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Article

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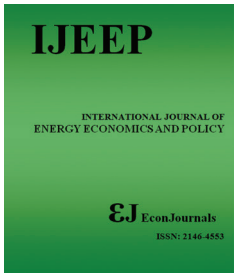

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Relationship of Environmental Disclosure of Renewable Energy, Carbon Emissions, Waste Management, Water Consumption, and Banks' Financial Performance

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ABSTRACT

In recent years, sustainable banking principles have been employed in the daily operations of deposit money banks in Nigeria. This study examines the relationship between environmental sustainability and the financial performance of 14 deposit money banks listed on the Nigerian Exchange Group. It focuses on the impact of environmental disclosure of renewable energy, carbon emissions, waste management, and water consumption (i.e. proxies for environment sustainability) on the bank's return on assets (ROA i.e. proxy for financial performance). The research spans an 8-year period from 2013 to 2021, using panel data and multiple regression analysis to analyze the data. The data is collected from the annual reports of the deposit money banks listed on the Nigerian Exchange Group. The research design is ex-post facto, utilizing secondary data collection methods. The findings suggest that there is a positive but insignificant association between environmental sustainability indicators (renewable energy, carbon emissions, waste management, and water consumption) and financial performance (ROA). In conclusion, the study finds no significant relationship between and financial performance (ROA).

Keywords: Carbon Emission Disclosure, Financial Performance, Sustainable Banking
JEL Classifications: C1, C20, C22, Q16, Q51

1. INTRODUCTION

Global warming has led to an increase in the incidence and extent of natural catastrophes in contemporary society, which has forced mankind to reevaluate how we use resources from nature and how we produce and consume. Countries are therefore continuously seeking for ways to lessen and delay the impacts of climate change. It's critical to take the environment into account while working to encourage economic growth. The good news is that carbon dioxide emissions that cause climate change can be decreased by using renewable energy resources. Thus, in the last few years, nations with developed economies as well as developing ones have turned their attention to sustainable economic development. It is essential to take into account the environmental crisis, energy production, industrial output, farming, and economic growth as a means to achieve a prosperous economy (Nugraha and Osman, 2019; Dugelay et al., 2017).

According to Deloitte, sustainability banking involves incorporating environmental, social, and governance (ESG) criteria into traditional banking and making ESG benefits a key objective. However, the current regulatory framework governing the banking system has not fully addressed systemic environmental risks. To close this blind spot Alexander and Fisher (2018) recommend

incorporating sustainability and environmental standards into banking laws. Some banks have voluntarily adopted principles and codes of conduct, such as the Equator Principles for project finance, to manage environmental and social risks in their business operations (Weber, 2017). The Nigerian Bankers' Committee introduced the Nigerian Sustainable Banking Principles on July 14, 2012, with the aim of achieving measurable progress in creating and sustaining environmentally responsible and socially relevant economic growth. However, traditional indicators used by banks do not typically monitor ESG issues associated with financial products and services. Instead, they focus on economic performance and financial risk without considering environmental costs (Oyegunle and Weber, 2015). The financial performance (FP) of banks is crucial for economic growth, as positive performance encourages investment and fosters economic development, while poor performance can lead to banking failures and crises that negatively impact growth. The adoption of sustainable banking principles, which have not yet been widely embraced in Nigeria can mitigate environmental and social risks associated with bank operations and lead to increased efficiency, productivity, and staff morale. This adoption of sustainability practices can also improve the banks' credibility, value, and competitiveness for the benefit of stakeholders.

Environmental sustainability (ES) is typically measured through indicators like carbon emissions, renewable energy usage, water consumption, and waste management, which are often disclosed in the annual reports. Some studies have explicitly looked at how ES affects the FP of quoted deposit money banks (DMBs) in Nigeria, despite the fact that many research studies have investigated the link between ES and FP and have produced a range of findings. This study's primary goal is to ascertain how ES affects DMB FP in Nigeria and what that means for stakeholders.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Conceptual Review

2.1.1. Financial performance

FP refers to the evaluation of how effectively a company utilizes its assets and generates revenue. It can be measured through indicators such as net income, cash flow, and overall financial strength (Onyefulu et al., 2019; Otekunrin et al., 2022; Emmanuel et al., 2023). The goal is often to maximize shareholder wealth and assess the company's financial strength over time (Olakunle, 2015). In the banking industry, FP holds significant importance for various stakeholders, including consumers, shareholders, employees, regulators, and the economy as a whole (Qamruzzaman, 2014). It helps banks assess their overall performance, identify strengths and weaknesses, pursue investment opportunities, and improve competitive positioning (Dufera, 2010). Key indicators used to measure FP in banks include Return on Assets (ROA), Return on Equity (ROE), Return on Capital Employed (ROCE), Earnings per Share (EPS), and Return on Investments (ROI), (Bagh et al., 2017). This study adopts as a proxy for FP in banks. Return on assets (ROA) is a financial ratio that measures the profitability and efficiency of a company in generating profit from its total assets (Otekunrin et al., 2020; Otekunrin et al., 2019). Net income is divided by the entirety of assets to arrive at this figure. A greater ROA suggests greater profitability besides the effective use of a company's investment resources. ROA is widely used to compare the operational performance of companies and assess their ability to generate returns on their assets. In the banking industry, ROA serves as an indicator of a bank's capital capacity and profitability. The ratio provides insights into how effectively bank management utilizes assets to generate income and measure profitability. Higher ROA values indicate greater profitability and better asset utilization (Otekunrin et al., 2022). ROA is considered a key metric to assess a bank's profitability and asset management efficiency. Therefore, the higher a bank's ROA, the higher the bank's profitability and the better the bank's asset utilization position. It is for these reasons mentioned above that this study adopts ROA as a proxy for banks' FP

2.1.2. Environmental sustainability

ES refers to the reduction of an organization's impact on the natural system, including ecosystems and the elements within them such as land, air, and water. It involves managing input factors like materials, energy, and water, as well as minimizing output such as emissions, effluents, and waste (Ucheagwu et al., 2019). The idea is to preserve environmental well-being while providing for the necessities of future generations as well as the present (Morelli, 2011). From an academic perspective, ES entails innovative and transformative changes that challenge existing practices in products, processes, and business operations (Hao et al., 2021). Banks, in particular, have a significant role and social impact, and they are increasingly proactive in sustainability efforts, going beyond managing risks to embracing new opportunities and marketing sustainable practices (Clark et al., 2015). Their engagement in sustainable development is influenced by interactions with customers through products and services, and banks are encouraged to disclose their ES practices, including carbon emissions, renewable energy, waste management, and water consumption, in their annual reports to benefit stakeholders (Dugelay et al., 2017; Dzomonda, 2022; Omaliko et al., 2020). Hence, carbon emissions, renewable energy, waste management, and water consumption are next to be discussed in this study

2.1.3. Renewable energy disclosure

In recent years, the growth of renewable energy has been fueled by government-sponsored projects such as tax reductions and subsidies which have reduced energy production costs leading to cost competitiveness. Renewable energy refers to energy derived from natural sources, such as the sun and wind, which are replenished at a faster rate than they are consumed. It is seen as a sustainable and non-polluting alternative to traditional energy consumption, and it can be utilized for various purposes, including electricity generation, heating and cooling systems, and transportation. The global focus on reducing CO2 emissions has led to increased attention towards renewable energy as a viable solution. Governments have implemented initiatives and incentives, such as tax reductions and subsidies, to promote the growth of renewable energy projects, resulting in cost competitiveness and the emergence of renewable energy technology installers and manufacturers (Shahbaz et al., 2020). Solar and wind energy are

the most common and widely available sources of renewable energy, offering clean and greenhouse gas-free energy options (Zhou et al., 2010). DMBs can adopt renewable energy sources, particularly solar and wind energy, in their day-to-day operations. This can involve powering their facilities with solar power plants, utilizing energy-efficient light fixtures, and implementing motion sensors to promote energy efficiency. Some DMBs have already disclosed in their annual reports how their ATMs are powered by solar power plants, demonstrating their commitment to sustainable operations and the use of LED bulbs and motion sensors in their banking facilities (Shahbaz et al., 2020). Hence, this study is carried out to see if the disclosure of renewable energy is related to the FP of quoted DMBs in Nigeria. The research's first hypothesis has been put forward in null styles, along with the links to the researched literature:

$H0_1$: The disclosures of renewable energy and FP of quoted DMBs in Nigeria are not related.

2.1.4. Carbon emission disclosures

Carbon emissions refer to the release of carbon into the atmosphere as a result of various burning processes. According to Cahya and Hanifah (2017), disclosing carbon emissions involves evaluating an organization's carbon footprint and setting goals to reduce those emissions. It is considered a commitment to address global warming and greenhouse gas-related issues (Choi et al., 2013). Carbon emissions disclosure includes reporting on climate change risks and opportunities, greenhouse gas emission intensity, energy consumption, emissions reductions, and associated costs (Marietza and Hatta, 2021; Cahya and Hanifah, 2017). DMBs can benefit from such disclosure by gaining stakeholder legitimacy, mitigating threats, reducing operational costs, increasing transparency and accountability, and minimizing reputational risks (Berthelot and Robert, 2011). It is seen as a long-term investment that enhances stakeholder confidence and improves FP (Marietza and Hatta, 2021). The publication of carbon emissions has garnered considerable attention from prominent interested parties and global organizations like European Commission Guidelines, United Nations Global Compacts, Task Force on Climate-related Financial Disclosures, Sustainability Accounting Standards Board, Global Reporting Initiative, and International Integrated Reporting Council (Omaliko et al., 2020; Saka and Oshika, 2014). Banks can manage their emissions and reduce their carbon footprint through carbon accounting, which involves calculating, reporting, and developing programs to reduce carbon emissions. Strategies for reducing carbon emissions include minimizing fuel consumption reducing generator usage, and promoting online meetings to minimize travel. Banks in Nigeria are not lagging behind in disclosing how they contributed to reducing carbon emissions. Therefore, the tenacity of this study is to find out whether carbon emission publication and the FP of quoted DMBs in Nigeria are connected. Here are the null forms of the second hypothesis that this study looked at, along with their relation to the researched literature:

$H0_2$: The disclosure of carbon emissions and FP of quoted DMBs in Nigeria are not related

2.1.5. Waste management disclosure

Waste denotes every material that is discarded and no longer serves its intended purpose. It can be in solid, liquid, or gaseous form and may be generated as a byproduct of manufacturing processes or from obsolete commercial products (Mubaslat, 2021). From the production of waste to recycling, the handling of waste encompasses a range of methods and techniques for identifying, managing, as well as treating diverse waste forms. The 3Rs (Reduce, Reuse, Recycle) are a structure that waste management aims to set up in order to support the preservation of the environment and healthy communities. Waste reduction aims to minimize material costs and waste generation, while waste reuse involves using discarded materials for the same or different purposes, and waste recycling entails further processing for alternative uses (Oti and Mbu-Ogar, 2018). In Nigeria, waste generation is significant, with a majority of it being organic, and there is a lack of proper sewer systems, leading to liquid waste ending up in waterways. Solid waste management has become increasingly important in public health and environmental policies, driven by rapid economic growth, urbanization, and industrialization (Okoli et al., 2020). The Federal Environment Protection Agency was established in Nigeria to report waste management concerns (Maiyaki et al., 2020). The focus is now on more sustainable waste management practices that prioritize production reduction, waste sorting, reuse, recycling, and energy recovery over landfilling and incineration (Abubakar et al., 2022). DMBs have disclosed their waste management practices, such as reducing paper consumption through online banking and promoting waste sorting, reuse, and recycling by employees and customers. Hence, this study is also carried out to see if disclosure of waste management is related to the FP of quoted DMBs in Nigeria. Hypothesis three examined in this study with references to the literature reviewed is now listed in null forms as follows:

$H0_3$: The disclosure of waste management and FP of quoted DMBs in Nigeria are not related

2.1.6. Water consumption disclosures

Water consumption refers to the amount of water used that is not returned to its original source after being withdrawn. It is recognized as a significant risk, and there are sustainability criteria in place that emphasize efficient water management (Ali et al., 2021). The financial impact of reported water risks in 2020 was substantial, with the cost of mitigation significantly lower than the potential financial impact (Ali et al., 2021). This has led investors to pay closer attention to corporate disclosures regarding water usage and associated risks (Trausch et al., 2011). It is crucial for businesses to build resilience to climate change and address water-related risks to mitigate potential financial impacts (Ali et al., 2021). Investing in water management or sustainable water practices can provide a competitive advantage, while effective water accounting allows companies to assess impacts on water use in communities and ecosystems, track their own water management practices, identify significant risks, and report trends to stakeholders. Engaging investors and stakeholders is essential in promoting sustainable investments and maximizing wealth (Ali et al., 2020). DMBs committed to water sustainability disclose their water management practices and encourage employees and customers to reduce and manage water usage appropriately. Hence, this study is also carried out to see if disclosure of water sustainability is related to the FP of quoted DMBs in Nigeria.

Hypothesis four examined in this study with references to the literature reviewed is now listed in null forms as follows:

$H0_4$: The disclosure of water sustainability and FP of quoted DMBs in Nigeria are not related

2.2. Control variables

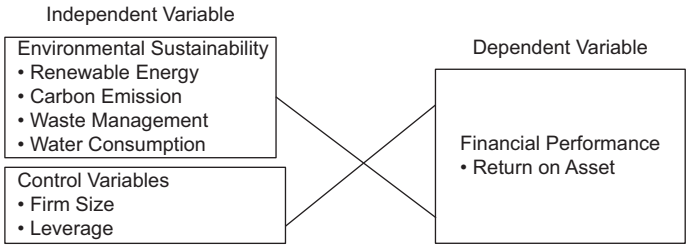
2.2.1. Firm size

Firm size refers to the capacity and productive potential of a company, including the number and variety of services it can offer to customers. It plays a significant role in describing the relationships within and outside the business environment (Olawale et al., 2017; Shaheen and Malik, 2012; Babalola, 2013; Egbuhuzor and Wokeh, 2022). Larger companies have a greater influence on stakeholders and hold more competitive power compared to smaller firms in the same industry. They often perform better and can take advantage of opportunities that require substantial as electricity and security. Firm size allows for competitive advantages, raising barriers to entry and benefiting from economies of scale. This research aims to examine the impact of firm size on the FP of quoted DMBs in Nigeria.

2.2.2. Leverage

A bank's monetary strategy is heavily influenced by leverage, which sets the amount of external and internal finance available as well as having an enormous effect on the bank's finances and worth. The ratio of borrowing and preference stock to the ownership stake in a firm's capital structure is known as financial leverage (Pandey and Pandey, 2015It is employed to boost profits, but using too much leverage can raise the chance of failure and make repaying debt more difficult (Ofulue et al., 2022). The leverage ratio measures the degree of debt financing and reflects a company's financial risk. It involves the use of borrowed money to purchase assets, aiming to generate higher investment returns (Ezechukwu and Amahalu, 2017). DMBs, like any other organization, require capital to finance their investments and operations, and choosing the optimal capital structure that minimizes costs and maximizes profit is a key challenge for bank management. The leverage decision may have significant implications for a firm FP. In view of the literature review on environmental disclosure of renewable energy, carbon emissions, waste management, water consumption, and banks' financial performance, the conceptual framework based on independent, dependent and control variable is as given in Figure 1.

Figure 1: Conceptual framework



Source: Researcher's Compilation (2023)

2.3. Theoretical Review

2.3.1. Stakeholder's theory

Freeman's, 1984 development of the stakeholder theory has been extensively utilized to comprehend the desires of major stakeholders in enterprises. It defines stakeholders as individual organizations that a firm's actions may have an impact on. According to this theory, managers should focus on developing and maintaining relationships with all stakeholders, not just shareholders. It highlights the fact that businesses exist for the good of society as well as for their owners. By considering the needs of various stakeholders, companies can adapt to the changing demands of society and avoid conflicts of interest. According to Olanrewaju and Johnson-Rokosu (2016), stakeholders can be classified as external (government agencies, customers, communities, shareholders) and internal (management, employees, board of directors). Organizations must satisfy the expectations of different stakeholder groups, including their expectations for sustainability practices and ESG reporting. The stakeholder theory highlights the importance of managing stakeholder relationships to promote ES practices and improve FP in the banking sector. While stakeholder theory has its limitations, such as the challenge of satisfying all stakeholders and criticism regarding its impact on the market economy, it remains highly relevant and valuable in understanding and managing the complex relationships between banks and their stakeholders. Adopting sustainable banking initiatives based on stakeholder theory can help establish trust, cooperation, and goodwill with stakeholders, providing a competitive advantage for banks (Jizi et al., 2014; Kolk and Pinkse, 2010). Hence, this study adopts stakeholder theory.

2.3.2. Legitimacy theory

Legitimacy theory, as defined by Dowling and Preffer, refers to the state in which the values of an organization align with the values of the larger social system it operates within. Organizations strive to operate within societal boundaries and norms, maintaining their legitimacy through various strategies. Legitimacy theory emphasizes the social contract between a company and its community, providing information that legitimizes the company's actions and influences stakeholder and public perceptions of its value (Qian et al., 2021). The theory assumes that companies should naturally conduct their activities in a manner that aligns with existing peace, environmental conditions, and social norms within their community (Burgwal and Vieira, 2014). Meeting societal expectations and disclosing social information are seen as necessary for companies to fulfill their corporate social responsibility. In a dynamic society, institutions must demonstrate both legitimacy and relevance by meeting the needs of the public and gaining societal approval. The social contract between a company and society requires the company to fulfill certain socially necessary actions to secure its goals and survival. Failure to operate within societal boundaries can lead to public dissatisfaction and pressure for improved performance. Legitimacy theory suggests that companies respond to the demands of different interest groups and use social reporting to influence public perceptions. Failure to comply with societal demands, particularly in terms of environmental behavior, can threaten a company's legitimacy and hinder its access to necessary resources. However, companies with higher environmental performance are more likely to engage in environmental reporting to legitimize their practices. Therefore, DMBs are encouraged to embrace environmental reporting, which can positively impact their FP. Hence, this study also adopts the Legitimacy theory.

2.3.3. Agency theory

The theory of agency, first introduced by Jensen and Meckling in 1976, centers on the possible contradictions of interest between the managers, key debt financiers, and owners of an enterprise. The theory suggests that as companies grow, owners appoint managers to run the company on their behalf, resulting in an agency relationship. The owners expect the managers to act in their best interests, but the inherent problem lies in aligning the interests of both parties through a contract. Jensen and Meckling (1976) noted that agency problems are more common in successful companies with low revenue growth and significant free cash flow. To mitigate this, companies can incorporate a higher portion of debt in their capital structure, which reduces free cash flow and incentivizes management to generate profitable investments. Corporations with limited liability operate based on agency theory principles, where shareholders are the principals and owners, and management acts as agents, responsible for managing and controlling the company on behalf of the shareholders (Otekunrin et al., 2018). The separation of ownership and control can lead to conflicts between principals and agents within firms (Owolabi et al., 2023). In the context of commercial banks, agency problems can arise between the banks and their correspondent banks due to incongruent interests. Management decisions, such as leverage and initiatives for maintaining sufficient capital, play a crucial role in banks. Excessive lending and decision-making by banking institutions were major contributors to the financial crisis of 2007/2008 (Calabrese, 2011). In today's banking landscape, executives aim to implement sustainable banking initiatives to reduce conflicts of interest with shareholders and promote long-term sustainability. Increased sustainability efforts can positively impact a bank's FP by mitigating conflicts between shareholders and management. It is for these reasons, that this study adopts Agency theory.

3. METHODOLOGY

The ex post facto research design was used for this investigation. The study encompasses 14 DMBs that were quoted in Nigeria over an 8-year period, from 2013 to 2021. Multiple regression analysis is used in the study on the panel data of the DMBs that are cited. The data used in this study was generated through secondary sources from the annual report of the DMBs listed on the Nigerian Exchange Group (NGX). Regression analysis was performed on the data. The four hypotheses put forth in the study were examined and tested using multiple regression analysis. The Unobserved Effects Model (UEM) was used for calculating the regression models, as well as the Hausman test result showed which impact model was fixed while the other was random. According to documented literature, an operational formula representing the link in the two parameters has been offered:

$$ROA = \beta_0 + \beta_1 (RENE, t) + \beta_2 (CAREi, t) + \beta_3 (WASMi, t) + \beta_4 (WATCi, t) + \beta_5 (FIRSi, t) + \beta_6 (LEVi, t) + \varepsilon i, t$$

Where;

B_0 is the intercept;

ROA = Return on Assets;

RENE = Renewable Energy;

CARE = Carbon Emissions;

WASM = Waste Management;

WATC = Water Consumption;

FIRS = Firm Size;

LEV = Leverage;

i = 1,2..., N pertains to the cross-section unit;

t = 1,2..., T refers to the time period;

4. RESULTS AND DISCUSSION OF FINDINGS

4.1. Hausman Test

The Hausman test above assesses the presence of model specification issues by comparing the coefficients obtained from fixed-effects (fe) and random-effects (re) regressions. The test results in this instance show that the random-effects and fixed-effects coefficients do not differ in a systematic way. With a p-value of 0.2914 and a chi-squared test statistic of 3.74, it appears that the null hypothesis—that the difference in coefficients is not systematic—is not successfully rejected. Therefore, we do not have strong evidence to suggest model misspecification. The variance-covariance matrix difference (V_b-V_B) not being positive definite implies that the random-effects estimator may be inefficient under the alternative hypothesis, but this does not affect the interpretation of the Hausman test results. Overall, based on the Hausman test results, which indicate no systematic difference between the fixed-effects and random-effects coefficients, it is recommended to use the fixed-effects regression. The fixed-effects model accounts for individual-specific effects by controlling for time-invariant heterogeneity, which can lead to more accurate and reliable estimates. Therefore, in this case, the fixed-effects regression would be the preferred model for analyzing the relationship between the variables.

Test: Ho: difference in coefficients not systematic

Chi-squared (3) = (b-B)[(V_b-V_B)^(-1)](b-B)

= 3.74

Prob>Chi-squared = 0.2914

(V_b-V_B is not positive definite)

4.2. Regression Analysis

4.2.1. Hypothesis one

H01: The disclosure of renewable energy and FP of quoted DMBs in Nigeria are not related. In Table 1, A fixed-effect (within) regression model is used for the analysis, with the dependent variable being ROA and the control variables being LEV and FIRS. The findings indicate that a decrease in ROA is correlated with an increase in leverage (LEV), which is negative and statistically significant at the 0.05 level. This implies that a company's return on assets might be adversely affected by higher levels of leverage. Despite being positive, the coefficient of FIRS does not meet the conventional significance level of 0.05 for statistical significance. This implies that there may not be statistical support for the link between firm size (FIRS) and ROA in this analysis. The coefficient of RENE (Renewable Energy Disclosure) is positive but not significant as it is.0006155, indicating that it does not have a

significant impact on ROA in this analysis. The model contains a constant term (_cons), but it is not statistically significant, meaning that it has no discernible effect on ROA. The R-squared values indicate that approximately 9.85% of the variation in ROA can be explained by the variation in the independent variables within the groups. The between-group variation explains approximately 12.71% of the total variation in ROA. The overall R-squared represents the combined effect of within-group and between-group variation on ROA, which is approximately 11.87%. It is important to note that other unobserved factors may also influence ROA, and further research or additional variables may be needed to obtain a more comprehensive understanding of the determinants of ROA in the given data. In conclusion, the analysis suggests that leverage (LEV) is a significant factor affecting ROA, while FIRS and RENE do not show statistically significant relationships with ROA in this analysis. Hence, the null hypothesis H 0_1: the disclosures of renewable energy and FP of quoted DMBs in Nigeria are not related is accepted as the result of the fixed regression analysis shows that Renewable Energy Disclosure has a positive but insignificant effect on ROA.

4.2.2. Hypothesis two

H02: The disclosures of carbon emissions and FP of quoted DMBs in Nigeria are not related. In Table 2; the analysis is conducted using fixed-effects regression, and the significance level of the variables is examined. Return on Assets (ROA) is inversely correlated with leverage (LEV), as demonstrated by the negative and statistically significant coefficient of leverage at the 0.05 level. This suggests that higher levels of leverage have a detrimental effect on a firm's return on assets. The coefficient of Firm Size (FIRS) is positive, but it is not statistically significant at the conventional significance level of 0.05. This implies that the relationship between firm size and ROA may not be statistically robust in this analysis. Similarly, the coefficient of Carbon Emission Disclosure (CARE) is not statistically significant, indicating that it does not have a significant impact on ROA in this analysis. The model contains a constant term (_cons), but it is not systematically significant, indicating that it has no discernible effect on ROA. The F-test is used to determine the model's general validity by assessing if each of the distinct group-specific effects is in tandem equal to zero. The F-test statistic is significant, indicating that there are significant differences in the group-specific effects and the model as a whole provides a better fit than an intercept-only model. In conclusion, the analysis indicates that leverage (LEV) is a significant factor affecting ROA, while firm size (FIRS) and Carbon Emission Disclosure (CARE) do not show statistically significant relationships with ROA in this analysis. However, it is important to note that other unobserved factors or additional variables may also influence ROA, and further research or consideration of different models may be necessary to gain a more comprehensive understanding of the determinants of ROA in the given data. Therefore, the null hypothesis which is H02: the disclosures of carbon emissions and FP of quoted DMBs in Nigeria are not related is accepted as the fixed effect regression has shown a positive but insignificant effect between Carbon Emission Disclosure and ROA.

4.2.3. Hypothesis three

H03: The disclosures of waste management and FP of quoted DMBs in Nigeria are not related. In Table 3, the analysis uses a fixed-effects regression; the significance level of the variables is examined. A rise in leverage (LEV) is linked to a fall in return on assets (ROA), as the coefficient of leverage (LEV) is negative and statistically significant at the 0.05 level. This suggests that higher levels of leverage have a detrimental effect on a firm's return on

Table 1: Fixed effect regression on renewable energy disclosure

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Leverage	−0.0176274	0.0056241	−3.13	0.002	−0.0287741	−0.0064807
Firm size	0.0040237	0.0024043	1.67	0.097	−0.0007416	0.008789
Renewable energy disclosures	0.0006155	0.0031974	0.19	0.848	−0.0057217	0.0069528
_cons	−0.0856529	0.0654877	−1.31	0.194	−0.2154473	0.0441415
sigma_u	0.01987728					
sigma_e	0.01179349					
rho	0.73963264				(fraction of variance due to u_i)	
F test that all u_ i=0:		F (13, 109) = 17.68			Prob>F = 0.0000	
		F (3,109) = 3.97				
corr (u_i, Xb) = 0.0727					Prob>F = 0.0100	

Source: Researcher's compilation (2023)

Table 2: Fixed effect regression on carbon emission disclosure

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
LEV	−0.0176298	0.005621	−3.14	0.002	−0.0287705	−0.0064892
FIRS	0.0039654	0.0023797	1.67	0.099	−0.000751	0.0086818
CARE	0.0011103	0.0033474	0.33	0.741	−0.0055241	0.0077447
_cons	−0.0844491	0.0648924	−1.30	0.196	−0.2130637	0.0441655
sigma_u	0.01980843					
sigma_e	0.01178954					
rho	0.73842324				(fraction of variance due to u_i)	
F test that all u_ i=0:		F (13, 109) = 17.72			Prob>F = 0.0000	
		F (3,109) = 4.00				
corr (u_i, Xb) = 0.0836					Prob>F = 0.0096	

Source: Researcher's compilation (2023)

assets. Although the Firm Size (FIRS) coefficient is positive, it does not meet the traditional significance level of 0.05 for statistical significance. This suggests that the relationship between firm size and ROA may not be statistically robust in this analysis. Similarly, the coefficient of Waste Management Disclosure (WASM) is not statistically significant as it has a coefficient of.0019331 indicating that It has no substantial effect on ROA in this analysis. Additionally, the model's constant term (_cons) is not statistically significant, indicating that it has no noticeable influence on ROA. By determining whether each individual coefficient is substantially equal to zero, the F-test is used to assess the model's general impact. Overall, the model fits data more accurately than an intercept-only model, according to the test statistic, which is significant at the 0.05 level. In conclusion, the analysis indicates that leverage (LEV) is a significant factor affecting ROA, while firm size (FIRS) and WASM do not show statistically significant relationships with ROA in this analysis. However, it is important to note that other unobserved factors or additional variables may also influence ROA, and further research or consideration of different models may be necessary to gain a more comprehensive understanding of the determinants of ROA in the given data. Also, the null hypothesis which is H03: The disclosures of waste management and FP of quoted DMBs in Nigeria are not related is accepted as it also shows a positive but insignificant effect between Waste Management Disclosure and ROA.

4.2.4. Hypothesis four

H04: The disclosures of water consumption and FP of quoted DMBs in Nigeria are not related. In Table 4, the analysis is using a fixed-effects regression; the significance level of the variables is examined. At the 0.05 level, the coefficient of leverage (LEV) is negative and statistically significant, meaning that a rise in LEV is correlated with a fall in ROA (Return on Assets). This suggests that higher levels of leverage have a detrimental effect on a firm's ROA. The coefficient of FIRS (Firm Size) is positive, however, at the 0.10 level, it is only slightly systematically significant. This implies that there might be a couple of proofs of a positive correlation between firm size and ROA. However, it is not as strong as the 0.05 significance level. Likewise, the Water Consumption Disclosures (WATC) coefficient exhibits positivity. However, because of its coefficient of 0.0038262, it is not systematically significant at the traditional significance level of 0.05. This suggests that the disclosure of WATC and ROA is not statistically related in this analysis. The constant term in the model is also not statistically significant, indicating that it does not have a significant impact on ROA. The F-test is conducted to test the overall significance of the model, examining whether all the individual coefficients are jointly equal to zero. The test statistic is significant at the 0.05 level, indicating that the model as a whole provides a better fit than an intercept-only model. In conclusion, the analysis indicates that leverage (LEV) is a significant factor affecting ROA, while firm size (FIRS) and WATC show some indication of an impact on ROA, but not at significance levels. However, it is important to consider other factors or unobserved variables that may provide a more comprehensive understanding of the determinants of ROA in the given data. Henceforth, the null hypothesis which is H04: The disclosures of water and FP of quoted DMBs in Nigeria are not related is accepted as it shows a positive but insignificant effect on ROA.

This study focuses on the impact of environmental disclosure, including renewable energy, carbon emissions, waste management, and water consumption, on the bank's return on assets (ROA). The objective is to analyze how ES disclosures affect the FP of these banks. The research spans an 8-year period from 2013 to 2021, using panel data and multiple regression analysis to analyze the data. The fixed

Table 3: Fixed effect regression on waste management disclosure

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Leverage	−0.0175044	0.0056169	−3.12	0.002	−0.0286368	−0.0063719
Firm size	0.0037928	0.002374	1.60	0.113	−0.0009123	0.008498
Renewable energy disclosures	0.0019331	0.0029421	0.66	0.513	−0.0038981	0.0077643
_cons	−0.0804087	0.0648014	−1.24	0.217	−0.208843	0.0480256
sigma_u	0.01982477					
sigma_e	0.0117722					
rho	0.73930939				(fraction of variance due to u_i)	
F test that all u_ i=0:		F (13, 109) = 17.69			Prob>F = 0.0000	
		F (3,109) = 4.12				
corr (u_i, Xb) = 0.0915					Prob>F = 0.0083	

Source: Researcher's compilation (2023)

Table 4: Fixed effect regression on water consumption disclosure

ROA	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
Leverage	−0.0171399	0.0055794	−3.07	0.003	−0.028198	−0.0060817
Firm size	0.0041451	0.0022935	1.81	0.073	−0.0004005	0.0086907
Renewable energy disclosures	0.0038262	0.0026026	1.47	0.144	−0.001332	0.0089844
_cons	−0.0906021	0.0631196	−1.44	0.154	−0.2157031	0.0344989
sigma_u	0.0201223					
sigma_e	0.01168025					
rho	0.74797818				(fraction of variance due to u_i)	
F test that all u_ i=0:		F (13, 109) = 18.05			Prob>F = 0.0000	
		F (3,109) = 4.76				
corr (u_i, Xb) = 0.0128					Prob>F = 0.0037	

Source: Researcher's compilation (2023)

effect regression and random effect regression analyses showed that the impact of various ES proxies (RENE, CARE, WASM, WATC, and FIRS) on the dependent variable, ROA, was positive but statistically insignificant. However, FIRS had a negative but insignificant effect on ROA. These findings are consistent with previous studies such as Tomomewo et al. (2022), Igbekoyi et al. (2021), and Nejla and Haithom (2022), which also found no significant relationship between ES reporting and FP in DMBs and firms. On the other hand, these findings contradict the conclusions of other studies conducted by Olakunle (2015), ABM, Ruzlin and Jeaneth (2021), Zamil and Hassan (2019) and Atanda et al. (2021), which suggested that ES practices have a significant impact, both positive and negative, on the FP of SMEs, financial institutions, banks, and firms. In this study, it is argued that ES is more of an ethical practice rather than a resource-based practice for DMBs, and therefore does not necessarily affect their FP (Igbekoyi et al., 2021). Overall, the findings of this study are consistent with stakeholder theory, legitimacy theory, and agency theory, supporting a positive relationship between ES practices and the FP of the quoted DMBs in Nigeria though it is insignificant.

5. CONCLUSION

This study focused on exploring if ES disclosures and FP of quoted DMBs in Nigeria are related. The study aimed to contribute to the existing body of knowledge by examining the impact of ES practices, as measured by disclosures in areas such as renewable energy, carbon emissions, waste management, and water consumption, on the FP of the DMBs. The findings of the study show that in quoted DMBs in Nigeria, disclosure of renewable energy is positively but not significantly related to the FP. The findings of the study have shown that in the quoted DMBs in Nigeria, disclosures of carbon emissions are positively but not significantly related to the FP. The findings of the study have shown that in quoted DMBs in Nigeria, disclosures of waste management are positively but not significantly related to the FP. The findings of the study have shown that in quoted DMBs in Nigeria, disclosures of water consumption are positively but not significantly related to the FP. Hence, this study from its findings concluded that the ES disclosures are positively but not significantly related to the ROA (i.e. FP). Future research could further explore the relationship between ES disclosures and FP using a broader range of variables and FP indicators. Additionally, efforts can be made to expand the empirical research available in this context. In general, this research advances knowledge of the connection between ES and FP in the Nigerian banking sector and sets the stage for further exploration in this area.

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