Audit Committee Characteristics and Environmental Disclosure Among Nigeria Listed Non-Financial Firms

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Abstract

This study investigates the influence of audit committee attributes on the corporate environmental disclosure using listed non-financial firms in Nigeria as case study. The population of the study consists of all non-financial listed firms on the Nigerian Exchange Group (formerly NSE). Using purposive sampling techniques, the study selected a total 70 listed non-financial firms having required information necessary for the study between 2011 and 2020. The study employed fixed effect and feasible generalized least square (FGLS) panel regression technique. The fixed effect of FGLS regression analysis indicates that while audit committee independent and audit committee gender diversity recorded significant positive influence on the environmental disclosure among Nigerian listed non-financial firms, the impact of audit committee size and audit committee meetings were negligible. Based on results, it is not the size of the committee nor the number of their meetings that matter for the disclosure of environmental information but the composition of the committee in terms of female and independent members representation. In conclusion, the study found evidence in support of the critical role of audit committee characteristics in environmental disclosure practices among Nigerian listed non-financial firms. Hence, it is recommended that efforts should be made to encourage higher composition of female and independent members on the audit committee.

Keywords

environmental disclosure, audit committee diversity, audit committee independence, audit committee meetings, audit committee size

JEL Codes

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1 Introduction

Though the expansion of business sector influence economic development of a nation through its impact on humans, corporate activities which affect country's environment through its contribution to natural disasters and environmental pollution (Li et al., 2018). Throughout the past few decades, the effects of industrial activity on the environment have resulted in serious ecological issues. This in addition to other human activities resulting in over-exploitation of natural resources and pollution, is a contributory factor to the nearly collapse of the environment in recent time. The sustainability of the economies of nations around the world, especially those in sub-Saharan Africa, has been harmed by the worsening of problems including climate change, air pollution, and hazardous wastes (Nwobu et al., 2018; Ozordi et al., 2018).

Many literatures have documented the potential adverse effect of corporate activities on the operating environment (Ghani et al., 2018; Wilson et al., 2011). The current accounting and corporate finance literature places high priority relating to the requirement for assessments of environmental effects and reporting as a means of effectively reducing the negative effects of various companies' operations (Ghani et al., 2018; Rokhmawati & Gunardi, 2017). To avoid the detrimental effects of corporate activity on the environment, corporate entities are required to conduct themselves responsibly. It was reported for instance that rail, hospital beds, telephones, computer keyboards, and automated teller machines are transmission agents of microorganisms (Wilson et al., 2011). Industries environmental pollution and many incidences of respiratory infections and chronic obstructive lung illnesses have really been linked to climate change difficulties (Nriagu et al., 2016). Increase in domestic and multinational food companies have been characterized with potential negative environmental health impact (Akbas, 2016; Khoiruman & Haryanto, 2017).

Governments and international organizations and other stakeholders are increasingly concerned with the issue of global warming arising from environmental pollution (Kalu et al., 2016). One of the main focuses of the UN's sustainable development goals, which are supported by all nations in the world, is conscientious production that reduces environmental damage. Concerned efforts must be put in place to prevent further deterioration of the environment and restore its stability (Syed & Tollamadugu, 2019). Corporate entities must therefore submit information about their activities in the situated area to demonstrate how fully they uphold their environmental responsibilities. The timely disclosure of considerable information by firms is therefore expected to influence the corporate social image of the firm as it affords the public the opportunity to monitor the sustainability behaviour of the corporate entity effectively. For stakeholders to accurately and rationally assess performance and take necessary action, high-quality environmental information must be published (Global Reporting Initiative, GRI, 2013). Through its impact on social image, environmental disclosure in an organization is linked with the financial and market performance of the firm (Odoemelam & Okafor, 2018).

Given its potential to affect the firm market and financial performance, environmental issues resulting from the corporate activities has been receiving attention from the shareholders of corporate entities also (Joshi & Li, 2016; Li et al., 2016; Wang, 2016). Hence, policy makers, are particularly being placed under obligation to show more commitment towards achieving an environmentally friendly operations as its benefits to humanity is tremendous (Mulyanto et al., 2018; Votsi et al., 2017). The question that has continued to come up in corporate finance literature in the last decade is therefore centres around the factors that drive the environmental disclosure in corporate firms. Corporate environmental disclosure is the practice of businesses that operate in an environment disclosing accurate and timely relevant data (Bateman et al., 2017). Few business entities often include this information in their annual reports (de Villiers et al., 2017).

Disclosing environmental impact of a company's operations is still optional (Plumlee et al., 2015), many annual reports of corporate firms, particularly in developing nations like Nigeria (Al-Janadi et al., 2012; Odoemelam & Okafor, 2018), severely lack this information. Additionally, when it does exist, such details are usually selective as organizations only disclose information that is favorable (Deegan & Gordon, 1996). Environmental disclosure practice is reportedly weak in developing countries (Biobele & Mefor, 2012) and required data for controlling the environment are often unreliable (Botero et al., 2015). Thus, the relevant data is less visible in the annual reports of the entities, investors and regulators may rely on outside information for their valuation judgments (Asay et al., 2017). One major topic that has been linked with environmental disclosure among corporate entities is corporate governance.

The corporate governance system of the organization will determine what, how, when, and how much information should be disclosed about these environmental issues (e.g. Agyei-Mensah, 2016; Akbas, 2016; Cormier et al., 2015; Elsakit & Worthington, 2014; Liao et al., 2015; Mayorga & Trotman, 2016; Trireksani & Djajadikerta, 2016). Research from developed and developing nations has shown that business governance affects environmental exposure (Akbas, 2016; Umoren et al., 2015; Trireksani & Djajadikerta, 2016). Audit committee characteristics are a significant corporate governance instrument that possibly affecting environmental reporting procedures.

The disclosure of environmental information is strategic choice that is within the purview of the management of the companies. In making this decision, the management relies often in the advice from its various committees including the audit committees. Given its monitoring role, audit committee attributes including its size, independence, gender diversity and meetings may thus find out how much sustainability data the business has disclosed.

Even though there have been number of attempts in literature to assess the effect of corporate governance on environmental disclosure, very few studies focus on the effect attributes of audit committee on firms' environmental disclosure. Theses few studies have produced mixed results especially in Nigeria due to the sectoral coverage and variation in the method of analysis employed. Majority of the existing studies have failed to take endogeneity issue into cognizance. This study does not only test for the endogeneity problem but demonstrated how endogeneity issue observed was addressed. The outcome of this study is expected to be indispensable to the corporate firms in Nigeria and to regulators in the country. Firms that operate in Nigeria and in other developing countries can leverage on the outcome of this study to achieve a responsible production process that will reduce carbon emissions and other activities that damage the environment.

2 Literature Review

2.1 Conceptual Review

Environmental Disclosure

According to Mamman et al. (2021), environmental disclosure is the process of informing diverse stakeholders about the environmental effects of corporate operations. Environmental disclosure also refers to the dissemination of data to various stakeholder groups regarding the operational performance of businesses that have impact on the environment. Businesses can share their environmental performance through corporate environmental reporting, sometimes called environmental disclosure.

The process through which a business notifies different stakeholders, such as staff, local communities, shareholders, consumers, the government, and environmental groups, about the range of its management of operations impact on environmental is known as environmental disclosure. In Nigeria, environmental information disclosure refers to voluntary disclosures made by businesses more than legal obligations or managerial decisions to give accounting and other information deemed important for annual report readers to make decisions (Tashakor, 2014). In considering the broad nature and extent of the idea, Environmental disclosure, according to Adam et al. (2016), is a strategy for sharing environmental data on an enterprise's impact, effectiveness, and commitment to environmentally sustainable initiatives.

Audit Committee

A sub-committee of board of directors called audit committee (AC) is in charge of confirming the reliability and accuracy of the financial statements that management provides (Kuang, 2007). The objective of the audit committee's monitoring process is to enhance the quality of information disclosure to all relevant stakeholders (Mamman et al., 2021). The audit committee, which oversees financial reporting and other information disclosure, constitutes one of the board of directors' primary operating committees. The audit committee in Nigeria is required to review the company's financial statements, among other things, in accordance with section 359(6) of CAMA (2020), as amended. The statute also mandates that the audit committee assess the scope and findings of external auditors in order to reinforce their objectivity and ensuring that the company keeps up a strong internal control and accounting process. Like this, every year, AC assesses risk management programs, including issues relating to corporate environmental responsibility.

According to Smith (2003), audit committee is required to push management on critical reporting and sustainability concerns, such as the annual report's disclosure's completeness and clarity, and analyses how the organization is incorporating these difficulties into its own corporate goals and business planning (KPMG, 2010). Furthermore, adequate AC has been argued to be crucial for excellent corporate governance (Zaman et al., 2011). Due to the accounting expertise and experience of the AC, corporate governance is positively and significantly impacted by disclosures on social and environmental issues. In a similar line, AC is best recognised for reducing errors and insisting on regulatory compliance, which strengthens internal control and raises the quality of disclosures (Ho & Wong, 2001).

Audit Committee Size

The term "audit committee size" refers to the total number of members. According to Financial Reporting Council of Nigeria – FRCN (2018), each audit committee must have a significant number of members relative to the size of the board. An audit committee with a larger membership typically has diverse knowledge and experience, which allows it to share more insights during meetings. According to several academic works, a big team size increases the likelihood that individual team members would succumb to the "crowd effect" and be more likely to adopt the opinions of their colleagues without giving the matter more attention. When this occurs, the audit committee members are less likely to bring up accounting report concerns during the internally review process, increasing the likelihood that errors may be created and not be discovered until later (Kipkoech & Rono, 2016).

Audit Committee Independence

An independent member of the audit committee is one who has never worked for the corporation and is not currently doing so. The term "AC independence" refers to a member of the AC not conducting a large amount of business with the organisation on whose board of directors he is serving. The independence of the audit committee, according to Ayuso and Argandona (2007), is "the extent to which board members (audit committee) are the subject of the current CEO or organisation". The board should receive assistance from an independent audit committee to fulfil its legal and fiduciary obligations (Weir & Laing, 2001). The goal is to ensure the committee's independence, which will increase board activity confidence, financial control, and the legitimacy of the committee's work in overseeing the firm's financial statement process (Kibiyaet al., 2016).

Audit committee that is independent board of directors will be in position to objectively perform the statutory duties expected and thereby enhancing corporate governance and promote disclosure of the effect of activities on the immediate environment of a business/organization.

Audit Committee Meeting

DeZoort et al. (2002) state that an auditor committee's level of diligence can be gauged by the number of meetings held. Even though few studies directly link business performance to the frequency of meetings, meeting frequency is a critical component of a company's operations and processes that ensures reliability and efficiency (Ioana & Mariana, 2014). One of the most important aspects of auditor bodies is their meeting frequency. Yatim et al. (2006) was of the view that there is the likelihood that board members will carry out their responsibilities and raised the level of oversight over accounting procedures through external auditing and the existence of audit committee.

The frequency at which the audit committee meets during an accounting year determines the opportunity to reasonably perform their functions as regular meeting will provide platform to critically examine operational process that will affect environment and to confirm the reportage of such in financial statements.

Audit Committee Gender Diversity

In terms of gender diversity, having women on the AC might result in increased reporting discipline and closer supervision (Adams & Ferreira, 2009; Srinidhi, et al., 2011). For numerous reasons, women are especially likely to manage ESG reporting methods more effectively. Women are expected, on the one hand, to supervise environmental disclosures in AC meetings more effectively than men (Galbreath, 2018; Husted & De Sousa-Filho, 2018). However, female directors bring distinct viewpoints and moral principles to the table, which increases awareness of environmental and societal issues. The literature also highlights the ways in which female board members foster more active board discussions, enhancing the AC's ability to discuss and monitor environmental issues (Bear et al., 2010). Because they actively seek out and acquire knowledge about environmental and social concerns.

Literature also emphasises how female board members encourage more engaged board discussion, which improves the audit committee's capacity to debate and track environmental issues (Bear et al., 2010). Women directors rigorously search for and gather knowledge about issues related to society and the environment, so they are more equipped to emphasise the advantages of environmental disclosures at meetings (Huse & Solberg, 2006). (Galbreath, 2018.) Women also take their roles as directors more seriously and actively which may help them perform their duties as members of the audit committee more effectively, such as checking environmental reporting methods. Liao et al. (2015), found that female directors are more inclined to take jobs addressing sustainability and environmental challenges.

Theoretical Framework

The agency theory, which is one of the most often utilized theories in accounting and finance literature to describe firm's strategic behaviour, serves as the foundation for this study. The agent (management) pursues interests that are at odds with the principal (shareholders) and even other stakeholders, creating conflict in the modern corporate environment, according to agency theory.

It is argued that, management need to be socially responsible to attract higher firms' value and thus maximize the wealth of shareholders (Principal) (Jensen & Mecklings, 1976). Ultimately, Stakeholders increasingly demand that businesses disclose their environmental difficulties, and audit committees play a critical role in forming firms strategic decisions leading to the disclosure of higher environmental information. The ability of the audit committees to determine strategic decisions and thus encourage firm to disclose more environmental information is anchored on the audit committees' features which reflects the audit committee effectiveness (Royaie & Ebrahimi, 2015).

Some of these attributes include the size, independent, meetings and gender diversity of audit committee. In particular, it has been argued in several quarters that audit effectiveness of the audit committee is higher with size (Buallay & Aldhaen, 2018), audit committee meetings (Bicer & Feneira 2019), audit committee independence (Chariri et al., 2018; Odoemelam & Okafor, 2018) and gender diversity of the audit committee (Wang & Sun, 2022).

Empirical Literature
Audit Committee Size and Environmental Disclosure

Sheikh et al. (2019) equally assessed how audit committee qualities influence voluntary disclosure in a study of 150 Pakistan firms. It was reported that voluntary disclosure increases with audit committee size. In a study conducted by Buallay and Aldhaen (2018), the authors looked at the influence of AC traits on the amount of sustainability report disclosure for 59 listed companies in the Gulf Cooperation Council (GCC) between 2013 and 2017. The findings of their investigation showed that the sampled organizations' sustainability disclosure rises with larger audit committee sizes. Royaie and Ebrahimi (2015) reported that audit committee size does not affect voluntary ethics disclosure.

Audit Committee Independence and Environmental Disclosure

Mamman et al (2021) reported in a study of 58 Nigerian non-financial companies using multiple OLS regression that independence and size of audit committee though recorded positive but do not significantly impact on environmental disclosure of the sampled firms. In a research of 150 Pakistani companies, Sheikh, et al. (2019) evaluated equally how audit committee features affect voluntary disclosure. According to a report, audit committee independence and size both boost voluntary disclosure.

Odoemelam and Okafor (2018) reported Nigerian listed non-financial firms using OLS regression that audit committee independence does not drive corporate environmental disclosure. The study was however a cross sectional study of 86 firms. Ofoegbu, Odoemelam et al (2018) found in a study of selected companies in South Africa and Nigeria which was based on data collected from 90 Nigerian companies and 213 South African firms and analysed using OLS that committee independence does not drive environmental disclosure practices. The study was based on cross-sectional data. Naseer and Rashid (2018) in study to interrogate the implication of audit committee independent on environmental reporting of 50 non-financial firms in Pakistan between 2014 and 2015 reported that audit committee independence exerts positive influence on environmental reporting of the firms.

In a study carried out by Chariri et al. (2017) to examine the implication of audit committee independent and meetings on carbon emission disclosure using data from 136 listed firms on Indonesia Stock Exchange between 2009 and 2015, it was revealed that audit committee independence exerts significant positive influence on the environmental performance of the firms. Appuhami and Tashakor (2017) in a study of 300 firms in Australia corporations found that audit committee independence has no discernible consequences for environmental disclosure and that the size of the audit committee considerably boosts the corporate social and environmental disclosure.

Audit Committee Meetings and Environmental Disclosure

The influence of the features of AC on the social and environmental disclosure of Turkish listed companies were studied by Bicer and Feneir (2019). Based on information gathered from listed banks on Borsa, the size of the audit committee and the frequency of the meetings of the audit committee did not significantly affect environmental disclosure, according to the findings of the OLS model used in the study. Data from 237 environmentally sensitive industries in Malaysia were used by Azman (2019) to examine the impact of audit committee characteristics on the calibre of voluntary disclosure. While the au8dit committee size has a favourable effect on the standard of environmental disclosure, the level of main environmental disclosure was determined to be 45.42%. The quantity of audit committee meetings has no bearing on the quality of environmental disclosure.

In a study conducted by Buallay and AlDhaen (2018), the authors looked at the impact of audit committee traits on the amount of sustainability report disclosure for 59 listed firms in the Gulf Cooperation Council (GCC) between 2013 and 2017. Their analysis' findings showed that the number of AC meetings increases with the amount of sustainability disclosure made by the tested companies.

Audit Committee Diversity and Environmental Disclosure

Wang and Sun (2022) found that having more women on the audit committee stimulates greater disclosure of social and environmental information in their research of publicly traded Chinese companies. According to a related study by Bravo and Reguera-Alvarado (2018), female presence on the audit committee is positively and significantly correlated with disclosure practices of social and environmental data.

3 Methodology

3.1 Data and Technique of Analysis

The study employed ex-post-facto research design. The population of the study is made up of all firms listed non-financial firms between 2011 and 2020. This study utilized purposive sampling technique to select 70 listed non-financial firms. The data collected are from secondary sources from annual report of listed non-financial firms. Three hypotheses were tested through Panel regression analysis. Hence, study employed robust fixed effect panel regression to control for violation of heteroscedasticity and serial correlation assumptions in achieving the objectives.

Table 1: List of Sampled Firms by Sectors

Sector	Number of Sampled Firms	Percent (%)
Oil and Gas	7	10.00
Services	13	18.57
Natural Resources	4	5.71
Industrial	10	14.29
Consumer Goods	16	22.86
ICT	4	5.71
Conglomerate	5	7.14
Health Care	6	8.57
Agriculture	3	4.29
Construction	2	2.86
Total	700	100.00

Source: Authors' Compilation (2023)

3.2 Model

To investigate the influence of audit committee attributes on corporate environmental disclosures, the following regression model was used:

$$ENDI = f(ACS, ACM, ACID, ACD, FP, FS, FLV) - \quad - \quad - \qquad (3.1)$$

(3.1) could be represented in linear form as

$$ENDI_{it} = \tau + \sigma ACS_{it} + \vartheta ACM_{it} + \varphi ACID_{it} + \lambda ACD_{it} + \beta FP_{it} + \alpha FS_{it} + \propto FLV_{it} + \pi_{11} IND_{it} + \beta_{11-20} YEAR_{it} \mu_{it} - - - \qquad (3.2)$$

Where;

ACS_{it} = size of audit committee

ACM_{it} = audit committee meeting

$ACID_{it}$ = audit committee independent

ACD_{it} = audit committee diversity

FS_{it} = Firm size

FP_{it} = firm performance

FP_{it} = Financial leverage

I = Firms, t = time

Table 2: Variable Measurement

Variables	Description
Dependent Variable	
Environmental disclosure (ENDI)	An index score of the extent of firm disclosure of environmental information based on GRI framework expressed in proportion.
Independent Variables	
Audit Committee Size (ACS)	Number of members on committee
Audit committee meeting (ACM)	Number of times meeting in fiscal year
Audit Committee Independent (ACID)	The proportion of non-board members in the board
Audit committee Diversity (ACD)	Proportion of women in committee
Control Variables	
Firm Performance (FP)	The change in revenue from one year to another
Firm Size (FS)	Natural log of the total asset of the firm
Financial leverage (FLV)	The ratio of liability to equity
Industry Effect (IND)	A binary variable with one use as indicator of environmentally sensitive sectors. Following leads form other literature, this study used oil and gas, construction and industrial sectors to be environmentally sensitive sectors.

Source: Authors' Computation (2023)

The level of environmental disclosure is obtained from the 8 themes relating to environmental disclosure in the Global Reporting Initiatives which include energy, water, material, emission, biodiversity, products and services and effluent and waste disclosure and compliance to environmental law disclosure. A four-level quantitative scale ranging from 0 to 3 (0, 1, 2, 3) is employed in attaching weight to each of the eight indicators. The score of 0 is assigned if no information on a theme is disclosed, 1 is assigned for the disclosure of the theme in general statement, 2 is assigned for qualitative disclosure while 3 is assigned for the quantitative disclosure of the theme. The implication is that the maximum score obtainable by each indicator is 3 and since there are a eight indicators of environmental disclosure being captured, the maximum score is 24. The environmental disclosure index is then obtained as:

$$ENDI = \frac{\sum_1^8 d_i}{24}$$

Where ENDI is environmental disclosure index, d is the weight score (using a four-level quantitative scale) obtain for each of the indicators i.

4 Results and Discussion

Table 3: Summary Statistics of Variables

	Mean	Std. Dev.	min	max	p25	Median	p75	skewness	kurtosis
ENDI	0.309	0.169	0.167	0..958	0.250	0..250	0.250	2.684	9.004
ACID	0.457	0.127	0.000	1.000	4.000	0.500	0.500	0.407	9.087
ACM	3.811	0.756	1.000	9.000	3.000	4.000	4.000	0.247	7.744
ACD	0.106	0.139	0.000	0.667	0.000	0.000	0.167	1.175	3.820
ACS	5.451	1.007	0.000	9.000	4.000	6.000	6.000	-0.590	3.133
FP	2.942	17.268	-179.917	176.267	0.562	3.746	8.249	-1.534	42.608
FS	7.064	0.818	5.093	9.241	6.464	6.997	7.721	0.132	2.449
FLV	1.893	4.624	-28.271	47.923	0.683	1.298	2.282	3.009	39.502

Source: Authors' Computation, (2023)

Table 3 above revealed that the average environmental disclosure index to be 0.309 implying that the extent of environmental disclosure among Nigerian non-financial firms is 30.09 per cent.. The results further revealed the average audit committee size to be 5.451 with a SD of 1.007. The minimum audit committee size was 2 with maximum of 9. The average frequencies of audit committee meetings in a financial year are found to be 3.811 or about four times with SD of 0.756 as well as minimum and maximum meeting time of 1 and 9. Also, the results revealed that the average number of non-executive members of audit committee (Audit committee independence) of Nigerian non-financial firms to be 0.457 with SD of 0.127, minimum of 0 and maximum of 4. Also, the average female representation on the committee is 0.106 with a standard deviation of 0.139, while the average firm performance as represented by the return on asset is 2.942 with standard deviation of 17.268 indicating wide variation in the performance of Nigerian non-financial firms, the firm size, the estimated average is 7.064 with SD of 0.818 and finally, the average of firm financial leverage is 1.893 and it SD is 4.674.

The results suggest that there is no wide variation in the environmental disclosure among Nigerian listed non-financial firms over the period covered as the SDs were found to possess lower value that the means of all elements except for firm performance and financial leverages where the SDs were found with higher value compared with their means.

Table 4: Estimated Pairwise Correlations

Matrix of Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) ENDI	1.000							
(2) ACID	0.126	1.000						
(3) ACM	0.115	0.022	1.000					
(4) ACD	0.121	-0.043	0.063	1.000				
(5) ACS	0.248	-0.002	0.208	0.103	.000			
(6) FP	0.111	0.063	0.039	0.074	0.130	1.000		
(7) FS	0.396	0.046	0.280	0.081	0.542	0.213	1.000	
(8) FLV	-0.056	-0.179	0.033	0.024	0.131	0.015	0.109	1.000

Source: Authors' Computation, (2023)

The results of correlation matrix of the study as shown in Table 4 above shows that the interrelationship between the dependent variable and the explanatory variables in one hand, and in another between the explanation variables shows the absence of multicollinearity as the highest correlation coefficient shows a value of 0.542 for the relationship between the size of audit committee (ACS) and firm size (FS). This value is lower than the threshold of 0.7 as suggested by Kennedy, (2008) for the presence of multicollinearity.

Normality Test

Table 5: Summary of Normality Test

Test	Prob Value	Remarks
Skeweness/Kurtosis	0.000	Normal Distribution Assumption rejected
JaqueBera	0.000	Normal Distribution Assumption rejected

Source: Authors' Computation, (2023)

The results of normality test using skeweness, kurtosis and JaqueBera tests are as shown in Table 5 above which shows that the joint probability value of the skewness and Kurtosis score of 0.000 implies the rejection of the null hypothesis of normal distribution. The results of the JaqueBera test equally indicate that the null hypothesis of normal distribution is rejected. The implication is that the data used in the study are not normally distributed. The graphical representation equally confirms this (see appendix). This may be linked with heteroscedasticity in the data used. The study therefore tests for heteroscedasticity in the subsequent section and the results affirmed existence of heteroscedasticity. The issues are addressed by obtaining the regression results with robust standard error while feasible generalized least square panel regression was used in the alternative.

Unit Root Test

Unit root test was conducted to check for the stationarity of the series used in this study. Given the few years covered in the study, Handri t test for unit root was employed and the results are summarized in Table 6 shown below. It provides that the null hypothesis of no unit root was only rejected for the environmental disclosure index while the null hypothesis of no unit root could not be rejected for all the explanatory variables. By implication, the explanatory variables are stationary while the environmental disclosure index is found to be non-stationary. The non-stationarity of the environmental disclosure may be attributable to its trending over time. Thus, this study controls for time by including year effect in the regression model of the study.

Table 6: Summarised Results of the Handri t Unit Root Test

Variable	Statistic	Prob. Value	Order of Integration	Remarks
ENDI	0.7601	0.841	I(1)	Not Stationary
ACID	0.4578	0.000	I(0)	Stationary
ACM	0.2386	0.000	I(0)	Stationary
ACD	0.508	0.000	I(0)	Stationary
ACS	0.4416	0.000	I(0)	Stationary
FP	0.3261	0.000	I(0)	Stationary
FS	0.2937	0.000	I(0)	Stationary
FLV	0.1984	0.000	I(0)	Stationary

Source: Authors' Compilation, (2023)

To ensure that relative linear regression assumptions are not violated, the study conducts diagnostic tests for serial correlation, heteroscedasticity and cross-sectional dependence. The results obtained are summarized in Table 7. The results of the Pesaran test indicates the presence of cross sectional dependent while Wooldridge test shows that there is existence of firs-order serial correlation. Also, the Breusch-Pagan test for heteroscedasticity revealed the no absence of heteroscedasticity in the study.

Table 7: Summary of Diagnostic Tests

Test	**Results**	**Remarks**
Pesaran Cross Sectional Dependence Test	F = 35.559 Pr = 0.000	Existence of Cross Sectional Dependence at 1 per cent
Breusch-Pagan test for heteroskedasticity	Chi2 = 179.34 Prob> Chi2 = 0.000	Existence of Heteroscedasticity at 1 per cent
Wooldridge test for serial correlation	F stat = 87.173 **Prob> Chi2 = 0.000**	Existence of First-order serial correlation

Source: Authors' Computation, (2023)

In addition, few other post estimation diagnostic tests were conducted and Hausman test to determine whether the fixed or random effect models be selected. Thus, the estimation of the data for this study was be based on the fixed effect panel regression.

From the robust fixed effect panel regression results presented in the second column of Table 8, audit committee size has insignificant effect on the environmental disclosure of listed firms given its coefficient and standard error of 0.0075 and 0.0055 respectively.

These results imply that the size of the audit committee does not matter for the disclosure of environmental information. The estimated slope and corresponding standard error of 0.0074 and 0.00683 respectively in the full model presented in column 6 of Table 9 imply that audit committee's size impact on the environmental disclosure of publicly traded non-financial enterprises in Nigeria is positive but insignificant.

Table 8: Estimated Static Panel Regression Results (Dep = ENDI)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ACID	ACM	ACGD	ACS	Full Model
ACID	0.107**				0.112**
	(0.0467)				(0.0467)
ACM		-0.0061			-0.0066
		(0.0090)			(0.0082)
ACDn			0.0857**		0.0882**
			(0.0418)		(0.0418)
ACS				0.00754	0.0074
				(0.00550)	(0.0068)
FP	0.000372	0.0004	0.000374	0.000417	0.0003
	(0.000343)	(0.0003)	(0.000343)	(0.000341)	(0.0003)
FS	0.0786***	0.0806***	0.0784***	0.0743***	0.0745***
	(0.00728)	(0.0109)	(0.00729)	(0.0115)	(0.0087)
FLV	-0.00267**	-0.00321***	-0.00329***	-0.00335***	-0.0028**
	(0.00127)	(0.0009)	(0.00125)	(0.000852)	(0.0013)
Ind	0.0125	0.0104	0.00780	0.0101	0.0105
	(0.0115)	(0.0119)	(0.0116)	(0.0118)	(0.0116)
Year Effect	YES	YES	YES	YES	YES
Constant	-0.317***	-0.262***	-0.272***	-0.278***	-0.314***
	(0.0568)	(0.0638)	(0.0533)	(0.0670)	(0.059)
Observations	700	700	700	700	700
R-squared	0.215	0.209	0.214	0.210	0.222

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' Computation (2023)

In column 3 of Table 8, the results (coefficient = -0.0061; standard error = 0.0090) imply that meetings of the audit committee (ACM) have a negative and negligible effect on the environmental disclosure of publicly traded non-financial companies in Nigeria. Inferentially, the frequency of audit committee meetings has little bearing on the depth of environmental disclosure made by Nigerian non-financial enterprises. The coefficient of -0.0066 and standard error of 0.0082 in the full model of column 6 equally confirm that audit committee meetings have a negligible impact on listed non-financial corporations in Nigeria's disclosure of the effect of activities on environment.

Furthermore, he results of column 2 with a coeff. 0.107; stand error = 0.0467 and suggest that audit committee independence has a direct and significant effect on environmental disclosure, indicating that the higher the percentage of independent board members, the higher the tendency of higher environmental disclosure by the Nigerian non-financial. Similar results are recorded in the full model where the coefficient is found to be 0.0112;

stand error = 0.0467demonstrate that environmental disclosure among Nigerian listed non-financial enterprises is positively and significantly impacted by audit committee independence. The results of the fixed effect panel regression summarized in column 4 of Table 8, an estimated coefficient of. 0.0857; stand error = 0.0414 revealed that audit committee diversity has significant positive impact on environmental disclosure of listed Nigerian non-financial firms implying that higher audit committee diversity lead to more environmental disclosure practice in Nigerian corporate environment. The estimated slope and corresponding standard error of 0.088 and 0.0418 respectively in the full model presented in column 6 above equally revealed that audit committee diversity has positive and significant impact at 5 per cent level on environmental disclosure of Nigerian listed non-financial firms. The implication of the results is that higher female representation on the audit committee is expected to facilitate higher corporate environmental disclosure in Nigerian non-financial sector.

According to the estimated results in Table 8 above for the influence of the control variables, performance of the company has a direct but insignificant impact upon the environmental disclosure of the listed non-financial enterprises in Nigeria. The size of the firm on the other hand recorded positive and significant influence on environmental disclosure. This suggests that larger firms are more disposed to disclose more environmental information. The financial leverage (FLV) of firms is found to exert negative influence which is significant on the environmental disclosure, as indicated by the estimated coefficient of -0.0028 and standard error of 0.0013 which implies that a company's financial leverage is irrelevant for corporate social and environmental disclosure.

Robustness Check

The study checks for the robustness of the fixed effect panel results obtained by using a panel feasible generalized least square, which is alternative panel regression technique that is not only autocorrelation and heteroskesdasticity consistent (controls for both serial correlation and heteroskedasticity), but also controls for endogeneity. The results obtained with panel feasible generalized least square are presented in Table 9 where in column 5 it reveals that the size of the audit committee (ACS) has a direct but no significant influence on the environmental reporting procedures of listed non-financial companies in Nigeria with coefficient of 0.0075; stand. error. = 0.0068 respectively, the full model revealed a coefficient of 0.0074 with standard error of 0.0067 which suggest that audit committee size has a direct but no significant impact on environmental disclosure. The estimated coefficient of -0.0061; stand error = 0.0082 shows that frequency of meetings of audit committee has positive and significant influence on environmental disclosure while coef. -0.0066; stand error = 0.0081 in the full model and this indicate that the impact of the frequency of audit committee meetings (ACM) on environmental disclosure is negative but not significant. In addition, the results revealed that audit committee independence (ACID) with coef. 0.107; stand. error = 0.0462 records a positive and significant influence on environmental disclosure among Nigerian listed non-financial firms and the estimated coefficient and standard error of 0.112 and 0.0462 in the full model affirmed independent audit committees have a strong positive impact on environmental disclosure. Similarly, the estimated coefficient of 0.0857 and standard error of 0.0414 reveal that audit committee diversity (ACD) exerts positive and significant influence on environmental disclosure of listed firms while the coefficient and standard error of 0.088 and 0.0413 respectively in the full model in column 6 confirmed that audit committee diversity has a considerable positive impact on environmental disclosure. The above suggest that the way in which audit committee influence the disclosure of environmental information among Nigerian listed non-financial firms is robust to alternative technique of analysis.

Table 9: Estimated Feasible Generalized Least Square Panel Regression Results

Estimated Pannel Regression Results

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ACID	ACM	ACGD	ACS	Full Model
ACID	0.107**				0.112**
	(0.0462)				(0.0461)
ACM		-0.00610			-0.00664
		(0.00816)			(0.00811)
ACD			0.0857**		0.0882**
			(0.0414)		(0.0413)
ACS				0.00754	0.00737
				(0.00676)	(0.00674)
FP	0.000372	0.000427	0.000374	0.000417	0.000310
	(0.000339)	(0.000340)	(0.000340)	(0.000340)	(0.000339)
FS	0.0786***	0.0806***	0.0784***	0.0743***	0.0745***
	(0.00720)	(0.00746)	(0.00721)	(0.00845)	(0.00854)
FLV	-0.00267**	-0.00321***	-0.00329***	-0.00335***	-0.00282**
	(0.00126)	(0.00124)	(0.00124)	(0.00125)	(0.00126)
Ind (sens =1)	0.0125	0.0104	0.00780	0.0101	0.0105
	(0.0114)	(0.0114)	(0.0114)	(0.0114)	(0.0114)
Years Effect	YES	YES	YES	YES	YES
Constant	-0.317***	-0.262***	-0.272***	-0.278***	-0.314***
	(0.0561)	(0.0546)	(0.0527)	(0.0531)	(0.0579)
Observations	700	700	700	700	700
Number of PID	70	70	70	70	70

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Authors' Computation (2023)

5 Discussion of Findings

This study finds that the audit committee's independence had a positive and substantial impact on environmental exposure in both the fixed effect and FGLS analyses, indicating a connection between greater representation of independent individuals on the board and higher environmentally information disclosure. This demonstrates that higher proportion of non-executive directors have a strong, positive influence on environmental disclosure in the corporate environment of Nigeria.

Also, based on the FGLS results, the study concluded that the audit committee's independence has a favourable and substantial effect on sustainability disclosure, suggesting that greater participation of independent members in audit committee is related to greater openness about environmental information. This is consistent with the efficient monitoring hypothesis proposed under the agency theory, according to which independent committee with varying ideas and independent mind which ultimately make it easier to make informed decisions, including those involving the release of environmentally sensitive information. This is expected as higher AC independent encourages the audit committee to make independent strategic decision which is fair to all stakeholders including the disclosure of environmental disclosure practices. The results obtained agree with the findings of Chariri et al. (2017) that AC independent exerts positive and significant influence on environmental disclosure. However, the results found here does not agree with the report of literature which submitted that audit committee independence has no bearing on environmental disclosure including Appuhami and Tashakor (2017), Odoemelam and Okafor (2018), and Ofoegbu et al. (2018).

The results of the fixed effect panel regression and the FGLS used in the study also showed that audit committee diversity (ACD) records a positive and substantial effect on environmental disclosure, indicating that the higher the proportion of female audit committee members, the more environmental information disclosure among Nigerian listed non-financial firms. The findings here concur with Wang and Sun (2022) finds that disclosure of environmental and social information is encouraged if there's a large proportion of women on the audit committee. Bravo and Reguera-Alvarado (2018) equally reported that female representation on the board enhances environmental disclosure practices.

According to the panel regression results from the study, frequency of audit committee meetings has a negative but no significant impact on environmental disclosure, including when FGLS, which corrects for endogeneity issues, is used. So, audit committee activeness in terms of how frequently they meet does not have effect on the environmental disclosure of the listed non-financial companies in Nigeria. The non-significant of the audit committee meeting may be linked to the fact that no large variation is observed in the audit committee meetings in the study across firms and time. The results do not agree with the submission in related studies such as those by Buallay and Aldhaen (2018) and Chariri, et al. (2018), which found an association between audit committee meetings and greater environmental disclosure.

In addition, the results found in the study indicate that audit committee size (ACS) records positive but no significant influence on the environmental disclosure practice. The finding here fails to agree with the results of previous studies including Buallay and Aldhaen (2018), and Abdullah and Shah (2019) who found that environmental disclosure increases with higher firm size. The study however agrees with the finding of Mamman et al. (2021) who reported no significant influence of AC size on environmental disclosure, as well as Royaie and Ebrahimi (2015) and Bicer (2019) who reported no influence of AC size on environmental disclosure.

6 Policy Implications

The study found evidence that the attributes of the audit committee matter for the disclosure of the environmental related information by the Nigerian non-financial firms. In particular, the implication of the findings in this study is that neither the size of the audit committee nor the number of times they meet that matters for encouraging disclosure of environmental information but the composition of the committee in a way that give room for more independent members and female on the committee. From this study therefore, policy makers and other concern stakeholders can leverage on the composition of the audit committees to encourage and enhance sustainability practices among Nigerian non-financial firms.

7 Conclusion and Recommendations

This study extensively examined the effect of audit committee characteristics on the amount of corporate environmental disclosure in Nigeria. In this study, a variety of audit committee characteristics were taken into account, including the size, independence, gender diversity, and frequency of meetings. According to empirical findings from both fixed effect and FGLS used in the study, audit committee independence and gender diversity had a favourable and significant impact on environmental disclosure among Nigerian listed non-financial enterprises while the impact of audit committee meetings and size were found to be negligible.

The general conclusion of this study is that the composition of the audit committees in terms of more independent members and female representation play crucial role in attainment more environmental disclosure. Previous studies on the link between audit committee attributes and environmental disclosures have largely failed to incorporate the issue of endogeneity in their studies. This study is different as it tested for the presence of endogeneity and control for the problem using feasible generalized least square panel regression technique.

In line with the results, the study recommends that regulators should lay emphasis on the effectiveness of the audit committees to achieve disclosure of environmental information by these firms. In particular, it is suggested efforts should be made to ensure that the audit committee composition of the Nigeria non-financial firms reflect more independent members. Also, more female representation on the audit committee of the Nigeria non-financial firms should be encouraged.

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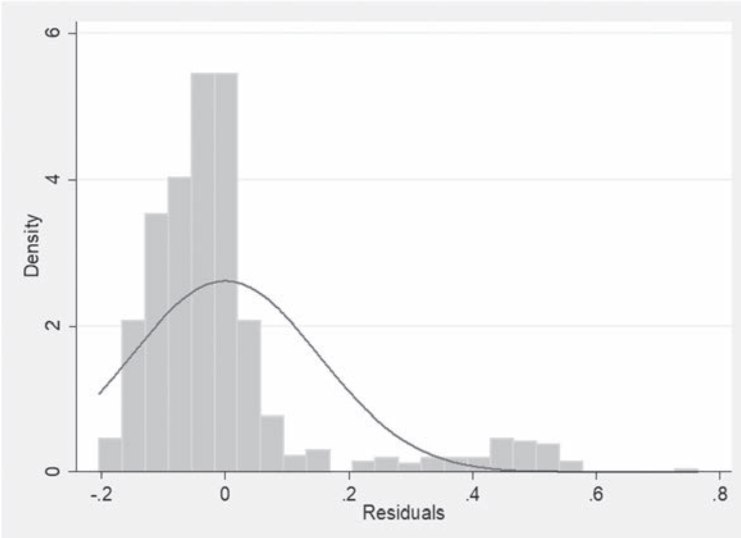
Appendix



Normal distribution graph

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