EMPIRICAL EVIDENCE ON THE IMPACT OF TRADE OPENNESS ON ENVIRONMENTAL QUALITY IN NIGERIA

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ABSTRACT

Global decline in environmental quality has been an issue of concern among researchers. Prominent factors identified in connection with this include industrialization, population growth, pollution, agricultural activities and increased global trade. This study, therefore, investigated the impact of trade openness on environmental quality in Nigeria using time series data from 1980 to 2021. The Phillip-Perron (PP) unit root test was used to establish the stationarity properties of the data while the Autoregressive Distributed Lag (ARDL)/Bound test for cointegration showed that there exists a short run relationship between trade openness and environmental quality. Findings support the postulation that trade openness leads to Nigeria being a pollution haven for the industrialized countries of the world, while agricultural activities have insignificant effect on environmental quality in Nigeria. The study, therefore, concludes that trade openness does not contribute significantly to decline in environmental quality in Nigeria. It is recommended that Nigeria should strengthen her trade and environmental policies to avoid being a dumping ground for the industrialized countries.

Keywords: Trade Openness, Environmental Quality, CO2 Emission, Energy Consumption, FDI

JEL Classification: F18, Q43, Q53, Q5

INTRODUCTION

Advocates of trade openness have harped on its role in expanding international frontiers in terms of increased global trade among countries of the world. Besides being a key component in the process of international economic integration, the benefits of liberalizing trade especially in developing countries like Nigeria can be translated into major sectors of the economy such as agricultural, industrial and the manufacturing sectors, which can accelerate the process of economic development. In addition, trade openness has proven to be a powerful means for countries to promote economic growth, development and poverty reduction, as it opens up new markets beyond national frontiers, thus enabling firms to produce and reap the benefits of large-scale production. However, trade openness has brought in its wake the emergence of global concerns – one of such being the environment (Field & Field, 2017).

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Concern over the environment is also driven by the argument that trade openness negatively affects environmental quality. The environment being viewed as the common interest of all nations is evident in the Climate Change Convention (1994) which acknowledges that "change in the earth's climate and its adverse effects are a common concern of humankind" (Spence, 2011). Environmentalists argue that trade liberalization is bad for the environment, as it has led to countries with lax environmental standards, in some instances, having a comparative advantage in the global marketplace. This argument is linked to the pollution-haven hypothesis, which suggests that trade liberalization allows firms to take advantage of cross-country differences on environmental regulations, and that lowering trade barriers induces pollution intensive industries to relocate to countries with weaker environmental regulations. The argument is based on the fact that the production of a tradable good also produces environmental damage of one type or another, hence, increased export demand will clearly result in increased environmental damage (Field & Field, 2017). Increased atmospheric pollution due to high carbon emission has been blamed on the rising wave of industrialization particularly in China and the western world.

Globally, instances abound where increased production for export has added to the burden of environmental damage; that is to say an open economy and world trade did not lead to sustainable economic growth (Naazneen, Kaiser, Minh & Viñuela, 2012). Another argument has it that with trade liberalization, countries will utilize their comparative advantage and specialize in the production of goods and services in which they are most efficient. This will reduce the possible negative impact on the environment from the unsustainable utilization of natural resources (Spence, 2011).

In the Niger-delta area of Nigeria for example, decades of oil exploration for trade have led to the destruction of the environment. Gas flaring and oil spillage, for instance, have resulted in the destruction of both aquatic and terrestrial life, which has affected the biodiversity of the area. In addition, mining activities in the northern part of the country, particularly the Jos Plateau, have equally led to the deterioration of the environment. However, it has been argued that it is not the trade that leads to environmental costs, but the lack of effective pollution-control technology and institutions by the trading countries. In all, trade liberalization and environmental quality appear to be closely interwoven. It is in this connection that this paper sought to investigate the argument that increased trade leads to decrease in environmental quality. This paper is structured into five sections. Section one is the introduction;

section two is the literature review where relevant concepts were reviewed; section three is the methodology where the model was specified; empirical results and discussion of findings were captured in section four; while section five is the conclusion and policy recommendation.

LITERATURE REVIEW

The review of literature in this study provides the theoretical underpinnings for this paper. The factor endowment hypothesis (FEH) predicts that trade liberalization will result in trade patterns consistent with the Heckscher Ohlin-Vanek (HOV) theory of comparative advantage based on factor endowment differentials. Rich countries are typically well endowed with physical capital. Since capital-intensive goods are often also pollution intensive, factor endowment theories of international trade maintained that rich countries specialize in pollution-intensive goods and export them. The expansion of global trade receives so much attention largely because it has important influences on the factor markets of the countries involved. The HOV model, which focuses on the relationship between production factors and trade, predicts that a country will export services of the factors that are relatively abundant in the country and will import services of the factors that are relatively scarce in such country. Thus, to export more means increased production, hence, more damage to the environment. The weakness of the comparative advantage theory is that it did not factor in the environmental cost in the form of deterioration to the environment while production is being carried out (Daniels, Radebaugh & Sullivan, 2011).

The United Nations Environmental Programme (UNEP, 2000), however, believes that the potential for negative impacts of trade on the environment can be minimised, if not avoided entirely. This can be done by integrating environmental considerations – that complement rather than inhibit trade – into development planning.

The environmental Kuznets curve posits an inverted-U relationship between environmental pollution and economic growth. Grossman and Krueger (1993), who noted its resemblance to the original Kuznets' inverted-U relationship between income inequality and development, apparently attached Kuznets's name to the curve. According to the proposition of Environmental Kuznets Curve '(EKC)', in the first stage of industrialization, pollution along the curve would grow rapidly because people are more interested in jobs and income than clean air and water, communities are too poor to pay for abatement, and environmental regulation is correspondingly weak. The balance, however, shifts as income rises. Leading industrial sectors

become cleaner, people value the environment more highly, and regulatory institutions become more effective. Along the curve, pollution levels off in the middle-income range and then falls toward pre-industrial levels in wealthy societies.

The concept of EKC flourished in the early nineties to describe the time trajectory that a country's pollution would follow because of its economic growth. When the growth occurs in an extremely poor country, pollution emissions grow because the increase in production generates pollutants and because the country places low priority on the environmental degradation control. As a country obtains enough affluence degree, its priority switches to protection of environmental quality (Carvalho & Almeida, 2011). EKC hypothesizes that at low level of income, an increase in national income corresponds to an increased environmental pressure. In later stages of development, the de-linking between economic growth and environmental degradation leads to a better environmental quality (Bello & Abimbola, 2010).

Behind the hypothesis of Environmental Kuznets Curve (EKC) is the argument that environmental quality will be derived by reaching high levels of economic growth. Although in the first stage of development, the environment will deteriorate, there will be the turning point after which the environmental quality will improve. One of the explanations put forward by Grossman and Krueger (1995) for the negative slope of the curve is that countries that are experiencing a growth pattern after having reached a turning point, have adequate income to buy products that are more energy efficient and would export pollution intensive products to other countries that cannot produce them. In this case, it is assumed that rich countries are going to export these products to poor economies, but if all countries try to embark on the growth process, the remaining countries will not allow others (even poorer countries) to export the pollution intensive products when they want to develop.

The logic of the EKC is intuitively appealing: in the early stages of industrialization, pollution grows more rapidly because high priority is given to increasing material output, and people are more interested in income than environment. The rapid growth inevitably leads to higher utilization of natural resources and thus higher emissions of pollutants, which in turn worsens the environmental conditions. However, at the later stage of industrialization and as income increases, the willingness to pay for a clean environment increases by a greater proportion than income, regulatory institutions become more effective for the environment and pollution levels decline (Kijima, Nishide & Ohyama, 2010).

Different researchers have varying opinions about the impact of trade liberalization on the quality of the environment. For example, Chua (1999) reviewed the economic evidence of the nexus among economic growth, liberalization, and the environment in both developed and developing countries. Overall, findings revealed that some pollutants are estimated to decrease with free trade whereas others increase. Even then, any increases in pollution caused by trade liberalization are small compared with the increases attributed to growth and structural changes that would have occurred even without trade liberalization. Thus, the fear that trade liberalization will be detrimental to the environment of developing countries is minimal.

Mukhopadhyay and Chakraborty (2005) inquired whether trade liberalization was good for the environment in India by examining both the pollution haven and the factor endowment hypotheses for India's trade with the rest of the world and the European Union during the 1990s when radical economic reforms were introduced. A modified Leontief's input-output method was used to test both the hypotheses considering three pollutants: carbon dioxide, sulphur dioxide and nitrogen dioxide (CO_2, SO_2 and NO_2, respectively) using input-output, energy flow, emission and trade related data, as well as, labour and capital coefficients for the years 1991-1992 and 1996-1997, respectively. Findings revealed that import-related pollution is much greater than the export-related pollution for India. Hence, the work challenged the pollution haven hypothesis, arguing that liberalization of trade policy in India has not been associated with pollution-intensive industrial development. On the other hand, the study supports the factor endowment hypothesis thus confirming that the export-oriented labour requirements are much more in weight than their import counterpart is. Hence India gains in terms of emissions from trade in both cases.

Feridun, Ayadi and Balouga (2006) investigated the impact of trade openness on pollution and resource depletion in Nigeria between 1992 and 1999. The study utilized the Ordinary Least Square (OLS) and Generalized Least Square (GLS) methods to analyse the two models which were formulated for the study. Findings revealed that trade intensity leads to increase in environmental degradation. It recommended that Nigeria should carefully choose a combination of policies that will not make the country vulnerable.

Bernard and Mandal (2016) examined the impact of trade openness on environmental quality using a dynamic panel data model for 60 emerging and developing economies for the period 2002 to 2012. Environmental Performance Index (EPI) and CO2 emissions were used as indicators of environmental quality while GDP, Trade Openness, Energy Consumption, Financial Development, Foreign Direct Investment (FDI), Urbanization, Political Globalization and Governance

were the explanatory variables in the multivariate analysis. Findings from the fixed effects model showed that trade openness improves EPI, though it escalated CO_2 emissions. Also, the GMM findings with EPI revealed that political factors improve environmental quality, whereas income and population have detrimental effects. In the GMM estimations with CO_2 emissions, trade openness, income, energy consumption and population were found to have deleterious effects on environmental quality.

Cherniwchan (2017) investigated the effects of Trade liberalization on the environment and particularly, the effect of North American Free Trade Agreement (NAFTA) on the emissions of particulate matter (PM10) and sulphur dioxide (SO_2) from manufacturing plants in the United States (US) from 1991 to 1998, using both descriptive statistics and multiple regression analysis. Findings suggest that trade liberalization led to significant reductions of these pollutants at affected plants. On average, nearly two-thirds of the reductions in PM10 and SO_2 emissions from the U.S. manufacturing sector between the study period is attributed to trade liberalization following NAFTA. These findings suggest that increased foreign market access can reduce emission intensity directly by creating incentives for firms to alter their pollution abatement technologies.

He (2019) examined the environmental impact of trade liberalization in the business ethics perspective in China using the province-level data from 1997 to 2008. Specifically, the investigation centred on the different effects of trade on environmental performance, namely the scale effect, technique effect, and trade-induced composition effects. Findings from the panel regression techniques estimation showed that trade itself had significant positive effects on the environment. The research empirically confirmed and theoretically proved that the impacts of trade liberalization on environmental performance differ from pollutant to pollutant, and it rather depends upon the specific indicator in question.

Alvi, Chaudhry, Farooq and Safdar (2019) investigated the nexus among trade liberalization, foreign direct investment inflows, environmental quality and economic growth for Pakistan and China spanning from 1989 to 2018 using the ARDL and the unrestricted error correction model techniques for the dual regression models. Findings revealed that gross capital formation, foreign direct investment, total labour force and trade openness had positive effects on economic growth in both nations while the impingements of carbon dioxide emission leaning on economic growth are negative and phenomenally disastrous in both nations.

Dinh (2020) explored different aspects of the relationship between trade liberalization and the environment in Vietnam and four other Southeast Asian countries, namely, Thailand, Indonesia, Malaysia and Philippines for the period 1986-2010. Findings revealed an increasing linear relationship between per capita GDP and per capita carbon dioxide emissions, which supports the Pollution Haven Hypothesis that freer trade negatively affects the environment. Also, using an Environmental Input-Output Analysis to measure the pollution embodied in exports, imports, and content of Vietnam's international trade (for three air pollutants CO_2, SO_2, NO_2) in 2007 and 2012, the findings showed that Vietnam gained "environmentally" from trade liberalization and expansion as at 2007, but slid into a "pollution haven" as at 2012.

Ajayi and Ogunrinola (2020) examined the relationship between growth, trade openness and environmental degradation in Nigeria using the ARDL bound test approach to analyse time series data from 1960 – 2017. Results revealed that trade openness and population growth lead to environmental degradation. The study recommended among others that the Nigerian government should adopt policies that promote responsible production pattern and utilize renewable energy in order to encourage a clean and sustainable environment.

Raza, Sui, Jermsittiparsert, Zukiewicz-Sobczak, and Sobczak (2021) examined the environmental performance of South and East Asian countries and its association with trade and other economic variables. Panel regression techniques and robust checks were used to examine the data, which covered 15 years from 2002 to 2016. The findings revealed an extensive negative association between trade liberalization and the environmental performance of selected countries. The findings also affirm the concept of pollution haven hypothesis. The study recommended the need for each country to make an effort to improve its environmental performance along with economic development.

METHODOLOGY

Secondary data from the World Bank World Development Indicator (WDI) 2021 was used for this study. In most empirical work, CO_2 emission was used as the universal measure of environmental quality (Bernard & Mandal, 2016; Dinh, 2020; Mukhopadhyay & Chakraborty, 2015; Safdar, Ghaffar, Farooq & Liaquat, 2020; Alvi, Chaudhry, Farooq & Safdar, 2019). In this work, CO_2 emission was used as the dependent variable while trade openness, net migration index, energy consumption, foreign direct investment, agricultural output, as well as industrial output were used as the explanatory/independent variables. Hence, the model for this study is specified as: $CO_2 = f(TO, NM, EC, FDI, AO, IO)$ - - - - (1)

In econometric form, equation (1) is specified as:

$$CO_2 = \beta_0 + \beta_1 TO + \beta_2 NM + \beta_3 EC + \beta_4 FDI + \beta_5 AO + \beta_6 IO + \mu \quad -(2)$$

Where,
CO_2 = Carbon dioxide emission per metric tons
TO = Trade Openness
NM = Net Migration index
EC = Energy Consumption
FDI = Foreign Direct Investment
AO = Agricultural Output as a percentage of GDP
IO = Industrial Output as a percentage of GDP
$\beta_0 - \beta_6$ = The parameters of the respective explanatory variables
μ = Stochastic variable

Before the estimation of the regression equation, stationarity properties of the variables were checked. Hence, unit root test was conducted to ensure that the data set is stationary to avoid spurious results as well as to ensure that the appropriate estimation procedures are followed. Thereafter, diagnostic tests, namely, Jarque-Bera test for normality, Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey Heteroskedasticity Test, CUSUM and CUSUM of square test for stability were carried out to validate the results. The impact of trade openness on environmental quality in Nigeria was then determined using the ARDL estimation technique in line with the unit root test result.

EMPIRICAL RESULTS AND DISCUSSION

Unit Root Test Results

To check the order of integration, the Phillip-Perron (PP) test was conducted and tested at the 5% level of significance. The result is presented in table 1.

Table 1: Phillip-Perron (PP) Test Result

Variables	PP Statistics	5% Critical Value	Probability	Order of Integration	Remark
CO_2	-13.63091	-2.936942	0.0000	I(1)	Stationary
TO	-2.984360	-2.935001	0.0448	I(0)	Stationary
NM	-5.488143	-2.935001	0.0000	I(0)	Stationary
EC	-9.564827	-2.936942	0.0000	I(1)	Stationary
FDI	-3.729802	-2.935001	0.0071	I(0)	Stationary
AO	-6.376759	-2.936942	0.0000	I(1)	Stationary
IO	-8.644080	-2.936942	0.0000	I(1)	Stationary

Source: Authors' computation using E-views 10

The results in table 1 indicated that when the variables were tested at levels, TO, NM and FDI were stationary (I(0)). After first differencing, however, CO_2, EC, AO and IO were found to be stationary (I(1)). Hence the null hypothesis of a unit root was rejected at the 5% level of significance.

ARDL Bound Test

Since our order of integration is a mixture of I(0) and I(1) without any I(2) in the variables, the ARDL/Bound test was utilized on the basis of appropriateness to ascertain the existence of a long run relationship among the variables. Thus, the hypotheses are stated as:

$H_0: b_{1i} = b_{2i} = b_{3i} = b_{4i} = b_{5i} = b_{6i} = b_{7i} = 0$

$H_1: b_{1i} \neq b_{2i} \neq b_{3i} \neq b_{4i} \neq b_{5i} \neq b_{6i} \neq b_{7i} \neq 0$

Table 2: ARDL Bound Test Result

Test Statistics	Value	K
F-statistic	1.934394	6
Critical Value Bounds		
Significance	I(0) Bound	I(1) Bound
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Source: Authors' computation using E-views 10

Table 2 revealed that the calculated F-statistic (1.934394) is lower than the critical lower bound I(0) value (2.27), thus, we conclude that there is no co-integration. Hence, the null hypothesis of no long-run relationship is accepted at the 5% level of significance. That is, there is no long-run relationship between environmental quality and trade liberalization in Nigeria.

Since there is no long-run relationship as revealed in table 2, the short run model of the ARDL analysis was employed to estimate the parameters. Hence, there will be no need to incorporate the Vector Error Correction Model (VECM) into the equation. The ARDL model which uses a combination of both endogenous and exogenous variables is specified with the difference operator (Δ) as follows:

$$\Delta CO_{2t} = \beta_{0l} + \sum i^{P} \beta_{1i} \Delta CO_{2t-1} + \sum^{q} \beta_{2i} \Delta TO_{t-1} + \sum^{q} \beta_{3i} \Delta NM_{t-1} + \sum^{q} \beta_{4i} \Delta EC_{t-1} + \sum^{q} \beta_{5i} \Delta FDI_{t-1} + \sum^{q} \beta_{6i} \Delta AO_{t-1} + \sum^{q} \beta_{7i} \Delta IO_{t-1} + \mu_t$$

The model is estimated by automatic selection of maximum lag of 1 and using Akaike information criteria in selecting the optimum lag order of (1, 0, 1, 1, 1, 0, 1). The statistics are presented in table 3.

Table 3: Short-run Estimates of the ARDL Model "(1, 0, 1, 1, 1, 0, 1)"

Variable	Coefficient	Std. Error	t-Statistics	Probability
C	-2.880868	3.778902	-0.762356	0.4520
CO_2(-1)	0.570413	0.182124	3.132013	0.0039
AO	-0.005133	0.003722	-1.379187	0.1784
LOG(EC)	-0.726239	0.792262	-0.916665	0.3669
LOG(EC(-1))	1.177312	0.666837	1.765517	0.0880
FDI	-0.026588	0.012314	-2.159054	0.0393
FDI(-1)	0.022392	0.011636	1.924440	0.0642
IO	-0.001262	0.004859	-0.259803	0.7969
IO(-1)	0.012316	0.004987	2.469333	0.0197
NM	0.054078	0.029368	1.841413	0.0758
TO	0.003594	0.002052	1.751046	0.0905
TO(-1)	-0.003131	0.001634	-1.916549	0.0652
R-squared	0.740313			
Adjusted R-squared	0.641811			
Durbin-Watson stat	1.741376			

Source: Authors' Computation, extracted from E-views 10

The result of the short-run analysis revealed that CO_2 in the previous period is positively (0.570413) related with CO_2 in the present period, and it is significant with a p-value 0.0039, which is less than 5%. This implies that there has been an increase in CO_2 emission over time, which is consistent with the work of Field and Field (2017) that high carbon emission has led to increased atmospheric pollution. Table 3 also showed that agricultural output is negatively (-0.005133) related with CO_2 emission, indicating that agricultural activities in Nigeria do not add more to carbon emission due firstly to the fact that agricultural practices are not mechanized and secondly as a result of poor agricultural production; hence, insignificant environmental damage (with a p-value of 0.1784).

Furthermore, energy consumption is negatively related (-0.726239) with CO_2 emission. This finding is at variance with the work of Bernard and Mandal (2016), which held that energy consumption has deleterious effects on environmental

quality. This could be because of the fact that energy consumption/utilization in Nigeria is low due to low energy generation (because of the consistent collapse of the national grid) and poor production and manufacturing activities. Thus, energy consumption is statistically insignificant based on the p-value (0.3669). However, unlike the current year, the previous year's energy consumption adds to the level of CO_2 emission (1.177312), although, insignificantly. This depicts the declining rate of energy consumption in Nigeria. In addition, FDI is negatively related (-0.026588) with CO_2 emission, which revealed the declining and low foreign investment in Nigeria. This is obvious in the shutting down and relocation of foreign companies from Nigeria to neighbouring countries like Ghana. With no real investment in the country, production activities are low, thus no significant damage to the environment, all things being equal. However, the previous year's FDI is positively related to CO_2 emission (0.022392), which further confirms that FDI into Nigeria is on the decline. In addition, industrial output (IO) is negatively (-0.001262) related to CO_2 emission. As a country that relies heavily on importation, industrial production and activities are low in Nigeria, which invariably suggests low carbon emission. In the lagged period, however, IO is positively related (0.012316) to CO_2 emission, which implies that industrial production has reduced compared to the lagged period.

On the other hand, net migration and trade openness are positively related to CO_2 emission, albeit both are insignificant based on their p-values. This implies net migration and trade openness dampen environmental quality in Nigeria, all things being equal. Mass movement of people for businesses and other economic activities across borders lead to increase in discharge of carbon monoxide which invariably deteriorates the quality of the environment. Also, openness to international trade increases the inflow of goods and services from the industrialized countries, which results in high transportation activities with its attendant impacts on the environment. This finding is consistent with the works of Feridun, Ayadi and Balouga (2006); Ajayi and Ogunrinola (2020); Dinh (2020); Raza, Sui, Jermsittiparsert, Zukiewicz-Sobczak, and Sobczak (2021) and supports the Pollution Haven Hypothesis that freer trade negatively affects the environment, as well as that of Bernard and Mandal (2016) and Alvi, Chaudhry, Farooq and Safdar (2019), which assert that trade openness escalates CO_2 emissions, thus worsening environmental quality. However, this finding is at variance with that of He (2019).
The coefficient of determination (R^2) reveals that about 74% variations in the dependent variable is explained by the independent variables and the drop to 64% (Adjusted R^2) after adjusting for degree of freedom is still significant. The Durbin-

Watson statistic of 1.74 shows the absence of serial autocorrelation, which implies that there is independence of observations in the error terms. The F-statistics, which shows the robustness of the model, confirms the existence of a statistically significant simultaneous relationship between carbon dioxide emissions (CO_2) and explanatory variables in the specified model (TO, NM, EC, FDI, AO, IO). This reveals an appreciable fit.

Diagnostic Tests

Table 4: Diagnostic Tests

Test	F-statistic	Prob. Value	Obs*R-squared	Prob. Value
Breusch-Godfrey Serial Correlation LM Test	1.236475	0.3083	3.736569	0.1544
Breusch-Pagan-Godfrey Heteroskedasticity Test	1.594739	0.1507	17.74525	0.1674
Ramsey RESET Test	0.431663	0.5172		
Jarque-Bera Normality test		0.466712		

Source: Authors' Computation, extracted from E-views 10

From the diagnostic test result in table 4, the probability values for the Breusch-Godfrey Serial Correlation LM test (0.3083) and the Breusch-Pagan-Godfrey Heteroskedasticity test (0.1507) are greater than 0.05. Thus, the null hypotheses of no serial correlation and homoscedasticity were accepted. Likewise, the probability value of the Ramsey RESET test for stability (0.5172) is greater than 0.05, hence, we accept the null hypothesis that the model is correctly specified. Furthermore, the result of the Ramsey RESET test for stability is corroborated by the result of the Cumulative Sum of Recursive Residuals presented in the Appendix. Also, the probability value of the Jarque-Bera statistic (0.466712), being greater than 0.05, implies that the null hypothesis that the variables are normally distributed is accepted.

CONCLUSION AND RECOMMENDATIONS

This paper provides empirical evidence on the impact of trade liberalization on environmental quality in Nigeria using annual time series data spanning from 1980 to 2021. The ARDL/Bound test approach utilized for the study revealed the non-existence of a long run relationship between environmental quality and the various indicators used as proxies for trade liberalization. The study revealed that Nigeria does not contribute significantly to decline in environmental quality (increasing CO_2 emissions). This is due mainly to her weak industrial base and poor production/manufacturing activities. Findings also support the Pollution Haven Hypothesis that freer trade negatively affects the environment and that trade openness escalates CO_2 emissions, thus worsening environmental quality. The study concludes that trade openness does not lead to decline in environmental quality in Nigeria.

The policy implication of this study is that Nigeria should increase her domestic output particularly in terms of industrial production to avoid being a dumping ground (Pollution Haven) for the products of the industrialized countries. However, green technology should be embraced in order to ameliorate possible environmental damage. In addition, Nigeria needs to strengthen her environmental regulation policies to avoid being a dumping ground or pollution haven for the western industrialized countries of the world.

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