

# Environmental Accounting Disclosures and Capital Structure Decisions of Listed Multinational Firms in Nigeria

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## Abstract

This study explores the influence of environmental accounting disclosures on capital structure decisions among Nigerian multinational firms. We analyzed annual reports from 12 firms listed on the Nigerian Exchange Group between 2011 and 2024 using an ex post facto design. Environmental disclosures—carbon emissions, water efficiency, energy efficiency, and waste management—were assessed via content analysis. The debt to total assets ratio (DTAR) represented corporate financing decisions. Our findings, using a Generalized Method of Moments estimator, reveal that increased carbon ( $p = 0.0002$ ) and water ( $p = 0.0003$ ) disclosures significantly enhance DTAR, indicating better access to debt. Conversely, waste management disclosure negatively impacts DTAR ( $p = 0.0305$ ), suggesting higher borrowing costs due to compliance. Energy efficiency had no significant effect. These results align with stakeholder theory, emphasizing the need for firms to balance environmental reporting and financing goals, while policymakers should consider incentives to ease the burden of sustainability reporting. Future research could explore sectoral and cross-country variations in these impacts.

**Keywords:** Environmental accounting disclosures, corporate financing, capital structure decision, stakeholder theory, Nigerian multinational firms.

## 1 INTRODUCTION

The relationship between environmental accounting disclosures and capital structure decisions has attracted increasing attention within contemporary corporate governance and sustainable finance discourse. For multinational firms operating in Nigeria, the integration of environmental accounting information into financial decision making extends beyond regulatory compliance to influencing firms' leverage choices and reliance on debt financing. Environmental accounting disclosures, which encompass information on carbon emissions, water usage, energy efficiency, and waste management, serve as important signals of a firm's sustainability orientation. Such disclosures shape investor and lender perceptions, influence credit risk assessment, and affect firms' financing conditions (Mondal, Akter & Moni, 2023; Khandelwal & Chaturvedi, 2021). Firms that engage in transparent environmental reporting are often perceived as lower risk, which may translate into more favorable capital structure outcomes, particularly in economies where sustainability considerations are increasingly relevant (Fabian, Onuora & Onyeka, 2022).

Capital structure decisions reflect the extent to which a firm relies on debt financing relative to its total assets. The debt to total assets ratio therefore serves as a widely accepted proxy for assessing corporate leverage. Understanding whether environmental accountability influences this ratio remains a critical area of inquiry, especially within Nigeria's evolving sustainability and regulatory environment. Prior studies suggest that firms with stronger environmental performance and disclosure practices tend to experience improved access to debt markets and more favorable borrowing conditions, thereby influencing their capital structure configuration (Ratnadi & Widanaputra, 2022; Fabian et al., 2022). Enhanced environmental disclosure can also strengthen corporate reputation, reduce information asymmetry, and lower perceived

investment risk, with potential implications for the cost and availability of debt capital (Afolabi, Amosun, Okunade & Agbor, 2024).

Nigeria's financial and regulatory context presents distinctive challenges and opportunities for multinational firms with respect to sustainability related financing decisions. Unlike firms in developed economies with well-established environmental reporting frameworks, Nigerian multinational firms operate within a relatively nascent and evolving sustainability disclosure regime. Consequently, empirical evidence on how environmental accounting disclosures influence firms' capital structure decisions in this context remains limited. This gap necessitates a focused investigation into whether firms that provide more extensive environmental disclosures exhibit different leverage outcomes compared to their less transparent counterparts (Gaviria, Martínez & Polo, 2023).

Firm size is also an important factor in the environmental disclosure–capital structure relationship. Larger firms generally possess greater financial and organizational capacity to comply with environmental reporting requirements and to implement sustainability initiatives. Existing literature indicates that firm size is positively associated with both sustainability disclosure practices and access to external financing, thereby influencing leverage decisions (Parmono & Humairah, 2023; Kumar & Firoz, 2022). Accordingly, firm size is incorporated as a control variable in this study to account for its potential effect on capital structure outcomes.

Despite growing scholarly interest in sustainability reporting, empirical studies focusing specifically on listed multinational firms in Nigeria remain scarce. While prior Nigerian studies such as Fabian et al. (2022) and Afolabi et al. (2024) examine environmental accounting disclosures, limited attention has been paid to their direct implications for firms' capital structure decisions. This study seeks to address this gap by empirically examining whether variations in environmental accounting disclosures among Nigerian multinational firms are associated with differences in leverage levels.

By addressing these issues, the study contributes to the sustainable finance and capital structure literature by providing evidence from an emerging economy context. The findings are expected to offer useful insights for policymakers, corporate managers, and financial market participants regarding the role of environmental disclosure in shaping corporate leverage decisions. Specifically, this study investigates the relationship between environmental accounting disclosures, including carbon disclosure, water efficiency disclosure, energy efficiency disclosure, and waste management disclosure, and capital structure decisions, proxied by the debt to total assets ratio. The study further examines the role of firm size in influencing this relationship among listed multinational firms in Nigeria.

## **2 LITERATURE REVIEW**

### **2.1 Conceptual Review**

#### **2.1.1 Debt to Asset Ratio**

The Debt to Asset Ratio is a financial metric used to measure the proportion of a firm's total assets that are financed through debt. It is computed as the ratio of total debt to total assets and serves as a key indicator of a firm's capital structure and leverage position. A higher ratio indicates greater reliance on debt financing, which may increase financial risk while also enabling firms to expand operations and undertake investment opportunities. The debt to asset ratio is widely used in capital structure studies to capture firms' financing choices and exposure to leverage related risks. Prior research suggests that excessive reliance on debt can heighten financial vulnerability and increase the likelihood of distress, particularly in volatile economic environments (Wulansari & Adhariani, 2023). In this study, the debt to asset ratio is employed as a proxy for capital structure decisions, reflecting the extent to which listed multinational firms in Nigeria rely on debt financing.

#### **2.1.2 Carbon Disclosure**

Carbon disclosure refers to the voluntary or mandatory reporting of greenhouse gas emissions and climate-related risks by firms. It plays a crucial role in corporate transparency and environmental accountability, influencing investor decisions and regulatory compliance. Research indicates that firms with higher carbon disclosure levels often experience improved stakeholder trust and lower financing costs due to reduced perceived investment risks (Paea & Drogo, 2020). Additionally, carbon emissions reporting can impact leverage decisions by shaping creditor perceptions and borrowing conditions. Conversely, companies with higher emissions face stricter financial scrutiny and potential regulatory penalties (Goodell, Gurdgiev, Karim, & Palma, 2024).

### **2.1.3 Water Disclosure**

Water disclosure involves corporate reporting on water usage, conservation initiatives, and associated risks, especially in industries with high water consumption. This practice enables firms to demonstrate environmental responsibility while helping investors and regulators assess sustainability risks. According to Bogdan, Sabău-Popa, & Boloş, (2022), firms that disclose water-related information tend to have stronger corporate governance structures, leading to improved financial performance and external financing. Transparency in water usage is becoming increasingly important due to global concerns over water scarcity and resource management. With the view of capital structure decisions, water disclosure can reduce uncertainty and risk for investors and contribute to more meaningful leverage by mitigating environmental and operational risk.

### **2.1.4 Energy Efficiency Disclosure**

Energy efficiency disclosure pertains to firms publicly reporting their energy consumption patterns and strategies to enhance energy efficiency. Such disclosures often highlight a company's initiatives to reduce energy costs and minimize environmental impact. Research shows that firms with strong energy efficiency disclosures are more likely to attract investment and secure favorable financing conditions, as these efforts align with global sustainability goals (Emmanuel, Doorasamy, & Kwarbai, 2024). In capital structure terms, financial institutions are increasingly considering energy efficiency metrics in their lending decisions; ability to secure debt financing and determine their optimal leverage levels, further emphasizing the financial relevance of this disclosure.

### **2.1.5 Waste Management Disclosure**

Waste management disclosure involves corporate transparency regarding waste generation, reduction, recycling, and disposal practices. It enables stakeholders to assess a firm's commitment to sustainability and regulatory compliance. Studies have shown that effective waste disclosure not only improves corporate reputation but also reduces environmental risks and enhances financial stability (Benjamin, Biswas, & Wellalage, 2023). From a capital structure standpoint, waste disclosure can affect lenders' views of firm risk and compliance level, thereby influencing borrowing capacity and leverage decisions. Moreover, investors and policymakers increasingly scrutinize waste disclosures as part of broader environmental, social, and governance (ESG) assessments, influencing corporate valuation and risk exposure.

## **3.0 METHODOLOGY**

This study adopts an ex-post facto research design to examine the impact of environmental accounting disclosures on corporate capital structure decisions using historical data. Since variables are not manipulated, this approach allows for an objective assessment of how environmental disclosures have influenced leverage decisions over time. The population comprises all multinational companies listed on the Nigerian Exchange Group (NGX) as of December 31, 2024. Using purposive sampling, 12 multinational firms were selected based on two key criteria: (1) continuous listing on the NGX from 2011 to 2024, ensuring data availability, and (2) accessibility of financial statements for the entire study period. The sampled firms—Cadbury Nigeria Plc, Dangote Cement Plc, Guinness Nigeria Plc, International Breweries Plc, Julius Berger Nigeria Plc, Lafarge Africa Plc, MTN Nigeria Communications Plc, Nestlé Nigeria Plc,

OANDO Plc, SEPLAT Energy Plc, TOTAL Plc, and Unilever Nigeria Plc—represent diverse industries such as manufacturing, telecommunications, oil & gas, construction, and FMCG, enhancing the study's relevance across multinational corporate operations.

Data was collected from annual reports and financial statements (2011–2024), and a content analysis technique was used to quantify environmental disclosures. A dichotomous scoring system was applied, assigning (1) for disclosed items and (0) for non-disclosed items, across four disclosure categories: carbon emission, water efficiency, energy efficiency, and waste management. The independent variables are these disclosure parameters, while the dependent variable is the Debt-to-Total-Asset Ratio (DTAR), representing capital structure decisions showing the extent to which firms rely on debt financing in relation to their total assets. Firm size (natural logarithm of total assets) serves as a control variable. Multiple regression analysis, conducted using Valustats Statistical Package (VSP 2.2), was employed to analyze the relationship between environmental disclosures and capital structure decisions. The combination of content analysis, regression modeling, and purposive sampling ensures the study effectively captures the impact of sustainability reporting on corporate financing in Nigerian multinational firms, offering valuable insights for policymakers, corporate managers, and investors.

This research uses a panel regression framework that was modified from earlier research on environmental disclosure and capital structure (e.g. Modigliani and Miller, 1958; Rajan and Zingales, 1995; Clarkson et al., 2008). To reflect the sustainability reporting context of the study, the original models—which relate leverage to firm-specific characteristics—are modified by adding disaggregated environmental disclosure variables, namely carbon disclosure, water efficiency disclosure, energy efficiency disclosure, and waste management disclosure.

The functional relationship for the study is given as:

$$DTAR = f(CARD, WATD, ENEED, WMAND, FS)$$

$$DTAR_{it} = \beta_0 + \beta_1 CARD_{it} + \beta_2 WATD_{it} + \beta_3 ENEED_{it} + \beta_4 WMAND_{it} + \beta_5 FS_{it} + \varepsilon_{it}$$

Where:

DTAR: Debt-to-Total-Asset Ratio (proxy for corporate financing decision)

Carbon Disclosure

WATD: Water Efficiency Disclosure

ENEED: Energy Efficiency Disclosure

WMAND: Waste Management Disclosure

FS: Firm Size

$\beta_0$ : Constant term

$\beta_1 - \beta_4$ : Coefficients of the explanatory variables

$\beta_5$ : Coefficient of the control variable

$\varepsilon_{it}$ : Error term

i: Firm index

t: Time index (2011–2024)

## 4 ANALYSES

### 4.1 Descriptive Statistics

The descriptive statistics (Table 2.0) provide insights into the environmental disclosure practices and capital structure decisions of multinational firms in this study. The mean scores for environmental disclosures indicate that water disclosure (0.56) and waste management disclosure (0.50) are more frequently reported, suggesting that firms in resource-intensive industries like cement (Dangote Cement, Lafarge Africa) and

beverage production (Guinness, International Breweries, Nestlé) prioritize these areas, likely due to regulatory and operational pressures. In contrast, carbon emission (0.36) and energy efficiency (0.39) disclosures are less frequent, implying that firms may not perceive them as financially or reputationally significant or that regulatory requirements for these disclosures remain weak in Nigeria. This variation suggests that while some firms engage in sustainability reporting, environmental disclosure remains inconsistent across multinational corporations, potentially affecting how investors and lenders assess corporate risk and financing decisions.

The debt-total-asset ratio (DTAR) means 20.25%, combined with its high standard deviation (13.27), highlights significant differences in capital structures among firms. Companies in capital-intensive sectors like cement and telecommunications (e.g., Dangote Cement, MTN Nigeria) may rely more on debt financing, while firms in consumer goods sectors (e.g., Unilever, Nestlé) may use a more equity-based approach. The mean firm size (8.35 log-transformed total assets) with low variation (0.57) confirms that the selected firms are large multinational corporations, reinforcing the relevance of the study to high-profile firms with access to diverse financing sources. The relationship between environmental disclosure and capital structures will be further tested through regression analysis to determine whether multinational firms in Nigeria with stronger environmental reporting benefit from improved financing conditions and lower debt-related risks.

#### 4.1.2 Correlation Analysis

The correlation matrix (Table 3.0) provides insights into the relationships between environmental disclosures, firm size (FS), and debt-to-total-asset ratio (DTAR) among multinational companies in Nigeria. The positive correlation between carbon disclosure (CARD) and energy efficiency disclosure (ENEED) (0.69) suggests that firms reporting carbon emissions are also likely to disclose energy efficiency practices, indicating a sustainability-focused approach in certain industries like cement and oil & gas. Similarly, waste management disclosure (WMAND) and water disclosure (WATD) (0.68) show strong alignment, reflecting industries where resource management is a priority, such as beverage production and manufacturing.

The positive correlation between DTAR and CARD (0.42), WATD (0.35), and ENEED (0.28) implies that firms with higher environmental disclosures tend to have higher leverage, suggesting that multinational firms engaging in sustainability reporting may leverage debt to fund environmental initiatives or gain favorable financing conditions thereby influencing their capital structure decisions. However, the weak and negative correlation between WMAND and firm size (-0.24) suggests that larger firms may not prioritize waste disclosure as much as smaller firms, possibly due to differing regulatory expectations or operational efficiencies. Overall, the results indicate that environmental disclosures are linked to firms' capital structure, as reflected in leverage levels. Further analysis is needed to determine the causal effects and industry-specific influences.

## 4.2 Test of Hypothesis

### 4.2.1 GMM Test Results (Table 1.0)

The Generalized Method of Moments (GMM) estimation was conducted to analyze the impact of environmental accounting disclosures on capital structure among multinational firms in Nigeria, with Debt-to-Total-Asset Ratio (DTAR) as the dependent variable. The ADF test ( $p = 0.0001$ ) confirms that DTAR is stationary, validating its suitability for regression analysis. The system GMM estimation yielded  $R^2 = 0.2622$ , indicating that environmental disclosure variables ( $\beta_1$ CARD,  $\beta_2$ WATD,  $\beta_3$ ENEED, and  $\beta_4$ WMAND) explain approximately 26.22% of the variations in DTAR, with the remaining variance attributable to other firm-specific and external financial factors. The Driscoll-Kraay robust covariance

estimator was applied to correct heteroskedasticity and autocorrelation biases, ensuring the robustness of the results.

The regression coefficients reveal that carbon disclosure ( $\beta_1\text{CARD} = 9.24, p = 0.0002$ ) and water disclosure ( $\beta_2\text{WATD} = 9.79, p = 0.0003$ ) are positively and significantly associated with DTAR, suggesting that firms with stronger environmental disclosures in these areas tend to utilize more debt financing. This finding aligns with prior research, which suggests that firms disclosing sustainability efforts attract investor confidence and lower capital constraints. However, waste management disclosure ( $\beta_4\text{WMAND} = -6.41, p = 0.0305$ ) has a negative and significant impact on DTAR, implying that firms prioritizing waste management transparency may face higher debt costs or more restrictive lending conditions, potentially due to increased compliance costs or regulatory scrutiny. Meanwhile, energy efficiency disclosure ( $\beta_3\text{ENEED} = -1.51, p = 0.5302$ ) and firm size ( $\beta_5\text{FS} = 3.03, p = 0.1752$ ) do not exhibit significant effects on DTAR, suggesting that these variables do not independently drive debt-financing decisions within the studied multinational firms.

#### 4.2.2 Variance Inflation Factors (Table 4.0)

The Variance Inflation Factor (VIF) results confirm that multicollinearity is not a concern, as all predictors exhibit VIF values below 5, with the highest being 2.24 (WATD) and 2.20 (CARD). This ensures that the estimated regression coefficients are stable and reliable, reinforcing the credibility of the GMM results.

#### 4.2.3 OLS Regression Results (Table 5.0)

The Ordinary Least Squares (OLS) regression further validates the relationship between environmental disclosures and capital structure decisions, yielding  $R^2 = 0.262$  and  $AdjR^2 = 0.231$ , which align with the GMM model results. The overall significance of the model is confirmed by the F-statistic ( $F_{(5,117)} = 8.318, p < 0.0001$ ), indicating that environmental disclosures collectively influence capital structure decisions among Nigerian multinational firms. In line with the GMM findings, carbon disclosure ( $\beta_1\text{CARD} = 9.24, p = 0.005$ ) and water disclosure ( $\beta_2\text{WATD} = 9.79, p = 0.002$ ) demonstrate significant positive effects on DTAR, suggesting that firms with higher transparency in these areas secure more debt financing. Conversely, waste management disclosure ( $\beta_4\text{WMAND} = -6.41, p = 0.036$ ) exhibits a negative and significant relationship with DTAR, implying that firms prioritizing waste transparency may face higher borrowing constraints, possibly due to regulatory compliance costs or risk perception by creditors. Meanwhile, energy efficiency disclosure ( $\beta_3\text{ENEED} = -1.51, p = 0.616$ ) remains statistically insignificant, indicating that this factor does not independently drive debt-financing decisions within the studied firms.

Robustness diagnostics confirm that the model passes the Breusch-Pagan test for heteroskedasticity ( $LM = 4.397, p = 0.494; F_{(1,117)} = 0.868, p = 0.505$ ), ensuring that heteroskedasticity does not distort the results. However, Durbin Watson (DW stat = 0.856) suggests mild autocorrelation, reinforcing the preference for GMM estimation as a more robust approach to analyzing the relationship between environmental disclosures and capital structure decisions.

**H<sub>01</sub>: There is no significant relationship between environmental accounting disclosures and capital structure decisions.**

## 5 DISCUSSIONS

The findings of this study reinforce the argument that environmental accounting disclosures influence capital structure, particularly firm's leverage outcomes. The GMM test results reveal that carbon emission disclosure (CARD) and water disclosure (WATD) have significant positive effects on the debt-to-total-assets ratio (DTAR), suggesting that multinational firms in Nigeria that disclose these environmental factors tend to access more debt financing. This aligns with the findings of Ding, Appolloni, & Shahzad, (2022), who established that corporate environmental disclosures enhance firms' ability to secure favorable credit terms by reducing perceived investment risk. Similarly, Chang, Agyemang, Saeed, & Adam, (2023) found that environmental disclosures improve corporate performance by increasing investor confidence and

access to external financing sources. The results also show that waste management disclosure (WMAND) has a significant negative relationship with DTAR, which could imply that firms prioritizing waste management transparency may face stricter lending conditions due to regulatory compliance costs, a trend also observed by Luo, Guo, Zhong, & Wang, (2019), who noted that higher environmental disclosure quality can sometimes increase financing costs in heavily regulated industries.

Contrasting findings from previous studies suggest that environmental disclosures do not always translate to improved financing conditions. For instance, Bala, Ja'afar, & Lawal, (2021) examined oil and gas firms in Nigeria and found that while some environmental disclosures attracted investor interest, others had no significant impact on corporate financing due to weak regulatory enforcement. Similarly, Xi and Xiao (2022) argued that corporate environmental disclosures are often used as a signaling mechanism rather than an actual determinant of financial outcomes, highlighting that investors may not always perceive such disclosures as reliable indicators of firm performance. The insignificant relationship between energy efficiency disclosure (ENEED) and DTAR in this study supports this argument, suggesting that some sustainability initiatives may not directly influence debt management strategies in multinational firms.

These findings are well-grounded within stakeholder theory, which asserts that firms disclose environmental information not just to satisfy regulatory requirements but to meet the expectations of various stakeholders, including investors, creditors, and policymakers (Freeman, 1984). The positive impact of carbon and water disclosures on debt financing aligns with the notion that environmental transparency enhances corporate reputation and attracts favorable lending conditions (Agyemang et al., 2023). However, the negative association between waste management disclosure and DTAR suggests that stakeholder expectations, particularly from regulators and lenders, can create additional financial burdens rather than incentives for firms. Thus, while environmental disclosures serve as strategic tools for firms to secure financing, their effectiveness largely depends on the nature of disclosure, industry dynamics, and the regulatory environment.

## **5.1 Theoretical Framework**

### **5.1.1 Stakeholder Theory**

Stakeholder Theory, first introduced by Freeman (1984), argues that businesses are accountable to a wide range of stakeholders beyond just shareholders. This theory suggests that firms must align their strategies with the expectations of various groups, including investors, governments, customers, and communities. In the context of environmental accounting disclosures, stakeholder theory provides a strong framework for understanding why firms voluntarily disclose environmental information to maintain legitimacy and secure financial resources (Freeman et al., 2010).

Environmental disclosures serve as a mechanism for firms to demonstrate corporate responsibility and transparency, which helps in managing stakeholder perceptions. Prior research indicates that firms that actively engage in environmental disclosures tend to receive more favorable financing terms, as investors and creditors perceive them as lower-risk entities (Dube & Maroun, 2017). Additionally, regulatory bodies and policymakers often impose sustainability reporting requirements, reinforcing the importance of environmental transparency.

Stakeholder pressure influences corporate financing decisions, as firms with stronger environmental accountability attract investors who prioritize sustainable investments. Studies show that multinational firms with robust environmental disclosures experience reduced cost of debt and improved access to financing (Kumar & Firoz, 2022). This aligns with the argument that firms responding to stakeholder concerns can enhance financial flexibility and long-term profitability.

By applying Stakeholder Theory, this study highlights how firms engage in environmental accounting disclosures to satisfy stakeholder demands, improve financial credibility, and secure financing advantages. The theory provides a compelling explanation for why multinational firms in Nigeria must integrate sustainability disclosures into their financial strategies.

### 5.1.2 Empirical Review of Environmental Accounting Disclosures and Capital Structure Decisions

Empirical studies on environmental accounting disclosures and capital structure decisions, particularly firms' leverage, have yielded both consistent and divergent findings. This section synthesizes similar results, contrasts differing perspectives, and identifies gaps in the literature.

A growing body of research suggests a positive correlation between environmental accounting disclosures and capital structure decisions, such as reduced financing costs, improved debt ratios, and increased investor confidence.

Zheng and Shen (2024) found that firms with higher levels of environmental disclosures experienced lower costs of debt due to improved creditworthiness and investor trust. Similarly, Saeed et al. (2024) confirmed that technological innovation strengthens the link between environmental accounting disclosures and financing decisions, highlighting that companies investing in sustainability tend to attract better financing terms.

In line with these findings, Ding et al. (2022) analyzed firms subjected to environmental administrative penalties and found that poor environmental disclosure increased financing costs, reinforcing the idea that transparency in sustainability reporting is a risk mitigation strategy that reassures investors and lenders. Likewise, Du, Chai, Wei, Wang, & Li (2022) provided evidence that corporate environmental disclosure positively influences bank credit decisions, particularly in environmentally sensitive industries. These studies collectively emphasize that firms engaging in comprehensive and transparent environmental disclosures tend to benefit from improved financing opportunities and lower debt-related risks.

Furthermore, Aruna and Orji-Okafor (2024) examined oil and gas firms in Nigeria and observed that debt financing is more accessible for companies with strong environmental sustainability reporting, suggesting that even in developing economies, financial markets reward transparency in environmental practices. Similarly, Luo et al. (2019) found that media attention on environmental disclosures improves debt financing conditions by increasing accountability and firm reputation.

While most studies support a positive relationship between environmental disclosures and improved financing conditions, some studies present contradictory or nuanced perspectives.

Amahalu and Aruna (2024) focused on environmental research and development (R&D) disclosures and found that high debt financing levels sometimes hinder firms from investing in sustainability projects. This suggests that while environmental disclosures may attract investors, companies heavily reliant on debt may struggle to allocate sufficient funds for sustainability initiatives.

Bala et al. (2021) further complicates the discussion by indicating that firm size and industry type moderate the impact of environmental disclosures on capital structure. While larger firms benefit from their disclosures, smaller firms often face financial constraints that limit the perceived benefits of sustainability reporting. Similarly, Udo (2019) highlighted that firms in developing markets like Nigeria exhibit inconsistencies in their environmental disclosure practices, leading to unclear or mixed effects on corporate financing.

Contrary to the argument that disclosures always reduce financing costs, Luo et al. (2019) found that firms with excessive media scrutiny on their environmental disclosures sometimes experience higher debt financing costs. This suggests that while transparency is generally beneficial, negative investor reactions to poor environmental performance can offset the advantages of disclosure.

Despite the increasing interest in environmental disclosures and capital structure financing, several research gaps remain, particularly in the context of multinational firms (MNFs). One major limitation is the lack of studies focusing on specific capital structure within MNFs. While existing literature predominantly examines broad financial indicators such as cost of capital and investor confidence, fewer studies have explored granular measures like the debt-to-total-assets ratio or debt repayment capacity, which are crucial

for understanding how multinational firms structure their debt portfolios (Zheng & Shen, 2024; Ding et al., 2022).

Additionally, there is a lack of sector-specific analysis concerning MNFs. While research on oil and gas firms (Aruna & Orji-Okafor, 2024) and high-polluting industries (Du et al., 2022) have provided valuable insights, other sectors where multinational firms play a significant role, such as manufacturing, telecommunications, and banking, remain underexplored. The absence of industry-specific findings limits the ability to generalize how environmental disclosures impact capital structure decisions across multinational operations.

Another critical gap relates to the role of firm size and regulatory environment in shaping the relationship between environmental disclosures and capital structure decisions in MNFs. While some studies suggest that larger firms are better positioned to leverage environmental disclosures for financial benefits (Bala et al., 2021), there is still insufficient empirical evidence on how variations in regulatory policies across different host countries influence capital structure decisions among multinational corporations. Given that MNCs operate across multiple jurisdictions with varying environmental disclosure requirements, understanding how regulatory inconsistencies affect financing decisions is essential.

Furthermore, there is conflicting evidence on the impact of media attention on capital structure for multinational firms. Some studies indicate that positive media coverage of environmental disclosures enhances financing conditions by increasing transparency and investor confidence (Luo et al., 2019). However, others suggest that intense scrutiny may elevate financing costs, particularly for firms operating in regions with weak environmental regulations. Given the global footprint of MNCs, further investigation is needed to determine whether media attention acts as a facilitator or deterrent in corporate financing across different regulatory and economic environments.

Addressing these gaps is crucial for developing a more comprehensive understanding of how environmental accounting disclosures influence debt management strategies within multinational firms, particularly in emerging economies like Nigeria, where regulatory structures are still evolving.

This empirical review consolidates existing research on environmental accounting disclosures and corporate financing, demonstrating a consensus that transparency in sustainability reporting leads to favorable financial outcomes. However, contrasting findings highlight the need for more sector-specific and country-specific studies to refine our understanding of how environmental disclosures impact corporate debt management strategies.

## 6 CONCLUSION AND IMPLICATIONS

The study provides empirical evidence that environmental accounting disclosures significantly influence capital structure decisions among multinational firms in Nigeria. Specifically, carbon emission and water efficiency disclosures enhance debt accessibility, while waste management disclosure is associated with stricter lending conditions, likely due to compliance costs. These findings highlight the complex interplay between environmental transparency, stakeholder expectations, and capital structure decisions. While some disclosures improve investor and lender confidence, others may impose additional financial burdens, particularly in industries with stringent environmental regulations. The study's findings support stakeholder theory, emphasizing that corporate environmental disclosures are shaped by the need to satisfy multiple stakeholders, including investors, creditors, and regulators.

### 6.1 Recommendations

1. For Corporate Management: Multinational firms should prioritize strategic environmental disclosures, particularly in areas such as carbon emissions and water efficiency, as these have been shown to enhance access to debt financing. However, firms should also assess the financial implications of waste management disclosures and explore cost-effective sustainability initiatives that minimize regulatory burdens.

2. For Investors and Lenders: Financial institutions should develop risk-adjusted lending frameworks that incentivize firms engaging in comprehensive environmental disclosures, particularly in carbon and water efficiency, without penalizing firms undertaking long-term sustainability projects like waste management.
3. For Policymakers and Regulators: Government agencies should implement clear and standardized environmental disclosure requirements to reduce inconsistencies in reporting practices across industries. Additionally, regulators should consider incentive-based policies, such as tax breaks or favorable loan terms, to encourage firms to enhance their sustainability reporting practices.
4. For Industry-Specific Stakeholders: Firms in capital-intensive industries such as cement, oil & gas, and telecommunications should collaborate with industry regulators to develop sector-specific environmental disclosure guidelines that align with global best practices while balancing compliance costs.

## 7 LIMITATION AND FURTHER STUDIES

To expand the scope and applicability of these findings, future research should explore:

1. Industry-Specific Analysis: Conducting sectoral studies to assess how the impact of environmental disclosures on financing decisions varies across industries such as manufacturing, telecommunications, and financial services.
2. Comparative Cross-Country Studies: Examining the role of regulatory frameworks in shaping the relationship between environmental disclosures and financing decisions across emerging and developed markets.
3. Longitudinal Analysis of Debt Financing Trends: Investigating how changes in environmental disclosure practices over time influence capital structure decisions, considering factors like economic downturns, global sustainability trends, and policy shifts.
4. Stakeholder Perception Studies: Conducting surveys to understand how investors, creditors, and regulators interpret environmental disclosures in assessing firm risk and financial stability, which could offer deeper insights into the decision-making processes of financial institutions.

By addressing these areas, future research can further enhance the understanding of the dynamic relationship between corporate sustainability reporting and financial performance, ultimately contributing to more effective policy frameworks and corporate strategies.

## AUTHOR DECLARATIONS

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## APPENDIX

### VSP (2.2) OUTPUT

OUTCOME VARIABLE [DTAR]

[DTAR] is <Stationary> (ADF p-value: 0.0001) Proceeding with GMM analysis for [DTAR]  
Driscoll-Kraay Correction Results: <bound method RegressionResults.summary of  
<statsmodels.regression.linear\_model.OLSResults object at 0x0000016E51A77DD0>>

**Table 1.0 GMM Test Results [DTAR]**

System 2-Step System GMM Estimation Summary						
Estimator:	2-Step System GMM		Overall R-squared:	0.2622		
No. Equations.:	1		McElroy's R-squared:	0.2622		
No. Observations:	123		Judge's (OLS) R-squared:	0.2622		
Date:	Sat, Mar 22 2025		Berndt's R-squared:	0.2622		
Time:	09:04:14		Dhrymes's R-squared:	0.2622		
Cov. Estimator:	robust		Num. Constraints:	None		
Equation: DTAR, Dependent Variable: DTAR						
	Parameter	Std. Err.	T-stat	P-value	Lower CI	Upper CI
Intercept	-10.071	19.061	-0.5283	0.5973	-47.429	27.288
CARD	9.2449	2.5057	3.6896	0.0002	4.3339	14.156
WATD	9.7863	2.7181	3.6004	0.0003	4.4589	15.114
ENEED	-1.5108	2.4069	-0.6277	0.5302	-6.2282	3.2066
WMAND	-6.4115	2.9638	-2.1633	0.0305	-12.220	-0.6025
FS	3.0278	2.2332	1.3558	0.1752	-1.3492	7.4048

Covariance Estimator: GMM Heteroskedastic (Robust) Covariance

Weight Estimator: Heteroskedastic (Robust) Weighting (Debiased: False, Center: False)

MODEL APPLIED:

Dependent Variables: ['DTAR']

Predictor Variables: ['CARD', 'WATD', 'ENEED', 'WMAND', 'FS']

**Table 2.0 Descriptive Statistics**

	CARD	WATD	ENEED	WMAND	FS	DTAR
count	123	123	123	123	123	123
mean	0.36	0.56	0.39	0.5	8.35	20.25
std	0.48	0.50	0.49	0.5	0.57	13.27

**Table 3.0 Correlation Matrix**

	CARD	WATD	ENEED	WMAND	FS	DTAR
CARD	1.00	0.52	0.69	0.38	0.17	0.42
WATD	0.52	1.00	0.44	0.68	-0.03	0.35
ENEED	0.69	0.44	1.00	0.31	0.17	0.28
WMAND	0.38	0.68	0.31	1.00	-0.24	0.09
FS	0.17	-0.03	0.17	-0.24	1.00	0.23
DTAR	0.42	0.35	0.28	0.09	0.23	1.00

**Table 4.0 Variance Inflation Factors**

features	VIF
0 const	255.648502
1 CARD	2.200697
2 WATD	2.242365
3 ENEED	1.953001
4 WMAND	2.076758

5 FS 1.176062

**Table 5.0 Regression Analysis for DTAR**  
OLS Regression Results

Dep. Variable:	DTAR	R-squared:	0.262
Model:	OLS	Adj. R-squared:	0.231
Method:	Least Squares	F-statistic:	8.318
Date:	Sat, 22 Mar 2025	Prob (F-statistic):	9.38e-07
Time:	09:04:15	Log-Likelihood:	-473.34
No. Observations:	123	AIC:	958.7
Df Residuals:	117	BIC:	975.5
Df Model:	5	Covariance Type:	nonrobust

	coef	std err	t	P> t	[0.025	0.975]
const	-10.0705	16.779	-0.600	0.550	-43.301	23.159
CARD	9.2449	3.248	2.846	0.005	2.813	15.677
WATD	9.7863	3.167	3.091	0.002	3.515	16.057
ENEED	-1.5108	3.006	-0.503	0.616	-7.465	4.443
WMAND	-6.4115	3.025	-2.120	0.036	-12.402	-0.421
FS	3.0278	1.991	1.521	0.131	-0.915	6.971

Omnibus:	9.700	Durbin-Watson:	0.856
Prob (Omnibus):	0.008	Jarque-Bera (JB):	10.558
Skew:	0.710	Prob (JB):	0.00510
Kurtosis:	2.793	Cond. No.	137.

Notes:

[1] Standard Errors assume that the covariance matrix of the errors is correctly specified.

Wald Test for Joint Significance:  $F(1, 117) = [17.71658293]$ , p-value = 5.0549448814920734e-05

Durbin Watson stat: 0.8556

Shapiro stat: 0.9432

Shapiro p-value: 0.000

Unit Root Test (Phillips-Perron):

Test Statistic: -4.4066

P-Value: 0.000

Breusch-Pagan test (Heteroscedasticity):

LM Statistic: 4.3973

LM-Test p-value: 0.494

F-Statistic: 0.8676

F-Test p-value: 0.505

White test (Heteroscedasticity):

LM Statistic: 19.1246

LM-Test p-value: 0.208