

Environmental Accounting Reporting and Firm Performance Among Listed Nigerian Firms

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Abstract—The need for firms to account for their environmental costs in line with global environmental awareness and the campaign for sustainable economic development has become rife. Firms also want to provide their stakeholders with reports on their sustainability performance, including environmental performance. This study examined the effect of environmental accounting reporting on firm performance among Nigerian-listed firms. The environmental performance scores include Environmental Greenhouse Gas Emissions, Water consumption, Energy consumption, Waste management, Land Biodiversity investment, and Polluting plants and Machinery to proxy environmental accounting reporting. Firm performance was proxy by Return on Asset (ROA), an accounting-based performance measure, and Tobin Q, and Price-to-Earnings ratio (P/E ratio), both market-based performance measures. The study also used firm age and debt-to-equity leverage as control variables. The population of the study is comprised of listed firms in Nigeria, totaling 161, while data were purposively obtained for 117 sample firms across all sectors in Nigeria from 2019 to 2022. Data were analyzed using the Ordinary Least Square regression analysis method. The study found no statistically significant relationship between environmental accounting reporting and ROA. The study also found a statistically significant positive relationship between environmental accounting reporting and the market-based variables of Tobin Q and Price-Earning (P/E) Ratio. The study recommended that the Security and Exchange Commission (SEC), the regulatory body for listed firms in Nigeria, should mandate firms to report and publish their environmental activities for inclusion in their financial statements, which could lead to improved environmental practices and enhanced market-based performance. The study further recommended that firm managers in Nigeria should endeavor to disclose their environmental performance, as this tends to improve their market-based performance, potentially leading to increased investor confidence and market value.

Index Terms: Environmental Accounting Reporting, Return on Asset, Tobin Q, Price-to-Earnings Ratio.

I. INTRODUCTION

Environmental accounting was an essential part of Environmental, Social, and Governance (ESG) reporting, which came into being due to many financial failures reported in the US in the early 21st century [2]. Before ESG reporting, environmental accounting was part of Corporate Social Responsibility (CSR) Reporting, where firms report on their non-financial activities, particularly those that affect their stakeholders, namely the community, investors, employees, customers, and suppliers [34]. Environmental activities are important to stakeholders because of their impact on the community in which the business operates and perhaps because of their direct effect on the sustainability of the business. [20] opined that environmental accounting investigates the impact of the firms on their environment and vice-versa. These impacts are measured and disclosed in the financial statement as environmental costs.

[25] identified the need for firms to account for their environmental costs in line with global environmental awareness and the campaign for sustainable economic development. Firms also want to provide their stakeholders with reports on their corporate responsibility performances, and this has contributed to the development of corporate disclosure of environmental, social, and governance (ESG) performance in the last two decades. [11] also noted that a company's financial performance should reflect a level of

profitability that will benefit investors, and the environmental activities disclosed by the company should enable investors to make appropriate decisions.

[14] had earlier observed that accounting for the environmental activities of a firm has a significant relationship with the firm's performance. They noted that firms that reported minimal cash flows might experience negative investors' perspectives of their performance. This negative investors' perspective on the firm performance seemed to have made many firms unwilling to report their environmental activities, particularly when such reports are unsatisfactory. Some laws now compel firms to report their environmental activities as part of their annual financial reporting in developed economies [14]. [25] noted that a firm's environmental performance, which forms part of its ESG performance, mainly determines its sustainability. This assertion underscores the importance of the relationship between a firm's performance and its environmental accounting. [31] and [1] noted that environmental accounting recognizes and measures environmental costs to ensure adequate environmental performance. Environmental accounting enables external users of accounting information to monitor a firm's performance with respect to its environmental activities, as presented in the financial statements.

A. Statement of the Problem

[27] noted that some variables employed to measure environmental accounting include CSR, sustainability reporting, and social reporting. [34] also posited that developing countries naturally focus more on profitability than on softer values, such as environmental conservation, fair distribution of wealth, and community relations. [27] corroborated [34] position in their study on social and environmental accounting in developing countries between 2001 and 2020. They noted that before 2000, there were only a few studies on environmental accounting in developing countries despite the environmental hazards like climate change, water pollution, and biodiversity loss typical of developing countries. This position might have changed as there seems to be increasing interest in social and environmental accounting research in developing countries, perhaps owing to the rapidly increasing voluntary disclosure of environmental accounting in business practice. Also, in recent times, several studies on environmental accounting and firm performance have been conducted in Nigeria, a developing country. However, many of these studies relate to past periods or were restricted to only a particular sector of the economy.

Several studies {[26], [3], [6], [8], [12] and [7]} examined the impact of environmental accounting on firm performance in Nigeria using several constructs. They, however, concentrated on the economy's manufacturing sector, neglecting other sectors. Also, some of the earlier studies that used data in the past suggested varying relationships between the variables of environmental accounting and firm performance.

[18] also observed corporate sustainability performance disclosure as a measure of firm performance among firms in Asian countries. [1] also examined environmental accounting and firm performance in the mining industry in China, while [18] study concentrated on the firms' sustainability and [26] concentrated on the effect of environmental accounting disclosure on firm performance. [26] employed the index of six main activities prescribed in [30], namely Greenhouse Gas Emissions, Energy Consumption, Water Usage, Waste Management, Land Biodiversity, and Polluting Plant and Machinery to proxy environmental accounting disclosure, while the variables of Return on Equity (ROE), Tobin Q, and Economic Value Added (EVA) were used to measure firm performance among listed manufacturing firms in Nigeria.

This study further enriched existing knowledge by taking a holistic view of all listed firms in Nigeria using the variables of Return on Asset, Tobin's Q, and Price Earnings Ratio to measure firm performance, suggesting a peep into the effect on a firm's share price. This study also considered the firms' financial characteristics of firm age and leverage of debt to equity as control variables to enable a robust regression, which aligns with the work of [32]. The methodology adopted by this study is similar to that of [26] and [32]. The methodology of these studies may be similar, but the

geographical scope differs. Existing studies might also have concentrated on the manufacturing sector without a holistic view of the entire country, a gap this study intends to fill.

This study significantly advances our understanding of environmental accounting reporting and firms' performance in Nigeria, a developing country. Examining all sectors of the Nigerian economy provides valuable insights that can be applied to other developing countries. The findings of this study not only contribute to the existing body of research but also address a gap identified by [27] and [34]. By focusing on the impact of environmental accounting reporting on listed firms in a developing economy like Nigeria, this study has broader implications for the field.

This study examined the effect of environmental accounting reporting on the financial performance of listed firms in Nigeria. Also, the specific objectives of this study are to examine the effect of environmental accounting reporting on the Return on Asset (ROA) of listed firms in Nigeria, investigate the effect of environmental accounting reporting on Tobin Q of listed firms in Nigeria, and determine the effect of environmental accounting reporting on the Price Earnings Ratio of listed firms in Nigeria. This study included all listed firms in the Nigerian Exchange Group for four years between 2019 and 2022, totaling 161 [23]. Listed firms mostly prepare their sustainability reports, which capture their environmental performance report. Also, owing to time constraints and a lack of enough data, the study focused on Nigeria as a developing economy.

This study would immensely benefit corporate managers who would like to ascertain the impact of environmental accounting reporting on their firm's performance. Also, environmental analysts would want to determine an organization's impact on its environment and vice versa. Governments at all levels, researchers, and International Environmental Organizations would also find this study helpful in enacting policies and laws on environmental matters. Lastly, investors and prospective investors can predict the growth in their investment from the environmental performance of their intending investing firm, among others.

II. LITERATURE REVIEW

The section discusses extant literature. A review of the relevant concepts, theories, and the empirical review of extant literature.

A. Environmental Accounting Reporting and Firm Performance

Environmental accounting reporting and disclosure measures companies' non-financial performance and can also be used to assess management performance [15]. Most organizations now report environmental accounting as part of the ESG or the sustainability report. Organizations are expected to be socially responsible for the resources in their immediate environment and their depletion [29]. ESG

comprises moral contributions to economic growth and improves the standard of life of the employees, their families, and the people around them. ESG seems very significant in developed countries, with encouraging environmental performance. However, it is still at a marginal compliance stage in developing economies with environmental performance challenges [15]. Environmental performance is, therefore, an important constituent of ESG reporting.

[13] defined environmental accounting as assessing and disclosing environment-related financial information in financial statements. [8] also noted that environmental accounting reporting enables firms to monitor their environmental performance and other Greenhouse gas (GHG) emissions against reduction targets. They further opined that consumers and investors demonstrate increased interest in socially and environmentally responsible businesses as information regarding their environmental activities are readily assessed.

[32] observed that evolving studies focused on investigating the impact of CSR, including its environmental activities, as a new governance model within the framework of stakeholder relationships beyond mere legal compliance. Enacting and enforcing environmental regulations mandating environmental disclosure has positively impacted firms' financial performance [19]. [4] also opined that a good knowledge of a firm's environmental activities would assist management in its decision-making. Also, environmental activities are part of ESG reporting, which largely determines an entity's sustainability or otherwise. These points underscore the importance of environmental accounting and its disclosure of the firm's performance.

Previous researchers used many variables to represent environmental accounting reporting. For instance, [8] used the variable of environmental accounting disclosure to measure environmental accounting. [1] also employed the variables of environmental accounting information disclosure and environmental accounting performance index to measure environmental accounting. [18] used content analysis to compute the disclosure score of the corporate sustainability performance of selected firms based on the framework of Global Reporting Initiatives (GRI, 3 and 3.1), [23] used meta-regression analyses to examine the effect of sustainability performance on five different firm performance measures, namely, the overall performance, the accounting-based performance, market-based performance, economic-based performance, and operational-based performance. Also, [26] used the index of environmental Greenhouse gas emission use, Water and energy consumption, Environmental waste management, Land Biodiversity investment, and Polluting plants and Machinery to measure environmental performance in line with [30]. This study also adopted these measures as proxies for environmental accounting reporting. Also, it adapted firm performance measures of ROA as an accounting-based performance measure and Tobin Q and P/E Ratio as

market-based performance, in line with the work of [24].

B. Empirical Review of Literature

This study's empirical review sought to gain insight into the various contributions in the extant literature on the subject matter.

a. Environmental Accounting Reporting and Return on Asset

The return on assets measures how well a firm can generate an adequate return on its assets employed. [19], in their study Using 1,347 Chinese A-share-listed manufacturing firms from 2012 to 2018, found that environmental disclosure positively influenced firms' financial performance, especially with the implementation and enforcement of stringent environmental regulations.

[9] examined the role of environmental management accounting (EMA) as a mechanism for enhancing firm performance. The study used primary data collected via a questionnaire survey of chief executive officers and finance managers of 204 SMEs in Pakistan. The findings showed a significant direct relationship between EMA and firm performance. Also,

[26] also examined whether an affirmative relationship exists between environmental accounting disclosure and return on assets of listed manufacturing firms in Nigeria using a sample of forty-three firms. The study employed a correlational research design to analyze data from 2019 to 2022 using the OLS regression analysis models. Findings revealed that environmental accounting disclosure has a statistically significant positive relationship with Return on Asset (ROA)

[11] investigated the relationship between environmental performance and ROA using secondary data from manufacturing companies listed on the Indonesia Stock Exchange (IDX) between 2016 and 2020. The study used cross-section data and a purposive sampling technique and found that the environmental performance variable has no effect on stock return, whereas Return on Assets has a positive effect on Stock Return. This implies that investors pay attention to environmental performance as business sustainability as long as it positively affects their returns.

[24] analyzed the impact of the adoption of sustainable practices on the performance of companies. The heterogeneous results of 96 studies (taken from the Web of Science) were synthesized using meta-regression analyses, from which data on 339 effects were collected. The effects of five different performance measures were analyzed: the overall performance, the accounting-based, the market-based, the economic-based, and the operational-based firm performance. Findings showed that environmental sustainability practices positively influence the five performance measures.

[33] examined the effect of implementing green accounting and environmental performance on a company's Return on Assets using eight purposively selected samples of

listed manufacturing companies in the Consumer non-cyclical sector of the Indonesia Stock Exchange between 2017 and 2021. The study employed a multiple regression analysis using the *SPSS* statistical tool. The findings revealed that though green accounting influences Return on Assets, Environmental Performance has no effect on Return on Assets.

[6], in his study on green accounting disclosure and the financial performance of listed manufacturing firms in Nigeria, using data from sixty-one listed manufacturing firms between 2010 and 2019, found a significant positive relationship between green accounting disclosure and ROA.

Similarly, [8], in their study of the relationship between environmental accounting disclosure and return on assets, used data from eighteen (18) listed manufacturing firms in Nigeria as of December 8. The data were analyzed using the OLS regression analysis method. The study found a statistically significant positive relationship between Environmental Accounting (EA) and Return on Asset (ROA).

[21], in his study on the impact of environmental disclosure on firm performance in listed Food, Beverage, and Tobacco sector firms in the Colombo Stock Exchange, Sri Lanka, between 2012 and 2019 using Pooled OLS, found a positive significant relationship between environmental accounting disclosure index and ROA.

[5], in his comparative study on sustainability reporting and firm performance among listed manufacturing firms and banks in 80 countries from 2008 to 2017 using a pooled data regression model, found a positive significant relationship between ESG disclosure and ROA in the manufacturing sector but a negative significant relationship between the variables in the banking sector.

[7], in their study on environmental disclosure and financial performance in listed food and beverage companies in Nigeria, found a positive significant relationship between environmental accounting disclosure and return on assets. Also, [8] also noted that the study on the relationship between environmental accounting reporting disclosure and a company's profitability, using secondary data sources obtained from annual reports of listed manufacturing firms of Bangladesh, and using ANOVA and Bivariate regression model analysis, developed a disclosure index using 21 major environmental disclosures. Their study found a significant positive relationship between environmental accounting and return on assets.

Also, [22], in their study on the relationship between environmental accounting and profitability of fourteen (14) Indian firms listed on the Bombay Stock Exchange using multiple regression model analysis, found a significant positive relationship between environmental accounting and return on assets. Thus, the first hypothesis was stated as follows:

H₀₁: There is no significant relationship between environmental accounting reporting and the return on assets

of listed firms on the Nigerian Exchange Group.

b. Environmental Accounting Reporting and Tobin Q

Tobin Q is a firm performance measure based on the market value and book value of assets. The market value of assets is estimated as the book value of assets plus the market value of common stocks less the sum of the book value of common stock [32].

[28], in their study on Environmental, Social, and Governance Activities and Firm Performance in China, used 1,372 Shanghai and Shenzhen A-Share Listed firms between 2015 and 2019, using Ordinary least square OLS regression analysis, and found a significant negative relationship between ESG activities and the Firm's Tobin Q.

[32], in their comparative study on corporate social performance and firm performance between 4886 developed and developing countries from 2014 to 2018 using the OLS regression analysis method, found a positive significant relationship between Environmental Average Score of Resource Use Score, Emission Score, and Innovation Score (IS), Emission Score and Price Tobin Q.

Similarly, [5] in his comparative study on sustainability reporting and firm performance among listed manufacturing firms and banks in 80 countries from 2008 to 2017 using a pooled data regression model, also found a positive significant relationship between ESG disclosure and Tobin Q in the manufacturing sector but a negative significant relationship between the variables in the banking sector.

In the same vein, [26] also examined the relationship between environmental accounting disclosure and Tobin Q of listed manufacturing firms in Nigeria using a sample of forty-three firms. The study employed a correlational research design to analyze data from 2019 to 2022 using the OLS regression analysis models. Findings revealed that environmental accounting disclosure has no statistically significant relationship with Tobin Q. Thus, the second hypothesis was stated as follows:

H₀₂: No significant relationship exists between environmental accounting reporting and Tobin Q of listed firms on the Nigerian Exchange Group.

c. Environmental Accounting Reporting and Price Earnings Ratio

[32], in their comparative study on corporate social performance and firm performance in developed and developing countries using 4886 data between 2014 and 2018 using the OLS regression analysis method, found a positive significant relationship between Environmental Average Score of Resource Use Score, Emission score, and Innovation Score (IS), Emission Score and Price Earnings Ratio. Thus, the third hypothesis was stated as follows:

H₀₃: There is no significant relationship between environmental accounting reporting and the Price Earnings Ratio of listed firms on the Nigerian Exchange Group.

C. Theoretical Review

The institutional theory opines that firms engage in environmental reporting as a norm, aligning with what similar firms do and as a response to external pressures from outside the firm. The stakeholders' theory relates to the demand for information from stakeholders on the firm's various activities [32], [16], while the resource-based theory opined that companies could develop and maintain a reasonable advantage over others by efficiently managing rare, valuable, and non-sustainable resources. All these theories are relevant to this study. However, this study is hinged on environmental stewardship theory. The environmental stewardship theory opines that organizations are accountable to the stakeholders and society for financial and non-financial assets, including their environment [14]. He further noted that organizations are social institutions comprising human beings who also interrelate with fellow human beings in their immediate environment to achieve their organizational goals. In turn, they owe a deep sense of accountability to ensure the stability of the environment so that it can continue to achieve its organizational goal.

[24] also noted that stakeholders' environmental pressures must be seen as opportunities. Such pressures must improve multiple aspects of competitiveness and thus enhance profitability. [26] also employed this theory in her earlier study on environmental accounting disclosure and firm performance among listed manufacturing firms in Nigeria.

Figure 1 is a diagrammatic expression of the relationship between the dependent variables of ROA, Tobin Q, and P/E Ratio, the independent variable of Environmental Accounting Reporting, and the control variables of Firm Age and Debt / Equity ratio.

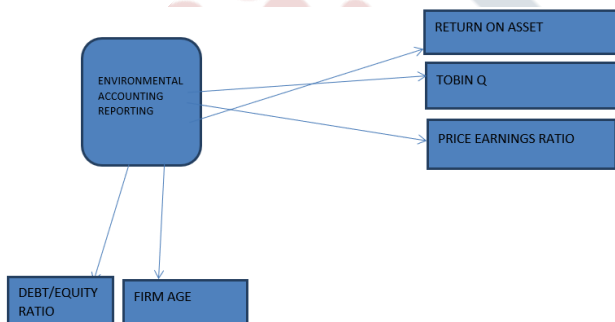


Fig. 1. Schema of the relationship between environmental accounting reporting and firm performance.

Source: Researcher's Concept (2024)

III. DATA AND METHODOLOGY

This section describes the methodology adopted to achieve this study's stated objectives. It also discusses the research design, data source and collection, and data analysis methods.

A. Data Source and Research Design

The study used the ex-post-facto research design because the data already existed, and the researcher had no control over manipulating the variables. The data on environmental

scores reflects the firm's fulfillment of its environmental performance. The environmental performance score comprised an index of six (6) important measures that reflected the environmental elements. Therefore, due to its balanced nature, the study employed the OLS regression method to analyze the data. Secondary data were also collected from published sustainability and annual reports of listed manufacturing firms in Nigeria from 2019 to 2022. Datasets from the *Makame* database, a registered data company, were gathered to examine the study hypotheses.

The study population comprises all listed firms on the Nigerian Exchange Group (NEXG) from 2019 to 2022, the last four years for which data is available. One hundred and Sixty-One (161) firms were listed on the (NEXG) during the period [23], out of which a sample of one hundred and seventeen listed firms across all the sectors was purposively selected to ensure that virtually all sectors are represented in the sample. The data for this study were analyzed using descriptive, correlation, and regression analyses using the STATA statistical software.

B. Variable Measurement

The Environmental Accounting Reporting represented the independent variable of environmental accounting. The Environmental Performance Score was estimated by adding the average yearly scores of Environmental Greenhouse Gas Emissions, Water consumption, Energy consumption, Waste Management, Land Biodiversity Investment, and Polluting Plants and Machinery [26]. Table 1 shows the components of the environmental score that will be employed for this study: Environmental Greenhouse Gas Emissions, Water consumption, Energy consumption, Waste management, Land Biodiversity investment, and Polluting Plant and Machinery [30].

Table I: Classification Scores and Measurement of Variables.

Scores	Measurements	Source
Environmental Greenhouse Gas Emissions Score (GES)	The Environmental Greenhouse Gas Emission Score reflects the firm's responsibility and competence in reducing environmental gas emissions in its manufacturing and operating processes. If reported 1, otherwise 0.	[30], [26].
Environmental Water Score (WS)	The Water Score indicates a firm's ability to reduce its water usage for environmentally friendly alternatives. If reported 1, otherwise 0	[30], [26].
Environmental Energy Score (ES)	The Energy Score indicates a firm's ability to optimize its energy usage for environmentally friendly alternatives. If reported 1, otherwise 0.	[30], [26].
	The Waste Management Score	[30], [26].

Environmental Waste Management Score (WMS)	reflects a company's ability to recycle its waste and create new market opportunities through environmentally friendly alternatives. If reported 1, otherwise 0	
Environmental Land Biodiversity Investment (LBI)	The Land Biodiversity Investment Score reflects a company's ability to effectively utilize its unused land for revenue generation. If reported 1, otherwise 0	[30], [26].
Environmental Polluting Plant and Machinery Score (PPM)	The Polluting Plant and Machinery Score reflects how well a firm can minimize pollution from its plant and Machinery. If reported 1, otherwise 0.	[30], [26].
Environmental Performance Score (ENV)	An index of the average score of greenhouse gas emission, water consumption, energy consumption, waste management, land biodiversity investment, and plant and Machinery pollution Management.	[30], [26].
ROA	Return on Asset.	[32], [26].
Tobin Q	The market value of assets (total book value of assets minus book value of equity plus the market value of equity)/book value of assets.	[32], [26].
P/E	Price-to-earnings ratio.	[32].
AGE	Log of number of years since the listing of stock.	[32].
LEVERAGE (Debt EQ)	Book value of debt divided by book value of equity.	[32].

ROA, Tobin Q, and P/E ratio measured the dependent variable of firm performance. While ROA is book-value (accounting) based, Tobin Q and P/E Ratio are market-based values. Tobin Q is suitable for analyzing the valuation effects of the observable and unobservable aspects of the relationship between the firm and stakeholders [17]. This study used the financial attributes of firms as the control variables. The control variables include firm size and leverage, which measure debt to equity (D/E) [32].

C. Model Construction

A multivariate analysis was done on the following regression model to assess the association between EAP and FP. The model was adapted from the work of [32]. The regression model for the study was expressed as:

$$FP_{it} = f(EAP_{it-1}), X_{it}$$

Where: FP_i is the measure of the firm's financial performance, and EAP_i is the measure of the firm's environmental accounting performance, represented by 'enviro.' X_{it} is a vector of control variables that includes the firm's financial characteristics. FP_i is represented by the variables of Tobin's Q, ROE, and price-to-earnings ratio (P/E). X_{it} represents the control variables, such as the Firm age and Debt-Equity Ratio. The values for all variables were for the years 2019-2022.

IV. DATA ANALYSIS AND DISCUSSIONS

A. Descriptive Statistics

The descriptive statistics for the dependent and the independent variables are captured in Table 2.

Table 2: Descriptive Statistics of the Variables

```

tabstat roa tobinq pricetoearnings firmage debttoequity
environmentalenvironmentalaccoun, statistics (mean sd cv max min)
  stats |      roa      tobinq  priceto~s   firmage  debtto~y  enviro~n
-----+-----
  mean |  1.183974      .5625  49.66158   60.5812  4.060662  .2717735
  sd   |  16.07334  2.531865  910.8891  259.4791  12.02527  .1181498
  cv   |  13.57575  4.501094  18.34193  4.283163  2.961406  .4347363
  max  |    176.27    52.39  19707.91    2023    207.53     .83
  min  |   -179.92     0    -67.05         2   -16.68     0
    
```

Source: Researcher's computation, (2024).

Table 2 above shows that ROA has an average value of 1.18, with a high standard deviation of 16.07, suggesting a wide dispersion. The maximum and minimum values were 176.27 and -179.92, respectively. The Tobin q has a mean of 0.56, with a high standard deviation of 2.53, while the maximum and minimum values were 52.39 and 0, respectively. The P/E ratio has a mean value of 49.66 with a high standard deviation of 910.89. The coefficient of variation (CV) for all the variables is high, especially for

price-earnings ratio, indicating high volatility.

B. Normality Test

The normality test goes a long way in telling the researcher whether the data sample contains some elements of outliers. An outlier is an indication of abnormal data distribution. Tests for skewness and kurtosis were done to determine the normality of the data used for the study.

Table 3: Normality Test Result

Skewness/Kurtosis tests for Normality

```

----- joint -----
Variable |          Obs  Pr (Skewness)  Pr (Kurtosis)  adj chi2 (2)  Prob>chi2
-----+-----
      roa |          468    0.2178         0.0000         .           0.0000
    tobing |          468    0.0000         0.0000         .           0.0000
pricetoea~s |          468    0.0000         0.0000         .           0.0000
debttoequity |          468    0.0000         0.0000         .           0.0000
environmen~n |          468    0.9676         0.0000        36.87         0.0000

```

Source: Researcher’s computation, (2024).

Table 3 above shows the result obtained from the joint probability of skewness and kurtosis for all the variables of interest. The results revealed that all variables are not normally distributed except ROA and environmental accounting reporting. The variables deviate from normality ($p < 0.05$), perhaps owing to the cross-sectoral nature of the

data.

C. Correlation Test

The relationship between all the variables were considered in order to investigate their correlation

Table 4: Variables Correlation Test

```

(obs=468)
          |          roa  tobing  pricet~s  firmage  debtto~y  enviro~n
-----+-----
      roa |          1.0000
    tobing |          0.0240  1.0000
pricetoea~s |         -0.0002  0.9501  1.0000
      firmage |         -0.0485 -0.0168 -0.0062  1.0000
debttoequity |         -0.0544 -0.0227 -0.0130 -0.0233  1.0000
environmen~n |          0.1071  0.0439  0.0244 -0.0164 -0.0553  1.0000

```

Source: Researcher’s computation, 2024

In Table 4. Above, the relationship among variables was tested using the Spearman correlation coefficient. The correlation matrix indicated that the relationships between environmental accounting performance and ROA, Tobin Q, and P/E Ratio are positive and that an increase in environment performance will cause an increase in ROA by 10.71%, Tobin Q by 4.39%, and P/E ratio b 2.44%. All the variables are normally correlated except the P/E ratio, which

is highly correlated with Tobin Q, with a correlation coefficient of more than 0.8. (0.9501).

D. Test of Hypotheses (OLS Regression)

The OLS regression revealed the relationship between the dependent and the independent variables. Also, the multicollinearity, heteroskedasticity tests were also carried out.

Table 5: Regression analysis of the variables

```

. regress roa environmentalenvironmentalaccoun
Source |          SS          df          MS          Number of obs          =          468
F(1, 466)          =          5.41
Model | 1385.00062          1 1385.00062  Prob > F          =          0.0204
Residual | 119265.543          466 255.934643  R-squared          =          0.0115
Adj R-squared          =          0.0094
Total | 120650.544          467 258.352343  Root MSE          =          15.998

-----+-----
roa |          Coef.  Std. Err.  t  P>|t|  [95% Conf. Interval]
-----+-----
environmenta~n 14.57584  6.265751  2.33  0.020  2.263214  26.88846
      cons |          -2.777352  1.856507 -1.50  0.135 -6.425514  .8708095

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regress tobing environmentalenvironmentalaccoun
Source |      SS      df      MS      Number of obs      =      468
F(1, 466)      =      0.90
Model | 5.77138362      1 5.77138362  Prob > F      =      0.3432
Residual | 2987.85794      466 6.41171232  R-squared      =      0.0019
Adj R-squared      =      -0.0002
Total | 2993.62932      467 6.41034116  Root MSE      =      2.5321
-----+-----
tobing |      Coef.   Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
environmenta~n |  .940911   .9917349   0.95  0.343   -1.007915   2.889737
cons |      .3067853   .2938455   1.04  0.297   -.270641   .8842117
-----+-----

. regress pricetoearnings environmentalenvironmentalaccoun
Source |      SS      df      MS      Number of obs      =      468
F(1, 466)      =      0.28
Model | 230850.604      1 230850.604  Prob > F      =      0.5984
Residual | 387247937      466 831004.157  R-squared      =      0.0006
Adj R-squared      =      -0.0015
Total | 387478788      467 829719.031  Root MSE      =      911.59
-----+-----
pricetoearni~s |      Coef.   Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
environmenta~n | 188.1803   357.0345   0.53  0.598   -513.4167   889.7772
cons |      -1.48083   105.7873   -0.01  0.989   -209.3601   206.3984
-----+-----

regress firmage environmentalenvironmentalaccoun
Source |      SS      df      MS      Number of obs      =      468
F(1, 466)      =      0.13
Model | 8439.83257      1 8439.83257  Prob > F      =      0.7237
Residual | 31434402.1      466 67455.7985  R-squared      =      0.0003
Adj R-squared      =      -0.0019
Total | 31442841.9      467 67329.4259  Root MSE      =      259.72
-----+-----
firmage |      Coef.   Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
environmenta~n | -35.98119  101.7228   -0.35  0.724   -235.8733   163.911
cons |      70.35993  30.13989   2.33  0.020   11.133   129.5869
-----+-----

. regress debttoequity environmentalenvironmentalaccoun
Source |      SS      df      MS      Number of obs      =      468
F(1, 466)      =      1.43
Model | 206.615234      1 206.615234  Prob > F      =      0.2324
Residual | 67324.9203      466 144.474078  R-squared      =      0.0031
Adj R-squared      =      0.0009
Total | 67531.5356      467 144.607143  Root MSE      =      12.02
-----+-----
debttoequity |      Coef.   Std. Err.   t   P>|t|   [95% Conf. Interval]
-----+-----
environmenta~n | -5.629758  4.707643   -1.20  0.232   -14.8806   3.621079
cons |      5.590682  1.394848   4.01  0.000   2.84971   8.331653
-----+-----
    
```

Source: Researcher's computation (2024).

Table 5 shows that Environmental Accounting Reporting has a statistically significant positive relationship with ROA (coef = 14.57584, $p < 0.05$) and no significant relationship with Tobin Q and P/E Ratio (coef=0.940911, $p > 0.05$) and (coef=188.1803, $p > 0.05$) respectively. The control variables of Firm age and Debt-Equity also have insignificant relationships ($p=0.7247$, $p=0.2334$), respectively.

E. Post Estimation Tests

Source: Researcher’s computation (2024).

Table 6: Multicollinearity Test

```
. estat vif
Variable |          VIF      1/VIF
-----+-----
environmen~n |          1.00      1.000000
-----+-----
Mean VIF |          1.00
```

Source: Researcher’s computation (2024).

From Tables 6 and 7 above, the result of the multicollinearity tests shows no multicollinearity between the independent variables with a mean VIF of 1. A VIF of more than five (5) might suggest multicollinearity [10]. The Breusch-Pagan test result, however, indicates the presence of heteroskedasticity ($p < 0.05$). The presence of heteroskedasticity led to a robust regression.

Table 7: Heteroskedasticity Test

```
. estat hettest
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
Ho: Constant variance
Variables: fitted values of debttoequity
chi2(1)      =   39.68
Prob > chi2  =   0.0000
```

Table 8: Robust Regression analysis of the variables

```
Robust regression                Number of obs   =       468
                                F( 1,          466) =       0.60
                                Prob > F         =       0.4388
```

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
environmenta~n	1.627232	2.099993	0.77	0.439	-2.499397 5.753861
cons	2.06057	.6222163	3.31	0.001	.8378729 3.283267

```
Robust regression                Number of obs   =       468
                                F(1,          466) =       9.27
                                Prob > F         =       0.0025
```

tobinq	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
environmenta~n	.286644	.0941299	3.05	0.002	.1016723 .4716157
cons	.1848932	.0278902	6.63	0.000	.1300872 .2396993

```
Robust regression                Number of obs   =       468
                                F( 1,          466) =       4.65
                                Prob > F         =       0.0316
```

pricetoearn~s	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
environmenta~n	7.044459	3.268421	2.16	0.032	.6217911 13.46713
cons	2.792579	.9684148	2.88	0.004	.8895784 4.69558

Source: Researcher’s Computation (2024).

The robust regression result in Table 8 reveals an insignificant relationship between Environmental Accounting Reporting and ROA ($p = 0.4388$). However, there were significant relationships between Environmental Accounting Reporting and Tobin Q and P/E Ratio, both market-based performance firm measures with

(coef=0.286644, $p < 0.05$) and (coef=7.044459, $p < 0.05$) respectively.

F. Discussions

The decision rule for testing hypotheses is to reject the null hypothesis and accept the alternate hypothesis if the p-value is significant.

For H₀₁, the result shows that there is no significant relationship between environmental accounting performance and ROE, a book-value (accounting) based firm performance measure. This finding is in line with the work of [33], who also found no relationship between environmental performance and ROA, and in contrast with several existing studies that suggested a positive relationship between these variables.

For H₀₂ and H₀₃, the result shows a statistically significant positive relationship between environmental accounting performance and the variables of Tobin Q and P/E Ratio, both market-based firm performance measures. We, therefore, reject the null hypotheses and accept that environmental accounting performance has a significant positive relationship with the Tobin Q and P/E Ratio of listed firms on the Nigerian Exchange Group. Again, the findings of this study are in line with the works of [32], [5], and [26], who found a significant positive relationship between environmental accounting performance variables and Tobin Q. but contrasts with the work of [28], who found a significant negative relationship between ESG activities and Firm's Tobin Q.

Similarly, the findings of this study also agree with the work of [32], who also found a significant positive relationship between environmental accounting performance and the P/E Ratio. There seem to be few studies on the P/E Ratio variable of firm performance measure.

V. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

This study concludes that Environmental Accounting reporting has no significant relationship with the return on assets of listed firms on the Nigerian Exchange Group. Return on Assets is a book-based measure of financial performance. [24] distinguished the effect of environmental accounting performance on firm performance based on the performance measures. This study suggests that environmental accounting performance does not affect the accounting (book-value) based firm performance measure. This is understandable since the book-value measure focuses on management performance in terms of efficiency and effectiveness. In contrast, environmental performance focuses more on the stakeholders, including the shareholders. However, this study found that environmental accounting performance significantly influences the market-based firm performance measurement of Tobin Q and P/E Ratio. This outcome suggests that an increase in the environmental accounting performance of a firm will also increase the market-based assets and the firm value. Considering the fact that investors now move away from assessing a firm by its financial statements and book net worth but rather by its market share price, it is pertinent for firm managers to focus on improving their environmental accounting disclosure to enhance the market-based performance.

Also, [19] suggest that environmental disclosure following

the implementation of stringent environmental regulations has positively influenced firms' financial performance, especially when these regulations are effectively enforced; arising from this, the Securities and Exchange Commission (SEC), the regulatory body for capital markets in Nigeria, might need to mandate firms listed in the capital market to mandatorily report their environmental accounting performance to enhance their marketability and liquidity in the market. This will also allow for inter-companies and inter-sectoral performance comparisons among firms. Particularly that

B. Recommendations

Arising from the findings of this study, the following recommendations were made:

- i. The Security and Exchange Commission (SEC), the regulatory body for listed firms in Nigeria, should mandate its firms to report and publish their environmental activities for inclusion in their financial statements.
- ii. Firm managers in Nigeria should endeavor to disclose their environmental performance, as this tends to improve their market-based performance.

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