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Energy performance and Environmental degradation in Nigeria and Ghana

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Abstract

This study examines effect of energy performance, GDP, financial sector development and FDI on environmental degradation in Nigeria and Ghana, using FMOLS method from 1980 to 2019. The outcome of the cointegration tests reveal a long run link among the variables. The outcome from long run result shows that energy use, financial performance and FDI increase environmental degradation. Therefore, the study suggest rightful policies with the purpose of reducing the capacity of environmental pollution through measures that will promote credit allocation, less emission energy use like thermal and solar energy. It is essential for governments, policymakers and stakeholders to educate on dangers of the CO_2 explosion and to promote awareness on the ways to reduce the emissions among its citizens through public lectures and seminars for clean and better environment.

Keywords*:* Energy, financial performance, FDI, CO_2, FMOLS

1. INTRODUCTION

The global CO_2 explosion is worrisome to nation's sustainable economic development (Sehrawat et al., 2015). In recent time, the percentage of CO_2 discharge from developing and emerging nations is increasing to the threat level of environmental quality (Meratizaman et al., 2015; Nejat et al., 2015). It is argued that CO_2 discharge has risen to 32 billion kt with almost 3.3 percent increment yearly (EIA, 2016). From 2010 to 2019 energy use have accelerates the level of the world's CO2 explosion to the tune of 36.2 % (Global Carbon Project, 2018). Countries such as India, China and Africa have contributed to 63% of the total global CO2

explosion. (Hansen and Sato 2016; IPCC 2014). Therefore, the vulnerability effect of CO2 explosion will be high in the emerging nations. These could generate problems like drought, low production of agricultural output, diseases outbreak and the alteration of the ecosystem that affect human development. (Danlami, Applanaidu, and Islam 2018).

Sub Saharan Africa (SSA) today are among nations with increasing level of CO2 discharge due economic progression, population growth and energy use (Asongu 2018; Yahaya, Mohd-jali, and Raji 2020). The level of CO_2 discharge in SSA reached an increase of 0.84 billion tons yearly (WDI 2017). For instance, CO2 release in Nigeria and Ghana have increased by 17,110.22 kt and 3,868.68 kt from 2000 to 2015 (WDI, 2017). It is further indicate that energy performance in these nation have risen by 0.11million kg of oil equivalent, 0.1kg and 0.36 kg of oil equivalent from 2000 to 2015, respectively. (WDI, 2017). Thus, this condition may have linked with increasing level of CO2 discharge in the nation. Hence, the study analyze the effect of energy performance, GDP, financial sector development and FDI on environmental degradation in Nigeria and Ghana.

2. LITERATURE REVIEW

The link among energy performance, financial, GDP and FDI were discussed in the literature. for instance, BOlük and Mert (2014) conducts an estimate for 16 EU nations to analyze the performance of energy on CO_2 using fixed effect approach from 1990 to 2008. They finds that energy utilization accelerates the explosion of CO_2. Mahdi (2015) used PVAR technique to estimate the effect of energy utilization on CO_2 for European and Asian nation from 1989 to 2011. He found energy use increases the capacity of CO_2 explosion. Similarly, Begum et al. (2015) stressed that in Malaysia use of energy resources upsurge CO_2 discharge. Study by Mirzaei and Bekri (2017) justify their work by estimating the effect of energy performance on CO_2 in Iran. The outcome reveals energy resources increases CO_2. Danish et al. (2018) evaluate the performance of energy resources on the CO_2 explosion in Pakistan. They reveals energy accelerate the level of CO_2. Yahaya, Iro, and Kabiru (2019) studied the impact of fossil fuel for Nigeria. They discovered that energy upsurge the capacity of CO_2 discharge.

Nevertheless, Nguyen and Kakinaka (2019) argued that energy utilization in 170 nations reduce the level of CO_2 explosion. Yahaya, Adamu, and Mustapha (2020) utilize ARDL approach to estimate the impact of energy resource in Nigeria. It finds a positive link among energy and CO_2.

Moreover, Sehrawat, Giri, and Mohapatra (2015) documents that financial resources in India upsurge the capacity of CO_2 explosion. Javid and Sharif (2016) stressed that in Pakistan development of financial sector accelerates the rate of CO_2 discharge. However, Zafar, Saud, and Hou (2019) estimate the performance of financial development on CO_2 in OECD nations using FMOLS method. They find financial progress reduce the release of CO_2. In another dimension, Shahbaz, Mutascu, and Azim (2014) examine the influence of output performance on CO_2 in Romania by applying ARDL approach. The result shows that output performance increases CO_2. Cetin and Ecevit (2017) argued that GDP in Turkey accelerates the capacity of CO_2 release. Similarly, Sulaiman and Abdul-Rahim (2017) discover same outcome in Malaysia that energy use upsurge the release of CO_2. Nonetheless, study by Acheampong (2018) using PVAR analysis emphasized that industrial growth performance decelerates the rate of CO_2 level in 116 emerging economies. Moreover, Ren et al. (2014) utilize GMM technique to evaluate the effect of FDI on CO_2 in China from 2000 to 2010. They stressed that FDI increase the level of CO_2 discharge. Gökmenoğlu and Taspinar (2016) argued that FDI and energy resources in Turkey upsurge the level of CO_2 explosion. This result is supported by previous outcome (Shao 2018). Based on the reviewed literature linkage among energy performance and environmental degradation have been analyzed. However, relationship among these variable have very limited studies in Nigeria and Ghana. Hence, the study examine the effect of energy performance and environmental pollution in Nigeria and Ghana.

3. DATA AND TECHNIQUE OF ESTIMATION

3.1 Data

Yearly data for Ghana and Nigeria on environmental degradation (CO_2), energy performance (kg of oil), financial progress (credits percentage of GDP) GDP (percapita current USD) and FDI (net inflow) from 1980 to 2019. Data was obtained from WDI. The statistical

description of the variables are illustrated in table 1. It indicates that environmental degradation have the highest mean variation of 6.7 and FDI with lowest mean value of 3.6.

Table 1. Data description

Variables	Min	Max	Mean	SD
LENV	3.40	5.70	6.72	0.76
LEP	1.06	1.95	1.55	0.30
LGDP	1.21	9.99	4.48	3.66
LFD	0.79	1.65	1.42	0.14
LFDI	0.48	9.52	3.67	3.18

3.2 Model specification

The study used a model modified by Salahuddin et al. (2015) in order to estimate the long run confidents of the variables and it is illustrates based on the econometric specification in equation 1.

$$ENV_{it} = \propto + \beta_1 EP_{it} + \beta_2 GDP_{it} + \beta_3 FD_{it} + \beta_4 FDI_{it} + \varepsilon_{it} \quad (1)$$

From equation 1, ENV, EP, GDP, FD and FDI, indicate environmental degradation, energy performance, GDP, financial progress and foreign direct investment, α and ß represnts the parameter in the model, t illustrate time, i shows each nation entity and ε signifies the error term. It expected that ($\beta_1\ \beta_2\ \beta_3\ \beta_4\ \beta_5\ > 0$).

4. RESULT

The stationarity tests outcome is illustrated in this part, cointegration and the model's estimation. Table 2 shows that the variables from both IPS and LLC tests reveals stationarity at the first difference.

Table 2 stationarity tests

Variables	Level				First Dif.			
	IPS		LLC		IPS		LLC	
LCO2	-0.036	(0.485)	-0.896	(0.184)	-3.193*	(0.007)	-0.994*	(0.000)
LEU	0.064	(0.525)	-0.115	(0.453)	-6.222*	(0.000)	-0.453**	(0.074)
LFD	-0.449	(0.326)	-1.221	(0.110)	-6.306*	(0.000)	-5.725*	(0.000)
LIND	-0.852	(0.197)	-2.258	(0.320)	-7.824*	(0.000)	-8102*	(0.000)
LFDI	0.385	(0.649)	-0.157	(0.437)	-5.365*	(0.000)	-3.913*	(0.000)

Note: *** and ** signifies 1 and 5 % significance.

Table 3 presents the outcome of the cointegration tests. It reveals the confirmation of long run linkage among the variables. Hence, this condition validate the use of the FMOLS technique.

Table 3 cointegration tests result

Test	Statistics	Prob.	Weighted statistics	Prob.
Pedroni cointegration test				
Panel υ-statistics	0.656	0.255	1.031	0.151
Panel ρ statistics	-0.020	0.491	-0.012	0.495
Panel PP-statistics	-1.873**	0.030	-1.402*	0.080
Panel ADF-statistics	-2.062*	0.019	-1.545*	0.061
Group ρ-statistics	0.637	0.738		
Group PP-statistics	-2.993***	0.001		
Group ADF-statistics	-1.558**	0.059		
Kao cointegration test				
ADF	-1.975***	0.024		

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

Table 4, illustrate the estimates of FMOLS outcome. It reveals a positive link among energy performance and environmental degradation that is in these nations, energy use increase the environmental pollution. It entails that a one percent increase in energy performance results to 1.6 percent increase in environmental degradation. Therefore, the implication is that 1.6 percent increase in environmental degradation due increase in energy performance. Thus, governments and policymakers should design rightful policies to mitigate the discharge of CO_2 for better environment. This outcome is similar with the result reported by past studies (BOlük and Mert 2014). Similarly, the outcome indicates that GDP, financial progress and FDI have also influence environmental degradation positively. This means that a one percent increase in GDP, financial sector development and FDI result to 1.1, 1.1 and 0.1 rise in environmental degradation. The outcome is similar with result of the earlier studies (Sehrawat, Giri, and Mohapatra 2015).

Table 4 FMOLS estimates result

Variables	Coefficients	t-statistics
LEP	2.610*** (0.002)	3.835
LGDP	1.190*** (0.001)	3.240
LFD	1.144 (0.139)	-1.490
LFDI	0.113*** (0.001)	3.974

Note: *** and ** shows 1 and 5 % significance

Table 5 presents the model validity check and it illustrate that the disturbance errors are correctely distributed in the model.

Table 5 Post estimation test

Test Type	F-statistics	Probability	Result
Jarque-Bera	4.2451	0.2614	Normally Distributed

5. CONCLUSION

This study examines the effect of energy performance, GDP, financial sector development and FDI Nigeria and Ghana, using FMOLS method from 1980 to 2019. The outcome of the Pedroni and Kao panel cointegration endorse the long run association on the variables. The FMOLS result reveal that energy performance, GDP, financial sector development and FDI accelerate the level of environmental degradation. Therefore, the study suggests appropriate policies with the design goals of mitigating CO_2, especially with the measures that will enhance credit allocation, promoting zero emission energy use such as (thermal, solar and wind energy) and technologies. This could be through giving instructions to financial institutions that credits should be allocated to the purchases of low emission energy and technologies, putting restrictions and control measures on the credit allocation, enhancing rural banking system as well as setting out legal institutions that will oversee and audit all aspect with regard to this mandate. It is essential for governments, policymakers and stakeholders to expose dangers of the CO_2 explosion and to promote awareness on the ways to reduce the emissions among its citizens through public lectures and seminars for clean and better environment. The limitations of the study, it is clear that other determinant of CO_2 discharge are not captured for the reason that some of these factor have no data especially disaggregated energy variables. Hence, future research should focus on other disaggregates of energy variables to incorporate in the models.

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