

FIRMS' FINANCIAL CHARACTERISTICS AND SUSTAINABILITY OF THE NIGERIAN OIL AND GAS INDUSTRY

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Abstract

The study appraises the effect of Firms' Financial Characteristics on the Sustainability of the Nigerian Oil and Gas Industry. The specific objectives are to determine the effect of profit after tax on the sustainability and ascertain the effect of firm size on the sustainability Performance of the Nigerian Oil and Gas Industry. An ex-post facto research design was adopted for the study. Quantitative data deployed in validating the formulated hypotheses was sourced from secondary data. The data were extracted from the audited financial statements of the selected Oil and Gas firms, which are listed on the Nigerian Exchange Group (NGX). The study utilized the Pooled Ordinary Least Squares (POLS) regression technique to ascertain the effect of financial variables on the sustainability performance of the Nigerian oil and gas industry. The data were analyzed using E-views 13.0 and STATA 17.0. The result revealed that Profit after tax does not have a significant effect on the Sustainability Performance [$\beta = -0.0496$, Prob. = $0.2318 > 0.05$], and Firm size has a significantly positive effect on the Sustainability Performance of the Nigerian Oil and Gas Industry [$\beta = 0.4389$, Prob. = $0.0000 < 0.05$]. The study concluded that Firms' Financial Characteristics have a significant effect on the Sustainability of the Nigerian Oil and Gas Industry. The study recommends that firms should improve their profit after tax by embarking on operational efficiency and cost and waste reduction by adopting energy efficient technologies, effective

management of water consumption, and minimization of material waste like gas flares to ensure strong profitability that can encourage the activities of sustainability performances.

Keywords: Characteristics, Financial, Firms, Sustainability.

1. INTRODUCTION

The dire need for companies to satisfy various stakeholders' interests is of great concern in recent times. The way and manner a company strives to judiciously maintain economic, environmental, and social sustainability, and at the same time ensure value creation, is an act worthy of public commendation, as these companies are required to satisfy the desires of the wide range of stakeholders that have one interest or the other in a company's created value. Companies are expected to provide the shareholders with financial reports and, in addition to that, supply non-financial information that will showcase how the company fared in handling its environmental and social affairs. The development of the current burning desire for non-financial reporting (which is the genesis of organizations' sustainability reporting journey) began in the US in the 1980s, which is over 30 years ago, as a response to the emergence of the global environmental and natural resources problem. Herbert, Nwaorgu, Onyilo, and Iormbagah (2020) asserted that the premise on which sustainable development is based is the growing awareness of the neglect of the environment and the mounting need to beam a searchlight on corporate activities, especially international oil companies (IOCs), whose operations have historically had serious repercussions on the environment and social lives of the host communities.

Sustainability, therefore, is the ethical way of engaging the economic, social, and environmental resources in the present so as not to hinder future generations from their usage. There is no obvious definitive date when sustainability started in Nigeria. However, the concept intensified and gained popular reception in the 2010s. The incremental rate of environmental degradation, which includes deforestation, pollution, and soil erosion, also mounted pressure on the issue of sustainability. Furthermore, the major challenge of businesses is the deterioration of the natural resources (Mieseigha, & Ihenyen, 2014). Sustainability weighed at a balance, is termed the Triple Bottom Line (TBL), and it is denoted by Economic, Environmental, and Social (EES) sustainability. Economic Line relates more to the production of goods and services at fair prices for the satisfaction of corporate profit objectives as an obligation to investors, through the satisfaction of the identified target market (Ndu & Agbonifoh, 2014). It means responding to the financial expectations of shareholders, while nevertheless generating economic well-being for society as a whole. Niskala and Tarna 2003 in Siljala (2009) outlined economic sustainability, as they articulate - as doing business in a way that enables the company to continue for an indefinite period of time. Economic sustainability refers to strategic activities that aim at maintaining long-term financial stability without any negative impact on the environment or society. This involves proper management of resources, reduction of waste, fair distribution of resources, and promotion of practices that ensure future economic thriving, together with social and environmental health. Environmental sustainability can be implemented by using natural resources efficiently, avoiding emissions into water, air, and soil, and avoiding environmental damage by conducting risk and impact assessments (Siljala, 2009). The social sustainability is all about carrying out businesses in

a way that is beneficial and fair to the labor, human capital, and the community at large (Elkington, 1997). The idea is that these practices provide value to society and “give back” to the community. The social responsibility can be ensured by ensuring fair wage and salary policy, promoting human rights and fair trade, producing safe products, and cooperating in the networks of companies and communities (Siljala, 2009). Social sustainability can also come by way of scholarship to students, building of roads, hospitals, schools, infrastructure, pipe-borne water, bore holes, good working environment.

1.1. Statement of the Problem

The attention of many business stakeholders had been captured by non-financial Corporate Performance, seeing that only profitability is not enough to sustain a firm’s long-term growth. The arguments as to whether organizations that maintain sustainability performance suffer financial injury or outperform financially more than those that do not have engaged the minds of academia. Furthermore, the factors that can drive sustainability consciousness and thereby maintain the triple bottom line strands represented by profit, planet, and people in a balance are of great concern to socio-financial and environmental scholars. The progress in any company’s business often results in self-satisfaction, which leads to a desire to increase achievements, and this can begin to cause excessive environmental degradation, which can bring about disregard for corporate regulations, threats to employee safety, and, to a large extent, all other stakeholders are either directly or indirectly affected. These stakeholders are communities, employees, customers, investors, suppliers, and even the government. They also demand that corporate management assume responsibility and undertake additional measures towards ensuring sustainability. Many people have also proposed that social injustice experienced by a large number of people, and the growing damage to the ecosphere, are a result of the dominant and almost unquestioned objective of maximizing economic growth. In these terms, economic growth indexed by energy use, intensive material production, and exploitative social relations is socially and environmentally unsustainable.

Environmental pollution, inequity, injustice, and poverty are encountered by millions of people across the world (Unerman, Bebbington & O’Dwyer, 2007). Industrial pollution is still a threat to sustainable development, and this can explain why sustainability has turned to be a worldwide concern (Sobhani, Zainuddin, Amran, & Baten, 2011). Unerman et al (2007) opined that human activities, to some extent, contributed to the declining state of society, ecology, and economy, which the immediate generation is confronted with and will also be passed to the unborn generations. Nearly all cases of conflict over environmental harm arise from projects executed without proper consultations with the local communities, which leads to public outcry from the communities. These communities are not generally opposed to oil and gas investments or projects, but they know and insist upon their rights to live in a safe, healthy, and sustainable environment. This is a right that has been increasingly elaborated in international, regional, and domestic laws, especially those relating to business and human rights.

1.2. Objectives of the Study

The main objective of the study is to appraise the effect of Firms' Financial Characteristics on the Sustainability of the Nigerian Oil and Gas Industry. The specific objectives are to:

- i. Determine the effect of profit after tax on the sustainability of the Nigerian Oil and Gas Industry.
- ii. Ascertain the effect of firm size on the sustainability Performance of the Nigerian Oil and Gas Industry.

1.3. Statement of the Hypotheses

The following hypotheses will help address the above research questions:

- i. Profit after tax does not significantly affect the Sustainability Performance of the Nigerian Oil and Gas Industry.
- ii. Firm size does not significantly affect the Sustainability Performance of the Nigerian Oil and Gas Industry.

2. REVIEW OF RELATED LITERATURE

2.1. Conceptual Review

Financial Variables

Financial variables are the parameters/bases for assessing firms' performance. Sustainability performance can be dissuaded or encouraged based on some factors. For this work, the factors in question are the financial variables. These financial variables can bring about high or low performance or even outright nonperformance of sustainability activities. The parameters used in this study are profit after Tax, firm size, Level of leverage, liquidity, shareholders' equity, and sales growth rate. This study seeks to evaluate the effect of these financial variables on Sustainability Performance.

Profit

Profit may be said to be the amount of money the company makes each year. It is a measure of output. Profitability of firms is a variable that strongly influences the engagement of firms in sustainability performance because it provides the needed resources for payment of dividends and engagement in sustainability activities which is a current way of investment for future growth and survival of the firm which is current investment for future growth and survival of the firm (Ombugu 2016). Profitability refers to the potential of a venture to be rewarding. It is the ability of a business to earn a profit. A profit is what is left of the revenue a business generates after it pays all expenses directly related to the generation of the revenue, such as producing a product, and other expenses related to the conduct of the business activities. Profit can also be described as the total financial gain of an enterprise within a specified period of time, while profitability refers to the operating efficiency of the enterprise. It is the ability of a business enterprise to make a financial gain on sales. It is the capability of a business venture to get sufficient return on the capital and employees used in the performance of the business operation (Ombugu 2016).

Sustainability in the business world is basically a matter of knowing how to make long-term money. Profit and profitability are paramount to have the capacity and resources to implement change and make investments. But this must not be at the expense of customers, employees, the environment, or society at large. Increasing the profitability of your business by cutting costs is

sustainable if physical resources, such as saving on power or raw materials, are involved. The installation of solar panels, investing in electric vehicles, or energy-efficient machinery are also ways of increasing profitability through long-term investments.

Profit after Tax

This profit is the net profit attributable to ordinary shareholders, which is arrived at after deducting taxation (Anyanwaokoro, 2008). It is net income after income tax expense. The higher the profit at the disposal of the business, the higher the tendency to engage in sustainability-related activities and vice versa.

Firm Size

Firm size could be measured using various parameters, such as market share of the business, level of sales turnover, number of employees, value of the total assets, and value of capital employed. Duarte (2000) declared that a realization of total assets, for instance, reflects several statistical effects of which only one size is desirable in this context. One of the proxies of firm size is total assets (Chongyu, Zhichuan & Chen, 2013). For this research work, firm size is assumed to be total assets. It is expected that the availability of huge assets should serve as a stimulus to be involved in sustainability performances.

Sustainability

Sustainability is a current and flourishing field of study, which is concerned with the economic implications of environmental issues for various industries and firms, and the burning desire to move to a stable economy (Thi et al, 2021). However, in development literature, most academics, researchers, and practitioners (Tjarve, & Zemite, 2016; Mensah & Enu-Kwesi, 2018; Thomas, 2015) apply the concept to connote improving and sustaining a healthy economic, ecological, and social system for human development. Stoddart, Schneeberger, Dodds, Shaw, Bottero, Cornforth, and White (2011) opined that sustainability can be seen as the careful use and fair dissemination of resources for both the present and coming generation, with the operation of socio-economic activities within the confines of a finite ecosystem. Ben-Eli (2015), on the other hand, sees sustainability as a way of maintaining the general principle of justice and fair play as the present populace utilizes the full potential of the carrying capacity of its environment without producing irreversible adverse effects on the carrying capacity of the environment upon which it depends for the unborn population.

2.2. Theoretical Review

2.2.1. Stakeholders' Theory

The stakeholder theory, which was propounded by R. Edward Freeman in the year 1984, is a theory of business ethics and organizational management that addresses morals and values in the management of an organization. It carefully describes and classifies the set of stakeholders of an organization, and it is concerned with how best the management can recommend and give due regard to the interests of those sets of stakeholders. The stakeholders can either be internal or external. The internal stakeholders include the shareholders, employees, and managers, while the external stakeholders are the government, customers, creditors, suppliers, communities, and the general public. In short, it attempts to address the "Principle of Who or What Really Counts.

Stakeholder theory recognizes the fact that outside the shareholders, other wider groups of stakeholders are viewed to affect or be affected by the actions of a business (Ntim, and Soobaroyen, 2013).

Furthermore, Inyang (2018) opined that a stakeholder is any individual or constituency that contributes in any form, whether voluntarily or not, to the wealth creation machinery, capacity, or activities of an organization and who, by virtue of the contribution, is qualified to queue as either a beneficiary or risk bearer. It is therefore expected that corporations should cover the interests of all stakeholders in the provision of corporate social responsibility. Again, Stakeholder theory can be grouped into ethical (moral) or normative and positive (managerial) branches. The moral (normative) perspective of Stakeholder theory argues that there should be fair treatment of all stakeholders by an organization. Regardless of whether stakeholder management leads to improved financial performance, managers should manage the organization for the benefit of all stakeholders. One definition of stakeholders is provided by Freeman and Reed: Any identifiable group or individual who can affect the achievement of an organization's objectives is affected by the achievement of an organization's objectives. "Stakeholders" refers to anyone who is influenced, either directly or indirectly, by the actions of the firm. According to the stakeholder theory, the business entity should serve as a coordinating vehicle for all the stakeholders' interests, instead of maximizing shareholder (owner) profit (Bernardez, 2005).

The "upstreaming" of a portion of profit from the marketing of finished goods back to the original producer of raw materials, for example, a farmer in fair trade agricultural practice, is a common feature. The following interest groups, like the shareholders, creditors, government, media, employees, employees' families, local communities, local charities, future generations, and so on, are the stakeholders whose interests are expected to be covered by any business organization. Within the ethical (moral) or normative perspective of stakeholder theory, all stakeholders have certain minimum rights that must not be violated (Kwaghfan, 2015).

2.3. Empirical Review

Egolum, Amahalu, and Obi (2021) investigated the Effect of Firm Characteristics on Environmental Performance of Quoted Industrial Goods Firms in Nigeria. The study adopted the ex-post facto research design. This study utilized secondary data sourced from annual reports and accounts of the sampled firms for the study period. Pearson correlation coefficient and multiple regression analysis was used in the hypotheses testing from 2008 – 2017. The result of findings revealed that firm characteristics (proxied by firm size, profitability and firm age) have a significant positive effect on environmental performance (measured by waste management cost). Olusola, Olayinka and Ayodele (2021) wrote on the financial Performance and Environmental Sustainability Reporting Practices of Listed Manufacturing Firms in Nigeria. The need to investigate how financial performance will affect environmental sustainability came about because of the pursuit to be environmental responsible and as well maintenance of a balance between profit maximization and environmentally sustainability practice. The study employed proportional sampling technique regression model to analyse the data as at 2018. The result revealed that profit after tax as a proxy for profitability significantly affect environmental sustainability reporting

practice while earning per share has positive but insignificant effect, liquidity ratio shows negative and insignificant relationship with environmental sustainability.

Mondal, Akter, and Polas (2023) explored the Factors influencing the environmental accounting disclosure practices for sustainable development: A systematic literature review. The study aimed to analyze the framework that demonstrates the link between various factors and environmental accounting disclosure practices, which were carried out in emerging nations in Bangladesh. The data analysis was done through a systematic review approach from 2001-2023. The result unveiled that firm size, profitability, leverage, industry type, and ownership are critical motivators of environmental accounting disclosure

Bakti, and Nengzih (2023) studied the effect of financial performance, company characteristics, and corporate governance on the quality of sustainability report disclosure. The study was carried out in manufacturing companies listed on the Indonesia Stock Exchange from 2017-2020. The analysis was done using statistical techniques and the application of EIEWS12. It was found that company size has no significant effect on the quality of sustainability report disclosure, while other characteristics, like independent commissioners, have an effect. flow, and financial leverage have positive but no significant relationships with sustainability reporting.

3. METHODOLOGY

Research Design and Data Collection

Ex-post facto research design was adopted. The data source was secondary; extracted from the audited financial statements of the selected Oil and Gas firms, which are listed on the Nigerian Exchange Group (NGX), covering 12 years period, 2011-2022. Characteristics captured in the study were:

SP = Sustainability Performance

PAT = Profit after Tax

FIZ = Firm Size

Also, the Company Codes and meanings as applied in this study are as presented in Table 1 below:

Table 1: Company Code and Meaning

	Company Code	Company Name
1	CP	Conoil Plc
2	ET	Eterna Plc
3	MO	Mrs. Oil Nig Plc
4	OO	Oando Oil
5	SP	Seplat
6	TE	Total Energy Marketing Nig
7	CPT	Capital Oil
8	JO	Japaul Oil and Maritime
9	RUP	Rak Unity Pet Comp Plc
10	Arдова	Arдова Oil and Gas

Source: Researcher’s compilation

Model Specification

Classical Linear Regression Model (CLRM) as proposed by Wooldridge (2009) formed the fundamental econometric model for the study. This model specification allows for identification of the channels through which the financial variables, profit after tax and firm size, affect the sustainability performance of the Nigerian oil and gas industry. Assuming sustainability performance to be Y_{it} and the determinants given as X_{it} , the panel least squares model can be presented thus:

$$Y_{it} = \alpha + \sum_{k=1}^j \beta_k X_{kit} + \mu_{it}; \quad k = 1, \dots, J \dots \dots \dots \quad (3.1)$$

Where Y is the dependent variable and X_{it} are the explanatory variables, α is a constant. The subscripts i and t refer to the individual firms and time dimension respectively; β is coefficient of the independent variables. μ_{it} is the composite error term, which can be decomposed further into specific effects and the remainder disturbance term such that,

$$\mu_{it} = \pi_i + \varepsilon_{it} \quad \dots \dots \dots \quad (3.2)$$

Where π_i denotes the unobservable individual specific effect and ε_{it} denote the remainder disturbance.

However, in line with our study variables and specific objectives, the econometric representation of the model in 3.1 is as shown below:

Hypothesis One

$$LnSP_{it} = \beta_0 + \sum_{i=1}^n \beta_1 LnPAT_{it} + \pi_i + \varepsilon_{it} \quad \dots \dots \dots \quad (3.3)$$

Hypothesis Two

$$LnSP_{it} = \beta_0 + \sum_{i=1}^n \beta_1 LnFIZ_{it} + \pi_i + \varepsilon_{it} \quad \dots \dots \dots \quad (3.4)$$

Where, $\sum LnSP_{it}$ = Pooled estimate of the log-transformed values of Corporate Social Responsibility Cost, Tax paid and general overhead at i th cross-section and time t , (Dependent Variable).

β_0 = Constant/Intercept of the regression estimate

$\sum LnPAT_{it}$ = Pooled estimate of the log-transformed values of Profit after Tax at i th cross-section and time t , (Independent Variable).

$\sum LnFIZ_{it}$ = Pooled estimate of the log-transformed values of Total Assets at i th cross-section and time t , (Independent Variable).

The study utilized the Pooled Ordinary Least Squares (POLS) regression technique since it allows flexibility in modeling differences in behaviour across firms and time. Also, in ascertaining the effect of financial variables on the sustainability performance of the Nigerian oil and gas industry, some relevant descriptive and preliminary tests were conducted. For instance, descriptive statistics which presents the *summary statistics* and possibly other descriptive estimates of the data series was used to explain the basic features and behaviour of the data series. *Pairwise Pearson Product-Moment Correlation* analysis was carried out to establish the levels of a significant relationship between the variables of the study. Moreso, the study performed statistical and diagnostic tests of *Skewness/Kurtosis tests*, *Jarque-Bera test* for normality; *Breusch-Pegan Langrangian Multiplier test* for panel heteroskedasticity; *Panel Levin, Lin & Chu t* tests* for stationarity; and *Hausman*

specification test for fixed/ random effect model selection. The study made use of STATA 17.0 for the data analysis.

The Decision Rule was to accept the alternate hypothesis (H1) if the coefficient for the regressor is either positive or negative, and the modulus of the t-statistic > 2.

4. RESULTS

4.1. Summary Descriptive, Normality and Unit Root Tests

Table 2. Summary Descriptive Statistics

VARIABLES	OBS.	MEAN	STD. DEV.	MIN	MAX
LSP	108	15.4639	1.6575	11.4849	18.4545
LPAT	81	14.4724	1.8221	10.296	18.2741
LFIZ	110	17.76	1.7137	13.262	21.1955

Source: Author’s result

The descriptive results as shown in **table 2** provide valuable insights into various financial and sustainability aspects of the study. The mean and standard deviation for each variable offers a glimpse into the central tendency and variability within the dataset. The sustainability variable, with a mean of 15.4639 and a standard deviation of 1.6575, indicates that, on average, the observed sustainability scores are centered around 15.5, and there is relatively low variability, suggesting a consistent level of sustainability across the studied entities. Profit after tax has a mean of 14.4724 and a standard deviation of 1.8221, implying moderate variability in profit figures among the firms. Firm size (mean: 17.76, standard deviation: 1.7137) equally suggest moderate variability across the firms and within the study period. These findings collectively offer a comprehensive overview of the financial and sustainability landscape within the study, helping to identify areas of consistency and variability among the examined variables.

Table 3: Shapiro–Wilk W test for Normality

Variable	Obs	W	V	z	Prob>z
Log_Sustai~y	108	0.91435	5.088	3.529	0.00021
Log_Pat	81	1.67428	9.350	0.427	0.61072
Log_FirmSize	110	0.88769	6.672	4.117	0.00002

Source: Author’s result

Table 3 is the Shapiro-Wilk test which was conducted on seven financial variables, namely sustainability, profit after tax, and firm size, with corresponding p-values of 0.00021, 0.61072, and 0.00002, respectively. The extremely low p-values in sustainability and firm size strongly suggest rejecting the null hypothesis that the data follows a normal distribution. In other words, the Shapiro-Wilk test results indicate non-normality for sustainability and firm size, [p<0.001], while normality with the profit after tax [p>0.001]. This implies that the distribution of sustainability and firm size are significantly different from a normal distribution; therefore, the need to consider alternative approaches or transformations to accurately capture their underlying characteristics.

Table 4: Unit Root Stationarity Test

Variables	Integration order	Statistic	p-value
LSP	I (0)	-2.01984	0.0217

LPAT	I (1)	-4.97823	0.0000
LFIZ	I (1)	-2.80564	0.0025

Source: Author’s result

This study adopted Levin and Chu test (LLC) test as presented in table 4 above to investigate the stationarity of the panel data variables at the level stage and beyond. The panel unit root test results, including both the stationarity order and associated probability values, provide valuable information about the behaviour of each variable over time. Based on the results:

- i) Sustainability (LSP) requires no differencing [I(0)] to achieve stationarity, and the very low p-value of 0.0000 suggests strong evidence against the null hypothesis of a unit root. This indicates a high level of confidence in the stationarity of the sustainability series at its original form.
- ii) Profit after tax (LPAT) requires one differencing [I(1)] for stationarity, and the very low p-value of 0.0000 supports strong evidence against the null hypothesis of a unit root. This indicates confidence in the stationarity of the first difference of the profit after tax series.
- iii) Firm size (LFIZ) attained stationarity at first differencing [I(1)] with a p-value of 0.0025, supporting rejection of the null hypothesis of a unit root at first difference. This implies that the original series is non-stationarity without differencing.

4.2. Correlation Analysis

Correlation is a common tool for describing simple relationships without making statement about cause and effect. The sample correlation coefficient quantifies the strength of the relationship; however, correlation does not look at the presence or effect of other variables outside of the two being explored. Therefore, we have presented the correlation for the variables considered in this study in the table 5.

Table 5: Correlation Matrix of the Study Variables

Correlation			
Probability	LSP	LPAT	LFIZ
LSP	1.000000		

LPAT	0.776615	1.000000	
	0.0000	-----	
LFIZ	0.885427	0.795826	1.000000
	0.0000	0.0000	-----

Source: Author’s result

Table 5 is the correlation results between sustainability and the selected financial metrics revealed the following information:

- i) That there is strong positive correlation between sustainability and profit after tax (LPAT) (r=0.777, p<0.001) which implies that, on average, firms with higher sustainability scores tend to also exhibit higher profits after tax. This positive association suggests a potential link between financial success and sustainability.

- ii) There is a strong positive correlation ($r=0.885$, $p<0.001$) between sustainability and firm size which suggests that larger firms tend to have higher sustainability scores. This could be due to the resources and capabilities that larger firms often possess, enabling them to invest more in sustainable practices.

4.3. Heteroskedasticity Test

The essence of this test (heteroskedasticity test) was to ascertain whether or not the standard deviation of the data over the period is statistically constant (heteroskedasticity problem). The Breusch-Pagan/Cook-Weisberg test method was employed. See the result in table 6 below.

Table 6: Breusch–Pagan/Cook–Weisberg test for heteroskedasticity

Assumption: Normal error terms
 Variable: Fitted values of LSP
 H0: Constant variance
 $\chi^2(1) = 65.45$
 Prob > $\chi^2 = 0.0000$

Source: Author’s result

Table 6 is the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity, and it yielded $\text{Prob}>\chi^2(1) = 0.0000$ which is highly significant, indicating strong evidence to reject the null hypothesis of homoskedasticity (constant variance) in the regression model; or, the presence of heteroskedasticity problem on the dataset. In a more simplified form, the result suggests that the variance of errors is not constant across different levels of the independent variables; hence, there is the presence of heteroskedasticity. The use of panel regression techniques in fixed and random effect models would classically address this heteroskedasticity-robust standard error.

4.4. Panel Data Regression

Panel least square regression is a statistical method used in finance, accounting and other disciplines that attempts to determine the strength and character of the relationship between one dependent variable and a series of other variables known as independent variables which are of a panel data; that is, a data that has both cross-sectional and time series properties together. Table 7 below summarizes the fixed and random regression with the pooled regression output. Table 8 is the table of Hausman test used to choose between the fixed and random effect models.

Table 7: Panel Regression Results of effect of the selected firm financial characteristics on the financial sustainability of Oil and Gas firms in Nigeria (FE, RE, and Pooled Regression estimate)

Variable	Fixed Effect estimate [Prob.]	Random Effect estimate [Prob.]	Pooled estimate [Prob.]
LPAT	-0.049641 [0.2318]	0.000894 [0.9821]	0.159508 [0.0238]
LFIZ	0.438945 [0.0000]	0.619867 [0.0000]	0.716366 [0.0000]
C	8.409679 [0.0000]	4.118907 [0.0003]	0.436117 [0.6406]
R-Square	95.5%	50.6%	79.8%
F-Statistic	128.0067	38.98887	150.2189
Prob. (F-Statistic)	0.0000	0.0000	0.000000

FE = Fixed Effect, RE = Random Effect

Source: Researcher’s extract from Eviews 13.0

In the fixed effect panel regression estimate, the results for profit after tax (LPAT) show a coefficient of -0.0496 with a high p-value of 0.2318, indicating that the relationship is not statistically significant. This suggests that profit after tax, while having a small negative coefficient, does not provide sufficient evidence to conclude a meaningful impact on the dependent variable in the context of this model. Meanwhile, in the same fixed effect results, firm size shows a statistically significant positive association with the dependent variable, as indicated by the coefficient of 0.4389 with a p-value less than 0.001. This implies that, controlling for profit after tax (LPAT), an increase in the firm size is associated with a positive and significant increase in the dependent variable. This finding suggests the importance of considering the size of the firms in understanding variations in the dependent variable.

Results of the random effect panel regression, revealed that profit after tax exhibits a coefficient of 0.000894 with a high p-value of 0.9821, indicating that the relationship is not statistically significant. This implies that, in the context of this model, profit after tax does not provide sufficient evidence to conclude a meaningful impact on the dependent variable. Conversely, firm size demonstrates a statistically significant positive association with the dependent variable, as indicated by the coefficient of 0.619867 with a low p-value of 0.0000. This suggests that, controlling for profit after tax, an increase in firm size is associated with a significant increase in the dependent variable. This finding also emphasizes the importance of considering the size of firms when examining their impact on the dependent variable within the context of the random effect model.

Finally, results of the pooled regression analysis provide that both the profit after tax, and firm size exhibits a statistically significant relationship with the dependent variable, as indicated by their low p-values of 0.0238 and 0.0000 respectively.

Table 8: Hausman test for selection of model

	---- Coefficients ----			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) Std. err.
LPAT	-0.049641	0.000894	0.000106	0.041139
LFIZ	0.438945	0.619867	0.002393	0.081638

b = Consistent under H0 and Ha; obtained from xtreg.
 B = Inconsistent under Ha, efficient under H0; obtained from xtreg.

Test of H0: Difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(6) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 24.822 \\ \text{Prob} > \text{chi2} &= 0.0000 \\ (V_b-V_B &\text{ is not positive definite}) \end{aligned}$$

Source: Author’s result

H0: Random effect model is consistent

H1: Fixed effect model is consistent

The Hausman specification test was conducted to compare the fixed-effect and the random-effect models so as to find out which is the best-suited model for the dataset. From the above table 8, with chi-square estimate of 24.822 and associated probability value of 0.0000 which is statistically significant, the null hypothesis that random effect model is consistent is rejected. The conclusion was drawn that the data series favours fixed effect model more than the random effect model. In other words, we reject the null hypothesis that random effect model is consistent. Hence, our parameter estimation for this study was done using the fixed effect regression model.

4.3. Test of Hypotheses

At this level, the two hypotheses formulated were tested to determine whether to accept or reject them. Conclusion from the hypotheses testing were drawn as follows:

Hypothesis One

H₀₁: Profit after tax does not significantly affect sustainability performance in the Nigerian Oil and Gas industry

Decision

The fixed effect results in table 7 above shows that at 5% level of significance, profit after tax with a p-value of $0.2318 > 0.05$ does not significantly affect the sustainability performance in the Nigerian oil and gas industry. Hence, we do not reject the null hypothesis.

Hypothesis Two

H₀₂: Firm size does not significantly affect sustainability performance in the Nigerian Oil and Gas industry

Decision

The fixed effect result in table 7 above indicates that at 5% level of significance, firm size with a p-value of $0.0000 < 0.05$ has a statistically significant effect on sustainability performance in the Nigerian oil and gas industry. Hence, we reject the null hypothesis.

5. CONCLUSION

In conclusion, the findings suggest that firms' financial characteristics influence sustainability performance in the Nigerian oil and gas industry in uneven and non-linear ways. Specifically, profit after tax does not exert a statistically significant effect on sustainability performance, indicating that higher accounting profitability, on its own, does not necessarily translate into stronger environmental, social, and governance outcomes. This implies that sustainability improvements may depend less on short-term profit levels and more on how firms prioritize, structure, and commit resources to sustainability-related activities, including compliance, risk management, community engagement, and environmental remediation.

Conversely, firm size demonstrates a significantly positive relationship with sustainability performance, underscoring the advantage larger firms appear to have in advancing sustainability goals. Larger firms typically possess greater financial capacity, stronger governance frameworks, more robust operational systems, and heightened public and regulatory visibility, all of which can drive deeper investment in sustainability initiatives and more consistent reporting and implementation. Overall, the evidence suggests that scale is a more reliable determinant of

sustainability performance than profitability within the Nigerian oil and gas context, highlighting the need for policies and corporate strategies that strengthen sustainability capabilities across smaller firms, rather than relying solely on profit growth as a pathway to improved sustainability outcomes. The study concluded that Firms' Financial Characteristics have a significant effect on the Sustainability of the Nigerian Oil and Gas Industry.

6. RECOMMENDATIONS

- i. The study recommends that firms should improve their profit after tax by embarking on operational efficiency and cost and waste reduction by adopting energy efficient technologies, effective management of water consumption, and minimization of material waste like gas flares to ensure strong profitability that can encourage the activities of sustainability performances.
- ii. There should be conscious efforts to increase the sizes of the firms by increasing market share by way of expanding into new markets, developing new products and services to encourage higher levels of sustainability performances.

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