The Environmental Aspect Examination of Maritime Transport, Environmental Pollution and Economic Growth in Nigeria

Ovuakporoye Emmanuel Clarke, Mehmet Fatih Huseyinoglu

Abstract:, The impact of maritime transport in the financial improvement of any nation cannot be over-accentuated. In the meantime, the result of the maritime exercises on the earth has been a worry and the subsequent impact on the economy. Nigeria is a developing country and could too have a portrayal as an import-oriented country; hence, it depends vigorously on sea transport for the importation of products. This study targets analyzing the connection between marine pollution, maritime transport, and financial development in Nigeria. Time arrangement information that spread over from the year 2000 to 2018 was used, and Autoregressive Distributive Lag (ARDL) model was utilized for the investigation.

The discoveries from this examination uncover a long-run relationship running from marine pollution to economic growth. It was additionally found from this examination that a critical short-run relationship exists between maritime transportation and environmental pollution. Additionally, huge long-run causal effect of sea transport was found in the financial development of Nigeria. Further investigation from the examination demonstrates a long-run unidirectional connection between environmental pollution and financial development; and exchange and economic growth, while the bi-directional causal relationship won between maritime transport and economic growth.

The investigation, in this manner, proposes that Nigeria ought to improve both environmentally and economically as a result of its negative job in ecological quality is more overwhelming than its advantages in monetary development.

Keywords: Maritime transport, economic growth, marine pollution, ARDL, Nigeria.

I. INTRODUCTION

The impact of maritime transportation in the social, economic, and political in its commitment to the improvement of countries, either developed or developing, is in no uncertainty a huge one. To be sure, the history and progression of countries are interwoven solidly with the degree of progress of their maritime transport system where they exist. The occasion of Nigeria isn't an exception. At the economical level, an adequate and capable maritime transport system expects a fundamental job in the improvement of a country's economy especially in all-inclusive trade by changing nearby markets into national, provincial and worldwide center points. It awards economies of scale in zones that have promising comparative favored stance with acquainted period of huge business openings.

The hazardous climatic deviation, which is because of human exercises, is an essential sign to caution everyone about environmental pollution dangers, living on the earth including environmentalists, scholastics, legislators, and religious people (Taghvaee and Parsa, 2015). "No one on the planet is going to be untouched by the impacts of climate change," said Rajendra K. Pachauri, the executive of the Intergovernmental Panel on Climate Change (IPCC) in an open meeting in Japan in 2014 after the gathering on the IPCC report. This amazing threat is significantly settled in economic exercises, for instance, maritime transportation.

Maritime transportation assumes an essential job in both environmental pollution and economic development, especially in the developing and oil-exchanging economies, associated with the tremendous ocean like Nigeria. This transportation mode transmits a high pace of Carbon Dioxide (CO_2), in spite of the fact that it gives a fruitful channel to lead overall exchange (Taghvaee et al. 2017). Many opined that ships increment the CO_2transmissions since they pass on the colossal and progressively critical piece of payloads, which requires a significant proportion of development, provoking ozone-hurting substance releases (Taghvaee and Hajiani, 2015). In any case, the others ensure that ocean transportation lessens the CO_2 releases owing to its higher limit of passing on mass cargo, differentiated, and the other transportation modes. The heading and power of the connection between maritime transportation, environmental pollution, and economic development accept a pleasing role in environmental and economic growth.

From one perspective, maritime transportation expands CO_2spreads. Various examinations believe that the vessels are considered as the essential hotspot for CO_2outpourings (European Sea Ports Organization, 2010; Gibbs et al., 2014; Taghvaee et al. 2017). Contrasted with other transportation modes, ships pass on enormous proportions of burden, which need to devour an unusual measure of fuel provoking the radiation of a huge pace of CO_2discharges (Taghavee and Hajiani, 2015). Additionally, maritime transportation is the reason for about 2.2% of CO_2spreads made by human activities on the planet in 2012 (International Maritime Organization, 2016). Given the Pollution Haven Hypothesis, trade responsiveness increases environmental pollution in developing countries like Nigeria (Tang, 2015; Almulali and Tang, 2013).

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Ovuakporoye Emmanuel Clarke: Student at the Faculty of Maritime Studies, University of Kyrenia. Main research area(s): Maritime transportation, environmental pollution

Mehmet Fatih Huseyinoglu: Assoc. Prof. Dr. Mehmet Fatih HUSEYINOGLU – Dean of the Faculty of Maritime Studies, University of Kyrenia. Main research area(s): Marine pollution, marine ecology, invasive species.

Since maritime transportation is a channel through which the overall exchange coordinates towards Nigeria, in an indirect way hoisting the environmental pollution in the country. On the other hand, maritime transportation cuts down CO_2emanations. In spite of the fact that ships devour much vitality, which causes CO_2 outflows, they are transporting the most critical volume of payloads among different sorts of vehicles. From an energy usage perspective, it gathers the high productivity of the maritime transportation mode (United Nations Framework Convention on Climate Change, 2016). Because of the all the more undermining status of creating countries in the environmental and economic issues, this test needs more thought in Nigeria (Taghavee et al., 2017; Taghvaee and Hajiani, 2014).

Also, the economy of Nigeria relies upon the investigation of oil-based commodities like oil and gas that require a ship to pass on it starting with one area then onto the next. Thus, this brings the association between maritime transportation, environmental pollution, and economic development in Nigeria. Henceforth, the requirement for the assessment of the relationship among the environmental piece of maritime transportation, environmental pollution, and economic development would deal with the environmentalists and business experts through technique making in the maritime transportation of Nigeria. The essential inspiration driving this examination is to evaluate the maritime transportation flexibility of environmental pollution and economy of Nigeria in the short-run and long-hurried to find the association between maritime transportation from one point of view, and environmental pollution and economic growth in the other hand.

II. MATERIALS AND METHODS

Materials: Type and Sources

This examination utilized auxiliary information. Hypothetically, this examination thinks about four potential factors; the factors are carbon dioxide outflows (CO_2), monetary development (GDP), marine transport (LSCI), and trade openness (TR). CO_2, GDP, and LSCI are viewed as a vector. The decision of CO_2 discharges as the intermediary for natural contamination is in accordance with some past investigations (see European Sea Ports Organization, 2010; Gibbs et al., 2014; International Maritime Organization, 2016). CO_2measures as those emanations originating from the consuming of petroleum derivatives and the production of concrete. They incorporate carbon dioxide created during the utilization of solid, fluid, and gas fuels and gas flaring. The information is estimated in metric tons per capita and sourced from the World Bank Development Indicator (2019).

In the study of Almulali and Tang, 2013; Tang 2015, two potential factors were viewed as assuming the job of an endogenous variable for GDP as the needy variable; sea transportation and exchange volume. In this investigation, GDP per capita (steady 2010 US$) considered an intermediary for financial development. Gross domestic product per capita (GDP) is GDP parceled by the midyear populace. Data is in constant 2010 U.S. dollars. Concerning maritime transport, UNCTAD (2018) utilized the Liner Shipping Connectivity Index (LSCI) as an intermediary for maritime transport. The LSCI is a marker of a country's situation inside the general liner movement structures. It is settled from data on the world's holder dispatch sending: the number of vessels, their container conveying limit, the number of organizations and associations, and the size of the best ship. The conflict for the LSCI by the UNCTAD (2018) is that first, there is a reasonable linkage between exchange expenses and network. Transport networks, together with coordination execution, are essential determinants of exchange expenses and accordingly of monetary detachments of making countries from business parts. Also, developing nations' regional and interregional exchanges are, all in all, passed on by systems for the ocean. Thusly, in this examination, LSCI was utilized as an intermediary for maritime transportation.

In this examination, trade is displayed as a control variable. It chooses those components, which have a causal relationship with biological tainting and those, which have a causal relationship with the budgetary development (see Farhani et al., 2014; Greene, 2012; Gujarati, 2004; Omri et al., 2015). Its definition is the total of fares and imports of products and adventures evaluated as a part of GDP and assessed as the percentage of GDP. CO_2, GDP, and TR were sourced from World Bank development pointers, while LSCI recouped from UNCTAD. Likewise, the data is a yearly time game plan educational gathering for the period 2000 – 2018.

Method

This investigation thought about Autoregressive Distributed Lag (ARDL) cointegration structure or bound testing for cointegration (Pesaran et al. 2001), which have been discovered appropriate for deciding the long-run relationship between vector factors, comparably as re-parameterization of them to the Error Correction Model (ECM). The re-parameterized result gives the short-run elements and the error correction term. In accordance with Granger (1981) and, Engle and Granger (1987), cointegration assessment isn't material in occurrences of factors that are incorporated in an alternate order (i.e., I(0) and I(1)) while it is applicable in ARDL cointegration strategy. However, the ARDL bound test doesn't requires a pre-testing for unit root, since it can suit factors that are incorporated in either order (0) or (1), in any case, so as to guarantee that none of our factors is integrated on order (2), so as not to damage the presumptions of ARDL bound test, unit root was completed for our information.This study first proposed a single equation with four-time series Y_t, X_t, K_t, Z_t as follows:

$$Y_t = c + \alpha X_t + \beta k_t + \square z_t + \square_t$$

In accordance with the ARDL bounds test as proposed by Pesaran et al. (2001), we originally guaranteed that none of the series utilized in this investigation is I(2). Thusly, the stationarity test was finished utilizing the Augmented Dickey-Fuller test and Philip Peron Test. The ARDL model with Bound Test strategy predicated on Ordinary Least Square (OLS) estimation, which utilized a conditional unrestricted error correction model for deciding cointegration among the factors utilized. This is to guarantee whether there is a long-run relationship between the factors. As per Pesaran et al. (2001) cited in Cai, Sam and Chang (2018), ARDL for

this investigation could be expressly stated as follows:

$$Y_t = \gamma oi + \sum_{\square=1}^{\square} \square_i Y_{t-i} + \sum_{\square=0}^{\square} \square_i X_{t-i} + \square_{it}$$

Where: Y_t – is a vector

X_t – the variables here are allowed to be purely I(0) or I(1) or cointegrated

β *and* δ – are coefficients

γ – is a constant

$i = 1, \dots, k; p, q$ – are optimal lag orders

ε_{it} – is a vector of error terms

In any case, where there is cointegration, as indicated by Pesaran et al., (2001), the model could be composed as follows:

$$Y_t = \gamma oi + \sum_{\square=1}^{\square} \square_i Y_{t-i} + \sum_{\square=0}^{\square} \square_i X_{t-i} + \square\square\square\square_{t-1} \square_{it}$$

The lag order is important to maintain a strategic distance from the over-parameterization of the model. In accordance with Goh et al. (2017), Breusch-Godfrey Serial Correlation LM test was utilized to test for serial correlation in every equation, while Breusch Pagan-Godfrey Heteroskedasticity was additionally used to verify that the model is free from the heteroskedasticity issue. Jarque-Bera test, notwithstanding, is utilized for the normality test.

To break down the parameters comparing to factors of interest from the information under thought, we utilized ARDL bounds test for the cointegration approach, which we found suitable for the gauge of both long and short-run causal relationships between our dependent variable and independent variables in the investigation model. In accordance with Pesaran et al. (2001), ARDL model with the bound test was utilized; this methodology depends on the Ordinary Least Square (OLS) estimation of a conditional unrestricted error correction model for cointegration investigation. This is in compatibility to the point of this paper looks to test for the presence of a long-run relationship, and to gauge long and short-run causality of the free factors on the needy variable.

Thao and Hua (2016) cited Bannerjee et al. 1993 that the ARDL model demonstrates that a dynamic error correction model (ECM) follows a basic straight change where the ECM installed the short-run dynamic with long-run harmony without having any data loss. Irregularity with Pesaran and Pesaran (1997) and Pesaran and Shin (2001) cited in Thao and Hua (2016), the increased ARDL (p, q1, q2 …. qk) gotten by modifying condition two as far as the lagged levels and the principal contrast of Y_t...X_{it}. .., X_{2t} . . . X_{kt} and w_t as follows:

$$\Delta Y_t = \square_0 + \square_{1t} + \square_{yx} Z_{t-1} + \sum_{\square=1}^{\square} \square_i \Delta_{Yt-1} + \sum_{\square=0}^{\square} \square_i \Delta X_{t-I} + \gamma_t w_t + \square_t \dots\dots (4)$$

Where: Δ - is the first difference operator

t – is the trend

Coefficient of α_i – represents the short-run dynamics of the model

$_{yx}$ and Z_{t-+1} – are long-run multipliers that show the convergence of the model to equilibrium

w_t – is a vector of the exogenous component

Hence for this study, the model can be written as follows:

$$\Delta LNGDP = \beta 0 + \sum_{\square=1}^{\square} \square 1 \square \Delta LNGDPt\text{-}i + \sum_{\square=0}^{\square} \square 2i \Delta CO_2 t\text{-}I + \sum_{\square=0}^{\square} \square 3i \Delta LSCIt\text{-}I + \sum_{\square=0}^{\square} \square 4i \Delta TRt\text{-}I + \square ECTt\text{-}1 + \square t \dots (5)$$

The decision of the ARDL Bound test approach for this investigation dependent on the contention of Pesaran and Pesaran (1997) cited in Thao and Hua (2016) that the technique performs altogether if there should arise an occurrence of little size. It likewise repudiates the traditional method for deciding a long-run relationship, which neglected to appraise the ARDL method system of equation, instead gauge a single equation. Besides, the capacity of the estimator to oblige various factors in a model with various ideal lag manages our decision. Finally, Pesaran et al. (2001) contended that in a circumstance where the idea of the stationarity of the information is confounding, the use of the ARDL bounds test is valuable.

III. RESULTS

Descriptive Analysis of Variables

The descriptive analysis of the factors was undertaken to comprehend the attributes of the factors utilized in the examination. In any case, as a result of the period under perception which traversed somewhere in the range of 2000 and 2018 (i.e., 19 years of perceptions), this is viewed as a low recurrence, and to improve the recurrence; the factors experience change from yearly information to quarterly information. The high-recurrence information is accepted to have more precision than low recurrence. The change was finished utilizing the quadratic capacity in the E-views package to accomplish the precision of the transformation. After the transformation, the descriptive analysis was performed, and the rundown of the outcomes introduced in Table 1.

The outcome as exhibited in Table 1 uncovers that carbon dioxide outflows in Nigeria during the period watched have a mean estimation of 0.65 metric tons per capita, while the most extreme and least qualities for emanations during the period are 0.78 and 0.49 separately. In the meantime, the standard deviation estimation of 0.09 shows that the year has an insignificant deviation from the mean value during the period watched. All the more in this way, out of the 76 perceptions, 60 perceptions were accessible for CO_2 outflows.

The descriptive analysis of the GDP uncovers that the mean value is 7.62, while the most extreme and least values are 7.86 and 7.23, separately. The low standard deviation estimation of 0.20 connotes that the qualities for the GDP over the years under perception are near the mean value. At the end of the day, the variety of values from the mean value is insignificant. Then, out of the 76 perceptions, 72 perceptions were made.

Concerning the marine transport which was intermediary with the Liner Shipping Connectivity Index (LSCI), the descriptive analysis demonstrates that however, Nigeria's connectivity index is still at a lower value with the mean value that remained at 18.43% while the greatest and least index is 23.01% and 12.76% individually. In the meantime, the standard deviation is somewhat high, with an estimation of 3.50, which shows that the indexes

among the years under perception are at the change from the mean value.
The 60 perceptions recorded out of 76 perceptions were because of the period that the UNCTAD who figured the index started the gathering of the index, which was in the year 2004.

Table 1. *Descriptive Analysis of Variables*

Statistics	CO_2	LNGDP	LSCI	TR
Mean	0.65	7.62	18.43	37.96
Median	0.64	7.66	19.77	39.44
Maximum	0.78	7.86	23.01	53.94
Minimum	0.49	7.23	12.76	19.81
Std. iDev.	0.09	0.20	3.50	9.62
Observations	60	72	60	72

The trade value for Nigeria, as appeared in Table 1, delineates critical trading exercises in the country. During the period under perception, the analysis result as appeared in Table 4.1 uncovers that the country recorded a trade mean value of 37.96%, the middle value (39.44%), while the most extreme and least values are 53.94% and 19.81% separately. The high value of 53.94%, which is the value of import and export as a percentage of GDP could credit to the economic development that is seeing in the country lately. The standard deviation value is 9.62, which is not too high to even think about suggesting a high variety of the values from the mean value, and 72 perceptions recorded out of the 76 perceptions.

Unit Root Test

For the analysis of the unit root test, Augmented Dickey-Fuller (ADF) (1981) was utilized. The test was applied dependent on its predominance, prevalence, and full application over different tests for stationary properties of factors. In the interim, to test the affectability of the outcome from the analysis, Philip-Peron (PP) (1988) was utilized. It is of the firm conviction that contrasting various outcomes from various test techniques is a superior method for testing the affectability of our outcomes.

Table 2. *Unit Root Test*

Variable	ADF Test		PP Test		Order of Integration
	Level	1st Difference	Level	1st Difference	
CO_2	-1.22	-1.71***	-0.99	-4.13*	I(1)
LNGDP	-3.38**	-	-2.82***	-3.34**	I(0)
LSCI	-2.26	-1.18	-3.62*	-	I(0)
TR	-2.13**	-	-1.82	-4.76*	I(0) & I(1)

*Note: *, **, *** denotes 1%, 5% and 10% respectively*

The analysis result, as displayed in Table 2, uncovers that $CO_2$is non-stationary at level, yet ends up stationary after first differencing. The PP-test affirmed the finding from ADF, which makes it safe to infer that CO_2 is an order (1) variable. Be that as it may, LNGDP is seen as stationary at level, which likewise introduces itself in the aftereffect of PP-test. The instance of LSCI is somewhat extraordinary, on the grounds that out of the two tests, just PP-test affirmed its stationary property at order (0), while ADF could not decide its stationarity at the two levels and first contrast.
Finally, the outcome for trade (TR) demonstrates that while the ADF test demonstrates the variable's reconciliation at order (0), PP-test shows its stationarity after first contrast. The critical issue about the TR stationarity is that the two tests affirmed that the variable is not an order (2) variable. In outline, it could be found from the abridged outcomes, as displayed in Table 2 that the four factors (CO_2, LNGDP, LSCI, TR) are altogether coordinated at order (0) and (1), and none is an order (2) variable, which makes it ok for this examination to continue with the use of ARDL model for further analysis.

Bound Testing for Cointegration

To decide the cointegration among the factors, and the conceivable outcomes of existing long-run relationships, the bound test for cointegration was figured. This was done on every one of the factors by putting one of the factors as the endogenous variable and others as exogenous factors. By doing these, if the important registered f-statistic for the joint hugeness of the level factors in equation (3) is higher than the upper bound basic value (I(1)), at that point the H0 is rejected that the factors are cointegrated, and there is the presence of a long-run relationship among the factors. Be that as it may, we will neglect to dismiss H0 if the processed f-statistic is not exactly the I(0) lower bound value and presume that there is no cointegration among the factors. Besides, for this situation, the model will be reparameterized to decide the short-run and error correction model (ECM). The reparameterized model (equation 10) will enable us to indicate the amount of the disequilibrium is adjusted. While a positive coefficient demonstrates disparity from harmony, a negative coefficient shows union to the balance.

Table 3. *Cointegration Test*

	F-Stat.	I(0) Bound	I(1) Bound	Cointegration
Model 1	9.49	3.23	4.25	Yes
Model 2	1.39	3.23	4.25	No
Model 3	2.28	3.23	4.25	No
Model 4	2.98	3.23	4.25	No

Note: Model 1 = LNGDP = f(CO_2, LSCI,TR), Model 2 = CO_2 = f(LNGDP, LSCI, TR), Model 3 = LSCI =f(LNGDP, CO_2, TR), Model 4 = TR = f(CO_2, LNGDP, LSCI)

The outcome from the analysis as outlined in Table 3 shows that in Model 1 when LNGDP is the needy variable, the determined f-statistic (9.49) is seen as higher than I(1) bound. Accordingly, the H0 is dismissed, and the reason that there is cointegration among LNGDP, CO_2, LSCI, and TR, which likewise implies a plausibility of long-run relationship running from CO_2, LSCI, and TR to LNGDP. In the meantime, the outcome is diverse in Model 2, 3, and 4, when CO_2, LSCI, and TR are dependent factors, individually. The bound test for cointegration in the two models uncovers that the registered f-statistics are lower than the I(0) bound value.

Subsequently, we neglected to dismiss the H0 and presume that there is no cointegration among the factors when CO_2, LSCI, and TR are dependent factors, individually. Additionally, it likewise suggests that there is a probability of no long-run relationship running from different factors to CO_2, LSCI, or TR.

Variable Lag Order Selection

To have Gaussian error terms, i.e., the error terms that do not have an issue of non-typicality, autocorrelation, heteroskedasticity, it is important to pick a proper lag length for every one of the factors. ARDL model enables every one of the factors to have diverse lag length. In doing these, the appropriate lag length is dictated by utilizing a legitimate model order selection criteria, for example, the Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC), Hannan-Quinn Information Criterion (HQ), Segmented Modified LR Test Statistic (LR) or Final Prediction Error (FPE). The factors were assessed utilizing the unlimited VAR technique, and the data basis with the little standard errors and high R2 perform better.

The outcomes, as abridged and exhibited in Table 4, demonstrate that the whole five data criterion selected lag (2) as the proper lag length for every one of the factors. In the event that an appropriate lag length is chosen, it will empower the analysis to be without fake relapse.

Table 4. *Variable Lag Order Selection*

Variable	LR	FPE	AIC	SC	HQ
CO_2	2	2	2	2	2
LNGDP	2	2	2	2	2
LSCI	2	2	2	2	2
TR	2	2	2	2	2

LR: Sequentially modified LR test statistic, FPE: Final prediction error, AIC: Akaike information criterion,SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion

Analysis of Long-run Causality

In the ARDL model, it is conceivable to surmise causality, relationship, and the bearing of the relationship from the analysis. From the bound testing for Cointegration, model 1 demonstrates the factors are cointegrated, which means that there is a probability of a long-run relationship to exist and the relationship running from the independent factors to the dependent variable. The outcome, as appeared in Table 5, uncovers that there is a long-run relationship running from CO_2outflows to economic growth (GDP). The indication of the coefficient is negative (-), which suggests that a percentage change in CO_2outflows will prompt an antagonistic change in the economic growth of Nigeria in the long-run. The negative effect is seen as factually noteworthy at a 1% certainty level.

In the interim, maritime transport (LSCI) is found to affect the economic growth (GDP) of Nigeria. The outcome in Table 6 shows that there exists a positive long-run relationship between maritime transport and the economic growth of Nigeria. The outcome is seen as factually critical at a 5% certainty level, which makes it safe to infer that maritime transport positively affects the economic growth of Nigeria.

With respect to the trade, the outcomes, as outlined in Table 5, show that there is a negative and factually huge long-run relationship running from trade (TR) to economic growth (GDP). The negative indication of the coefficient for trade could be because of the trade shortfall of a large portion of the developing countries, in which Nigeria is part. Nigeria is an import-oriented country, and the country exports less compared to its imports. This could hurt the economic growth, which could cite why the consequence of the long-run relationship running from trade to economic growth ended up being negative. In addition, Table 6 demonstrates that there exists a positive and measurably huge long-run relationship running from GDP (economic growth) to maritime transport. As it were, economic growth impacts maritime transport over the long haul.

In rundown, CO_2 and TR affect GDP over the long haul, while maritime transport (LSCI) has a positive long-run relationship running to economic growth and the other way around. As far as the course of a relationship, there is a unidirectional long-run relationship among GDP and CO_2, GDP and TR, while there is a bi-directional long-run relationship between economic growth and maritime transport. The bi-directional long-run relationship between economic growth and maritime transport infers that economic growth impacts maritime transport, while maritime transport additionally emphatically impacts economic growth.

Table 5. Long-run Causality Estimate

	Independent variable			
	ΔLNGDP	Δ CO_2	ΔLSCI	ΔTR
Dep. Variable				
ΔLNGDP	-	-0.66*(0.24)	0.01**(0.01)	-0.004**(0.002)
Δ CO_2	1.22 (1031)	-	-0.05 (0.04)	0.001 (0.004)
ΔLSCI	32.58*(8.72)	2028 (12.11)	-	010 (0.09)
ΔTR	169.76 (166.39)	-192.52 (155.04)	-10.87 (8.02)	-

*Note: *, **, *** denotes 1%, 5% and 10% respectively*

Short-run Causality Estimate

The outcome for short-run causality estimates as outlined and displayed in Table 6 uncovers that a short-run causality and relationship are running from trade to economic growth. The relationship is negative, which is like the outcome acquired for long-run relationship gauges. The consequence of short-run causality discovered running from trade to economic growth shows that there is a solid causality of trade on economic growth. In the interim, the Error Correction Term (ECT) value of - 0.05 which is factually huge at 1% certainty level shows that there is a joint causality of CO_2outflows, maritime transport, and trade receptiveness on the economic growth of Nigeria, and there will be an assembly at 5% speed of modification. At the end of the day, if there should be an occurrence of any outer shock, the model will modify back to the balance at 5% speed of alteration.

In accordance with the detail of ECT that if the coefficient is negative (-) and measurably huge, there will be a combination in the model; however, in the event that it is certain (+), there will be a dissimilarity from the

model. Thusly, in the model 1 where the economic growth is the dependent variable, and CO_2outflows, maritime transport, and trade are indicators, it is sheltered to presume that there will be intermingling to the model if there should be an occurrence of any shock at 5% speed of alteration. In addition, different outcomes, as condensed in Table 6, uncover that maritime transport has a negative causal impact on CO_2outflows in the short-run, which is factually noteworthy at a 5% certainty level. In the interim, in model 3, economic growth is found to have a positive causal impact on the maritime transport in the short-run at 10% certainty level, while trade is found to have a positive causal effect on maritime transport and it is factually critical at 5% certainty level. Like Model 1 where the coefficient of the ECT is negative (-) and measurably huge, the ECT value is - 0.17 which infers that the joint causal impact of economic growth, CO_2emanations, and maritime transport on trade transparency is factually noteworthy, and there will be union to the model at the speed of 17% if there should arise an occurrence of any outside stun to the model.

In outline, there is a unidirectional short-run causality running from trade receptiveness to economic growth; unidirectional short-run causality running from maritime transport to marine pollution (CO_2), and unidirectional short-run causality running from trade receptiveness to maritime transport. Also, in conclusion, the mix of marine pollution, maritime transport, and trade receptiveness is found to impact economic growth. Additionally, the mix of economic growth, emanations, and trade are found to impact maritime transport.

Table 6. *Short-run Causality Estimate*

	Independent variable				
	ΔLNGDP	Δ CO_2	ΔLSCI	ΔTR	ECT
Dep. Variable					
ΔLNGDP	-	-0.66	0.001 (0.0004)	-0.0002*(0.0001)	-0.05*(0.01)
Δ CO_2	0.12 (0.08)	-	-0.01**(0.002)	0.0001 (0.0004)	-0.10 (0.07)
ΔLSCI	50.06***(29.46)	-6.03 (3.62)	-	0.09**(0.04)	-0.17**(0.07)
ΔTR	13.22 (10.22)	25.78 (18.84)	0.89 (0.86)	-	-0.08 (0.05)

*Note: *, **, *** denotes 1%, 5% and 10% respectively*

Residual Diagnostics Test

The analysis result residuals were put under a magnifying glass to guarantee that the figured coefficients and insights in this investigation are ok for settling on forecasts and basic leadership. Four unique tests, in particular, normality, serial correlation, heteroskedasticity, and white noise (ARCH) test, were done. The outcomes are outlined and introduced in Table 7. From the outcomes displayed in Table 8, for the model 1 where GDP is the dependent variable, and CO_2, marine transport, and trade are independent factors, the remaining demonstrative test uncovers that out of the four tests directed, the model failed just the normality test, and breezed through the serial correlation LM test, heteroskedasticity test, and ARCH test. This is a decent result as the registered coefficient from the model doesn't fare badly, and demonstrates that the outcome from the analysis of model 1 is all right for making expectations and arrangement details; in light of the fact that the leftover analysis has demonstrated that the outcomes are not deceptive.

Like model 1, the leftover analysis for model 2 endures a difficulty in the normality test. Notwithstanding, the three (3) different tests that the model passed is viewed as appropriate for tolerating the outcomes found from this model. The analytic test result for model 3 isn't quite the same as the past two models, yet model 4 residual diagnostic test outcome demonstrates that the model breezed through all the four tests.

In synopsis, the diagnostic test of the model outcomes uncover that the outcomes from the analysis are not false having finished most of the test, this has offered trustworthiness to the legitimacy of the registered coefficients and insights, and it's sheltered to presume that the outcomes found in this examination are suitable and solid for forecast and policymaking.

Table 7. *Diagnostic Test*

	Test			
	Normality	Ser. Corr. LM Test	Heterosc. Test	ARCH
Model	*P-value*	*P-value*	*P-value*	*P-value*
1	0.01	0.17	0.38	0.45
2	0.00	0.64	0.28	0.82
3	0.00	0.11	0.57	0.68
4	0.21	0.68	0.37	0.70

IV. DISCUSSION

The outcome, as abridged and displayed in Table 6, demonstrates that a long-run relationship exists, and running from marine environmental pollution to economic growth. Since the coefficient of marine environmental pollution is measurably huge at a 1% certainty level, this investigation infers that there is a relationship between marine transport pollution and the Nigerian economy. The outcome is reliable with the investigation of Akbostanci et al., 2009; Fodha and Zaughdoud, 2010, who found a straight association between environmental pollution and economic growth. Comparable examinations by Chen et al., 2017 saw pollution as among the elements impacting economic growth. On account of Nigeria, the aftereffect of this examination is in concurrence with work by Iduk and Samson, 2015; Onwuegbuchunam et al., 2017 in their investigations discovered marine pollution to have a relationship with Nigeria economic growth. Be that as it may, the outcome is, in contrast, with the investigation of Akpan and Chuku (2011) who couldn't locate a fundamental result in their examination to analyze the nearness of the environmental Kuznets bend in Nigeria.

From the divulgences above, we can reason that there are ways to deal with environmental conditions, which are, changes inthe structure of the economy, slashing down the negative effect on the earth through scale effect and improvement in ocean transportation. Regular exercises are obligations of better environmental developments and improvement of attributes of environmental systems. The environmental pollution impact of economic development starts from two key pathways that have a general thought in the creation among which is the ideal position base expected to make an establishment to pass on vital economic development results, for instance, access to transport.

Additionally, the outcome from Table 7 demonstrates that there is a short-run relationship between marine transport and environmental pollution, which is likewise seen as factually huge at a 5% certainty level. In this manner, the investigation infers that in Nigeria, there is a relationship between marine transport and environmental pollution. This investigation finds is like work by Taghvaee, Omaraee, and Taghvaee, 2017; Smith et al., 2014, who in their examinations built up a relationship between marine transport and environmental pollution. Indeed, even in the investigation of the European Commission, EC (2013) in their examination did on European countries to decide components adding to the environmental

pollution inside the part countries; the result affirmed maritime transport as a determinant factor.

Marine transportation is in charge of moving billions of dollars of things dependably, tending to more fundamental than 90% (by weight) of in general trade. Notwithstanding, the high volume of overall marine transportation is likewise identified with negative environmental ramifications for the marine condition. Marine transportation presents various repercussions for the earth as it shows up in this assessment result. Spreads delivered utilizing the transportation organizations are an essential supporter of the general outpourings and conditions for future activities demonstrate a critical extension in imperativeness use and releases.

Additionally, the finding from this examination, as portrayed in Table 6 proposes a long-run causal effect of maritime transport on the economic growth of Nigeria. As appeared in Table 6, the coefficient of maritime transport on economic growth is seen as positive and measurably noteworthy at a 5% certainty level. In this manner, the investigation infers that there is a noteworthy effect of maritime transport on the Nigeria economy. The finding from this investigation isn't a deviation from past examinations that have discovered comparative results in their examinations. Vuik et al. (2010) did comparable examinations on the Dutch economy and discovered maritime transport to impact the Dutch economy fundamentally. Identified with that is the investigation of Morrissey et al., 2011; and Colgan, 2013 who discovered comparable aftereffects of the noteworthy effect of maritime transport on economic growth. In addition, the Ecorys (2012) study which was directed for the European Union countries to look at the impact of maritime transport on economic growth led in their investigation that maritime transport fundamentally affected the economic growth of European Union countries.

V. CONCLUSIONS

In synopsis, this examination surmises from the analysis that in Nigeria, it probably won't be achievable to observe economic growth without the disintegration of the earth. This is clear from the analysis result demonstrating that as there is an expansion in economic growth, so will there be an increment in the environmental decay, while an expansion in environmental crumbling will affect adversely on economic growth. In this manner, there is a requirement for policymakers in the maritime segment to figure an arrangement that will guarantee a cleaner situation without imperiling the economic growth of the country.

The effect of economic growth on maritime transport in Nigeria is seen as advantageous. This examination found a bi-directional relationship between maritime transport and economic growth. While maritime transport is found to affect economic growth in Nigeria, economic growth is likewise found to impact maritime transport. In the interim, a solid causal impact of economic growth exists on maritime transport. This is because of the long, and short-run causal relationship discovered running from economic growth to maritime transport. With respect to the effect of maritime transport pollution on the economic growth of Nigeria, the examination found that in the long-run, environmental pollution will hurt the economic growth of Nigeria. The effect is seen as huge at a 1% certainty level, which makes it a basic purpose of worry for every one of the partners in the maritime segment to address the test.

Moreover, this investigation discovered maritime transport as a supporter of environmental pollution in Nigeria. Nigeria is an oil-producing country that fares its raw petroleum through shipping and furthermore is import-oriented. A sign that there are loads of exercises being completed with maritime transport is the thing that this is, and having set up maritime transport as a wellspring of environmental pollution, Nigeria is no exclusion.

The course of the relationship between maritime transport pollution and Nigeria's economic growth experienced assessment; it is discovered that a unidirectional long-run relationship exists between maritime transport pollution and Nigeria's economic growth. The ramifications of this are environmental pollution could block economic growth in Nigeria in the long-run, and the invert isn't the situation. In view of the environmental coefficient in the table, the coefficient of environmental pollution is negative. The addition of maritime transportation or GDP builds the degree of CO_2emanations supporting the Pollution Haven Hypothesis for Nigeria as a developing country. In spite of the fact that the CO_2outflows have a relationship with economic growth over the long haul and short-raced to maritime transport, it reacts to the adjustments in the maritime transportation superior to anything the GDP, requiring the more stringently environmental arrangement development in the economic framework. So the long-run point of view for the earth is progressively persuasive, and the execution of environmental strategies needs adequate time to apply the totally potential impacts.

Considering basically, the maritime transport reaction to economic growth and CO_2, while maritime transport is reacting to economic growth in the long-run, maritime transport is reacting to CO_2in the short-run. It suggests that maritime transportation in Nigeria is more powerful in contaminating the earth than in developing the economy.

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