

Environmental Sustainability Disclosure and Firm Market Value: The Mediating Role of Investor Trading Behaviour in Nigerian Industrial Goods Firms

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ABSTRACT

Environmental sustainability disclosure is becoming increasingly important to capital-market decision-making in Nigeria as the country moves toward mandatory ISSB-aligned sustainability reporting. Yet evidence on its association with firm market value, and the mechanism through which such value relevance may arise, remains inconclusive. This study examines the relationship between environmental sustainability disclosure and firm market value and tests whether investor trading behaviour mediates that relationship. Using a balanced panel of nine industrial goods firms listed on the Nigerian Exchange Group over 2010–2025, yielding 144 firm-year observations, environmental disclosure is measured with a GRI-aligned index, firm value by Tobin's Q, investor trading behaviour by the natural logarithm of annual share-trading volume, and firm size by the natural logarithm of total assets. Panel diagnostics support random-effects GLS with firm-clustered robust standard errors. Environmental disclosure is negatively associated with firm market value ($\beta = -2.655$, $p = 0.014$) but is not significantly associated with investor trading behaviour ($\beta = -0.517$, $p = 0.107$). Investor trading behaviour is also not significantly associated with firm market value ($\beta = 0.144$, $p = 0.514$). The indirect effect is -0.0743 , while the 5,000-replication firm-cluster bootstrap confidence interval $[-0.490, 0.267]$ includes zero. Robustness checks incorporating year effects and conservative small-cluster inference leave the substantive conclusions unchanged. The findings provide no support for the hypothesized positive valuation effect and no evidence that annual trading activity mediates the environmental disclosure–firm value relationship.

Keywords: environmental sustainability disclosure; firm market value; Tobin's Q; investor trading behaviour; sustainability reporting; Nigeria

INTRODUCTION

Environmental sustainability reporting has evolved from a largely voluntary corporate responsibility practice into an increasingly important component of capital-market information. This transition reflects growing recognition that environmental risks and opportunities can affect operating costs, future cash flows, access to finance, regulatory exposure and, ultimately, corporate value. In Nigeria, the issue has assumed greater significance as the country progresses toward mandatory adoption of the IFRS Sustainability Disclosure Standards for public-interest entities from financial years beginning on or after 1 January 2028 (Financial Reporting Council of Nigeria [FRCN], 2026a, 2026b). The emerging reporting regime places greater responsibility on firms to communicate sustainability-related information that is material to investors and other capital providers. It also raises an important empirical question: does environmental sustainability disclosure influence how investors respond to firms and how the capital market values them?

This question is particularly relevant to industrial goods firms because their operations are frequently associated with significant environmental exposures, including energy consumption, emissions, waste generation, resource utilisation and environmental compliance obligations. These exposures may have implications for production costs, regulatory penalties, capital expenditure, corporate reputation and long-term competitiveness. Environmental disclosure may therefore provide investors with information for assessing

how effectively firms identify and manage environmentally related risks and opportunities. Consistent with IFRS S1, sustainability-related information is decision useful when it can reasonably be expected to affect an entity's cash flows, access to finance or cost of capital (International Sustainability Standards Board [ISSB], 2023a). Environmental disclosure may therefore be value relevant, but its capital-market consequences depend on whether investors regard the information as credible, material and economically consequential.

Signalling Theory provides a useful explanation for why environmental disclosure may influence market valuation. Under conditions of information asymmetry, managers possess information about corporate environmental risks, capabilities and strategies that outside investors may not fully observe. Disclosure can therefore serve as a signal through which firms communicate otherwise private or difficult-to-observe information to market participants (Spence, 1973; Connelly et al., 2011). Where environmental information is credible and economically relevant, it may reduce uncertainty, strengthen investor confidence and contribute to favourable valuation. The effect, however, need not always be positive. Greater disclosure may also reveal environmental liabilities, weak environmental performance, compliance costs or substantial future obligations. Consequently, environmental disclosure may generate favourable, neutral or adverse market responses depending on the information conveyed and how investors interpret its implications.

Existing empirical evidence reflects this ambiguity. International studies demonstrate that environmental and sustainability information can be value relevant, although the direction and magnitude of market responses depend on disclosure content, quality and the surrounding information environment. Matsumura et al. (2014) show that capital markets price both carbon emissions and firms' disclosure decisions, while Plumlee et al. (2015) find that environmental disclosure quality may affect firm value through expected cash-flow and cost-of-capital channels. Krüger (2015) documents asymmetric investor responses to corporate social-responsibility information, whereas Serafeim and Yoon (2023) show that stock-market reactions to ESG news depend partly on prior information and disagreement among market participants. Collectively, these studies suggest that greater environmental disclosure cannot be presumed to generate higher firm value automatically.

Evidence from Nigeria is similarly inconclusive. Emeka-Nwokeji and Osioma (2019) and Olagunju and Ajiboye (2022) report positive relationships between environmental or sustainability disclosure and market-value measures. In contrast, Nwaigwe et al. (2022) show that the extent and quality of sustainability disclosure may produce different valuation outcomes, including negative relationships for some disclosure measures. Related Nigerian evidence on corporate performance also reveals considerable heterogeneity. Nnedu et al. (2025a) report a significant negative relationship between environmental sustainability reporting and sales turnover, while Nnedu et al. (2025b) document a negative but statistically insignificant environmental-disclosure coefficient under a broader sustainability-reporting specification. Conversely, Nnedu, Okpanachi, and Uwaleke (2025) report a positive relationship between environmental sustainability reporting and profitability. These divergent findings reinforce Nnedu's (2025) conclusion that sustainability-reporting outcomes are sensitive to sector, disclosure dimension, regulatory setting and the particular measure of corporate performance employed.

The mixed evidence exposes an important limitation in the existing literature. Much of the Nigerian research has concentrated on whether environmental or sustainability disclosure is directly associated with firm performance or market value. Although such studies establish the existence and direction of statistical relationships, they provide limited explanation of how environmental information becomes incorporated into market valuation. Disclosure does not influence market value mechanically. Information must first be received, interpreted and acted upon by market participants before it can be reflected in valuation. Investor behaviour therefore represents a potentially important intervening mechanism in the environmental disclosure–firm value relationship.

Investor trading behaviour provides an observable means of examining this market-processing mechanism. Sustainability information that investors consider relevant may attract attention, stimulate portfolio rebalancing and alter trading activity. Hartzmark and Sussman (2019), for example, demonstrate that sustainability information can influence investment flows, while Serafeim and Yoon (2023) show that ESG-related information can generate measurable capital-market responses. Increased trading activity, however,

does not necessarily imply favourable valuation because trading may arise from positive expectations, adverse information, uncertainty or disagreement among investors. The important empirical issue is therefore not merely whether environmental disclosure is associated with trading activity, but whether such trading activity constitutes a channel through which disclosure becomes reflected in firm market value. This transmission mechanism has received comparatively limited empirical attention within the Nigerian sustainability-reporting literature.

Against this background, this study examines the relationship between environmental sustainability disclosure and firm market value and investigates whether investor trading behaviour mediates that relationship among listed industrial goods firms in Nigeria. Specifically, the study examines whether environmental sustainability disclosure is associated with Tobin's Q, whether environmental disclosure influences investor trading behaviour, whether investor trading behaviour is associated with firm market value, and whether investor trading behaviour transmits the effect of environmental disclosure to market valuation.

The study contributes to the literature in three important respects. First, it focuses specifically on the environmental dimension of sustainability reporting within the environmentally exposed industrial goods sector rather than combining environmental, social and governance disclosures into a composite measure. Second, it moves beyond the conventional direct disclosure–value relationship by explicitly testing investor trading behaviour as a market-transmission mechanism, thereby addressing not only whether environmental disclosure is value relevant but also how such value relevance may arise. Third, it provides evidence from an emerging capital market undergoing a significant transition toward ISSB-aligned mandatory sustainability reporting. The findings therefore contribute to the academic debate on sustainability disclosure and firm value while providing relevant evidence for firms, investors and regulators concerned with whether increasingly extensive environmental reporting generates information that is meaningfully processed by the capital market.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Environmental Sustainability Disclosure and Market Value

Environmental sustainability disclosure communicates information about a firm's environmental policies, risks, impacts, performance, targets, and management responses. In practice, disclosure may cover energy consumption, emissions, waste management, resource efficiency, environmental compliance, and related risks. Content-analysis indices aligned with the Global Reporting Initiative have frequently been used to capture the breadth of such reporting (Clarkson et al., 2008; GRI, 2021). The economic relevance of disclosure lies not in the number of environmental sentences reported but in whether the information reduces uncertainty about the firm's future prospects.

Firm market value reflects investor expectations about future cash flows, risk, and growth opportunities. Tobin's Q is commonly used in sustainability research because it relates the market value of the firm to the value of its asset base and therefore captures forward-looking market assessments. Environmental information may improve valuation when it signals stronger risk management, resource efficiency, regulatory preparedness, or future cash-flow resilience. Plumlee et al. (2015), for example, show that environmental disclosure quality can be associated with firm value through expected cash flows and the cost of equity. Matsumura et al. (2014) similarly demonstrate that capital markets price both carbon emissions and the decision to disclose emissions information.

The relationship need not always be positive. Environmental disclosure can reveal liabilities, remediation costs, weak performance, or future compliance burdens. Krüger (2015) shows that markets respond differently to positive and negative social-responsibility events, while Serafeim and Yoon (2023) demonstrate that the pricing of ESG news depends partly on prior ratings and disagreement. In Nigeria, the coexistence of positive and negative findings further suggests that market value depends on how disclosure is interpreted rather than on disclosure volume alone. Accordingly, the expected positive signalling effect is an empirical proposition rather than an assumption.

H1: Environmental sustainability disclosure has a significant positive relationship with the market value of listed industrial goods firms in Nigeria.

Environmental Disclosure and Investor Trading Behaviour

Investor behaviour encompasses market participants' responses to information, expectations and changes in perceived risk. In this study, the construct is operationalised through annual share-trading volume, which captures an observable dimension of investor behaviour: the intensity of trading activity in a firm's shares. Trading volume is relevant to the proposed transmission mechanism because information that attracts investor attention or prompts portfolio rebalancing may be reflected in changes in market participation. It does not, however, reveal the direction or motivation of individual trades and is therefore not interpreted as a direct measure of investor sentiment, attention or optimism.

Signalling Theory suggests that corporate disclosure becomes economically consequential when market participants recognise and respond to the information conveyed. Sustainability information can influence investment flows when it becomes salient to investors (Hartzmark & Sussman, 2019), while ESG-related information may generate measurable capital-market responses depending on its credibility and informational content (Serafeim & Yoon, 2023). Environmental sustainability disclosure may therefore influence trading activity where investors consider the information relevant to future cash flows, environmental exposure and corporate risk. Conversely, limited comparability, boilerplate reporting or weak investor attention may attenuate the trading response to disclosure.

H2: Environmental sustainability disclosure has a significant positive relationship with investor trading behaviour among listed industrial goods firms in Nigeria.

Investor Behaviour and Firm Market Value

Trading activity can affect the process through which information is incorporated into prices. Greater investor participation may improve liquidity, reduce trading frictions, and accelerate the impounding of new information into market valuation. The positive association between sustainability salience and capital flows documented by Hartzmark and Sussman (2019) illustrates that investors can reallocate capital in response to sustainability information even when superior future performance is not guaranteed.

Nevertheless, high trading volume is not synonymous with favourable valuation. Trading may reflect disagreement, uncertainty, or negative information. The hypothesised positive relationship therefore rests on the argument that, on average, stronger investor participation improves the market's capacity to process relevant corporate information. Whether this relationship holds in Nigeria's industrial goods sector is tested empirically.

H3: Investor trading behaviour has a significant positive relationship with the market value of listed industrial goods firms in Nigeria.

Mediating Role of Investor Trading Behaviour

The mediation argument integrates the preceding relationships. Environmental disclosure is expected to influence valuation partly because it changes what investors know and how they respond. If disclosure attracts investor attention or alters trading decisions, and trading behaviour in turn contributes to the incorporation of information into market value, investor behaviour can transmit part of the disclosure effect to valuation.

This mechanism-based framing is stronger than treating the absence of a prior direct-effects study as the sole research justification. It addresses an explanatory puzzle: mixed disclosure–value findings may arise because disclosure is not uniformly processed by investors. The study therefore separates the direct path from ENDI to Tobin's Q from the indirect path that runs through trade volume. Contemporary mediation analysis emphasises testing the indirect effect itself rather than relying exclusively on the sequential significance rules associated with Baron and Kenny (1986) (Zhao et al., 2010).

H4: Investor trading behaviour significantly mediates the relationship between environmental sustainability disclosure and the market value of listed industrial goods firms in Nigeria.

Theoretical Framework: Signalling Theory

Signalling Theory provides the principal theoretical lens for the study. Spence (1973) explains signalling under information asymmetry as a process in which one party possesses information that is not fully available to another and communicates observable signals that receivers interpret. Connelly et al. (2011) extend this logic to organisations, emphasizing the signaler, the signal, the receiver, and the feedback process.

Applied here, corporate managers are the signalers, environmental sustainability disclosure is the signal, investors are the receivers, trading behaviour is an observable market response, and Tobin's Q represents the valuation outcome. A credible environmental signal can reduce uncertainty about environmental risk management and long-term resilience. An uninformative or low-credibility signal may generate little response, while adverse environmental information may even reduce valuation. This framework therefore accommodates both positive and negative empirical outcomes and, importantly, explains why investor response is theoretically positioned between disclosure and market value.

Stakeholder and legitimacy perspectives remain relevant background explanations for why environmentally exposed firms disclose, but using Signalling Theory as the principal lens keeps the theoretical argument focused on the study's capital-market mechanism: information is released, interpreted by investors, and potentially incorporated into value.

Empirical Review

Empirical evidence on environmental disclosure and market valuation is mixed rather than uniformly positive. Matsumura et al. (2014) reported that carbon emissions and the decision not to disclose emissions were associated with lower firm value among U.S. firms, indicating that markets price both environmental performance and transparency. Plumlee et al. (2015) found that environmental disclosure quality relates to firm value through both cash-flow and cost-of-capital channels, but the effects vary by disclosure type. Krüger (2015) similarly showed asymmetric market reactions to corporate social-responsibility news, while Serafeim and Yoon (2023) found that the stock-price response to ESG news depends on the informational environment surrounding the news. Collectively, these studies suggest that disclosure affects valuation when investors regard the information as credible, salient, and economically relevant.

In Nigeria, direct evidence on disclosure and market value is equally unsettled. Emeka-Nwokeji and Osisioma (2019), using 93 listed non-financial firms and Tobin's Q, found a significant positive effect of overall sustainability disclosure and of the environmental dimension on firm value. Olagunju and Ajiboye (2022) also reported a positive and significant association between environmental accounting disclosure and market-value indicators among listed non-financial firms. By contrast, Nwaigwe et al. (2022), using 39 firms across nine sectors from 2010 to 2019, found that the extent of sustainability disclosure was positively but insignificantly related to market value, whereas disclosure quality was negatively related to market value. These divergent findings indicate that the valuation effect is sensitive to how disclosure is measured, the sample composition, the period examined, and the market-value proxy.

Nnedu (2025), synthesising empirical studies published between 2018 and 2024, similarly concluded that the relationship between sustainability reporting and firm performance is context-sensitive across sectors, regions and disclosure dimensions. Because the study is a thematic review rather than a firm-level test, it is used here to frame heterogeneity in the broader evidence rather than as an additional firm-level empirical observation.

The firm-level studies by Nnedu, Okpanachi, and Achema are more directly relevant to the present environmental-disclosure question, although they examine accounting performance rather than market value. Both use 16 listed consumer goods firms over 2014–2023 and should therefore be treated as related specifications rather than independent replications. In the environmental-focused specification, Nnedu et al. (2025a) reported a significant negative relationship between environmental sustainability reporting and sales

turnover, with firm size positively moderating the relationship. In the broader sustainability-reporting specification, Nnedu et al. (2025b) reported a negative but statistically insignificant environmental-disclosure coefficient and no significant moderating effect of firm size. Using a later 2018–2024 mandatory-disclosure sample and return on assets, Nnedu, Okpanachi, and Uwaleke (2025) found that environmental sustainability reporting significantly improved profitability. These studies are relevant Nigerian evidence on environmental disclosure and firm outcomes, but none tests market value or investor trading as the mediating mechanism; that distinction sharpens the gap addressed in the present study.

Although the literature has become richer, two gaps remain. First, most Nigerian studies estimate a direct disclosure–performance or disclosure–value relationship; few test the behavioural channel through which investors may translate environmental information into valuation. Second, accounting outcomes such as return on assets or sales turnover do not reveal whether capital-market participants actually respond to the information. Hartzmark and Sussman (2019) show that sustainability signals can influence investor fund flows, but evidence on whether trading behaviour transmits environmental disclosure into firm value remains limited in Nigeria. The present study addresses this gap by modelling investor trading volume as a mediator between environmental sustainability disclosure and Tobin’s Q in listed industrial goods firms. This mechanism-based design permits the study to explain why disclosure may attract investor attention without necessarily producing a higher valuation.

METHODOLOGY

The study employed an ex post facto longitudinal panel design to examine the relationship among environmental sustainability disclosure, investor trading behaviour and firm market value. The population comprised the twelve industrial goods firms listed on the Nigerian Exchange Group as at 31 December 2025. Nine firms were purposively retained because they were continuously listed and had the annual-report, sustainability-disclosure, market and financial data required throughout 2010–2025; late entrants and firms without continuous data were excluded. The resulting sample represents 75% of the sectoral population and yields a balanced panel of 144 firm-year observations.

Data were obtained from published annual reports and financial statements of the sampled firms and relevant Nigerian capital-market records. Environmental sustainability disclosure was measured through systematic content analysis using environmental items aligned with the Global Reporting Initiative framework. For each firm-year, ENDI was computed as the number of applicable environmental items disclosed divided by the total number of applicable environmental items.

A predetermined checklist and uniform coding protocol were applied consistently across firms and years to limit discretionary judgement. A formal inter-coder reliability coefficient was not available; accordingly, the disclosure measure should be interpreted as a consistently coded disclosure-breadth index rather than an independently validated measure of disclosure quality. Firm market value was proxied by Tobin’s Q, investor trading behaviour by the natural logarithm of annual share-trading volume, and firm size by the natural logarithm of total assets.

Table 1. Measurement of Variables

Variable	Role	Operational measure
TOBQ	Dependent variable	Tobin's Q = (market value of equity + total liabilities) / total assets
ENDI	Independent variable	Applicable environmental items disclosed / total applicable environmental items
TVOL	Mediator	Natural logarithm of annual share-trading volume
FSIZ	Control variable	Natural logarithm of total assets

Source: Authors' tabulation (2026)

Annual share-trading volume is used because it captures realised trading intensity and market participation in a firm's shares. It is interpreted as the trading-activity dimension of investor behaviour and not as a direct measure of investor sentiment, investor attention or the direction of individual trades.

Three panel regression models were estimated to capture the direct and mediating paths:

$$\text{Model 1: } \text{TOBQ}_{it} = \beta_0 + \beta_1 \text{ENDI}_{it} + \beta_2 \text{FSIZ}_{it} + \mu_i + \varepsilon_{it}$$

$$\text{Model 2: } \text{TVOL}_{it} = \beta_0 + \beta_1 \text{ENDI}_{it} + \beta_2 \text{FSIZ}_{it} + \mu_i + \varepsilon_{it}$$

$$\text{Model 3: } \text{TOBQ}_{it} = \beta_0 + \beta_1 \text{ENDI}_{it} + \beta_2 \text{TVOL}_{it} + \beta_3 \text{FSIZ}_{it} + \mu_i + \varepsilon_{it}$$

where i denotes firm, t denotes year, μ_i represents the unobserved firm-specific effect, and ε_{it} is the idiosyncratic disturbance term. Model 1 estimates the disclosure-value relationship, Model 2 estimates the disclosure-investor-behaviour path, and Model 3 estimates the firm-value equation after investor trading behaviour and firm size are controlled.

Descriptive statistics, Pearson correlation coefficients and variance inflation factors were used for preliminary analysis. Fixed-effects and random-effects estimators were considered, with the Hausman specification test used to guide model selection. A Mundlak correlated-random-effects test provided an additional assessment of the random-effects orthogonality assumption, while the Modified Wald test assessed groupwise heteroskedasticity. Based on the diagnostic evidence, the principal models were estimated using random-effects GLS with standard errors clustered at the firm level. Given the limited number of firms, asymptotic cluster-robust inference was supplemented by a conservative small-cluster sensitivity in which the coefficient-to-standard-error ratios were evaluated against a t distribution with eight degrees of freedom. The principal models were also re-estimated with year indicators to absorb common annual shocks affecting all firms over the 2010-2025 period, including changes in the macroeconomic, regulatory and capital-market environment (Mundlak, 1978; Wooldridge, 2019).

The mediating role of investor trading behaviour was assessed using the indirect effect $a \times b$, where a is the estimated relationship between ENDI and TVOL and b is the estimated relationship between TVOL and TOBQ after controlling for ENDI. Consistent with contemporary mediation analysis, inference focused on the indirect effect rather than solely on the sequential significance procedure of Baron and Kenny (1986) (Zhao et al., 2010). A firm-cluster bootstrap with 5,000 replications was used to construct the confidence interval for the indirect effect.

The empirical estimates are interpreted as conditional associations rather than causal effects. Although the panel structure accounts for persistent firm-specific heterogeneity and the year-effects specification controls for common time-specific shocks, the observational design cannot completely eliminate potential reverse causality or omitted time-varying firm characteristics. Accordingly, causal interpretations of the estimated coefficients are avoided.

RESULTS

Descriptive Statistics

Table 2. Descriptive Statistics

Variable	N	Mean	SD	Minimum	Maximum
TOBQ	144	2.372	2.308	0.506	11.757

ENDI	144	0.274	0.253	0.000	0.833
FSIZ	144	10.052	1.177	8.209	12.806
TVOL	144	7.362	1.231	2.959	9.363

Source: Authors' computation (2026)

The descriptive statistics indicate substantial variation in firm market value, with Tobin's Q recording a mean of 2.372 and a standard deviation of 2.308. Environmental sustainability disclosure has a mean of 0.274, indicating that the sampled firms disclosed, on average, 27.4% of the environmental items captured by the index. The dispersion in ENDI (SD = 0.253; range = 0.000-0.833) further shows marked variation in disclosure practices across firms and years. Firm size records a mean of 10.052 (SD = 1.177), while investor trading behaviour has a mean of 7.362 (SD = 1.231).

Correlation and Multicollinearity

Table 3. Correlation Matrix

Variable	TOBQ	ENDI	FSIZ	TVOL
TOBQ	1.000			
ENDI	-0.24700	1.000		
FSIZ	-0.31000	0.43100	1.000	
TVOL	0.039	0.249000	0.253000	1.000

Source: Authors' computation (2026)

The correlation analysis shows that environmental sustainability disclosure is negatively associated with Tobin's Q ($r = -0.247$, $p = 0.003$) but positively associated with investor trading behaviour ($r = 0.249$, $p = 0.003$). Investor trading behaviour is not significantly associated with Tobin's Q ($r = 0.039$, $p = 0.641$). Firm size is negatively related to Tobin's Q and positively associated with both environmental sustainability disclosure and trading volume. The variance inflation factor values range from 1.096 to 1.264, with a mean of 1.207, indicating that multicollinearity does not pose a concern for the estimated models.

Diagnostic Tests and Estimator Selection

Table 4. Diagnostic Tests and Estimator Selection

Diagnostic test	Statistic	p-value	Decision
Modified Wald test	$\chi^2(9) = 589.31$	< 0.001	Groupwise heteroskedasticity present
Hausman test: FE vs RE	$\chi^2(3) = 0.77$	0.858	Random effects not rejected
Robust Mundlak/CRE test	$\chi^2(3) = 1.44$	0.697	RE orthogonality not rejected

Source: Authors' computation (2026)

The diagnostic results provide the basis for estimator selection and statistical inference. The Modified Wald test is statistically significant ($\chi^2(9) = 589.31$, $p < 0.001$), indicating the presence of groupwise heteroskedasticity across firms and rendering conventional standard errors inappropriate. Accordingly, subsequent inference is based on firm-clustered robust standard errors. The Hausman specification test yields an insignificant statistic ($\chi^2(3) = 0.77$, $p = 0.858$), providing no evidence against the random-effects specification. This conclusion is reinforced by the robust Mundlak correlated-random-effects test ($\chi^2(3) = 1.44$, $p = 0.697$), which does not reject the orthogonality condition between the time-invariant firm-specific effects and the explanatory variables. Taken together, the diagnostic evidence supports the use of random-effects GLS as the principal estimator, with firm-clustered robust standard errors employed to address heteroskedasticity and within-firm dependence. Given the limited number of firm clusters, the robustness of the resulting inference is further examined using conservative small-cluster procedures.

Random-Effects Regression and Mediation Results

Table 5. Random-Effects Regression and Mediation Results

Variable / statistic	Model 1: TOBQ	Model 2: TVOL	Model 3: TOBQ	Indirect effect	Bootstrap 95% CI
ENDI	-2.655** (1.077)	-0.517 (0.321)	-2.577** (1.139)		
TVOL			0.144 (0.220)	-0.0743	[-0.490, 0.267]
FSIZ	-0.806 (0.523)	0.581** (0.233)	-0.909 (0.599)		
Model statistics	N = 144; G = 9 Within R ² = 0.261 Wald p = 0.042	N = 144; G = 9 Within R ² = 0.080 Wald p = 0.044	N = 144; G = 9 Within R ² = 0.265 Wald p = 0.040	Delta p = 0.545	5,000 replications

Source: Authors' computation (2026)

Model 1 examines the relationship between environmental sustainability disclosure and firm market value. The coefficient of ENDI is negative and statistically significant ($\beta = -2.655$, robust SE = 1.077, $p = 0.014$), indicating that greater environmental disclosure is associated with lower Tobin's Q after controlling for firm size. Firm size is negatively but insignificantly associated with market value ($\beta = -0.806$, $p = 0.123$). Although the ENDI coefficient is statistically significant, its direction is contrary to the positive relationship proposed in H₁. Accordingly, H₁ is not supported. The model is jointly significant (Wald $p = 0.042$), with a within-R² of 0.261.

Model 2 assesses the relationship between environmental sustainability disclosure and investor trading behaviour. ENDI has a negative but statistically insignificant coefficient ($\beta = -0.517$, robust SE = 0.321, $p = 0.107$), providing no evidence that greater environmental disclosure is associated with increased annual trading activity. Firm size is positively and significantly associated with trading volume ($\beta = 0.581$, $p = 0.013$). The positive relationship hypothesised in H₂ is therefore not supported. The model is jointly significant at the 5% level (Wald $p = 0.044$), although its within-R² of 0.080 indicates relatively limited explanatory power for changes in trading activity within firms over time.

Model 3 introduces investor trading behaviour into the firm-value specification. Environmental sustainability disclosure remains negatively and significantly associated with Tobin's Q ($\beta = -2.577$, robust SE = 1.139, $p = 0.024$), while investor trading behaviour is positively but statistically insignificantly associated with firm market value ($\beta = 0.144$, robust SE = 0.220, $p = 0.514$). Firm size also remains statistically insignificant ($\beta = -0.909$, $p = 0.129$). Thus, the evidence does not support H₃, which predicts a significant positive relationship between investor trading behaviour and firm market value. The model is jointly significant (Wald $p = 0.040$) and records a within- R^2 of 0.265.

The mediation analysis further provides no support for the proposed transmission mechanism. The estimated indirect effect of environmental sustainability disclosure on firm market value through investor trading behaviour is -0.0743 . The delta-method test is statistically insignificant ($p = 0.545$), while the 5,000-replication firm-cluster bootstrap produces a 95% confidence interval of $[-0.490, 0.267]$. Because the interval includes zero, the indirect effect is not statistically distinguishable from zero. Investor trading behaviour therefore does not mediate the relationship between environmental sustainability disclosure and firm market value, and H₄ is not supported..

Robustness to Year Effects and Small-Cluster Inference

Given the relatively small number of firms, the coefficient-to-clustered-standard-error ratios were first evaluated against a t distribution with eight degrees of freedom rather than relying solely on asymptotic normal inference. Under this more conservative specification, the negative ENDI coefficient in Model 1 remains statistically significant ($p = 0.039$), whereas ENDI remains insignificant in Model 2 ($p = 0.146$). In Model 3, the ENDI coefficient is marginally insignificant at the 5% level ($p = 0.054$), while investor trading behaviour remains insignificant ($p = 0.532$). These results preserve the central hypothesis decisions while indicating that the precision of the negative disclosure-value association should be interpreted cautiously.

Table 6. Random-Effects Robustness Results with Year Effects

Variable / statistic	Model 1: TOBQ	Model 2: TVOL	Model 3: TOBQ
ENDI	-2.78000 (1.174)	-0.635 (0.332)	-2.72600 (1.198)
TVOL	-	-	0.064 (0.154)
FSIZ	-2.24100 (1.094)	0.417 (0.536)	-2.38200 (1.098)
Year effects	Yes	Yes	Yes
Model statistics	N = 144; G = 9	N = 144; G = 9	N = 144; G = 9

Source: Authors' computation (2026)

Environmental sustainability disclosure remains negative in the market-value specifications. In Model 1, the coefficient remains statistically significant under conventional clustered inference ($\beta = -2.780$, $p = 0.018$) and the conservative $t(8)$ sensitivity ($p = 0.045$). In Model 3, the negative ENDI coefficient remains significant under conventional inference ($\beta = -2.726$, $p = 0.023$) but is marginally insignificant under the small-cluster sensitivity ($p = 0.053$). Environmental sustainability disclosure remains insignificant in the trading-volume equation under conservative inference ($\beta = -0.635$, $p = 0.092$), while trading volume remains clearly insignificant in the firm-value model ($\beta = 0.064$, $p = 0.690$ under the (8) sensitivity). Thus, controlling for common year-specific shocks does not support H₂ or H₃ and does not alter the conclusion that the hypothesised positive disclosure-value relationship is unsupported.

The year-effects specification also produces an indirect effect of -0.041. A 5,000-replication firm-cluster bootstrap yields a 95% percentile confidence interval of approximately (-0.388, 0.535). Because the interval includes zero, the conclusion regarding H₄ is unchanged: investor trading behaviour does not significantly mediate the relationship between environmental sustainability disclosure and firm market value after common year-specific influences are controlled.

DISCUSSION

The findings provide no support for the hypothesised positive relationship between environmental sustainability disclosure and firm market value. Environmental sustainability disclosure is negatively and significantly associated with Tobin's Q in the principal specification, contrary to H₁ and to the conventional expectation of Signalling Theory that credible disclosure reduces information asymmetry and conveys favourable information about corporate quality, risk management and future prospects. One plausible explanation is that greater environmental disclosure may reveal environmental exposure, compliance obligations, remediation costs or other economically relevant risks that investors do not necessarily interpret as favourable signals. Thus, the capital-market implications of environmental disclosure appear to depend less on disclosure breadth per se than on the nature and economic significance of the information conveyed.

The negative disclosure–value association contrasts with Emeka-Nwokeji and Osisioma (2019) and Olagunju and Ajiboye (2022), who report positive valuation consequences of environmental disclosure in Nigeria. It is, however, consistent with the broader evidence that sustainability-reporting outcomes vary with disclosure characteristics, sectoral conditions and the performance measure examined. Nwaigwe et al. (2022), for instance, show that disclosure extent and disclosure quality may have different valuation implications. The finding is also directionally consistent with Nnedu et al. (2025a), who report a significant negative relationship between environmental sustainability reporting and sales turnover, and Nnedu et al. (2025b), who document a negative but statistically insignificant environmental-disclosure coefficient. These studies examine accounting rather than market-based outcomes and are therefore not directly comparable with the present study, but their contrasting results reinforce the context sensitivity of the sustainability reporting–performance relationship identified by Nnedu (2025). Conversely, the present result differs from Nnedu, Okpanachi, and Uwaleke (2025), who report a positive association between environmental sustainability reporting and return on assets. International evidence similarly suggests that environmental information is not uniformly rewarded by capital markets because its valuation consequences depend on disclosure credibility, content and perceived economic implications (Matsumura et al., 2014; Plumlee et al., 2015; Krüger, 2015).

The findings also provide no support for H₂. Environmental sustainability disclosure is not significantly associated with annual trading volume after accounting for firm size and firm-specific heterogeneity. This suggests that broader environmental disclosure does not necessarily generate an observable increase in investor trading activity. From a signalling perspective, disclosure can affect market behaviour only where investors recognise the information as sufficiently credible, material and decision useful to warrant portfolio adjustment. The insignificant relationship may therefore reflect limited investor responsiveness to environmental information, variation in disclosure quality, or the possibility that annual trading volume is too aggregated to capture reactions occurring around particular disclosure events.

Similarly, H₃ is not supported. Investor trading behaviour is positively but insignificantly associated with Tobin's Q, indicating that greater trading activity is not necessarily accompanied by higher market valuation. This result is theoretically important because increased trading volume can arise from several forms of market response, including favourable expectations, disagreement, uncertainty or adverse information. Trading intensity therefore does not, by itself, reveal whether investors interpret disclosed environmental information positively or negatively. The absence of a significant trading-volume effect suggests that market participation alone is insufficient to explain differences in firm valuation within the sampled industrial goods firms.

Consistent with the insignificant component relationships, the mediation analysis provides no support for H₄. The estimated indirect effect of environmental sustainability disclosure on firm market value through investor trading behaviour is statistically insignificant, while the bootstrap confidence interval includes zero. Investor

trading behaviour therefore does not provide empirical evidence of a mediating channel between environmental disclosure and firm market value in the sampled firms. This finding qualifies the proposed signalling mechanism: either environmental disclosure does not generate a sufficiently strong observable trading response, or such trading activity does not subsequently translate into valuation differences.

The absence of mediation should not be interpreted as evidence that environmental sustainability information is irrelevant to investors. Rather, annual trading volume captures the intensity of trading activity but not investor sentiment, the direction of trades, institutional versus retail participation, or investor reactions specifically attributable to environmental disclosures. Environmental information may therefore affect valuation through alternative channels, including perceived environmental risk, institutional ownership, analyst coverage, disclosure assurance, corporate reputation, cost of capital or expectations concerning future cash flows. The findings consequently extend the disclosure–value literature by showing that increased annual trading activity cannot be presumed to constitute the mechanism through which environmental disclosure becomes reflected in firm value.

The robustness analysis strengthens this interpretation while also introducing appropriate caution regarding the direct disclosure–value relationship. Controlling for year-specific effects does not change the direction of the principal relationships or the conclusion that investor trading behaviour does not mediate the environmental disclosure–value relationship.

Nevertheless, the small cross-sectional dimension of the panel affects the precision of statistical inference. The negative ENDI coefficient remains statistically significant in Model 1 under the conservative small-cluster adjustment but becomes marginal in Model 3. Accordingly, the evidence is more appropriately interpreted as rejecting the hypothesised positive valuation premium than as establishing a definitive negative effect of environmental disclosure on firm value.

Potential endogeneity further limits causal interpretation. Firms with different valuation characteristics may adopt different environmental disclosure practices, while disclosure and market value may also respond jointly to unobserved time-varying firm conditions. The inclusion of firm-specific effects, firm size and year indicators mitigates some sources of heterogeneity but does not eliminate reverse causality or all omitted-variable concerns. The estimated coefficients should therefore be interpreted as conditional associations rather than causal effects. Stronger causal identification would require exogenous variation in disclosure, such as a credible regulatory discontinuity, external instrument or other quasi-experimental setting.

IMPLICATIONS

Implications for Firms and Investors

The findings indicate that greater environmental sustainability disclosure does not automatically translate into higher firm market value. For industrial goods firms, this implies that environmental reporting should move beyond the volume or breadth of disclosure toward information that is credible, specific and financially relevant. Firms should link environmental issues more clearly to strategy, governance, risk management, operating costs, capital expenditure, performance metrics, targets and expected financial consequences. Such reporting is more likely to help investors distinguish substantive environmental performance from symbolic or compliance-driven disclosure and is consistent with the decision-usefulness orientation of IFRS S1 and IFRS S2 (ISSB, 2023a, 2023b).

The absence of a significant relationship between environmental sustainability disclosure and investor trading behaviour further suggests that disclosure alone may not be sufficient to stimulate observable investor response. Firms may therefore need to improve the clarity, comparability and credibility of environmental information and ensure that material environmental issues are communicated in ways that enable investors to assess their implications for risk and future cash flows.

For investors, the findings caution against treating the extent of environmental disclosure as an automatic indicator of superior corporate value. Environmental information should instead be evaluated in terms of its

underlying economic content, including environmental exposure, compliance obligations, operational efficiency, regulatory risk and potential effects on future cash flows and cost of capital. The insignificant relationship between trading volume and Tobin's Q also indicates that greater trading activity should not itself be interpreted as evidence of favourable valuation consequences.

The findings should not be interpreted as evidence that environmental disclosure itself reduces corporate value. Rather, they indicate that greater disclosure breadth is not consistently associated with the positive valuation premium predicted by the study and that the estimated negative association is sensitive to conservative small-cluster inference. The practical implication is therefore to improve the materiality, credibility and decision usefulness of environmental reporting rather than to reduce the amount of information disclosed.

Implications for Regulators

The findings have important implications for sustainability-reporting regulation in Nigeria. As the country progresses toward mandatory ISSB-aligned sustainability reporting for public-interest entities, regulatory emphasis should extend beyond encouraging firms to disclose more information to ensuring that disclosures are material, comparable, credible and decision useful (FRCN, 2026a, 2026b). The negative association between environmental disclosure and market value observed in this study reinforces the importance of distinguishing disclosure quantity from disclosure quality.

Regulators should therefore encourage stronger linkage between environmental disclosures and financially material risks and opportunities, while promoting consistent reporting standards, appropriate assurance and effective enforcement. Improved investor education may also strengthen the ability of capital-market participants to interpret sustainability-related information. Since trading behaviour does not appear to transmit environmental disclosure into firm value, attention should also be given to other channels through which sustainability information may influence capital allocation, including analyst interpretation, institutional investment, perceived environmental risk and cost of capital.

CONCLUSION

This study examined the relationship between environmental sustainability disclosure and firm market value and investigated whether investor trading behaviour mediates that relationship among listed industrial goods firms in Nigeria. The findings provide no support for the four hypothesised relationships. Environmental sustainability disclosure exhibits a negative association with Tobin's Q rather than the positive relationship proposed in H1. Although the negative coefficient is statistically significant in the principal Model 1 specification and remains significant when year effects are introduced, its statistical precision weakens in the fuller specification under conservative small-cluster inference. The evidence therefore provides stronger support for rejecting the hypothesised positive valuation premium than for asserting a definitive negative causal effect. Environmental disclosure does not significantly predict investor trading behaviour, providing no support for H2, while investor trading behaviour does not significantly explain firm market value, providing no support for H3. The estimated indirect effect remains statistically insignificant after accounting for year effects, indicating that H4 is also not supported.

The findings demonstrate that greater environmental disclosure does not necessarily generate a market-value premium and that annual trading activity does not constitute a significant transmission mechanism through which environmental sustainability information becomes reflected in firm valuation. These conclusions remain substantively unchanged after controlling for year-specific shocks over the 2010-2025 period. The results therefore qualify the conventional signalling expectation that increased environmental disclosure should automatically stimulate investor trading and enhance market value. Rather, the capital-market consequences of environmental reporting appear to depend on the credibility, content, materiality and economic implications of the information disclosed.

The study contributes to the sustainability-reporting literature by moving beyond the conventional direct disclosure-value relationship to examine investor trading behaviour as an explicit market-transmission

mechanism. The absence of mediation suggests that environmental information may influence market valuation through channels other than aggregate annual trading activity, including perceived environmental risk, institutional ownership, analyst attention, disclosure assurance, cost of capital and expectations about future cash flows. Because the evidence is observational and based on a relatively small cross-section of firms, the findings are interpreted as conditional associations rather than causal effects. Future research employing more granular investor-response measures and stronger identification strategies would further clarify the channels through which environmental sustainability information becomes incorporated into corporate valuation.

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