Impact of Environmental Cost on the Performance of Firms in Nigeria

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Abstract: The study investigated the impact of the cost associated to the environmental and market performance of listed companies that explore, refine, produce and distribute oil and gas in Nigeria from 2006 to 2022. The research used a panel least squares regression technique. The study also assessed the environmental costs using Pollution control costs, Penalty costs and Donations and charitable contributions. The study found that there is a weak and non-sufficient relationship between donations and charitable contributions and earnings per share, a strong and significant negative correlation between penalty costs and earnings per share, and a weak and non-sufficient positive relationship between pollution control costs and earnings per share of listed companies that explore, refine, produce and distribute oil and gas in Nigeria. The study suggests that Nigerian enterprises should deliberately allocate resources to improve their environment and adopt environmentally-friendly practices. This not only helps in achieving the widely known goals of environmental sustainability but also positively impacts the firm's market performance.

Keywords: Environmental Costs; Market Performance; Earning per Share; Listed Company Oil and Gas

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1. Introduction

The present state of global climate change and its impact on overall biodiversity have sparked public interest and scrutiny of corporate practices and outcomes (Shivanna, 2022). There is a strong connection between environmental expenses and environmental accounting. Environmental accounting is a method used to identify and quantify the number of resources used by a firm or nation and to calculate the economic costs associated with its environmental impact (Deegan, 2013).

Environmental accounting involves the process of identifying, quantifying, and assigning costs related to the environment and integrating them into company operations. It also includes the methods used to communicate these costs (Bassey, Sunday & Eton, 2013). The oil and gas industry dedicate its efforts to petroleum product processing as well as transportation and marketing. The industry has transformed the entire nation through its export activities which generate about 80% of government revenue (Elwerfelli & Benhin, 2018).

Resulting from the seriousness of ecological harm and the increasing worry among participants, accounting for the environment has become a prominent field within accounting. Environmental accounting is often overlooked or disregarded in parts of Africa, such as Nigeria. Ifurueze, Lyndon and Bingilar (2013) said that companies are increasingly focusing on environmental costs due to the growing global awareness of the environment and the need for sustainable economic growth. According to them, the allocation of resources towards environmental efforts has been expanded to incorporate worker education, investigation and innovation, reuse, and dismantling. This is along with prioritizing the viability of products and implementing design of processes that reduce the ecological consequences of activities.

According to Agbo, Ohaegbu and Akubuilo (2017), reporting on the environment, reports on viable development, and societal accountability are widely acknowledged. A very effective and streamlined method for understanding the environmental performance and risks for establishments, local administrations, and individuals is by the use of reporting on protection. Ndukwe and John (2015) said that the heightened global consciousness has significantly transformed societal demands for corporate organization and assessment of effectiveness.

Currently, the detrimental influence of the environment on the condition of the economy has grown concerning. The cumulative effects on the environment of the human populace is not sustainable, and current patterns of development and ecological degradation recommend that we will come across more significant challenges in the future. This study evaluates how environmental expenditure costs affect market outcomes for Nigerian-listed oil and gas companies.

2. Literature Review

Nwanwu (2022) set out to determine, for the years 2011–2018, how environmental management expenses impacted the bottom lines of oil and gas companies that are publicly traded in Nigeria. A metric for financial success was net profit, whereas pollution costs were a component of environmental management costs. Optimism and contextual the study's research strategy was a combination of explanatory and correlational, with a philosophical bent. Ten companies that explore, refine, produce and distribute oil and gas were the subjects of the investigation. Information was culled from company financial statements and annual reports that may be seen on the Nigerian Exchange website. The research found that listed Nigerian oil and gas firms' performance financially is positively and sufficiently impacted by pollution costs. Results show that the price tag on environmental management has a significant effect on how well Nigeria's energy resources companies do.

Uzoh (2022) investigated how environmental costs affect the financial performance of different Nigerian oil and gas organizations. Environmental operating costs remain absent from Nigerian oil and gas companies' annual reports yet financial performance improves with investments in pollution prevention and protection activities and remediation and recycling programs. The outcome of multiple analysis of regression demonstrated positive, statistically relevant links between the predictors and organizational financial performance.

Oraka (2021) considered how energy resources companies in Nigeria fared financially and environmentally. The researchers used compliance costs and environmental remediation charges to quantify environmental costs as an independent variable and Tobin's Q to evaluate financial performance as a dependent variable. This study used the ex-post facto investigation strategy to compile financial statements from eleven (11) different companies during a twelve-year period from 2008–2019. The study results showed that environmental rehabilitation expenses together with compliance costs have substantial effects on Nigerian oil and gas company Tobin's Q values. Falack et al. (2020) analyzed environmental reporting and corporate performance among listed oil and gas companies operating in Nigeria. Research findings using ex-post facto methods demonstrated that natural security development healthcare expenses had a negative statistically significant impact on ROA.

Mikial et al. (2019) studied the impact of environmental performance and transparency on investment performance in Indonesian stock market enterprises. Public filings and reports on sustainability of companies listed on the Indonesian stock exchange were sources of secondary data collected between 2013 and 2016. There were a hundred and eighty observations made during this review. Although environmental effects do not significantly affect profitability, ecological reporting does have a significant influence, as shown in this research.

Bicer and Eldarewi (2019) investigated the role of environmental expenditures and how they may assist Libyan oil companies in enhancing the reliability of their financial statements. This research used a one-sample T-test. Additionally, the research found a statistical correlation between expenditures on environment and better financial reporting.

Beredugo and Mefor (2017) examined accounting environmental reporting and sustainability in Nigeria. Their research showed that sustainability in Nigeria is strongly related to environmental accounting.

Studies conducted on environmental costs show that researchers have primarily investigated their effects on oil and gas firms' financial performance instead of their market performance. The main research goal of this study analyzes costs to the environment effects on market results for Nigerian listed energy companies. A panel least squares regression method served to analyze environmental cost impacts on market performance across these companies. The researchers fill a methodological gap by using this approach which previous studies did not employ. This study addresses key gaps in existing research by introducing new variables that explain environmental costs' effect on market performance and utilizing the panel least squares regression method which previous research did not use.

3. Materials and Methods

The after the event research style was used in this study since the data was already available and the researchers were unable to influence the results, eliminating any potential for bias in the process of drawing reliable conclusions. Thirteen oil and gas companies were chosen from all the oil and gas listed as at 31st of December, 2023. Purposive sampling technique was used to determine the sample size. Selection criteria involved business that were listed as oil and gas companies, operational during the 2006 to 2022 research period, and have released yearly reports for the duration of the study and have a consistent set of data for each variable.

Content data analysis method was preferred because it is a quantitative, objective, and systematic method of data analysis that involves corporate environmental disclosure practices when the annual reports did not include environmental cost characteristics.

3.1. Model Specification

To account for the interactions between the independent and dependent variables, the Bello (2018) model was modified for the study. The equation's functional form is:

MPERF = f (PCC, PC, DCC)   (1)

This function is further converted into a panel data econometric model as:

$$EPS_{it} = \beta_0 + \beta_1 logPCC_{it} + \beta_2 logPC_{it} + \beta_3 logDCC_{it} + \mu_{it} \qquad (2)$$

Where:

EPS = Earnings per share (proxy for market performance)

PCC = Pollution control costs

PC = Penalty costs

DCC = Donations and charitable contributions

μ = Error term

β_1, β_2 and β_3 are estimated parameters.

3.2. Data Analysis Method

The panel least square regression techniques was used to estimate the model. All explanatory variables are expected to have a positive impact on market performance i.e. β_1, β_2, $\beta_3 > 0$.

4. Results

Table 1. Descriptive Statistics

	MPERF	EPS	MPS	PCC	PC	DCC
Mean	622.2395	2.243014	1.375861	0.008421	3.844550	6.688498
Median	2.375134	2.194679	1.556350	0.010073	3.351975	5.940867
Maximum	24802.58	3.119118	2.363893	0.067320	1.391450	133.295470
Minimum	0.000000	0.000000	0.000000	-0.156570	1.348950	-13.465985
Std. Dev.	3921.2787	0.523759	0.756316	0.040899	6.100450	10.469722
Skewness	2.586070	-0.741910	-0.391327	-0.809767	0.599675	1.167511
Kurtosis	16.160897	9.018207	1.136995	3.569504	4.357525	10.199769
Jarque-Bera	973.8862	38.144732	2.476831	30.931934	145.5726	185.8743
Probability	0.000000	0.000000	0.023062	0.000000	0.000000	0.000000
Sum	24889.585	89.720560	55.034440	0.336813	36.139637	1.418146
Sum Sq. Dev.	1.41E+09	25.173243	52.490603	0.153501	32.083506	1.340238
Observations	17					

Source: Researcher's Computation, 2024

Table 1 shows that pollution control costs (PCC) have the lowest average value, while market performance (MPERF) has the highest average value. In addition, the squared deviation figures show that there is a significant difference between the

means of pollution control costs (PCC) and market performance (MPERF) substitution, with the former having a low standard deviation and the latter having a relatively high one. The table indicates that the skewness coefficients for pollution control costs (PCC), penalty costs (PC), and donations and charity contributions (DCC) are -0.809767, 0.599675, and 1.167511, respectively.

These methods measure the degree of asymmetry in the time series data distribution relative to its average. The market performance (MPERF), earnings per share (EPS), and staff development costs (SDC) were 9.018207 and 16.160897, respectively. These metrics show the level of distribution of series. Additionally, the community development costs (CDC) was 10.68. Findings indicated the allocation of employee health and safety costs (EHSC) and donations and charitable contributions (DCC) was appropriate, whereas the distribution of market performance (MPERF) was atypical. The Jarque-Bera statistics provided additional evidence for the findings, revealing significant values of 0.000000 for market performance (MPERF), earnings per share (EPS), pollution control costs (PCC), penalty costs (PC), donations and charitable contributions (DCC), and 0.023062 for market price per share (MPS).

Table 2. Regression Analysis Results Dependent Variable: EPS

Variable	Co-efficient	Std Error	t Statistic	p-Value
DCC	0.0080	0.0087	1.0850	0.4178
PC	-0.0235	0.0120	-2.2982	0.0420*
PCC	0.0162	0.0238	0.7973	0.5830
Constant (C)	320.0473	14.7472	25.4155	< 0.001***
Model Statistics				
Cross-section effects	Fixed (dummy variables)			
Weighted R-squared	0.9404			
Adjusted R-squared	0.8341			
F-statistic	15.1391			$p < 0.001$***
Root MSE	358.0655			
Durbin-Watson statistic	2.3346			

Source: Researcher's Computation, 2024

The results show a 0.0080 positive coefficient of the DCC variable ($p = 0.4178$), indicating a positively insignificant relationship with EPS. Conversely, PC variable exhibits a significant 0.0235 negative coefficient, at the 5% level ($p = 0.0420$). This reveals that an increase in PC is associated with a significant decline in EPS. Meanwhile, the PCC variable has a positive coefficient of 0.0162 ($p = 0.5830$), but this relationship is also statistically insignificant.

The constant term (C) demonstrates a large and highly significant coefficient of 320.0473 ($p < 0.001$), reflecting the baseline value of EPS.

The weighted 0.9404 value of R-squared explains 94% of the variability in EPS, with an 83% adjusted R-squared, accounting for the number of predictors in the model. These high values suggest a strong fit of the model.

The F-statistic of 15.1391 ($p < 0.001$) further supports the overall significance of the model, indicating that independent variables have a collectively significant effect on the dependent variable. Root Mean Square Error (Root MSE) at 358.0655 reflects standard deviation of the residuals, providing an estimate of the model's predictive accuracy. Additionally, Durbin-Watson statistic of 2.3346 reveals minimal residuals autocorrelation.

5. Findings and Conclusions

The result indicates a modest negative correlation between earnings per share (EPS), market price per share (MPS), and pollution control costs (PCC) in Nigeria. This suggests absence of multicollinearity issue between the explanatory variables.

Based on the aforementioned data, the study concluded that there is a positive but statistically insignificant correlation between donations, charitable contributions, pollution control expenditures, and profits per share. These findings indicate that the spending by energy businesses on donations, charitable contributions, and pollution control efforts does not significantly impact the profitability per share of the analyzed oil and gas companies in Nigeria.

However, the analysis of the results also indicates a clear and significant inverse correlation between penalty costs and earnings per share for the oil and gas companies included in the sample. Penalty costs have a detrimental effect on Nigerian oil and gas companies' financial performance by lowering earnings per share.

Based on the aforementioned data, the study concluded that there is a positive but statistically insignificant correlation between donations, charity contributions, and the market price per share. These findings indicate that the financial contributions made by oil and gas firms in Nigeria towards donations and philanthropic activities do not significantly impact their profitability per share. A strong and inverse correlation exists between the expenses associated with pollution control and the market price per share. This indicates that the allocation of funds by oil and gas businesses towards efforts aimed at controlling pollution has a detrimental impact on the market price per share of the oil and gas companies under scrutiny in Nigeria.

However, the analysis of the results also shows that there is a weak and statistically insignificant correlation between penalty costs and the market price per share of the selected oil and gas businesses. Consequently, the financial penalties incurred by oil

and gas corporations in Nigeria have minimal or negligible impact on the market value per share of these companies.

According to the specific findings of this study, the researchers made the following recommendations: to promote sustainable economic development, companies should engage in environmental conservation efforts, philanthropic contributions, assistance to the impoverished, and any other activities that enhance the positive reputation of the business. The environmental regulatory body should prioritize the disclosure of individual and distinct cost components for staff development to improve reporting efficiency.

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