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# GREEN ACCOUNTING COST AND FINANCIAL PERFORMANCE OF OIL AND GAS COMPANIES IN NIGERIA

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**ABSTRACT:**

*This study examined the effect of green accounting cost on return on equity, shareholders' fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies. The study covered a time frame of thirteen (13) years that is, from 2020 to 2022 based on available data from the annual reports of the concerned companies. The study employed an ex-post facto research design with the aid of the Panel Ordinary Least Square (POLS) and Granger Causality techniques to analyse the data. The result of Granger Causality test revealed that green accounting cost has no significant effect on return on equity, shareholders' fund, earnings per share, and net profit margin of oil and gas companies. In view of the findings, management of oil and gas companies in Nigeria should develop a well-articulated environmental costing system in order to guarantee a conflict free corporate atmosphere for improved return on equity.*

## 1. INTRODUCTION

The impact of oil business activity on the environment is found in several forms: air, water, underground pollution, drinking water, land and habitat for endangered and threatened species, oceans, atmosphere, land, mass and so on, whereas array of pollutants, including toxic, hazardous and warming is accountable to business activities (Saman, 2019). During the fifties and sixties of the 19th century, people all over the world became more concerned about the quality of their environment. That is to say that the awareness of the environment and man's ability to cause damage started from the fifties of the 19th century. In recent years, the adverse environmental effect of economic development has become a matter of great public concern all over the world. Gradually, environment

is becoming a much more urgent economic, social and political problem. Therefore, accountants, as the basic custodian and light bearer of economic development can no longer shut their eyes to the effect of environmental issues on business management, accounting, auditing and disclosure system. Protection of environment and the potential involvement of accountants is becoming a common subject of discussion among the accountant all over the world. Nowadays, Accountants are expected to take a proactive role in the environmental protection process with the advent of liberalization. The outcome of this effort has been referred to as green accounting.

Green accounting is an inclusive aspect of sustainability accounting and reporting, thus, generates reports that provide environmental information to help make internal management decisions and external use by stakeholders (Iliemena, 2020). Akeem, Memba & Willy (2016) suggested that knowledge about the green accounting and their challenges should be adequately accounted for in compliance with standards; as a moral commitment to environmental stewardship and the desire to promote good relation with the residents of local communities, while the many ways in which environmental costs, losses or benefits may go unrecorded in traditional accounting systems is becoming obsolete. That is why green accounting and reporting, therefore, is of paramount importance today. However, the unserious attitudes of several companies not taking green accounting into consideration make performance below expectation. Another significant problem is the complete absence of environmental reporting standards, malfunctioning of the environmental management system and failure of our real sector to provide full accounting for environment costs incurred. It is disheartening to note that environmental management system is unduly complex, skewed, poorly administered, largely inequitable and loaded with unduly large number of overlapping penalties for non-compliance. The system is further exacerbated by poor policies, inconsistencies in legal application and low impact on the economy.

### 1.1 Objective of the Study

The objective of this study is to ascertain the effect of green accounting cost on return on equity, shareholders' fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies quoted on the Nigerian Exchange Group.

### 1.2 Hypothesis

The following hypothesis is formulated for this study:

$H_O$: Green accounting cost has no significant effect return on equity, shareholders' fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies quoted on the Nigerian Exchange Group.

## 2. LITERATURE REVIEW

### 2.1 Conceptual review

#### 2.1.1 Green Accounting

Green Accounting is a type of accounting that attempts to incorporate environmental costs into the financial results of operations (Rewadikar, 2014). It is accounting for any costs and benefits that arise from change to a firm's products and processes where the change also involves a change in environmental impact. It is also referred to "environmental accounting", "resource accounting", and "integrated environmental and economic accounting." It refers to the compilation of data relating to the environment into an accounting framework organized in terms of stocks and flows, and the interpretation and reporting of these data. Green accounting or environmental accounting is the practice of incorporating principles of environmental management and conservation into reporting practices and cost/benefit analyses (Rewadikar, 2014). Environmental accounting allows a business to see the impact of economically sustainable practices in everything. It allows accountants to report on the economic impact of those decisions to stakeholders so as to allow for proactive decision making about processes that simultaneously meet environmental regulations while adding to the bottom line (Inhrukd & Ordu, 2016).

According to Magara, Aming'a and Momanyi (2015), environmental accounting involves the identification, measurement and allocation of environmental costs, and the integration of these costs into business and encompasses the way of communicating such information to the companies' stakeholders. In this sense, it is a comprehensive approach to ensure good corporate governance that includes transparency in its societal activities (Magara, Aming'a & Momanyi, 2015).

#### 2.1.2 Elements of Green Accounting

##### 2.1.2.1 Environment Pollution Prevention Costs

These are costs of activities which are meant to prevent the production of contaminants and wastes which could cause damage to the environment. The costs include costs incurred in evaluating and selecting pollution control equipment, quality environmental consumables, designing processes,

designing products and carrying out environment studies. Others are auditing environmental risks and developmental management systems.

#### 2.1.2.2 Environmental Detection Costs

Environmental detection costs are costs resulting from activities to determine if products, processes and other activities within the company are in compliance with appropriate environmental standards. The costs include auditing environmental activities, inspecting products and processes, developing environmental performance measures, testing contamination and measuring contamination level.

#### 2.1.2.3 Environmental Internal Failure Costs

These are costs resulting from the activities performed because contaminants and wastes have been produced -but have not been discharged into the environment. Internal costs are incurred to eliminate and manage the wastes produced. The costs are costs for operating pollution control equipment, licensing facilities for producing contaminants and costs resulting from recycling scrap.

#### 2.1.2.4 Environmental External Failure Costs

These are costs of activities performed after discharging contaminants and wastes into the environment. These costs are those for cleaning up a polluted lake, clearing up oil spills, cleaning up contaminated soil, settling personal injury claims which are environment related and restoring land to natural state among others.

### 2.1.3 Financial Performance

Financial performance measurement is a means by which organizational success as well as management ability and efficiency can be measured. According to Iswaita (2007), there are two kinds of performance, financial performance and non-financial performance; and financial profitability emphasizes on variables related directly to financial report. Dwivedi, (2002) also established that financial performance is a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. The term is also used as a general measure of a firm's overall financial health over a given period of time and can be used to compare similar firms across the same industry or to compare industries or sectors in aggression (Suchman, 2021). Company performance is very essential to management as it is an outcome which has been achieved by an individual or a group of individuals in an organization related to its authority and responsibility in achieving the goal legally, and conforming to the morale and ethics. Company's performance is evaluated in three dimensions. The first dimension is company's productivity, or processing inputs into outputs efficiently. The

second is profitability dimension, or the level of which company's earnings are bigger than its costs. The third dimension is market premium, or the level of which company's market value is exceeding its book value (Wang, 2002).

Researchers in the strategic management field have offered a variety of models for analyzing financial performance. However, little consensus has emerged on what constitutes a valid set of financial performance criteria. For instance, researchers have suggested that studies on financial performance should include multiple criteria analysis. This multidimensional view of financial performance implies that different models or patterns of relationship between corporate Profitability and its determinants will emerge to demonstrate the various sets of relationships between dependent and independent variables in the estimated models (Corrol, 2019). However, profitability measures have been mostly used and thus can give a quick assessment of the way the organization has fared financially. Profitability indicators such as Return on capital employed (ROCE), Net profit margin, and dividend per share. Earnings per share, have been used by previous studies (Dwivedi, 2002; Uwigbe & Egbide; 2012, Zayol, Agaregh & Enerji, 2017; Adewoye, Olaoye and Ogundipe, 2018) to measures financial performance of firms, especially in the oil and gas operations hence this study adopts ROCE and Net profit for performance. Similarly, the dimensions of CSR activities have been highlighted to include to the host communities, employees and government as a stakeholders (Bhattacharya, Korschun & Sen, 2009) why costs such as environmental expenditure, human development costs, social expenditure and infrastructure contribution to government, environmental impact assessment costs amongst others have been reported in sustainability reports of oil companies and used for research purposes (Uwiaghbe & Egbide, 2012; Ordu & Anele, 2016; Ironkwe & Success, 2017; Adewoye et al, 2018).

## 3. MATERIAL AND METHOD

This study employed *ex-post facto* research design. The population of this study comprises all ten (10) oil and gas companies quoted on the Nigerian Exchange Group Plc as at 31st December, 2022. For the purpose of the study, a purposive/judgmental sampling technique which is a type of non-probability sampling technique was utilized in selecting the sample size. Five (5) out of the ten (10) oil and gas companies constitute the sample size of this study because they have operated on the Exchange for a period of more than ten (10) years. There are Ardova Oil, Mobil Oil, MRS Oil, Oando Oil, and Total Nigeria. The study basically utilized secondary data that were extracted from the annual reports and statements of account of the sample quoted firms.

The dependent variable of the study (performance) was measured with five proxies such as Return on Assets (ROA), Return on Equity (ROE), Profit before Tax (PBT), Shareholder's Fund (SHF) and Earning per Share (EPS). Green Accounting Cost (GRCOST) represents the independent variable. Green cost constitutes the expenses incurred through companies' donations to purpose such as education, health, environmental protection, social activities and charitable gifts as a means of identifying with the aspiration of the communities as well as the environment within which they operates.

### 3.1 Model Specification

To examine the effect of green accounting cost on return on equity, shareholder's fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies in Nigeria, the following models stated in functional form were estimated:

$$ROE = f(GRCOST) \quad \ldots 3.1$$

$$SHF = f(GRCOST) \quad \ldots 3.2$$

$$EPS = f(GRCOST) \quad \ldots 3.3$$

$$PAT = f(GRCOST) \quad \ldots 3.4$$

$$NPM = f(GRCOST) \quad \ldots 3.5$$

To avoid the possible effect of any outlier which will cast a dent to the result of the analysis, the variables were transformed to log-linear equations as follows:

**Model 1**

$$LogROE_t = a_0 + a_1 LogGRCOST_t + \mu_t \quad \ldots 3.6$$

**Model 2**

$$LogSHF_t = a_0 + a_1 LogGRCOST_t + \mu_t \quad \ldots 3.7$$

**Model 3**

$$LogEPS_t = a_0 + a_1 LogGRCOST_t + \mu_t \quad \ldots 3.8$$

**Model 4**

$$LogPAT_t = a_0 + a_1 LogGRCOST_t + \mu_t \quad \ldots 3.9$$

**Model 5**

$$LogNPM_t = a_0 + a_1 LogGRCOST_t + \mu_t \quad \ldots 3.10$$

Where:

ROE = Return on Equity

SHF = Shareholder's Fund

EPS = Earnings per Share

PAT = Profit after Tax

NPM = Net Profit Margin

GRCOST = Green Accounting Cost

$\beta_0$ = Constant parameter

$\mu$ = Error term

## 4. RESULT AND DISCUSSIONS

### 4.1 Data Analysis

The mean data of the selected firm as computed by E-views 10.0 software via the criteria of *Mean Plus SD Bound* are detailed in this sub-section. The annual reports of the selected oil and gas companies spanning from 2010 to 2022 provided the data used in the analysis. The average data on return on equity, shareholders' fund, earnings per share, profit after tax, net profit margin, and green accounting cost are presented in Table 1.

Table 1: Return on Equity, Shareholders' Fund, Earnings per Share, Profit after Tax, Net Profit Margin, and Green Accounting Cost from 2020 to 2022

| Year | Return on Equity (%) | Shareholde r' Fund (N' 000) | Earnings Per Share (N' Kobo) | Profit after Tax (N'000) | Net Profit Margin (%) | Green Accounting (N'000) |
|---|---|---|---|---|---|---|
| 2010 | 0.59 | 20,100,000 | 740 | 3,270,000 | 0.01 | 42,800,000 |
| 2011 | 0.55 | 30,100,000 | 1,740 | 8,950,000 | 0.03 | 800,000 |
| 2012 | -0.25 | 26,400,000 | 142 | 1,440,000 | 0.18 | 74,000,000 |
| 2013 | 0.22 | 30,000,000 | 1,001 | 4,330,000 | 0.13 | 36,700,000 |
| 2014 | 0.18 | 49,300,000 | 1,800 | 3,120,000 | 0.10 | 29,000,000 |
| 2015 | -0.02 | 24,400,000 | 671 | -8,690,000 | -0.91 | 34,500,000 |
| 2016 | -0.06 | 22,800,000 | 498 | -7,860,000 | -1.49 | 32,600,000 |
| 2017 | 0.57 | 19,900,000 | 1,446 | -155,000 | 0.58 | 59,200,000 |
| 2018 | -0.45 | 15,300,000 | 1,021 | -2,490,000 | 0.02 | 80,300,000 |
| 2019 | 0.06 | 76,100,000 | 875 | -333,000 | 0.02 | 20,900,000 |
| 2020 | 0.00 | -51,000,000 | 544 | -9,960,000 | -0.02 | 22,100,000 |
| 2021 | -0.02 | -12,700,000 | 253 | -6,510,000 | 0.07 | 37,900,000 |
| 2022 | 0.12 | 17,700,000 | 1,417 | 5,200,000 | 0.02 | 12,100,000 |

*Source: Authors Computation*

### 4.1 Panel Co-integration Test

The Pedroni Residual co-integration is a panel co-integration test for heterogeneous panels with multiple regressors. The null hypothesis of Pedroni's test is no co-integration, and the test allows for unbalanced panels, including heterogeneity in both the long-term co-integration vectors. There are seven panel co-integration statistics, first part is based on the within dimension approach, including the panel *v* statistic, the panel *rho* Statistic, the panel *PP* statistic and the panel *ADF* statistic; the second part is based on the between-dimension approach, including the group *rho* statistic, the group *PP* statistic and the group *ADF* statistic. The majority of the estimate findings of the Pedroni's Residual panel co-integration tests shown in Tables 2 - 6 suggest that the null hypothesis of no co-integration can be rejected at the 5% level of significance. This suggests that green accounting cost has a long-term relationship with the financial performance of selected oil and gas companies measured by return on equity, shareholders fund, earnings per share, profit after tax, and net profit margin. This is to say that financial performance indicators: return on equity, shareholders fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies have a long run relationship with green accounting cost.

Table 2: Pedroni Co-integration Result for ROE → GRCOST

| | **T-Statistic** | **Prob.**** |
|---|---|---|
| **Within Group** | | |
| Panel *v*-Statistic | -1.448451 | 0.9263 |
| Panel *rho*-Statistic | -3.632789 | 0.0001 |
| Panel *PP*-Statistic | -5.960854 | 0.0000 |
| Panel *ADF*-Statistic | -2.552899 | 0.0053 |
| **Between Group** | | |
| Group *rho*-Statistic | -0.869230 | 0.1924 |
| Group *PP*-Statistic | -4.819197 | 0.0000 |
| Group *ADF*-Statistic | -1.268249 | 0.1024 |

*Source: Computer output data using E-views 10.0*

Table 3: Pedroni Co-integration Result for SHF → GRCOST

| | T-Statistic | Prob.** |
|---|---|---|
| **Within Group** | | |
| Panel *v*-Statistic | 0.265302 | 0.3954 |
| Panel *rho*-Statistic | -1.219235 | 0.0114 |
| Panel *PP*-Statistic | -1.879984 | 0.0301 |
| Panel *ADF*-Statistic | -2.207783 | 0.0077 |
| **Between Group** | | |
| Group *rho*-Statistic | 0.618472 | 0.7319 |
| Group *PP*-Statistic | -3.828832 | 0.0001 |
| Group *ADF*-Statistic | -1.698539 | 0.0447 |

*Source: Computer output data using E-views 10.0*

Table 4: Pedroni Co-integration Result for EPS → GRCOST

| | T-Statistic | Prob.** |
|---|---|---|
| **Within Group** | | |
| Panel *v*-Statistic | -0.568752 | 0.7152 |
| Panel *rho*-Statistic | -2.540347 | 0.0055 |
| Panel *PP*-Statistic | -8.250614 | 0.0000 |
| Panel *ADF*-Statistic | -6.215502 | 0.0000 |
| **Between Group** | | |
| Group *rho*-Statistic | 0.182960 | 0.5726 |
| Group *PP*-Statistic | -4.090167 | 0.0000 |
| Group *ADF*-Statistic | -3.832742 | 0.0001 |

*Source: Computer output data using E-views 10.0*

Table 5: Pedroni Co-integration Result for PAT → GRCOST

| | **T-Statistic** | **Prob.**** |
|---|---|---|
| **Within Group** | | |
| Panel *v*-Statistic | -0.404645 | 0.6571 |
| Panel *rho*-Statistic | -2.349328 | 0.0034 |
| Panel *PP*-Statistic | -2.148086 | 0.0055 |
| Panel *ADF*-Statistic | -1.879923 | 0.0471 |
| **Between Group** | | |
| Group *rho*-Statistic | 0.153487 | 0.5610 |
| Group *PP*-Statistic | -1.703629 | 0.0442 |
| Group *ADF*-Statistic | -1.849446 | 0.0037 |

*Source: Computer output data using E-views 10.0*

Table 6: Pedroni Co-integration Result for NPM → GRCOST

| | **T-Statistic** | **Prob.**** |
|---|---|---|
| **Within Group** | | |
| Panel *v*-Statistic | -1.755231 | 0.9604 |
| Panel *rho*-Statistic | -0.976006 | 0.1645 |
| Panel *PP*-Statistic | -3.115535 | 0.0009 |
| Panel *ADF*-Statistic | -2.904801 | 0.0018 |
| **Between Group** | | |
| Group *rho*-Statistic | -0.741029 | 0.2293 |
| Group *PP*-Statistic | -7.172876 | 0.0000 |
| Group *ADF*-Statistic | -2.201109 | 0.0139 |

*Source: Computer output data using E-views 10.0*

### 4.1.1 Panel OLS Analysis of Green Accounting Cost and Financial Performance of selected Oil and Gas Companies in Nigeria

#### 4.1.1.1 Return on Equity and Green Accounting Cost

The Hausman test in Table 7 suggests that the random effect estimation is preferred to fixed effect due to insignificant p-value of the Chi-square. There is an insignificant negative relationship between return on equity and green accounting cost. A percentage increase in green accounting cost will lead to 2.34 factor depreciation in return on equity of selected oil and gas companies. If green accounting cost is held constant, return on equity would be estimated to be 20.17%. The adjusted R-square value of 0.037831 is an insinuation that only 3.78% changes in return on equity was as a result of joint variation in green accounting cost. The F-statistic which determines if the changes in the dependent variable is significant or not, showcases that the aforementioned magnitude of changes in return on equity was insignificantly (more than 0.05) explained by green accounting cost. The traditional Durbin Watson test of autocorrelation shows a value of 1.95, which implies that there is no autocorrelation in the model.

Table 7: Panel OLS of Green Accounting Cost and Financial Performance: ROE

| **Variables** | **Pooled OLS** | | **Fixed Effect** | | **Random Effect** | |
|---|---|---|---|---|---|---|
| | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** |
| C | 0.201752 | 0.0490 | 0.187181 | 0.0765 | 0.201752 | 0.0532 |
| GRCOST | -2.34E-09 | 0.0654 | -1.95E-09 | 0.1510 | -2.34E-09 | 0.0704 |
| R-squared | 0.052865 | | 0.204125 | | 0.052865 | |
| Adjusted R-squared | 0.037831 | | 0.001255 | | 0.037831 | |
| S.E. of regression | 0.719180 | | 0.732722 | | 0.719180 | |
| Sum squared resid | 32.58484 | | 27.38094 | | 32.58484 | |
| Log likelihood | -69.78845 | | -64.13345 | | | |
| F-statistic | 3.516392 | | 1.006188 | | 3.516392 | |
| Prob(F-statistic) | 0.065401 | | 0.459621 | | 0.065401 | |
| Durbin-Watson stat | 1.957515 | | 1.910162 | | 1.957515 | |
| | Hausman Specification Test | | | | | |
| | Chi-Sq. Statistic | 0.916475 | | | | |
| | P-value | 0.338400 | | | | |

*Source: Output Data using E-view 10.0.*

*Note: Periods included: 13; Cross-sections included: 5; Total Number of Observations: 65*

#### 4.1.1.2 Shareholders' Fund and Green Accounting Cost

As can be seen in Table 8, green accounting cost has significant negative relationship with shareholders' fund based on the result of the Hausman test which indicated the suitability of the random effect estimation. A percentage increase in green accounting cost leads to 22.40% appreciation in shareholders' fund of selected oil and gas companies. Holding green accounting cost constant would result in 10,580,819 million increase in shareholders' fund. From the adjusted R-square, 13.41% variation in shareholders' fund of selected oil and gas companies was attributed to green accounting cost. There is no need to worry about the significant of this variation as the p-value (0.00) and the F-statistic (10.91) showed that green accounting cost was significant in explaining the changes in shareholders' fund. The Durbin Watson is 0.85 shows an element of autocorrelation in the model but this was corrected using the serial correlation test.

Table 8: Panel OLS of Green Accounting Cost and Financial Performance: SHF

| **Variables** | **Pooled OLS** | | **Fixed Effect** | | **Random Effect** | |
|---|---|---|---|---|---|---|
| | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** |
| C | 10580819 | 0.0576 | 9723607. | 0.0881 | 10580819 | 0.0603 |
| GRCOST | 0.224098 | 0.0016 | 0.247164 | 0.0012 | 0.224098 | 0.0018 |
| R-squared | 0.147664 | | 0.294656 | | 0.147664 | |
| Adjusted R-squared | 0.134135 | | 0.114863 | | 0.134135 | |
| S.E. of regression | 39138149 | | 39571308 | | 39138149 | |
| Sum squared resid | 9.65E+16 | | 7.99E+16 | | 9.65E+16 | |
| Log likelihood | -1227.585 | | -1221.433 | | | |
| F-statistic | 10.91450 | | 1.638860 | | 10.91450 | |
| Prob(F-statistic) | 0.001576 | | 0.104987 | | 0.001576 | |
| Durbin-Watson stat | 0.850451 | | 0.805993 | | 0.850451 | |

Hausman Specification Test

| | | |
|---|---|---|
| | Chi-Sq. Statistic | 1.087622 |
| | P-value | 0.297000 |

*Source: Output Data using E-view 10.0.*

*Note: Periods included: 13; Cross-sections included: 5; Total Number of Observations: 65*

#### 4.1.1.3 Earnings per Share and Green Accounting Cost

The result in Table 9 shows the preference of the random effect estimation which envisages that green accounting cost has significant negative relationship with earnings per share of selected oil and gas companies in Nigeria. A unit increase in green accounting cost rate results in 8.16 factor depreciation in earnings per share of selected oil and gas companies. When green accounting cost is held constant, earnings per share would be valued at 964.76 Kobo. The result in Table 9 shows the adjusted R-square value to be -0.014021, an insinuation that 0.14% negative changes in earnings per share was as a result of variation in green accounting cost. The F-statistic which determines if the changes in the dependent variable is significant or not, showcases that the aforementioned magnitude of changes in earnings per share was significantly (more than 0.05) explained by green accounting cost. The traditional Durbin Watson test of autocorrelation shows a value of 1.39, which is still within the range of no autocorrelation in the model.

Table 9: Panel OLS of Green Accounting Cost and Financial Performance: EPS

| **Variables** | **Pooled OLS** | | **Fixed Effect** | | **Random Effect** | |
|---|---|---|---|---|---|---|
| | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** |
| C | 964.7635 | 0.0000 | 934.2608 | 0.0000 | 964.7635 | 0.0000 |
| GRCOST | -8.16E-07 | 0.7356 | 4.99E-09 | 0.9985 | -8.16E-07 | 0.7431 |
| R-squared | 0.001823 | | 0.141915 | | 0.001823 | |
| Adjusted R-squared | -0.014021 | | -0.076812 | | -0.014021 | |
| S.E. of regression | 1387.697 | | 1430.016 | | 1387.697 | |
| Sum squared resid | 1.21E+08 | | 1.04E+08 | | 1.21E+08 | |
| Log likelihood | -561.5163 | | -556.6014 | | | |
| F-statistic | 0.115054 | | 0.648822 | | 0.115054 | |
| Prob(F-statistic) | 0.735590 | | 0.801140 | | 0.735590 | |
| Durbin-Watson stat | 1.391661 | | 1.162493 | | 1.391661 | |

| Hausman Specification Test | | |
|---|---|---|
| | Chi-Sq. Statistic | 1.054525 |
| | P-value | 0.304500 |

*Source: Output Data using E-view 10.0.*

*Note: Periods included: 13; Cross-sections included: 5; Total Number of Observations: 65*

#### 4.1.1.4 Profit After Tax and Green Accounting Cost

As can be seen in Table 10, green accounting cost has insignificant negative relationship with profit after tax of oil and gas companies as dispelled by the random effect estimation. A percentage increase in green accounting cost leads to 3.84% depreciation in profit after tax of oil and gas companies. Holding green accounting cost constant would result in N1,163,902 million appreciation in profit after tax. From the adjusted R-square, 46.57% variation in profit after tax was attributed to green accounting cost. There is no need to worry about the significant of this variation as the p-value (0.00) and the F-statistic (26.71) vehemently showed that green accounting cost was significant in explaining the changes in profit after tax. The Durbin Watson of 1.91 shows that there is no element of autocorrelation in the model.

Table 10: Panel OLS of Green Accounting Cost and Financial Performance: PAT

| **Variables** | **Pooled OLS** | | **Fixed Effect** | | **Random Effect** | |
|---|---|---|---|---|---|---|
| | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** |
| C | 1181738. | 0.5303 | 1044347. | 0.5802 | 1163902. | 0.5588 |
| GRCOST | -0.039106 | 0.1024 | -0.033985 | 0.1750 | -0.038435 | 0.1075 |
| PAT (-1) | 0.666118 | 0.0000 | 0.706857 | 0.0000 | 0.671587 | 0.0000 |
| R-squared | 0.476425 | | 0.586113 | | 0.483822 | |
| Adjusted R-squared | 0.458054 | | 0.469145 | | 0.465711 | |
| S.E. of regression | 12845183 | | 12713070 | | 12645068 | |
| Sum squared resid | 9.40E+15 | | 7.43E+15 | | 9.11E+15 | |
| Log likelihood | -1065.706 | | -1058.654 | | | |
| F-statistic | 25.93351 | | 5.010881 | | 26.71356 | |
| Prob(F-statistic) | 0.000000 | | 0.000021 | | 0.000000 | |
| Durbin-Watson stat | 1.904678 | | 1.952284 | | 1.910986 | |

| Hausman Specification Test | | |
|---|---|---|
| | Chi-Sq. Statistic | 1.391845 |
| | P-value | 0.498600 |

*Source: Output Data using E-view 10.0.*

*Note: Periods included: 13; Cross-sections included: 5; Total Number of Observations: 65*

#### 4.1.1.5 Net Profit Margin and Green Accounting Cost

The Hausman test in Table 11 suggests that the random effect estimation is preferred to fixed effect due to insignificant p-value of the Chi-square. There is an insignificant negative relationship between net profit margin and green accounting cost. A percentage increase in green accounting cost will lead to 1.83 factor depreciation in net profit margin of selected oil and gas companies. If green accounting cost is held constant, net profit margin would be estimated to be -2.82%. The adjusted R-square value of -0.003019 is an insinuation that only -0.30% negative changes in net profit margin was as a result of variation in green accounting cost. The F-statistic which determines if the changes in the dependent variable is significant or not, showcases that the aforementioned magnitude of changes in net profit margin was insignificantly (more than 0.05) explained by green accounting cost. The traditional Durbin Watson test of autocorrelation shows a value of 1.85, which implies that there is no autocorrelation in the model.

Table 11: Panel OLS of Green Accounting Cost and Financial Performance: NPM

| **Variables** | **Pooled OLS** | | **Fixed Effect** | | **Random Effect** | |
|---|---|---|---|---|---|---|
| | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** | **Coefficient** | **Prob.** |
| C | -0.029587 | 0.8578 | -0.005750 | 0.9724 | -0.028240 | 0.8669 |
| GRCOST | -1.79E-09 | 0.3834 | -2.43E-09 | 0.2592 | -1.83E-09 | 0.3727 |
| R-squared | 0.012084 | | 0.208918 | | 0.012653 | |
| Adjusted R-squared | -0.003597 | | 0.007269 | | -0.003019 | |
| S.E. of regression | 1.176270 | | 1.169884 | | 1.169028 | |
| Sum squared resid | 87.16745 | | 69.80009 | | 86.09751 | |
| Log likelihood | -101.7679 | | -94.54656 | | | |
| F-statistic | 0.770593 | | 1.036049 | | 0.807348 | |
| Prob(F-statistic) | 0.383369 | | 0.433458 | | 0.372327 | |
| Durbin-Watson stat | 1.851804 | | 1.843318 | | 1.851456 | |

| Hausman Specification Test | | |
|---|---|---|
| | Chi-Sq. Statistic | 0.907846 |
| | P-value | 0.340700 |

*Source: Output Data using E-view 10.0.*

*Note: Periods included: 13; Cross-sections included: 5; Total Number of Observations: 65*

### 4.1.2 Granger Causality Effect Analysis

With regard to effect determination, the granger causality test was chosen. The essence of choosing the granger causality over ordinary least square regression is based on the fact that it takes into consideration the dynamic nature of variables. Furthermore, for a variable to have effect on another it must cause it move or granger cause it, and it is only the granger causality test that offers such tool of effect assessment. The lag length selected was one (1) on the premises that the data applied were gotten from the annual reports of the selected oil and gas companies were on yearly/annual bases. The result according to Table 12, green accounting cost has no discernible/significant effect on four financial performance variables: return on equity, shareholders' fund, earnings per share, and net profit margin. This is on the argument that causality do flows green accounting cost to return on equity, shareholders' fund, earnings per share, and net profit margin at 5% level of significance. On the contrary, green accounting cost has significant effect on profit after tax of selected oil and gas companies. This is because causality runs from green accounting cost to profit after tax of selected oil and gas companies in Nigeria at a significance level of 5%.

Table 12: Granger Causality Test on Green Accounting Cost and Financial Performance

| Null Hypothesis: | Obs | F-Statistic | Prob. | Remarks |
|---|---|---|---|---|
| GRCOST does not Granger Cause ROE | 60 | 1.02765 | 0.3653 | No Causality |
| ROE does not Granger Cause GRCOST | | 2.75413 | 0.0733 | No Causality |
| GRCOST does not Granger Cause SHF | 60 | 0.33646 | 0.7159 | No Causality |
| SHF does not Granger Cause GRCOST | | 2.76017 | 0.0729 | No Causality |
| GRCOST does not Granger Cause EPS | 60 | 0.30437 | 0.7389 | No Causality |
| EPS does not Granger Cause GRCOST | | 0.06020 | 0.9416 | No Causality |
| GRCOST does not Granger Cause PAT | 60 | 8.98709 | 0.0005 | Causality |
| PAT does not Granger Cause GRCOST | | 0.56885 | 0.5698 | No Causality |
| GRCOST does not Granger Cause NPM | 60 | 0.92133 | 0.4046 | No Causality |
| NPM does not Granger Cause GRCOST | | 5.76915 | 0.0056 | No Causality |

*Source: Output Data using E-views 10.0*

### 4.2 Test of Hypothesis

**4.2.1 Decision Criteria:** If the p-value of F-statistic in granger causality test is less than 0.05, the null hypothesis is rejected. On the other hand, if the p-value of F-statistic in granger causality test is greater than 0.05, the null hypothesis is accepted.

### 4.2.2 Restatement of Research Hypothesis

$H_O$: Green accounting cost has no significant effect return on equity, shareholders' fund, earnings per share, profit after tax, and net profit margin of selected oil and gas companies quoted on the Nigerian Exchange Group.

Table 13: Test of Hypothesis

| Hypotheses | Estimated Equation | F-Statistic | P-Value | Decision |
|---|---|---|---|---|
| Premise 1 | ROE → GRCOST | 1.02765 | 0.3653 | Accept $H_0$ & Reject $H_1$ |
| Premise 2 | SHF → GRCOST | 0.33646 | 0.7159 | Accept $H_0$ & Reject $H_1$ |
| Premise 3 | EPS → GRCOST | 0.30437 | 0.7389 | Accept $H_0$ & Reject $H_1$ |
| Premise 4 | PAT → GRCOST | 8.98709 | 0.0005 | Reject $H_0$ & Accept $H_1$ |
| Premise 5 | NPM → GRCOST | 0.92133 | 0.4046 | Accept $H_0$ & Reject $H_1$ |

*Source: Granger Causality Output from Table 4.10*

Table 13 depicts the acceptance of the null hypotheses for Premise one (1), Premise two (2), Premise three (3), and Premise five (5) as the p-values (0.3653), (0.7159), (0.7389), and (0.4046) respectively in the Granger Causality output in Table 13 are higher than 0.05 (insignificant at 5% level of significance) which is in line the hypothesis decision rule, hence the acceptance of Premise one (1), Premise two (2), Premise three (3), and Premise five (5) accordingly. In the same vain, Premise four (4) was rejected on the argument that the p-value (0.0000) in the Granger Causality output in Table 13 is lower than 0.05 (significant at 5% level of significance) thus the acceptance of Premise four (4).

The Pedroni Residual co-integration in Tables 2 - 6 shows that green accounting cost and financial performance selected oil and gas companies in Nigeria measured by return on equity, shareholders' fund, earnings per share, profit after tax, and net profit margin have a long-term connection. This portrays the fact that green accounting cost decisions has the potential to determining financial performance of selected oil and gas firms in Nigeria. In Nigeria, it is disheartening to note that green accounting cost management system is unduly complex, skewed, poorly administered, largely inequitable and loaded with unduly large number of overlapping penalties for non-compliance. This has led to the insurgencies in the Niger Delta region which houses the exploration of oil and gas companies in Nigeria.

Table 7 unveils the short-run relationship between return on equity and green accounting cost of selected oil and gas companies in Nigeria. It was found that green accounting cost has negative

insignificant relation with return on equity of oil and gas companies in Nigeria. This supports the findings of Yahaja (2019) on the negative association between green accounting and return on equity. On the contrary, it negates the studies of Obida, Owolabi, Enyi and Akintoye (2019) and Nwaiwu and Oluka (2018) on the positive linkage between green accounting and return on equity. On the significant effect of green accounting on return on equity, the result of this study rejects the findings of Obida, Owolabi, Enyi and Akintoye (2019) and Nwaiwu and Oluka (2018), and Osemene, Kolawole and Oyelakun (2016).

In Table 8, there is a significant positive relationship between shareholders' fund and green accounting cost. This provides evidence that when management of oil and gas firms fully disclose their environmental expenses unambiguously, the insurgency tension in oil and gas host community may reduce leading to appreciation in equity contribution to improving business operation. This agrees with Dike and Micah (2018) and Alhashi, Nobanee and Khare (2018) who established the importance of environmental accounting in positively influencing shareholders fund. The inability of the granger causality test to affect shareholders' fund is not in tandem with Nnamani, Onyekwelu and Ugwo (2017) and Nnamani, Onyekwelu and Ugwo (2017) who found that green accounting disclose has a strong potential in improving shareholders' fund. Table 9 shows that earnings per share is negatively and insignificantly related with green accounting cost. The implication is that high cost on green accounting would drastically affect earnings per share of the selected oil and gas firms in Nigeria. The insignificant effect of green accounting cost supports the study of Malarvizhi and Ranjanni (2016) on the no significant relationship between the level of environmental disclosure and firm performance in India and Ironkwe and Ordu (2016) in Nigeria.

Table 10 envisages the insignificant negative relationship between profit after tax and green accounting cost. This is in line with a priori expectation. However, the contrary, the granger causality result in Table 13 sprung up a surprise that green accounting cost has significant effect on profit after tax of selected oil and gas companies. This entails that oil and gas firms profit after tax may decline if they unnecessary spend on the environment owing to their inability to adhere to corporate social responsibility of the host communities. The finding that green accounting cost does not positively and significantly affect revenue of oil and gas companies in Nigeria supports the works of Raymond, John, Racheal and Ben (2016). Conversely, it is in disagreement with Islam, Miah and Fakir (2015) and Musa, Teru and Bukar (2015) who found that pollution, size of the firm, leverage and performance have positive effect on environmental disclosure because of the expected reactions of investors for the safety of their investments.

With regards to net profit margin, Table 11 shows that there is a negative but insignificant relationship with green accounting cost. Equally, the granger causality test did not provide any evidence on the positive and significant effect of green accounting cost on net profit margin. This may be attributed to the vulnerable and deteriorating nature of the host communities housing these oil and gas companies. The host communities are consistently complaining of neglect by oil and companies which has resulted in environmental degradation and pollution of water and air in host communities. This is line with Uzoma and Mgbemena (2015) that activities associated with petroleum exploration, development and production operations have local detrimental and significant impacts on the atmosphere, soils and sediments, surface and groundwater, marine environment and terrestrial ecosystems in the Niger Delta.

## CONCLUSION AND RECOMMENDATIONS

Green accounting is an inclusive aspect of sustainability accounting and reporting, thus, generates reports that provide environmental information to help make internal management decisions and external use by stakeholders. This study established that financial performance assessed by profit after tax of selected oil and gas companies is significantly affected by green accounting cost. Conversely, return on equity, shareholders fund, earnings per share, and net profit margin are significantly affected by green accounting cost. To this effect, the findings of this study should not be viewed as conclusive empirical evidence, but rather an additional motivation for which scholars can develop new idea for further research on the nexus between green accounting and financial performance of companies in the oil and gas sector.

In view of the research findings, the following recommendations are put forward for consideration and implementation by firms' managements:

1. Management of oil and gas companies in Nigeria should develop a well-articulated environmental costing system in order to guarantee a conflict free corporate atmosphere for improved return on equity.
2. Oil and gas companies should establish efficient production of products with reasonable rates without harmful effect on sustainable development, will result into the reduction of environmental effect and have positive effect to increasing shareholders' fund.
3. Oil and gas companies in Nigeria should invest reasonable amount of their earnings on sustainability activities while specific accounting templates be articulated by professional accounting regulating bodies such as ICAN, ANAN, etc. to guide companies' reportage on sustainability activities. The Financial Reporting Council of Nigeria (FRC) and others

alike should make sustainability reporting compulsory while adequate sanctions are spelt out and enforced on defaulting organizations to serve as a deterrent.

4. Indigenous and multinational oil and gas companies should ensure that strict policies as regards green/environmental accounting are adhered to, in order to enable stable organizational performance with respect to revenue which ultimately determines the profit after tax.
5. Environmental Regulation Agency should collaborate with the Financial Regulation Council of Nigeria (FRCN) to make environmental reporting a necessity in annual reports of oil and gas companies in Nigeria.

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