in Nigeria.

Unit Root Test

The results of the unit root test are presented in Table 4.2:

Table 4.2: Augmented Dickey-Fuller (ADF) Test Results

	ADF at Levels			ADF at First Difference			
Variables	**ADF Statistic**	**5% Critical Value**	**Decision**	**ADF Statistic**	**5% Critical Value**	**Decision**	**Order of Integration**
LOG(GDP)	-4.396596	-2.951125	Stationary	-	-	-	I(0)
LOG(MIM)	-2.376849	-2.951125	Not Stationary	-8.126326	-2.954021	Stationary	I(1)
LOG(MEX)	-1.012723	-2.951125	Not Stationary	-6.274158	-2.954021	Stationary	I(1)
LOG(MTS)	-3.418117	-2.951125	Stationary	-	-	-	I(0)
LOG(MTR)	-6.799660	-2.957110	Stationary	-	-	-	I(0)

Source: Researchers' Computation, 2026 (EViews 12 Output).

The results of the Augmented Dickey-Fuller (ADF) unit root test at levels show that Gross Domestic Product, maritime transportation and maritime tourism were stationary at the 5 percent level of significance, since their ADF test statistics exceeded their respective critical values in absolute terms, indicating that they are integrated of order zero, I(0). On the other hand, maritime import and marine export were not stationary at levels. However, following first differencing, maritime import and marine export became stationary, indicating that they are integrated of order one, I(1). This mixed order of integration, with some variables stationary at level and others stationary at first difference, justifies the application of the Autoregressive Distributed Lag (ARDL) approach for cointegration testing and long-run relationship estimation.

Bound Cointegration Test

Table 4.3: ARDL Bounds Cointegration Test Result of GDP Model

Selected Model: ARDL (2, 3, 2, 1, 3)		
Test Statistic	**Value**	**K**
F-statistic	5.875413*	4
Critical Value Bounds		
Significance	**Lower Bound** [I(0)]	**Upper Bound** [I(1)]
5%	2.56	3.49

Note: * implies that the F-statistic is greater than the upper bound 5% critical value and a long-run relationship exist among the variables in the model. Selected Model: ARDL (2, 3, 2, 1, 3).

Source: Researchers' Computation, 2026 (EViews 12 Output).

Bounds testing was used to test for cointegration because of the mixture of variables of order I(0) and I(1). The result of the ARDL bounds test shows that the computed F-statistic of 5.875413 is greater than both the lower bound of 2.56 and the upper bound of 3.49 at the 5 percent level of significance. There is therefore sufficient statistical evidence to reject the null hypothesis of no cointegration and conclude that there exists a long-run relationship among Gross Domestic Product, maritime import, marine export, maritime transportation and maritime tourism in Nigeria. The confirmation of long-run dynamics among the variables justified proceeding to estimate the ARDL short-run and long-run models for the Gross Domestic Product model.

Short-Run and Long-Run Dynamics of Autoregressive Distributive Lag (ARDL) Model

The short-run and long-run dynamic effect of maritime import, marine export, maritime transportation and maritime tourism on Gross Domestic Product in Nigeria was estimated using the Autoregressive Distributed Lag (ARDL) approach. The results of the estimation are presented in Table 4.4.

Table 4.4: Estimated Long-Run and Short-Run Coefficients of ARDL of GDP Model

Long-Run Results (Dependent Variable = LOG(GDP))

	Dependent Variable: GDP **Selected Model: ARDL (2, 3, 2, 1, 3)**			
Independent Variables (Regressors)	**Coefficient (Parameter estimates)**	**Std. Error**	**t-Statistic**	**Prob**
LOG(MIM)	2.367346	0.398596	5.939205	0.0010
LOG(MEX)	0.584552	0.134582	4.343452	0.0049
LOG(MTS)	0.547327	0.148993	3.673520	0.0019
LOG(MTR)	0.106323	0.356967	0.297852	0.7694
C	5.190553	0.967982	5.362241	0.0001

EC = LOG(GDP) - (2.3673*LOG(MIM) + 0.5846*LOG(MEX) + 0.5473*LOG(MTS) + 0.1063*LOG(MTR) + 5.1906)

	Dependent Variable: GDP **Selected Model: ARDL (2, 3, 2, 1, 3)**			
Independent Variables (Regressors)	**Coefficient (Parameter Estimates)**	**Std. Error**	**t-Statistic**	**Prob**
DLOG(GDP(-1))	0.350403	0.112518	3.114202	0.0063
DLOG(MIM)	0.073845	0.027856	2.650955	0.0168
DLOG(MIM(-1))	0.006393	0.037657	0.169778	0.8672
DLOG(MIM(-2))	0.017205	0.033160	0.518857	0.6105
DLOG(MEX)	0.123297	0.024567	5.018893	0.0001
DLOG(MEX(-1))	-0.082629	0.024907	-3.317533	0.0041
DLOG(MTS)	0.108573	0.039320	2.761232	0.0133
DLOG(MTR)	0.016498	0.033491	0.492609	0.6286
DLOG(MTR(-1))	-0.082152	0.042402	-1.937455	0.0695
DLOG(MTR(-2))	-0.080494	0.120573	-0.667600	0.5181
CointEq(-1)*	-0.347919	0.051511	-6.754321	0.0000

Adjusted R^2 = 0.842989; Durbin-Watson stat = 2.152886

Source: Researchers' Computation, 2026 (EViews 12 Output).

The ARDL model results presented above show both long-run and short-run relationships between Gross Domestic Product (GDP) and maritime import (MIM), marine export (MEX), maritime transportation (MTS), and maritime tourism (MTR) in Nigeria. Each variable's coefficient indicates the direction and magnitude of the effect, while the p-value indicates statistical significance. A p-value less than 0.05 suggests a statistically significant relationship.

Maritime Import (MIM) and Gross Domestic Product (GDP)

From the ARDL long-run result, maritime import has a positive coefficient of 2.367346 with a p-value of 0.0010, indicating a positive and statistically significant effect on Gross Domestic Product in the long run. In the short run, maritime import also has a positive coefficient of 0.073845 with a p-value of 0.0168, indicating a positive and statistically significant effect. It can therefore be concluded that maritime import has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run, implying that growth in maritime import activity, largely reflecting the importation of capital goods, machinery and raw materials through Nigerian seaports, meaningfully stimulates national output.

Marine Export (MEX) and Gross Domestic Product (GDP)

From the ARDL long-run result, marine export has a positive coefficient of 0.584552 with a p-value of 0.0049, indicating a positive and statistically significant effect on Gross Domestic Product in the long run. In the short run, marine export also has a positive coefficient of 0.123297 with a p-value of 0.0001, indicating a positive and statistically significant effect, although its first lag, DLOG(MEX(-1)), has a negative coefficient of -0.082629 with a p-value of 0.0041, suggesting a partial short-run reversal the following year. On the whole, it can be concluded that marine export has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run, implying that export earnings from marine trade contribute meaningfully to national output, notwithstanding a modest correction in the year following an export shock.

Maritime Transportation (MTS) and Gross Domestic Product (GDP)

From the ARDL long-run result, maritime transportation has a positive coefficient of 0.547327 with a p-value of 0.0019, indicating a positive and statistically significant effect on Gross Domestic Product in the long run. In the short run, maritime transportation also has a positive coefficient of 0.108573 with a p-value of 0.0133, indicating a positive and statistically significant effect. It can therefore be concluded that maritime transportation has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run, underscoring the importance of shipping and port transportation services in facilitating trade and stimulating national output.

Maritime Tourism (MTR) and Gross Domestic Product (GDP)

From the ARDL long-run result, maritime tourism has a positive coefficient of 0.106323 with a p-value of 0.7694, indicating a positive but statistically insignificant effect on Gross Domestic Product in the long run. In the short run, maritime tourism has a positive coefficient of 0.016498 with a p-value of 0.6286, also indicating a positive but statistically insignificant effect, and its first lag, DLOG(MTR (-1)), is negative and only marginally significant at the 10 percent level (coefficient -0.082152, p-value 0.0695). It can therefore be concluded that maritime tourism has a

positive but non-significant effect on Gross Domestic Product in Nigeria in both the short run and the long run, suggesting that maritime tourism in Nigeria remains too underdeveloped, relative to import, export and transportation activities, to exert a statistically dependable influence on national output.

Interpretation of CointEq(-1) Result

The error correction term, CointEq (-1), has a coefficient of -0.347919 and a p-value of 0.0000, which is negative and highly significant, as theoretically expected. This confirms the existence of a stable long-run relationship among Gross Domestic Product, maritime import, marine export, maritime transportation and maritime tourism. Specifically, the coefficient of -0.347919 indicates that approximately 35 percent of any deviation of Gross Domestic Product from its long-run equilibrium level is corrected within one year, implying a fairly rapid speed of adjustment back to long-run equilibrium following a shock.

Interpretation of Adjusted R-Squared (Adj. R^2) Value

The adjusted R-squared of 0.842989 indicates that about 82 percent of the total variation in Gross Domestic Product is explained by systematic changes in maritime import, marine export, maritime transportation and maritime tourism, while the remaining 18 percent of the variation is explained by other factors not included in the model. The Durbin-Watson statistic of 2.152886 shows that the model is free from the problem of autocorrelation.

Post-Estimation Tests of Gross Domestic Product (GDP) Model

The results of the diagnostic tests are presented and discussed below:

Table 4.5: Post-Estimation Test Results

Test	Null Hypothesis	F-stat.	Prob.	Decision
Jarque-Bera	Normal distribution exists	0.658864	0.7193	Do not reject H0
Breusch-Godfrey LM	No serial correlation	2.545336	0.1117	Do not reject H0
Breusch-Pagan-Godfrey	Homoscedasticity	1.206884	0.3520	Do not reject H0
Ramsey RESET	Model is correctly specified	2.052849	0.1712	Do not reject H0

Source: Researchers' Computation, 2026 (EViews 12 Output).

Table 4.5 presents the post-estimation diagnostic test results used to validate the reliability and robustness of the estimated ARDL model of Gross Domestic Product. The Jarque-Bera normality test result, with a statistic of 0.658864 and a probability value of 0.719332, confirms that the residuals are normally distributed. The Breusch-Godfrey serial correlation LM test, with an F-statistic of 2.545336 and a probability value of 0.1117, indicates that the residuals are not serially correlated. The Breusch-Pagan-Godfrey heteroskedasticity test, with an F-statistic of 1.206884 and a probability value of 0.3520, confirms that the variance of the residuals is homoscedastic. Lastly, the Ramsey RESET test, with an F-statistic of 2.052849 and a probability value of 0.1712, implies that the model is correctly specified. Overall, the post-estimation diagnostic results confirm that the estimated Gross Domestic Product model is statistically sound, stable, and reliable for policy analysis and inference.

Discussion of Findings

This study empirically analysed the relevant annual time series data sourced with respect to the effect of the maritime sector on macroeconomic performance in Nigeria from 1990 to 2024. The time series data used for the study were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, the World Development Indicators (WDI) of the World Bank, as well as United Nations Conference on Trade and Development (UNCTAD) reports. The study adopted descriptive statistical technique, unit root test, ARDL bounds cointegration test, and the Autoregressive Distributed Lag (ARDL) technique as the data analysis techniques. The findings of the study are discussed below.

Maritime Import and Macroeconomic Performance in Nigeria

The evidence that emerged from the study showed that maritime import has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run. This implies that an increase in maritime import leads to a significant increase in Gross Domestic Product in Nigeria in both the short run and the long run. The implication of this finding is that the importation of capital goods, machinery, and raw materials through Nigerian seaports supports industrial production and domestic economic activity, such that an efficient and well-functioning import channel through the maritime sector remains an important contributor to national output. This finding is in agreement with Ogoun (2022), who found that maritime import, as a proxy of maritime transport, plays a significant role in shaping macroeconomic performance in Nigeria, and is consistent with Bashiru, Muse and Lawal-Fagbo (2021), who found a positive association between maritime import-related cargo throughput costs and Nigeria's GDP.

Marine Export and Macroeconomic Performance in Nigeria

The results of the study showed that marine export has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run. This implies that an increase in marine export leads to a significant increase in Gross Domestic Product in Nigeria in both the short run and the long run. The implication of this finding is that export earnings generated through Nigeria's seaports, whether from crude oil or non-oil commodities, constitute an important channel through which the maritime sector strengthens national output, underscoring the need for continued diversification and expansion of Nigeria's maritime export base. This finding is in agreement with Richard and Azuka (2020), who found that maritime trade contributes to economic growth in Nigeria, and is consistent with Yıldız (2022), who found that Gross Domestic Product and maritime exports are closely linked in a Granger-causal sense in Turkey.

Maritime Transportation and Macroeconomic Performance in Nigeria

The evidence that emerged from the results of the study showed that maritime transportation has a positive and significant effect on Gross Domestic Product in Nigeria in both the short run and the long run. This implies that an increase in maritime transportation leads to a significant increase in Gross Domestic Product in Nigeria in both the short run and the long run. The implication of this finding is that efficient shipping and port transportation services reduce trade costs, shorten delivery times, and facilitate the smooth movement of goods, thereby exerting a direct and dependable stimulus on national output. This result is supported by Chasomeris (2018), who found that maritime transport exerts a positive impact on South Africa's economic growth, and is

consistent with Matekenya and Ncwadi (2022), who found a positive long-run and short-run relationship between maritime transport financing and total trade in South Africa.

Maritime Tourism and Macroeconomic Performance in Nigeria

The results of this study showed that maritime tourism has a positive but non-significant effect on Gross Domestic Product in Nigeria in both the short run and the long run. This implies that an increase in maritime tourism leads to an insignificant increase in Gross Domestic Product in Nigeria in both the short run and the long run. The implication of this finding is that, while maritime tourism activities such as coastal and marine leisure services are directionally supportive of national output, they remain too small in scale and underdeveloped, relative to maritime import, export, and transportation, to exert a statistically dependable influence on Nigeria's Gross Domestic Product. This result is broadly in tandem with Okeke and Adebayo (2019), who found that maritime tourism in Nigeria remains constrained by skills gaps and inadequate training that limit its full economic potential, although it contrasts with Smith and Peters (2019), who found that entrepreneurial activities in maritime tourism significantly drove economic growth in the more developed maritime tourism market of South Africa, suggesting that Nigeria's maritime tourism sub-sector has yet to reach a comparable scale of development.

5. Conclusion and Recommendations

Conclusion

This study empirically examined the effect of the maritime sector on macroeconomic performance in Nigeria. The findings of the study indicated that maritime import, marine export and maritime transportation, as components of the maritime sector, have positive and significant effects on Gross Domestic Product in Nigeria in both the short run and the long run, while maritime tourism has a positive but statistically insignificant effect in both periods. Premised on the findings, the study concludes that the maritime sector plays a vital role in enhancing macroeconomic performance in Nigeria, with maritime import, export and transportation activities serving as the most dependable channels through which the sector contributes to national output.

Recommendations

The following recommendations are proffered based on the findings of this study:

i. Government should intensify investment in port infrastructure, cargo handling facilities and customs processing systems to further enhance the efficiency of maritime import activities. Since maritime import was found to have a positive and significant effect on Gross Domestic Product in both the short run and long run, streamlining import procedures and reducing cargo dwell time at Nigerian seaports will further strengthen the sector's contribution to national output.

ii. Policymakers should implement targeted export promotion policies and diversify Nigeria's maritime export base beyond crude oil to include non-oil commodities such as agricultural produce and solid minerals. Given the significant positive effect of marine export on Gross Domestic Product, expanding and diversifying the export base through the maritime sector will help sustain and deepen this contribution to national output.

iii. The government should continue to invest in modernising maritime transportation infrastructure, including port facilities, shipping networks, and inland transport linkages, to sustain the significant positive effect of maritime transportation on Gross Domestic Product. Public-

private partnerships should be encouraged to mobilise the substantial capital required for large-scale maritime transportation infrastructure projects.

iv. Relevant government agencies, including the Nigerian Ports Authority and state tourism boards, should develop and implement a comprehensive maritime tourism strategy, including improved coastal infrastructure, security, and marketing, to grow the maritime tourism sub-sector to a scale where it can make a statistically significant contribution to Gross Domestic Product.

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