

Environmental Degradation on Economic Growth in Nigeria

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Abstract:- The study investigates the association between environmental degradation on economic growth in Nigeria. The main motivation is to empirically determine if environmental degradation hampers economic growth. Annual time series data from 1980-2016 were used. The variables are carbon oxide emission, total green-house effect and gross domestic product. We employed Unit Root test for stationarity, Co-integration test for long run determination and Error Correction Mechanism test to determine the speed of adjustment from the short to its long run. The results show that variables are integrated of order 1(1) and long run link among the variables was established. The ECM value of -0.213154 or 21per cent is able to correct, adjust and tie the short run dynamics to the long run equilibrium with a speed of six weeks and eight days. The post test results reveal that the model is entirely and structurally stable over time of study. The study concludes that environmental degradation cannot improve the level of economic growth in Nigeria and the study therefore recommends control over the environment in Nigeria.

Keywords: *Environment, degradation, carbon dioxide, economic growth, Nigeria.*

I. INTRODUCTION

Generally, “speaking problems with environmental degradation are often linked with process of development and therefore have effects on local, regional, as well as global levels. These effects which are the result of human activities have devastating consequences on the environment and so are harmful on human beings, animals and plants and can be passed on to future generations (Dang, 2013). In the face of global economic recession environmental degradation poses a great challenge to sustainable development. There are many problems, challenges and opportunities associated with living in the environment today. The earth and its treasure base, is experiencing a siege from all aspects of human endeavours ranging from misuse, abuse and degradation of the environment that have become so easily spotted and there are disruptions every day and almost everywhere. Cultures, economic activities, cultural behaviours and livelihood practices are changing and changing fast as a consequence of the realization that when people have power to extract resources around them for a more fulfilling life, they sometimes unleashed such power with a sense of desperation to solve the increasing and mounting problems of survival and progressive

improvement and this leads to environmental degradation. Thus, the desperate quest for self, family or organisational improvement is no longer a future threat but real threat for the future”.

“Over the years colonial and military, as well as civilian administrations in Nigeria have not given the required attention needed to environmental issues Bayode, Emmanuel and Sogbon (2011). As a result of the aforementioned environmental resources and their harmonious relations with nature have suffered dire consequences for decades and this remains one of the most intricate problems in Nigeria. Examples of these environmental hazards which have suffered neglect include the gully erosion in the east, the seemingly devastating effect of solid mineral mining on the plateau and the encroaching of desertification in the north to mention a few. The effect of this neglect can be further seen in the Niger delta geopolitical zone of Nigeria where gas flaring and oil spillage in the Niger Delta has wrecked tremendous damage on eco system, health and livelihood of the people. Thus, exploitation of finite and renewable resources of the environment which was meant for sustained economic growth and development has turned out to be a curse. At inception intense exploration, exploitation and consumption of these resources were effectively contained within the carrying capacity of the environment and its renewable potential. However, with passage of time, teeming population, sophisticated technical progress and their overall impact and pressure on the environment, the problem of environmental degradation began to emerge. It is in the light of the above, those certain pertinent questions are asked; what constitute an environmental degradation in the economy and how can it be mitigated in an economy like Nigeria. Specially, the objectives are to ascertain the impact of carbon oxide emission and greenhouse effect on the Nigerian economy”.

II. CONCEPTUAL ISSUES IN ENVIRONMENTAL DEGRADATION

“Environment is the natural and social condition surrounding all mankind including future generations. The environment as posited by Bayode, Emmanuel and Sogbon (2011), is made up of biophysical components and processes of natural environment of land, water and air. Expanding the above definition environment would also include all layers in the atmosphere, inorganic and organic matters, socio-economic components and processes of human endeavours. The elements mentioned here have a symbiotic relationship

and any distortion of their natural state could affect economic activities. Lending credence to the above that land and associated resources, structures, sites, human health, nutrition and safety are also inclusive. The environment can justifiably be said to be the natural habitat of man with several components within which various kinds of activities and processes occur. Environment was further defined by the National Conservation and Environment Protection Act (1987) to include the physical factors of the surrounding of human beings, land, soil, water, atmosphere, climate, sound, odour, taste and the biological factors of animals and plants. The Federal Environmental Protection Agency Act (1992) defined environment to include water, air, land, and all plants and human beings, or animals living there in and the interrelationships which exists among these or any of them”.

III. THE CONCEPT OF ECONOMIC DEVELOPMENT

The term “development refers to the quantitative and qualitative exchange in an economy where such actions can involve multiple areas including development of human capital, critical infrastructure, regional competitiveness, environmental sustainability, social inclusion, health, safety, literacy and other initiatives (Dang, 2013). Development is process that has many sides including economic, social, political and educational advancement. Most times the term development is used in an economic perspective because the type of economy under scrutiny is an indication of other social features. Economic development can be looked at by essentially focusing on equitable distribution of wealth and involves increasing a greater percentage of the people living standard of an overall population. Health and education have been given prime place as welfare indicators in addition to the indices of Gross Domestic Product per capita because education, good health and longevity are valuable outputs of life. The concept of human development has been broadened to include attitudinal change absence of corruption, access to basic infrastructure e.t.c in addition to the per capita income measure”.

IV. EMPIRICAL LITERATURE REVIEW

This study by Armeanu (2018) examines “the Environmental Kuznets Curve hypothesis (EKC), considering the primary energy consumption among other country-specific variables, for a panel of the EU-28 countries during the period 1990–2014. By estimating pooled OLS regressions with Driscoll-Kraay standard errors in order to account for cross-sectional dependence, the results confirm the EKC hypothesis in the case of emissions of sulphur oxides and emissions of non-methane volatile organic compounds. In addition to pooled estimations, the output of fixed-effects regressions with Driscoll-Kraay standard errors support the EKC hypothesis for greenhouse gas emissions, greenhouse gas emissions intensity of energy consumption, emissions of nitrogen oxides, emissions of non-methane volatile organic compounds and emissions of ammonia. Additionally, the empirical findings from panel vector error correction model reveal a short-run unidirectional causality from GDP per capita growth to

greenhouse gas emissions, as well as a bidirectional causal link between primary energy consumption and greenhouse gas emissions. Furthermore, since there occurred no causal link between economic growth and primary energy consumption, the neo-classical view was confirmed, namely the neutrality hypothesis”.

This study by Ominyi and Abu (2017) examined the “trade-off between economic growth and environmental degradation in Nigeria. This is against the postulation of Simon Kuznets’ inverted-U hypothesis in 1955 that pollution and other environmental degradation first rises and then falls with increase in income per capita. The study adopted the Vector Auto Regressive (VAR) approach in addition to the granger causality test to estimate this relationship using time series data from 1986 to 2015. The findings of this study reveal that the Environmental Kuznets Curve (EKC) does not fit the Nigerian data and contradicts the inverted-U hypothesis. This implies that at low income levels, the environment improves while at high income levels, the environment worsens. The empirical results reveal that an increase in GDP per capita leads to a rise in CO₂ per capita which denotes environmental degradation. Conversely, an increase in CO₂ emissions does not contribute significantly to growth which is contradictory. The study concludes that there is no significant trade-off between economic growth and environmental degradation – as both variables do not meaningfully affect each other. The study recommends that unless a meaningful reconciliation is done between fostering economic growth and protecting the environment, the goal of sustainable development will continue to be impaired by the overlaps. Further studies are recommended on estimating the balance between sustained economic growth and environmental sustainability”.

The study by Saibu and Ekundayo (2016) examines “the growth effects of foreign direct investment on environmental quality in Nigeria between 1970 and 2013. Variables like per capita income, environmental degradation, foreign direct investment, human capital, inflation, trade openness, interest rate, and the interaction term between foreign direct investment and carbon emission were employed in the study. A long run relationship was observed among the variables and foreign direct investment and environmental degradation negatively enhanced growth individually, while the interaction variable positively enhanced economic growth. The study concludes that environmental consideration does not really matter in growth consideration in Nigeria but that carbon emission must not exceed the 67.4% threshold if the economy is to benefit from the interaction between foreign direct investment and carbon emission. Policy makers are encouraged to strike a balance between the quantity of emissions and the amount of economic growth that is suitable for the country since the decision to maintain green growth by developing countries is not an easy one to make”.

The main aim of the study by Ahmadreza, Hamed and Leili (2016) was to “analyze evidence of an environmental Kuznets curve for water pollution in the developing and developed countries. The study was conducted based on a

panel data set of 54 countries – that were categorized into six groups of “developed countries developing countries”, “developed countries with low income developed countries with high income” and “coastal countries”- between the years 1995 to 2006. The results do not confirm the inverted U-shape of EKC curve for the developed countries with low income. Based on the estimated turning points and the average GDP per capita, the study revealed at which point of the EKC the countries are. Furthermore, impacts of capital-and-labour ratio as well as trade openness are drawn by estimating different models for the EKC. The magnitude role of each explanatory variable on BOD was calculated by estimating the associated elasticity”.

Dizaji, Badri&Shafaei (2016) investigated the “relationship between economic growth and environmental quality in D8 member countries. The study examined the relationship between economic growth and environmental quality in Bangladesh, Egypt, Indonesia, Iran, Malaysia, Nigeria, Pakistan and Turkey using panel data model in the period 1975 –2012. The results showed that economic growth has a positive effect on carbon dioxide emissions. However, the square GDP per capita has significant negative effect on carbon dioxide emissions. The study concludes that the Environmental Kuznets Curve hypothesis is confirmed from the studied group of countries”.

Fidel (2015) studies have tended to inquire as to whether there is evidence that “economic growth negatively impacts environmental quality. This remains and has always been an ample question to ponder with regard to the case of high-income countries. In terms of the low-income countries, however, the reverse question seems to be more appropriate given that the main concern in these countries is relatively more about growth than the environment. This paper develops an Environmental Quality Trajectory (EQT) model and applies it to provide a theoretical and empirical analysis of the importance of environmental quality, and how it impacts economic growth and development for developing countries. The study reveals some very important issues concerning the environment and the major factors that shape its role in economic growth and development in low-income countries. And most importantly, the study’s results appear to generally lend support to aspects of the Ruttan-Kuznets propositions about the relationship between income and environmental quality in developing countries, and at the same time seem to refute some aspects of it, to the effect that the implications of the environmental Kuznets curve does not seem to hold equally to all low-income countries per se, as ordinarily believed hitherto”.

Akomolafe, Danladi and Oseni (2015) analysed the “relationship between trade openness, economic growth, and environmental pollution in Nigeria. The study introduced urbanization and ruralisation as measures of the growth of urban and rural sectors to analyse their contributions to pollution in the country. Using Vector Error Correction Mechanism (VECM) and co-integration techniques, the result confirms the existence of the Environmental Kuznets

Curve in Nigeria. Also, there is a positive relationship between ruralisation and environmental pollution both in the short and long run. However, the result reveals a negative relationship between urbanization and environmental pollution in the long run, but positive in the short run. The study concludes with a recommendation that there is a need for policy makers to enact and enforce environmental laws that are aimed at regulating various sources of environmental pollution in the country”.

Ogboru and Anga (2015) in a theoretical approach to “environmental degradation and Sustainable Economic Development in Nigeria asserted that successive Nigerian administrations from the colonial era paid little attention to environmental issues. The study examined the effects of environmental degradation and the risk or threat it poses to sustainable economic development in Nigeria. The paper posited that a high number of cases of diseases such as cancer, tuberculosis, viral diseases etc. are consequences of environmental pollution which poses great challenge to sustainable economic development among others. Cases of floods, erosions and drastic drop in agricultural output as a result of environmental degradation were also identified. The paper therefore recommended that since our national development policy objective is to achieve rapid economic growth and improvement in individual welfare on a sustainable basis a range of enabling policies, economic instruments and incentives are required to propel this development process in the desired direction”.

V. MODEL SPECIFICATION

The choice of an appropriate indicator of environmental degradation is problematic. This stanches from the “qualitative problems encountered in measuring environmental quality as well as data availability. Hence different indicators have been employed in empirical literature on the subject matter. However, recent studies have shown that these models suffer from omitted variable bias as the addition of more explanatory variables also bear significant effect on environmental quality”.

The model is therefore specified as thus;

$$GDP = f(CO_2, TGH) \tag{1}$$

The econometrics form of it becomes

$$GDP = \beta_0 + \beta_1 CO_{2t} + \beta_2 GHE_t + \mu_t. \tag{2}$$

Discussion of results

UNIT ROOT TEST

Table 1 Unit Root Test Result (P-P)

Phillip PerronTest							
Variables	Levels		First difference			Order of integration	
	P-P Stat	Test critical value	Remark	P-P Stat	Test critical value (5%)	Remark	

		(5%)				
GDP	-	-	-	-	-	1(0)
	2.30	3.53		4.17	3.54032	
	5671	6601		1087	8	
CO ₂	-	-	1(0)	-	-	-
	6.46	3.53		35.3	3.53660	
	5469	3083		6052	1	
TGE	-	-	1(0)	-	-	-
	6.35	3.53		37.7	3.53660	
	2542	3083		2153	1	

Note: the P-P tests for H₀Xt as 1(1) against H₁Xt as 1(0)

Source: Authors' computation (E.view 9.0)

Note: (1) NS = Non – stationary. (2) S = Stationary

From “Table 1, the P-P test unit root procedure is used to confirm the presence or absence of unit root in the model. This was carried out to decide the time series properties of the model. The results designate that the P-P statistics is greater than the 5 percent test critical values. The variables from the estimated result remained integrated of the same order 1(0) for CO₂ and TGE but became integrated of order 1(0) for GDP. This helped in removing the problem of spurious regression often associated with time series data. In order words, the variables could be co-integrated. To ascertain this, we apply the Johansen Co-integration procedure”.

Table 2. Johansen Co-integration Test Result (Trace Test)

Hypothesize d No. of CE(s)	Eigenvalu e	Trace Statistic	0.05 Critical Value	Prob.* *
None *	0.404036	43.0557	35.0109	0.0057
At most 1 *	0.346740	24.4230	18.3977	0.0064
At most 2 *	0.223250	9.09491	3.84146	0.0026

Trace test indicates 3cointegratingeqn(s) at the 0.05 level

Source: Authors' computation (E.view 9.0)

From “Table 2, the Trace statistics shows the existence of 3 co-integrating relationship among the variables at 5 percent level of significance. The presence of co-integration among the variables shows that there is a clear long-run equilibrium relationship among the variables under investigation. The rule states that, for variables to have long-run equilibrium relationship there must be at least one co-integrating equation. The Trace statistics therefore exhibited the existence of a long-run equilibrium relationship among the variables”.

Table 3. Johansen Co-integration Test Result (Max-Eigen Test)

Hypothesize d No. of CE(s)	Eigenvalu e	Max-Eigen Statistic	0.05 Critical Value	Prob.* *
None	0.404036	18.6327	24.2520	0.2325
At most 1*	0.346740	15.3281	17.1476	0.0902

		1	9	
At most 2 *	0.223250	9.09491	3.84146	0.0026
		4	6	

Trace test indicates 2cointegratingeqn(s) at the 0.05 level

Source: Authors' computation (E.view 9.0)

Correspondingly from “Table 3, the Maximum-Eigen statistic indicates 2 co-integrating equation at 5 percent level of significance thus signifying the rejection of the null hypothesis of zero co-integrating relationship. This is confirmed by the fact that the Max-Eigen statistic value is greater than the critical value at 5 percent level of significance. Hence, there is a long-run equilibrium relationship between carbon oxide, green-house effect and economic growth within the period under review. Summarily, both the Trace and Max-Eigen test statistic confirms the existence of a long-run equilibrium relationship between the variables and the hypothesized fundamentals for the period under consideration i.e. 1980 – 2018. On the premises of the result from the Johansen co-integration test which confirmed the existence of a long run relationship among the variables, we therefore have the assurance to conduct the short run dynamic adjustment. Thus, we proceed to estimate an over-parameterized error correction model from where the parsimonious error correction mechanism is obtained”.

Table 4. ERROR CORECTION MECHANISM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.282596	2.679935	0.851735	0.4011
D(CO ₂)	0.001655	0.007369	0.224604	0.8238
D(CO ₂ (-1))	0.000946	0.010540	0.089730	0.9291
D(CO ₂ (-2))	0.002495	0.013107	0.190347	0.8503
D(TGE)	-0.052418	0.102511	0.511344	0.6129
ECM(-1)	-0.213154	0.091818	2.321477	0.0272

Adj. R= 0.019873; DW=1.238534

Source: Authors' computation (E.view 9.0)

The result from “table 4 reveals that the Adjusted R² is 0.019873 which indicate that about 19 per cent of the systematic variation in GDP is explained by the independent variables in the model. The remaining 81 per cent is attributed to variables not included in the model but are captured by the error term. The overall model is statistically significant since the F* value of 1.141932is greater than the F_{0.05} of 0.360208 at the 5 per cent level of significance”.

The AIC (8.456566) and the SCC (8.720486) “values are very low implying that the result could be deployed for policy formulation and recommendations within the period under review. The result also shows that DW statistic value is (1.238534) and very far from thereby depicting presence of first –order serial autocorrelation in the model”.

The error correction coefficient ECM (-1) value is -0.213154 or 21 per cent and appropriately signed with the negative sign and very significant (-2.321477). This implies that GDP in Nigeria adjust speedily to the changes in the explanatory variables. Therefore, the ECM (-1) is able to correct and tie any deviations from the long –run relationship between BOPs and the explanatory variables.

VI. CONCLUSION

From the foregoing, it can be concluded that “carbon dioxide emission can cause serious environmental problems too enormous to bring about undesirable changes in the economy. The findings of this study bear several policy implications for Nigeria. Economic growth is significantly associated with increased environmental degradation in Nigeria both in the short run and the long run”.

The result reveals that “TGE can reduce GDP whereas carbon dioxide increases GDP in Nigeria”.

RECOMMENDATIONS

The study recommends that “carbon dioxide emissions are responsible for decline in economic growth in Nigeria. However, the ECM result opines that it impacts on the economy positively.

The study recommends equally that total green-house effect is negative. This suggests that it impacts on the economy negatively but total green effect is capable of influencing the economy positively despite the obtained results”.

Finally “government at all levels should ensure a clean and green environment so as to improve the economy of Nigeria”.

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