

# Environmental Accounting Practices and Value of Accounting Numbers in Corporate Reporting

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## Abstract

*This study investigates the relationship between environmental accounting practices and the value of accounting numbers that are fundamental to financial reporting. We adopted ex-post facto research design for our work and concentrated on the oil and gas industries, financial sector, and the manufacturing industries listed in Nigeria's stock exchange (Nigeria Exchange group). Purposive sampling technique was used to select three sectors (oil and gas industry, manufacturing industries and financial sectors of the economy and simple random sampling techniques was used to select the sampled companies from the selected sectors. We used Taro Yamani formulae to determine our sample size of 90 companies from population of 116 companies, and to ensure randomness in the sample selection, the Bourley's (1964) population allocation formula was used to determine the individual sample size. We employ secondary data which was obtained from the corporate annual reports downloaded through the websites of the selected listed companies and the Nigeria stock exchange for the period 2013 -2022. The data was analysed using regression statistics. We discovered that environmental accounting practices positively and significantly affected book value of equity. A percentage increase in environmental accounting practices increases the book value of equity by 19%. The study recommended that companies should include environmental accounts as part of the conventional financial reporting system that will detail their environmental activities to reduce stakeholders' agitation and increase their value.*

**Keywords:** Environmental accounting, Value of accounting numbers, book value of equity, conservation cost, and compliance cost

## 1. Introduction

Eze, et al. (2016) observed that the 1860's industrial revolution has brought about economic progress that has led to prosperity and improved health, but it has also brought about environmental pollution and increased land use that has harmed the natural environment and caused a significant loss of habitat for animals and plants, which has led to the extinction or threatened status of many species. Andono (2020) discusses how the increase in global temperature, the warming of the ocean, the melting of ice sheets, the retreat of glaciers, the reduction in snowfall, the rise in sea level, the melting of Arctic Sea ice, extreme environmental events, and the acidification of the ocean all point to various climatic changes brought on by environmental pollution.

Nigeria, a thriving country with a wealth of natural resources like coal, limestone, forest, and other minerals, is not immune to environmental deterioration (Eze et al., 2016). Oil exploration, production, and refinement along with illegal oil bunkering and refineries

built in various parts of Nigeria have created a variety of ecological and environmental problems like habitat loss, air, land, and water pollution, gas flaring, and soil degradation. These spilled chemical components have heinous impact on the health of people, water bodies, and soil qualities (Lauwo, 2011). AbdulRafiu (2017) opine that environmental degradation in Nigeria causes violence and mayhem that either destroys lives and property or uproots residents, especially in the Niger Delta region where oil spillage to the host community's farms and rivers were rampant because of crude oil extraction for petroleum products.

The ability of businesses to prosper economically depends on herzz environment (Ainapur & Rao, 2014). The environment provides the biophysical foundation for human society and economic systems; it produces raw materials, natural capital stocks, and ecosystem service flows, as well as waste and pollutants produced by human activity (Rizio 2016). An organization's profitability may suffer if the environment is ignored or cared for improperly (Ikpor, Ituma & Okezie, 2019). Thus, it is necessary to take accurate record of environmental expenses and measure its effect on the profitability. Environmental accounting is the practice of using traditional accounting and financial principles to calculate the costs that business operations have on its environment. Environmental costs are the expenses that a productive economic entity bears for the preservation or protection her environments, whether voluntarily or statutorily.

Previous studies have shown that due to the voluntary nature of reporting, the volume of environmental information made available is at the discretion of the managers. Authors like Adekanmi, Adedoyin and Adewole (2015); Eze et al., (2016); Lorenc (2016); Oraka and Egbunike (2016); Orsioll and Farley (2016) observe that the financial information made available by companies in Nigeria has been incomplete as environmental information components are absent or inadequate and this has been a problem for the stakeholders, it has greatly hampered their decision making and subjected the true financial position of the organisation activities to question. However, the research evidence in this regards has been inconclusive indicating that the issues are still quite unresolved in the literature. Moreover, longitudinal and cross-sectional studies in developing countries are few. The thrust of this study is to examine the effect of environmental practices on the value of accounting numbers in financial reporting of corporate organisations in Nigeria.

## **2. Literature Review**

### **2.1 Conceptual Review**

#### **2.1.1 Value of Accounting Numbers**

It is essential to financial and accounting disclosures that numbers are used to reduce realities to something quantifiable and comparative (Alexander, 1902). Accounting provides data that can be used to predict, assess, and report on environmental performances. Different methods can be used to communicate this information; some of these methods are mandatory, such as financial statements for publicly traded companies, while others are optional, such as environmental and sustainable development reports. All financial indicators reported in the financial statement are expressed as accounting numbers.

Mohammadi (2014) asserts that accurate information given in financial reports helps to describe a firm's operations. Investors use financial accounting data to make investment decisions, government organizations require it for tax purposes in particular, and regulatory organizations use it to assess whether current legislation pronouncements are being followed (Adetula, Obigbemi, Owolabi & Nwobu 2016). Aroh, Ndu and Aroh (2011) assert that the relevance of annual reports can be attributed to its roles in educating stakeholders about the organization's financial health, notably its income and financial

situation. The clarity and simplicity of the information in yearly reports are used to evaluate a person's ability to grasp financial accounts.

Financial accounting information and non-financial accounting information are the two main categories of accounting information in the financial report of publicly traded organizations. The financial accounting information is based on historical cost and is usually prepared for both internal and external users e.g. statement of financial position, income statement, statement of changes in equity, and statement of cash flow. Though investors also use nonfinancial accounting information in making investment decisions, conventional and rational investors rely more on financial accounting information (Malhotra & Tandon, 2013).

#### **2.1.2 Book value of equity per share (BVES)**

Book value of equity is the amount of assets that shareholders directly own after all liabilities have been settled. It consists of the owner's contribution, treasury shares, retained earnings, and other comprehensive income. It is the fair value of the remaining assets after all liabilities have been satisfied, and very crucial in interpreting the financial health of a corporation or firm. The industry in which a company operates and its ability to manage its assets and obligations both have an impact on the owner's equity of that company. Book Value of Equity per share (BVES) =  $\frac{\text{Total Assets} - \text{Total Liabilities}}{\text{number of outstanding shares}}$

#### **2.1.3 Environmental Accounting Practices**

According to Rislan (2016), environmental accounting is a process that enables businesses to identify the cost of environmental conservation events and its benefits, provide the best means of quantitative measurement in monetary value or physical units and support the communication of environmental information.

Environmental costs are attached to generating, discovering, remediating, and preventing environmental degradation (Hansen & Mowen, 2000). The US Environmental Protection Agency states that expenses incurred to comply with environmental laws as well as expenses incurred to maintain the environment are categorically regarded as environmental costs. Business firms need to manage and control both external environmental costs from their activities and internal environmental costs relating to waste management, energy consumption, etc.

Environmental conservation is the entire process of making sure that the quality of the environment does not decline and that the environment if it has declined in any way, is restored to its earlier, better state. Environmental conservation is the planned management of natural resources to maintain the diversity and harmony of the environment (Mishra, 2021). This study, therefore, defines environmental conservation costs as expenses incurred to protect the environment from being destroyed.

Environmental preservation refers to efforts to keep parts of the earth that have so far escaped human influence in their current state. Expenditures associated with environmental protection can be incurred by businesses, governments, or individuals, and include costs associated with prevention, disposal, planning, control, shifting activities, and damage restoration. This study, therefore, defined environmental preservation cost as the reduction in the effect of activities on the environment so as to maintain its existence

It refers to any significant out-of-pocket costs, fines, penalties, fees, or expenses incurred specifically to satisfy an Environmental Agency's requirement that the Property complies with all applicable local, state, and federal laws and regulations relating to the presence of any hazardous substances on the Property. In order for organizations to be made liable for their environmental activities, Rezaee and Elam (2000) suggested that environmental rules and regulations must be put in place. Accountability for environmental

impact has become crucial as a result of increased pressure from stakeholders.

## **2.2 Theoretical Review**

### **2.2.1 Theory of utilitarianism**

Bentham propounded this theory in 1776, he describes utility as properties that produces happiness. He states that whether an action is right or wrong depends on the results it brings. According to utilitarianism, a decision is morally correct if it makes the majority of members of a community or group happy or satisfied. Likewise, an activity is considered improper if it frequently results in suffering or misery for both the action's performer and everyone else who is impacted by it. Utilitarianism do not support egoism, self-interest should not pursued at the expense of others, both intention and responsibility are unimportant in evaluating whether an action is good. According to utilitarianism, only the outcomes are thought to be important for evaluation, and everyone wants happiness.

Bentham (1781) opine that pleasure and pain are the two natural forces that control humans, and he defines happiness in terms of these two opposite emotions. Relating it to business and commerce, the best course of action is the one that will result in the greatest good for the largest number of people. Rule utilitarianism seeks to benefit the greatest amount of people in the most equitable ways. Act utilitarianism encourages individuals to take the most moral decisions for the good of society. The majority of businesses have written or informal codes of ethics that are influenced by their corporate cultures, values, and local regulations. A formal code of business ethics is more crucial than ever today. A company must develop a reputation for being socially responsible in order to expand. Additionally, businesses must make an effort to fulfill their commitments and place ethics on a level with earnings. Customers seek out trustworthy businesses, and staff members perform better when a strong code of ethics is in place.

Everyone's interest is pertinent when relating it to environmental accounting. The interests of the various stakeholders are sparked by the organization's operations to maximize their enjoyment (return on investment); yet, in order to do this, the organization engages in activities that pollute the environment (though not intentionally) by releasing harmful materials. The need for organizations to report all activities and actions taken to mitigate environmental pollution and reduce environmental costs through environmental accounting in order for the stakeholders to be satisfied.

## **2.3 Empirical Review**

Eze (2021) explore the impact of green accounting reporting on the financial performance of manufacturing companies, an ex-post facto research design was used to extract data from the financial statement of 40 manufacturing companies listed on the Nigerian Stock Exchange for the years 2010 to 2019. He used ROA, ROE, and share price as independent variables and the environmental disclosure index as a dependent variable. For the data analysis, panel regression and descriptive statistics were used. To ensure the robustness of the parameter, Arellano and Bond's (1991) GMM estimator was used, which compensates for potential endogeneity issues. The study discovered that green accounting disclosure positively and significantly impacted the company's profitability index.

The ex-post study methodology is used by Uniamikogbo and Ifeanyichukwu (2021) to investigate the effect of environmental accounting disclosure on the financial results of 40 manufacturing businesses in Nigeria. Data were acquired from the sampled manufacturing companies listed on the Nigerian Stock Exchange for the 2010–2019 fiscal years' corporate annual reports and the content analysis disclosure index. Data research utilizing the panel data regression technique revealed that environmental accounting disclosures had a

substantial impact on the share price, return on asset, and return on equity of industrial businesses in Nigeria.

Also, Iliemena (2020) looks at how listed Nigerian oil and gas businesses performed between 2012 and 2018 and the impact that environmental accounting procedures had on their performance. The study used an ex post facto research approach, and basic linear regression was used for the analysis. The results show that environmental accounting procedures and accounting have considerable beneficial effects on turnover and return on capital employed, but only a small and negligible impact on net profit. According to the study's findings, environmental accounting significantly improves the corporate performance of organizations that use it.

### 3. Methodology

This research adopted an ex-post facto research design because the events to under study have already taken place. It concentrated on oil and gas industries, the financial and the manufacturing industries which include industrial goods, consumer goods, natural resources, conglomerates, agricultural industries, and health care industries listed in Nigeria's stock exchange (Nigeria Exchange group). The total of 116 companies listed on the Nigerian Stock Exchange for a period of ten years (2013-2022) represents (116 x 10) i.e. 1,160 firm-year observations as the elements of the population. An important justification for choosing these companies is that they cover a broad range of industrial and commercial activities, and also contribute a lot to environmental pollution.

The study used purposive sampling technique to select three sectors of the economy namely oil and gas industry, manufacturing industries and financial sectors because they contributed significantly to economic growth and development, and also contributed a lot to environmental pollution. Simple random sampling techniques was used to select the sampled industries, these companies were selected based on their continued existence for the period of study. This study adopted the formulae propounded by Taro Yemane (1967) to determine the right sample size, the formulae state that  $n = \frac{N}{1 + N(e)^2}$ ; Where: n = required sample size, N = the population size (116), e= desired margin of error (0.05). The researcher calculated the required sample size for the study as follows:  $n = \frac{N}{1 + N(e)^2} = \frac{116}{1 + 116(0.05)^2} = 89.9$  approximately 90

Thus, the total sample size for this study was 90 companies listed on the Nigerian Stock Exchange for a period of ten years (2013-2022) which translated into (90 x 10) i.e. 900 firm year observations as the elements of the sample. To ensure randomness in the sample selection, the Bourley's (1964) population allocation formula was used to determine the individual sample size. The formula is stated as follows:  $n_h = \frac{N_h}{N} * n$  Where:  $n_h$  = sample size for stratum h N<sub>h</sub>=population size for stratum h N = Total population n = Size of entire sample

#### 3.1 Model Specifications

$$BVES = \beta_0 + \beta_1 compcost_{it} + \beta_2 conscost_{it} + \beta_3 prescost_{it} + \beta_4 firmsize_{it} + e_{it}$$

Where:

BVES = Book value of equity

Compcost = Compliance cost

Conscost = Conservation cost

Prescost= Preservation cost

Firmsize = Firm size

e<sub>it</sub> = error term

### ***A priori* expectation**

The a-priori expectation is that each model parameter is expected to have a positive relationship with the dependent variables (value of accounting numbers) and the independent variables (environmental accounting practices).  $\beta_1 \dots \beta_6 > 0$  signifies that the presence of environmental accounting practices leads to an increase in the value of accounting numbers.

**Table 1: Determination of individual sample size using Bourley allocation formula**

Strata	Oil and gas	financial sectors	Manufacturing	Total
Population (N)	11	50	55	116
Sample (n)	9	39	42	90

**Source: Authors' compilation (2023)**

**Table 2: Definition of variables**

Variables	Proxy	Measurement
Dependent	Book value of equity per share (BVES)	Total assets – total liabilities / no of shareholders.
Independent	Environmental conservation cost (consecost)	All costs incurred on controlling environmental Pollution.
	Environmental compliance cost (compcost)	All legal costs relating to environment
	Environmental Preservation cost (prescost)	All costs incurred in preserving the environment.
Control variable	Firm size	Log of total assets

**Source: Authors' compilation (2023)**

## **4. Data analyses and Discussion of Findings**

### **4.1 Co-integration Test**

**Table 3: Panel co-integration test**

Kao Residual Cointegration Test				
			t-Statistic	Prob.
ADF			2.928959	0.0017
Residual variance			180.6918	
HAC variance			64.71768	
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.741899	0.047902	-15.48787	0.0000
D(RESID(-1))	0.061566	0.039459	1.560255	0.1191
R-squared	0.316482	Mean dependent var		1.395914
Adjusted R-squared	0.315530	S.D. dependent var		14.57055
S.E. of regression	12.05461	Akaike info criterion		7.819545
Sum squared resid	104335.2	Schwarz criterion		7.832265
Log likelihood	-2813.036	Hannan-Quinn criter.		7.824456
Durbin-Watson stat	2.151364			

**Source: Authors' Computation (2023)**

Two variables are said to be co-integrated if they have long-term or long run equilibrium relationship between them, i.e. the means and variances of the variables remain stable regardless of time. The result above revealed that the p-value (0.0017) was less than critical value at 5%. Hence, we failed to accept the null hypothesis that say there is no co-integration among variables, hence there exist a long run relationship among the variables. Thus, we can proceed to specify the estimated effect.

#### 4.2 Environmental Accounting Practices and Value of Accounting Numbers in Corporate Reporting

**Table 4: Environmental accounting practices and book value of equity**

Variables	Fixed estimates	effect Random estimates	effect GMM estimates
C			
Coefficient	-53.5789	-73.5872	0.1887
P-value	{0.0011}	{0.0000}	{0.0000}
COMPCOST			
Coefficient	1.0249	1.3557	-9.6588
P-value	{0.6394}	{0.5196}	{0.0000}
CONSECOST			
Coefficient	-0.6769	1.3566	27.6224
P-value	{0.7543}	{0.5094}	{0.0000}
PRESCOST			
Coefficient	9.6368	7.9893	-1.5609
P-value	{0.0000}	{0.0000}	{0.000}
FIRMSIZE			
Coefficient	18.0302	25.9780	103.6169
P-value	{0.0000}	{0.0000}	{0.0000}
<b>Model parameters</b>			
R <sup>2</sup>	0.8370	0.0950	
Adjusted R <sup>2</sup>	0.8178	0.0889	
F-statistic	43.46	15.6255	
Prob(F-stat)	0.0000	0.000	
Durbin-Watson	1.2178	1.0524	
<b>Model diagnostics</b>			
Hausman test		0.0000	
Instrument Rank			39
j-statistics			74.9997
Prob-j-stat			0.3871
AR(1)			0.2922

**Source: Author's Computation, (2023)**

Table 2 showed the values for regression analysis used to assess the effect of environmental accounting practices on value of accounting numbers. The fixed effects estimate is preferred above the random effects estimates as revealed by Hausman test with p-value 0.0000. However, the fixed effects model may include endogeneity problem due to its econometric structure; to eliminate the possible endogeneity; the study used GMM approach developed by Arellano and Bond (1991).

Also, table 2 revealed that compliance cost (COMPCOST) is negatively related to the book value of equity (BVES) with a significant impact. This is expressed in terms of a negative coefficient of -9.658 and p-value 0.0000, which is less than 0.05, thus indicating a significant relationship suggesting that an increase in compliance cost will reduce the book

value of equity by 9.7% when other variables are held constant. Effort made by organizations to comply with environmental regulations and laws resulted in additional costs, because firms have to invest in more environmentally friendly equipment's or cleanser to reduce the environmental impacts of the factory activities thus resulting in the reduction in the book value of equity per share. This result agreed with the discovery of with Baribafe (2021), Ikpor et al., (2019), and Nwambeke et al., (2019) where the authors documented a negative and significant relationship among the variables.

There is a significant positive relationship between conservation cost (CONSECOST) and book value of equity with coefficient 27.6224 and p-value of 0.0000 less than critical value of 0.05. The result showed that 1% increase in the conservation costs would increase book value of equity by 27.6% when other variables are held constant. The study affirms the need for organizations to be socially responsible, which entails disclosures of costs incurred to the appropriate stakeholders, and this in turn guarantee long term corporate sustainability. Also, the quest for legitimacy compels organizations to increasingly report conservation cost incurred on social activity which portray favourable image of their corporation and ensure sustainability. This study aligns with Keun-hyo et al., (2017), Clarkson et al., (2007) reports which discovered a positive and significant relationship between environmental reporting and financial performances of organizations.

The relationship between preservation cost and book value of equity are negative and significant, with coefficient -1.5609 and P-value of  $0.000 < 0.05$ , implying a percentage increase in preservation cost will reduce book value of equity by 1.5% when other variables are held constant. The negative relationship between preservation cost and book value of equity can be traced to cost on improving environmental degradation and pollution incurred as a result organizations activities which polluted the environment, and this indicates outflow of cash, which resulted in reduction of book value of equity of the organization. This finding is consistent with the works of Oshiole et al., (2020) and Bassey et al., (2013) that uncover a significant relationship among the variables used.

The overall model has  $R^2$  of 0.8370 and adjusted  $R^2$  of 0.8178, indicates that about 84% of the dependent variable (BVES) was explained by all the independent variables plus the control variable and about 16% of the variation in the dependent variable was left unexplained but had been captured by the error term, implying that the model has a good fit and could be employed for interpretation. The Durbin Watson is 1.30 is less than 2 which signifies the absence of autocorrelation among the successive values of the variables in the model. The F-statistics 43.46 with coefficient -53.58 shows the overall significance of the variables used in the model with probability of 0.0000 less than 0.05 critical value, this indicate that the overall regression is statistically significant.

Also, The GMM estimation results showed that environmental accounting practices have positive beta 0.1887 and significant p-value 0.000 lesser than 5%. Consequently, on the basis of the Arrelano and Bond GMM estimation, the null hypothesis that environmental accounting practices has no significant relationship with book value of equity is rejected. This implies that a percentage increase in the environmental accounting practices will increase the book value of equity by 18%. The J-stat tests (74.9) yield p-values (0.3871) above 0.10, which means that a null hypothesis could not be rejected, hence, over identification restrictions are valid. The AR (1) tests (0.2922) above p-values (0.10) indicate that the residuals in first differences are not correlated, therefore, all results of the GMM model are valid.

## 5. Conclusion and Recommendations

The main objective of this study is to examine the effect of environmental



accounting practices on value of accounting numbers of listed companies in Nigeria for the period 2013 and 2022. Environmental accounting practices proxy with (compliance cost, conservative cost and preservative cost) have positive and significant effect on value of accounting numbers proxy with book value of equity. This implies that a percentage increase in the environmental accounting practices increased the book value of equity by 19%. The study recommended that management of corporate organizations should make concerted effort to embrace environmentally friendly practices to restore and guarantee conflict free corporate atmosphere needed by managers and workers for maximum productivity. More so, funds expended in settling disputes could be used to enhance corporate liquidity while management is able to plan better and make decisions when it is not engrossed in disputes. Also, the government should mandate all companies in the manufacturing, financials and oil and gas sectors to adopt the United Nations Environmental Management Accounting (EMA) Guidelines in reporting environmental issues; it will not only move forward environmental accounting practices in Nigeria but also create avenue for joining global campaign for environmentally enhanced society; Government are to encourage companies on the necessity to imbibe corporate environmental policies (e.g. green tax policy) that is targeted towards encouraging firms in promoting green technologies and cleaner production techniques.

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