Environmental, Social and Governance Disclosures and the Value of Listed Nigerian Firms

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Abstract
This study examined the effect of environmental, social and governance (ESG) disclosures on the value of listed Nigerian firms. Specifically, it investigated the effects of environmental disclosure index (EDI), social responsibility expenditure ratio (SRER), board independence ratio (BIR), and audit independence ratio (AIR) on firm value measured by Tobin's Q. The study adopted an ex-post facto research design with a quantitative panel-data approach. The population comprised firms listed on the Nigerian Exchange Group, while purposive sampling was used to select ten firms from the manufacturing and oil and gas sectors. The sampled firms were Dangote Cement Plc, BUA Cement Plc, Nestlé Nigeria Plc, Nigerian Breweries Plc, Lafarge Africa Plc, Seplat Energy Plc, TotalEnergies Marketing Nigeria Plc, Oando Plc, Conoil Plc, and MRS Oil Nigeria Plc. Secondary data were obtained from published annual reports and financial statements covering 2016–2025, producing 100 balanced firm-year observations. Data were analysed using panel least squares regression in EViews 13.0. Descriptive statistics, correlation analysis, residual cross-sectional dependence, ADF panel unit-root and Pedroni panel cointegration tests were conducted. The Redundant Fixed Effects and Correlated Hausman tests guided model selection. The results showed that EDI had a positive but insignificant effect on Tobin's Q (coefficient = 1.3590; p = 0.2270). SRER had a positive and significant effect (coefficient = 0.0976; p = 0.0052), while BIR also had a positive and significant effect (coefficient = 0.1751; p = 0.0119). AIR exerted a positive and significant effect on Tobin's Q (coefficient = 0.2325; p = 0.0061). The fixed-effects model was statistically significant (F = 932.6305; p = 0.0000) and explained 89.30% of the variation in firm value (R^2 = 0.892957). The study concluded that social responsibility expenditure, board independence and audit independence significantly enhanced firm value, whereas environmental disclosure alone did not produce a statistically significant valuation effect. The study recommended improved environmental disclosure quality, strategic social responsibility expenditure, stronger board independence and enhanced audit independence among listed Nigerian firms.

Keywords: *Environmental disclosure index, Social responsibility expenditure ratio, Board independence ratio, Audit independence ratio, Tobin's Q and Listed Nigerian firms.*

Introduction

The contemporary corporate environment has shifted from a narrow emphasis on financial performance towards broader consideration of environmental, social and governance (ESG) factors in assessing corporate success and value. ESG disclosure enables firms to communicate information about their environmental responsibilities, social commitments and governance practices, providing stakeholders with information beyond conventional financial statements. This is particularly relevant in emerging markets such as Nigeria, where investors require credible non-financial information to evaluate corporate risks and future prospects. Ezejiofor and Ufot (2025) found that ESG disclosure significantly influences the value of listed consumer goods firms in Nigeria. Similarly, Rohendi et al. (2024) reported a significant relationship between ESG disclosure and firm value among Indonesian firms, providing comparative evidence from another emerging economy. These findings suggest that ESG information can influence investors' perceptions and consequently the market value of listed firms.

The environmental dimension is increasingly important because corporate activities can generate resource depletion, waste, pollution and environmental degradation. Environmental disclosure index (EDI) provides a useful measure of the extent to which firms disclose information concerning their environmental policies, practices and performance. Such disclosure can improve transparency and enable investors to evaluate environmental risks associated with corporate activities. Orisakwe-Lawrence (2023) found that voluntary environmental disclosure significantly affects the value of quoted financial services companies in Nigeria. Similarly, Anyadufu and Orajekwe (2023) established a significant relationship between web-based environmental disclosure and firm value among listed manufacturing firms in Nigeria. These findings indicate that environmental information may constitute value-relevant information within the Nigerian capital market and justify examining EDI as a distinct determinant of firm value.

The social dimension is equally important because firms depend on employees, customers, suppliers and host communities for their continued operations and legitimacy. Social responsibility expenditure ratio (SRER) reflects the financial commitment of firms to activities such as community development, education, healthcare and employee welfare. Such expenditure may strengthen stakeholder relationships, enhance corporate reputation and improve perceptions of corporate sustainability. Edem et al. (2024) found that corporate social responsibility expenditure significantly affects the value of listed consumer goods firms in Nigeria. Ezejiofor and Ufot (2025) also established significant implications of ESG practices for the value of listed Nigerian firms. However, limited evidence exists on whether SRER, measured specifically as a financial ratio, independently explains variations in market-based firm value. This creates a need to examine social responsibility expenditure separately from other ESG dimensions.

Governance mechanisms provide another pathway through which ESG practices may influence firm value. Board independence ratio (BIR) represents the proportion of independent directors expected to provide objective oversight, strengthen accountability and constrain managerial opportunism. Akinwumi and Onmonya (2025) found a significant relationship between board characteristics and firm value among listed Nigerian firms. Akintunde et al. (2024) similarly established that board independence is relevant to the relationship between environmental and governance sustainability disclosure and firm value among listed non-financial firms in Nigeria. Audit independence ratio (AIR) is also important because independent auditing can enhance the credibility and reliability of corporate information. Sani and Benjamin (2023) found that audit-related governance characteristics significantly influence firm value among listed Nigerian consumer goods firms. Nevertheless, existing studies have generally examined governance

characteristics independently, providing limited evidence on their combined explanatory relevance alongside environmental and social variables.

The existing literature therefore reveals important contextual, variable and methodological gaps. Eze et al. (2025) examined sustainability disclosure among listed manufacturing firms using environmental, social and economic disclosure indices, but focused on market capitalisation rather than Tobin's Q, leaving scope for a different market-based measure of firm value. Alabi (2026) investigated aggregate ESG disclosure and firm value using a dynamic panel threshold approach, leaving limited evidence on the individual effects of specific ESG dimensions. Toryila (2026) similarly examined board independence as a moderator of ESG disclosure quality and firm value among listed manufacturing firms. Consequently, limited empirical evidence exists on the simultaneous effects of EDI, SRER, BIR and AIR on Tobin's Q across listed Nigerian firms. This study addresses these gaps by employing panel regression to exploit both cross-sectional and time-series variations, thereby providing more precise evidence on the individual contributions of environmental disclosure, social responsibility expenditure, board independence and audit independence to the value of listed Nigerian firms.

Literature Review

Conceptual Review

Environmental, Social and Government (ESG) Disclosures

Environmental, social and governance (ESG) disclosure refers to the systematic communication of non-financial information concerning a firm's environmental impacts, social responsibilities and governance practices to stakeholders. It extends conventional corporate reporting by providing information on environmental management, employee and community relations, ethical conduct, board structures, accountability and corporate oversight. Igbinovia and Agbadua (2023) explain that ESG reporting provides information capable of influencing stakeholders' assessment of corporate value and competitive positioning. In Nigeria, ESG disclosure encompasses three interconnected dimensions: environmental disclosure, which addresses firms' environmental impacts and responses; social disclosure, which concerns employees, communities, customers and other stakeholders; and governance disclosure, which focuses on leadership, transparency, accountability and control mechanisms. Essien et al. (2026) demonstrated the relevance of ESG practices to the value of listed financial firms in Nigeria, indicating that sustainability-related information and practices have become important considerations in corporate valuation and stakeholder assessment. Building on these dimensions, ESG disclosure can be regarded as a multidimensional reporting practice in which individual components may produce different implications for corporate outcomes. Ajape et al. (2025) examined environmental, social and governance practices in relation to corporate value among listed Nigerian firms, further demonstrating the relevance of examining ESG dimensions separately rather than relying exclusively on an aggregate measure. Azeez et al. (2025) also examined sustainability reporting and market value among environmentally sensitive companies in Nigeria, highlighting the importance of environmental, social and economic information in assessing corporate value. Recent Nigerian evidence further suggests that ESG reporting and its effects may vary according to firm characteristics and governance arrangements (Nadiyasu & Samuel, 2025). Accordingly, this study treats ESG disclosure as comprising distinct but complementary dimensions. Environmental disclosure is proxied by the EDI, the social dimension by the SRER, while governance is represented by BIR and AIR. This disaggregated approach provides a stronger basis

for determining how specific ESG disclosure and governance mechanisms influence the value of listed Nigerian firms.

Value of Listed Nigerian Firms

The value of listed Nigerian firms reflects the market's assessment of their capacity to generate future economic benefits and create wealth for shareholders. Unlike accounting-based measures that largely capture historical financial outcomes, market-based firm value incorporates investors' expectations concerning profitability, growth opportunities, risk and managerial effectiveness. Tobin's Q is an important market-based measure because it compares the market value of a firm with the value or replacement cost of its assets, thereby indicating how investors value the resources controlled by the firm. Babatunde et al. (2024) employed Tobin's Q in examining firm value among selected consumer goods manufacturing firms listed in Nigeria, demonstrating its applicability to corporate valuation within the Nigerian capital market. Similarly, Oranefo and Ezekwere (2024) used Tobin's Q to assess firm value among listed Nigerian oil and gas firms, further demonstrating its relevance across different corporate sectors.

Tobin's Q is particularly suitable for assessing listed Nigerian firms because market valuation incorporates investors' expectations about future corporate performance and value-creation opportunities. A Tobin's Q greater than one generally indicates that the market places a value on the firm exceeding the value attributed to its assets, whereas a ratio below one may indicate relatively weaker market valuation. Yahaya (2026) employed Tobin's Q in examining the relationship between sustainability reporting and firm value among listed Nigerian firms, confirming its usefulness in evaluating market-based corporate value. Oranefo and Egbunike (2022) similarly used Tobin's Q to investigate firm valuation among quoted non-financial firms in Nigeria. Accordingly, this study adopts Tobin's Q as the proxy for the value of listed Nigerian firms because it provides a forward-looking measure that captures investors' collective assessment of corporate assets, future prospects and expected returns. This measure is therefore appropriate for examining whether environmental, social and governance disclosures and mechanisms are reflected in the market valuation of listed Nigerian firms.

Theoretical Review

The study is anchored on stakeholder theory and agency theory, which jointly explain how ESG disclosures and governance mechanisms enhance transparency, accountability and stakeholder confidence, thereby improving firm value.

Stakeholder Theory

Stakeholder Theory was propounded by Freeman (1984) and argues that firms have responsibilities to parties whose interests can affect or be affected by corporate activities, including shareholders, employees, customers, suppliers, communities and regulators. Within ESG reporting, the theory suggests that firms disclose environmental, social and governance information to respond to stakeholders' information needs, maintain legitimacy and strengthen stakeholder relationships. Environmental disclosure index communicates environmental responsibility, while social responsibility expenditure ratio demonstrates commitment to societal interests. Board independence ratio and audit independence ratio provide evidence of accountability and effective oversight. These practices may improve stakeholder confidence and consequently enhance firm value measured by Tobin's Q. Ajape et al. (2025) provide recent Nigerian evidence supporting the

relevance of ESG practices to corporate value, making Stakeholder Theory particularly appropriate for explaining the relationship examined in this study.

Agency Theory

Agency Theory was propounded by Jensen and Meckling (1976) and explains the conflicts that can arise when ownership and managerial control are separated. Managers (agents) may pursue personal interests that differ from those of shareholders (principals), creating agency costs and information asymmetry. Effective governance mechanisms can reduce these problems by strengthening managerial monitoring and accountability. In this study, board independence ratio and audit independence ratio represent mechanisms for constraining managerial opportunism, while ESG disclosures can improve transparency and reduce information asymmetry. Improved monitoring and credible disclosure may consequently enhance investors' confidence and firm value, measured by Tobin's Q. Akinwumi and Onmonya (2025) provide recent Nigerian evidence linking board characteristics with firm value, supporting the applicability of Agency Theory to this study.

Empirical Review

Empirical studies have examined how environmental, social, and governance disclosures influence firm value, revealing mixed findings across countries, sectors, methodologies, and measurement approaches. A study by Upaa et al. (2026) examined the relationship between environmental, social and governance (ESG) practices and firm value, with audit firm size as a moderator, among six listed Nigerian oil and gas companies. The study covered 2015–2024 and used secondary data from audited financial statements. Panel regression was employed, with Tobin's Q measuring firm value. Results showed that ESG practices and audit firm size significantly increased firm value, while audit firm size significantly moderated the ESG–value relationship. Shawai et al. (2025) investigated corporate environmental disclosure and market value among Nigerian listed non-financial firms, examining whether board independence moderated the relationship. The study covered firms over the period 2011–2022 and employed environmental disclosure measures derived using DICTION software, while Tobin's Q represented market value. General and specific environmental disclosures significantly improved firm value. The study recommended stronger environmental reporting and effective board oversight to enhance the value relevance of corporate environmental information. Rahat and Nguyen (2024) investigated the effect of ESG profiles on firm valuation across non-financial firms in 16 emerging markets over an 11-year period. Using ESG scores, RepRisk controversy indicators and Tobin's Q as the principal valuation measure, the study employed fixed-effects panel regression. Findings revealed that stronger ESG profiles significantly improved firm value, whereas ESG controversies reduced valuation. The authors recommended stronger ESG compliance and effective management of sustainability-related controversies. Rohendi et al. (2024) examined ESG disclosure and firm value among 42 Indonesian non-financial firms using 252 firm-year observations covering 2015–2021. Secondary data were obtained from corporate reports, with ESG disclosure measured through disclosure indicators and firm value represented by Tobin's Q. The study employed Partial Least Squares Structural Equation Modelling (PLS-SEM). ESG disclosure had no significant direct effect on firm value but significantly improved competitive advantage, which mediated its positive effect on value. Sumarno et al. (2023) examined the effect of ESG assessment on firm value and the mediating role of profitability. The Indonesian study used secondary data and adopted a quantitative research design. ESG assessment was the explanatory variable, Tobin's Q represented

firm value, while ROA measured profitability. Path analysis was employed to test the relationships. Findings showed that profitability significantly mediated the relationship between ESG assessment and firm value, suggesting that ESG creates greater value when supported by improved profitability. Igbinovia and Agbadua (2023) investigated ESG reporting and firm value among 20 quoted Nigerian manufacturing firms over 2017–2021. ESG reporting was measured using a content-analysis checklist from annual reports, while Tobin's Q represented firm value. Descriptive statistics, correlation analysis and multiple regression were employed. ESG reporting alone had no significant direct effect on firm value; however, its effect became significant when moderated by firm advantage. The study recommended strengthening ESG reporting alongside competitive and financial performance. Onoh et al. (2023) examined sustainability reporting and firm value among listed Nigerian oil and gas companies. Using secondary data from published annual reports covering the study period, the researchers measured environmental, social and economic sustainability reporting and used Tobin's Q as the measure of firm value. Descriptive statistics, correlation and multiple regression were employed. Findings indicated that environmental sustainability reporting significantly increased firm value, whereas economic sustainability reporting had a significant negative effect. Nwaigwe et al. (2022) examined the effect of sustainability disclosure extent and quality on the value of 39 Nigerian listed firms across nine sectors over 2010–2019, producing 390 firm-year observations. Annual and sustainability reports were analysed using content analysis based on modified GRI indicators covering 31 sustainability aspects. Regression analysis was employed. Disclosure extent had a positive but insignificant effect on market value, while disclosure quality had a significant negative effect. The study recommended improving disclosure quality and usefulness.

Research Methodology

The study employed an *ex-post facto* research design with a quantitative panel-data approach to examine the effect of environmental, social and governance (ESG) disclosures on the value of listed Nigerian firms. The population comprised all firms listed on the Nigerian Exchange Group (NGX), while the study specifically focused on firms in the manufacturing and oil and gas sectors. A purposive sampling technique was employed to select ten firms, namely Dangote Cement Plc, BUA Cement Plc, Nestlé Nigeria Plc, Nigerian Breweries Plc, Lafarge Africa Plc, Seplat Energy Plc, TotalEnergies Marketing Nigeria Plc, Oando Plc, Conoil Plc, and MRS Oil Nigeria Plc. The firms were selected based on their listing status, continuity of operations, availability of published annual reports and financial statements, and accessibility of information required to measure the study variables throughout 2016–2025. The study relied entirely on secondary data obtained from the published annual reports and financial statements of the selected firms. Relevant information on environmental disclosures, social responsibility expenditure, board composition, audit characteristics and financial performance was extracted using a structured data-extraction sheet to ensure consistency, uniformity and accuracy. The extracted information was subsequently coded and transformed into the required indices and ratios for analysis.

The study employed panel least squares regression analysis using EViews 13.0. The analysis commenced with descriptive statistics to summarise the mean, median, maximum, minimum and standard deviation of Tobin's Q, EDI, SRER, BIR and AIR. Correlation analysis was conducted to examine the direction and strength of association among the variables and assess possible multicollinearity. The residual cross-sectional dependence test was conducted to determine whether cross-sectional dependence existed among the sampled firms, while the Augmented Dickey-Fuller (ADF) unit-root test was employed to examine the stationarity of the variables and

minimise the possibility of spurious regression results. Where the variables were integrated at the same order, the Pedroni panel cointegration test was conducted to establish whether a long-run equilibrium relationship existed among them. The Redundant Fixed Effects Test and Correlated Hausman Test were subsequently conducted to determine the appropriate panel model. Following these tests, the selected panel least squares model was estimated. The model examined the effects of EDI, SRER, BIR and AIR on Tobin's Q for the ten sampled firms over 2016–2025, and the estimated coefficients were used to assess the direction and magnitude of the relationships.

The functional form of the model was expressed as:

Tobin's Q = f(EDI, SRER, BIR, AIR)

The econometric form was specified as:

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 EDI_{it} + \beta_2 SRER_{it} + \beta_3 BIR_{it} + \beta_4 AIR_{it} + \varepsilon_{it}$$

Where, Tobin's Q measures firm value; EDI, SRER, BIR and AIR represent environmental disclosure, social responsibility expenditure, board independence and audit independence ratios, respectively. β_0 is the intercept, β_1–β_4 are coefficients, ε_{it} is the error term, while i and t denote firm and year.

Results and Discussion

Examining the effect of ESG disclosures on firm value is essential for understanding how corporate sustainability practices influence market valuation in Nigeria. This study investigated the effect of EDI, SRER, BIR, and AIR on firm value, measured by Tobin's Q, among selected listed Nigerian firms over the period 2016–2025. The study employed panel least squares estimation, incorporating fixed and random effects models to account for firm-specific heterogeneity. Several diagnostic tests were conducted, including descriptive statistics, correlation analysis, cross-sectional dependence, panel unit root, and Pedroni panel cointegration tests. The Redundant Fixed Effects and Correlated Hausman tests were also employed to determine the most appropriate panel estimation model.

Descriptive Statistics

Summarised the distribution of Tobin's Q, EDI, SRER, BIR, and AIR, providing preliminary evidence on firm value and ESG disclosure characteristics.

Table 1: Descriptive Statistics

	TOBIN_S_Q	EDI	SRER	BIR	AIR
Mean	1.610900	0.605390	0.633200	0.579850	0.697120
Median	1.556000	0.596000	0.581500	0.581000	0.695500
Maximum	2.333000	0.900000	1.045000	0.715000	0.730000
Minimum	1.215000	0.358000	0.318000	0.438000	0.664000
Std. Dev.	0.269210	0.127015	0.200230	0.056540	0.017820
Skewness	0.920125	0.221828	0.364998	-0.103133	0.056146
Kurtosis	3.277201	2.344674	2.017486	2.720757	1.881734
Jarque-Bera	1.543068	2.609516	4.242611	0.502175	5.263036
Probability	0.461735	0.271238	0.124100	0.777954	0.071969
Sum	161.0900	60.53900	63.32000	57.98500	69.71200
Sum Sq. Dev.	7.174927	1.597136	3.969132	0.316481	0.031437

Observations	100	100	100	100	100

Source: E-Views 13 Output, (2026).

Table 1 shows that TOBIN_S_Q recorded a mean of 1.611, median of 1.556, and standard deviation of 0.269, indicating moderate variation across firms and years. EDI, SRER, BIR, and AIR recorded mean values of 0.605, 0.633, 0.580, and 0.697, respectively. AIR had the highest mean, while BIR recorded the lowest. The Jarque–Bera probability values for TOBIN_S_Q (0.462), EDI (0.271), SRER (0.124), BIR (0.778), and AIR (0.072) all exceeded 0.05, indicating that the variables were approximately normally distributed across the 100 firm-year observations, thereby supporting their suitability for subsequent panel regression analysis.

Correlation Analysis

This test examined the direction and strength of relationships between Tobin's Q and the four ESG measures, while providing preliminary evidence of potential multicollinearity.

Table 2: Correlation Analysis

	TOBIN_S_Q	EDI	SRER	BIR	AIR
TOBIN_S_Q	1.000000				
EDI	0.530905	1.000000			
SRER	0.525237	0.611827	1.000000		
BIR	0.615446	0.602882	0.623907	1.000000	
AIR	0.512212	0.530558	0.409100	0.576588	1.000000

Source: E-Views 13 Output, (2026).

Table 2 presents the correlation matrix among the study variables. Tobin's Q showed positive relationships with EDI (0.531), SRER (0.525), BIR (0.615), and AIR (0.512), indicating that higher ESG disclosure measures were associated with higher firm value. EDI was positively correlated with SRER (0.612), BIR (0.603), and AIR (0.531). SRER also showed positive associations with BIR (0.624) and AIR (0.409), while BIR correlated positively with AIR (0.577). All coefficients remained below 0.80, suggesting no serious multicollinearity among the explanatory variables and supporting their inclusion in the panel regression model.

Residual Cross-Sectional Dependence Test

The test examined whether shocks or common economic conditions affecting Nigerian firms created dependence across Tobin's Q, EDI, SRER, BIR, and AIR observations.

Table 3: Residual Cross-Sectional Dependence Test

Residual Cross-Section Dependence Test
Null hypothesis: No cross-section dependence (correlation) in residuals
Equation: Untitled
Periods included: 10
Cross-sections included: 10
Total panel observations: 100
Cross-section effects were removed during estimation

Test	Statistic	d.f.	Prob.
Breusch-Pagan LM	25.30124	45	0.9922
Pesaran scaled LM	-1.130524		0.1017

Bias-corrected scaled LM	-1.686080	0.1202
Pesaran CD	0.888009	0.3745

Source: E-Views 13 Output, (2026).

Table 3 presents the residual cross-sectional dependence test for the panel data comprising 10 firms, 10 periods, and 100 observations. The Breusch-Pagan LM, Pesaran scaled LM, bias-corrected scaled LM, and Pesaran CD tests recorded probability values of 0.9922, 0.1017, 0.1202, and 0.3745, respectively. All probability values exceeded 0.05, indicating that the null hypothesis of no cross-sectional dependence in the residuals was not rejected. Thus, the residuals exhibited no significant cross-sectional dependence, supporting the suitability of the panel regression analysis for examining the relationship between ESG disclosures and firm value.

Panel Unit Root Test

The panel unit root test assessed the stationarity of Tobin's Q, EDI, SRER, BIR, and AIR, ensuring that regression relationships among the variables were reliable.

Table 4: ADF Panel Unit Root Test

Variables	Method	ADF Statistics	Probability	@ Level	Check for Stationary
TOBIN_S_Q	ADF Test	4.43781	0.9999	1(0)	Non-Stationary
EDI	ADF Test	4.06312	0.9999	1(0)	Non-Stationary
SRER	ADF Test	7.30845	0.9955	1(0)	Non-Stationary
BIR	ADF Test	4.73938	0.9998	1(0)	Non-Stationary
AIR	ADF Test	5.38602	0.9995	1(0)	Non-Stationary
Variables	Method	Statistics	Probability	@Ist Diff.	Check for Stationary
TOBIN_S_Q	ADF Test	168.585	0.0000	1(1)	Stationary
EDI	ADF Test	201.999	0.0000	1(1)	Stationary
SRER	ADF Test	220.026	0.0000	1(1)	Stationary
BIR	ADF Test	174.026	0.0000	1(1)	Stationary
AIR	ADF Test	138.930	0.0000	1(1)	Stationary

Source: E-Views 13 Output, (2026).

Table 4 presents the ADF panel unit-root results for the study variables. At level, TOBIN_S_Q, EDI, SRER, BIR, and AIR recorded probability values of 0.9999, 0.9999, 0.9955, 0.9998, and 0.9995, respectively, indicating that all variables were non-stationary. However, after first differencing, all variables became stationary, with each recording a probability value of 0.0000. Therefore, TOBIN_S_Q, EDI, SRER, BIR, and AIR were integrated of order one, I(1). This result established that the variables possessed similar orders of integration and provided justification for conducting the Pedroni panel cointegration test to determine the existence of a long-run relationship.

Pedroni Panel Cointegration Test

The Pedroni test examined whether Tobin's Q and the ESG disclosure measures maintained a stable long-run equilibrium relationship among the sampled Nigerian firms.

Table 5: Pedroni Residual Cointegration Test

Pedroni Residual Cointegration Test
Series: TOBIN_S_Q EDI SRER BIR AIR
Date: 09/13/26 Time: 17:28
Sample: 2016 2025
Included observations: 100
Cross-sections included: 10
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-1.800258	0.9641	-2.522576	0.9942
Panel rho-Statistic	5.311881	0.0152	5.470974	0.0194
Panel PP-Statistic	-13.08523	0.0000	-14.31145	0.0000
Panel ADF-Statistic	-8.274025	0.0000	-8.177333	0.0000

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.973352	0.9985
Group PP-Statistic	-16.48996	0.0000
Group ADF-Statistic	-6.766623	0.0000

Source: E-Views 13 Output, (2026).

Table 5 presents the Pedroni residual cointegration test for TOBIN_S_Q, EDI, SRER, BIR, and AIR using 100 observations across 10 firms. The Panel v-statistic was insignificant (0.9641), while the Panel rho-statistic was significant (0.0152). However, the Panel PP and ADF statistics were significant (0.0000). Similarly, the Group PP and ADF statistics were significant at 0.0000, although the Group rho-statistic was insignificant (0.9985). Thus, majority of the Pedroni statistics were significant, indicating the existence of a long-run equilibrium relationship among firm value and the ESG disclosure measures.

Redundant Fixed Effects Tests Vs Correlated Hausman Test

These tests determined whether unobserved firm-specific characteristics influenced ESG disclosures and Tobin's Q, thereby guiding selection between fixed-effects and random-effects estimation.

Table 6: Redundant Fixed Effects Tests Vs Correlated Hausman Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	804.000147	(9,86)	0.0000
Cross-section Chi-square	444.429168	9	0.0000

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	10.120730	4	0.0384

Source: E-Views 13 Output, (2026).

Table 6 presents the model selection results for examining the relationship between EDI, SRER, BIR, AIR, and Tobin's Q. The Redundant Fixed Effects test produced Cross-section F and Chi-square probability values of 0.0000, indicating significant cross-sectional effects among the sampled firms. The Hausman test recorded a Chi-square statistic of 10.121 with a probability value of 0.0384, showing a significant difference between the fixed and random effects estimates. These results indicated that firm-specific characteristics were significantly associated with the explanatory variables and firm value. Hence, the Fixed Effects (FE) model was considered more appropriate for estimating the effect of EDI, SRER, BIR, and AIR on Tobin's Q.

Fixed Effect Regression

Fixed-effect regression was employed to estimate the effects of EDI, SRER, BIR, and AIR on Tobin's Q while controlling for unobserved, time-invariant firm-specific characteristics that could influence both ESG disclosures and firm value. The fixed effect model is presented in Table 7 below.

Table 7: Fixed Effect Model

Dependent Variable: TOBIN_S_Q
Method: Panel Least Squares
Date: 09/13/26 Time: 17:23
Sample: 2016 2025
Periods included: 10
Cross-sections included: 10
Total panel (balanced) observations: 100

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EDI	1.359017	1.116964	1.216706	0.2270

SRER	0.097597	0.034040	2.867160	0.0052
BIR	0.175136	0.065758	2.663328	0.0119
AIR	0.232518	0.082764	2.809400	0.0061
C	9.462927	3.818716	2.478039	0.0152

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.892957	Mean dependent var	1.610900
Adjusted R-squared	0.891892	S.D. dependent var	0.269210
S.E. of regression	0.024241	Akaike info criterion	-4.472380
Sum squared resid	0.050535	Schwarz criterion	-4.107656
Log likelihood	237.6190	Hannan-Quinn criter.	-4.324770
F-statistic	932.6305	Durbin-Watson stat	2.313302
Prob(F-statistic)	0.000000		

Source: E-Views 13 Output, (2026).

Table 7 presents fixed-effects results examining ESG disclosures and firm value among selected listed Nigerian firms. Using 100 observations from 10 firms over 2016–2025, Tobin's Q represented firm value, while EDI, SRER, BIR, and AIR were explanatory variables. The R-squared of 0.8930 indicates that the variables jointly explained 89.30% of the variation in Tobin's Q, while adjusted R-squared was 0.8919. The F-statistic of 932.6305 (p=0.0000) confirms that the model was statistically significant. Durbin–Watson of 2.3133 indicates no serious first-order autocorrelation. The finding showed that EDI had a positive but insignificant effect on Tobin's Q, with a coefficient of 1.3590 and p-value of 0.2270. The positive relationship supported Stakeholder Theory, which suggested that environmental disclosure could improve transparency, stakeholder relationships and corporate reputation, thereby enhancing firm value. It also provided partial support for Agency Theory because environmental disclosure could reduce information asymmetry between managers and shareholders. However, the insignificant result suggested that environmental information disclosed by the sampled firms may not have been sufficiently value-relevant to investors. The finding agreed with Igbinovia and Agbadua (2023) and Nwaigwe et al. (2022), but differed from Upaa et al. (2026), Shawai et al. (2025), and Onoh et al. (2023), who reported significant positive effects. The finding indicated that SRER had a positive and significant effect on Tobin's Q, with a coefficient of 0.0976 and p-value of 0.0052. This result supported Stakeholder Theory because social responsibility expenditure demonstrated corporate responsiveness to employees, communities, customers and other stakeholders, potentially improving reputation, trust and firm value. The finding also supported Agency Theory, as responsible expenditure, when properly monitored, could enhance managerial accountability and reduce conflicts between managers and shareholders. The result was consistent with Upaa et al. (2026), who found that ESG practices significantly improved firm value, and Rahat and Nguyen (2024), who reported positive effects of stronger ESG profiles on valuation. It also agreed with Sumarno et al. (2023), supporting the value-enhancing potential of ESG-related practices.

The result revealed that BIR had a positive and significant effect on Tobin's Q, with a coefficient of 0.1751 and p-value of 0.0119. The finding strongly supported Agency Theory, which regarded independent directors as mechanisms for monitoring management, reducing agency conflicts and protecting shareholders' interests. Greater board independence could strengthen oversight,

improve accountability and increase investor confidence, thereby enhancing firm value. The result also supported Stakeholder Theory because independent boards could promote greater accountability to shareholders and other stakeholders. The finding was consistent with Shawai et al. (2025), who demonstrated the importance of board independence in the relationship between environmental disclosure and market value among Nigerian firms. It also agreed with Akinwumi and Onmonya (2025), who linked board characteristics with firm value.

The finding showed that AIR had a positive and significant effect on Tobin's Q, with a coefficient of 0.2325 and p-value of 0.0061. This result supported Agency Theory because audit independence strengthened monitoring, reduced information asymmetry and improved the credibility of financial reporting, thereby increasing investor confidence and firm value. It also supported Stakeholder Theory because independent audit oversight enhanced transparency and accountability to shareholders, regulators, creditors and other stakeholders. The finding was consistent with Upaa et al. (2026), who reported that ESG practices and audit-related characteristics significantly improved firm value among Nigerian oil and gas firms. The result extended the reviewed literature by demonstrating that audit independence represented an important governance mechanism through which accountability and reporting credibility could contribute to higher firm value.

Conclusion

The study concluded that ESG disclosures and governance mechanisms were important determinants of firm value among selected listed Nigerian firms. Although EDI had a positive but insignificant effect on Tobin's Q, SRER, BIR and AIR exerted positive and significant effects on firm value. The findings demonstrated that social responsibility expenditure, board independence and audit independence contributed meaningfully to enhancing market valuation. The results provided substantial support for Stakeholder Theory and Agency Theory by showing that responsible corporate practices, effective board oversight and independent audit mechanisms could strengthen stakeholder confidence, accountability and investor perceptions. The significant overall model further confirmed that ESG-related measures jointly explained a substantial proportion of variations in firm value among the sampled Nigerian firms during 2016–2025.

Recommendations

Based on the findings, the study recommended that:

i. Listed firms should improve the quality, completeness and relevance of EDI reporting by providing clear, consistent and verifiable environmental information capable of influencing investor decisions.

ii. Firms should maintain strategic and transparent SRER that addresses relevant community and stakeholder needs while ensuring that expenditure is efficiently managed to generate sustainable corporate value.

iii. Firms should strengthen BIR by ensuring adequate representation of genuinely independent directors who can effectively monitor management, improve accountability and protect shareholders' interests.

iv. Firms should enhance AIR by maintaining independent audit oversight, strengthening audit committee effectiveness and ensuring objective review of financial reporting to improve transparency, credibility and investor confidence.

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