

ENVIRONMENTAL SENSITIVITY CONTEXT AND FIRM VALUE: THE JOINT EFFECTS OF GREEN ACCOUNTING AND CORPORATE GOVERNANCE

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ABSTRACT

This research examines the impact of green accounting and corporate governance mechanisms on the firm value of companies listed on Vietnam's stock market, aiming to address a key research gap in emerging economies by integrating environmental transparency and internal governance into a unified framework. Using a quantitative approach, the research analyzes a balanced panel dataset of 232 firms over the period 2020-2024, applying the feasible generalized least squares (FGLS) method to ensure robust results. Additionally, a sub-sample analysis is conducted by dividing firms into environmentally sensitive and non-sensitive industries to explore how sectoral characteristics influence these relationships. The findings indicate that green accounting has a positive and statistically significant effect on firm value, measured by Tobin's Q and market-to-book ratio. In terms of corporate governance, ownership concentration, foreign ownership, and board gender diversity contribute positively to firm value, while CEO duality shows a favorable effect on Tobin's Q. Notably, the impact of green accounting is substantially stronger for firms operating in environmentally sensitive industries, whereas the effect is weaker or insignificant in non-sensitive sectors. These results suggest that green accounting can serve as a strategic signal of long-term sustainability for investors, while policymakers are encouraged to promote mandatory environmental reporting, particularly in high-impact industries. Overall, the study provides new evidence on how environmental and governance factors jointly shape firm value in an emerging market context.

Keywords: Corporate governance, environmental sensitivity, emerging market, firm value, green accounting.

1. INTRODUCTION

From a macroeconomic standpoint, environmental challenges such as pollution, ecosystem degradation, and the overexploitation of natural resources have become critical constraints on sustainable development. The increasing severity of these issues, coupled with inefficient resource utilization, has compelled firms to integrate sustainability considerations into their operational and production processes [1], [2]. As noted by Stanojević et al. [3], changes in natural systems should be systematically recorded in a manner comparable to economic transactions; otherwise, environmental costs may be underestimated or

misrepresented in financial reporting. This misalignment contributes to a widening gap between short-term economic gains and long-term sustainability objectives. In line with this argument, Gosselin [4] highlights that firms' strategic orientation significantly shapes their adoption of innovative management practices. Organizations pursuing long-term, innovation-driven strategies are more inclined to implement advanced accounting systems, including green accounting. As sustainability concerns have become increasingly central in global economic discourse, green accounting has emerged as a key tool for aligning financial performance with environmental responsibility [5].

At the firm level, the growing prominence of ESG practices, together with the adoption of green accounting, has added complexity to how firm value is conceptualized and assessed. Importantly, firm value should be distinguished from the broader value that firms contribute to society and the overall economic system [6]. Empirical evidence on the relationship between ESG and firm value remains inconclusive, with prior studies reporting mixed results. A similar pattern is observed for green accounting. Existing research provides conflicting evidence, with some studies suggesting that its implementation may impose additional costs and adversely affect firm performance [7], while others report insignificant effects, partly due to difficulties in quantifying environmental costs [8]. These mixed findings suggest that, despite being a core component of the ESG framework, green accounting remains relatively underexplored in the literature. Moreover, most prior studies have examined green accounting indirectly through related constructs such as environmental management accounting (EMA) or green accounting management (GAM). Consistent with this observation, the meta-analysis by Khan and Gupta [9] indicates that empirical evidence on the link between green accounting and firm performance is fragmented and lacks consensus. Against this backdrop, prior studies have largely treated green accounting and corporate governance as separate determinants of firm performance, with limited attention to their joint effects on firm value. More importantly, little is known about how these mechanisms interact under varying levels of environmental sensitivity, particularly in emerging market contexts such as Vietnam.

Beyond these empirical inconsistencies, a more fundamental limitation lies in the absence of a clear conceptual framework that explains how environmental accounting practices translate into firm value. Existing literature predominantly treats green accounting as an isolated disclosure mechanism or proxies it through broader ESG constructs, thereby overlooking the internal organizational conditions under which such disclosures become economically meaningful. In particular, the literature has yet to sufficiently explain how governance mechanisms condition the credibility, interpretation, and value relevance of environmental information in capital markets. This gap suggests that the relationship between green accounting and firm value is not direct, but contingent upon firm-level governance structures and external contextual factors. Without incorporating these conditional mechanisms, current evidence remains fragmented not only empirically but also theoretically, limiting our understanding of the channels through which sustainability practices are translated into market valuation.

Within the broader global context, corporate governance has also gained prominence as a fundamental mechanism for ensuring transparency, accountability, and long-term strategic direction. According to the OECD [10], corporate governance encompasses the network of relationships among management, the board of directors, shareholders, and other stakeholders, functioning as a framework for aligning interests and guiding corporate strategy. In response to increasing institutional pressure for sustainability, the scope of corporate governance has expanded to play a pivotal role in driving ESG-related initiatives, particularly in the areas of non-financial disclosure and environmental reporting [11]. Recent literature reviews [12], [13] suggest that, although ESG disclosure has been extensively studied, there remains a lack of comprehensive empirical evidence on how specific governance attributes, such as board ESG

expertise, CEO tenure, and the role of institutional investors, influence the extent and quality of ESG disclosure. Collectively, these findings underscore that corporate governance serves not only as a monitoring mechanism but also as a strategic driver shaping ESG performance, thereby exerting a significant impact on financial outcomes, corporate reputation, and long-term firm value. Notably, the effectiveness and economic consequences of such governance-driven sustainability practices are unlikely to be uniform across firms, as they are inherently conditioned by industry-specific environmental risks.

Building on this argument, an important factor that may further shape the economic implications of environmental practices is the variation in environmental risk across industries. The relevance of environmental information is not uniform, as firms are exposed to different levels of regulatory pressure, transition risk, and environmental externalities depending on their sector. Consistent with the findings of Khan and Gupta [9], the effects of sustainability-related practices tend to differ significantly across industries, reflecting diverse institutional settings and risk exposures. In environmentally intensive sectors, such as energy, heavy manufacturing, and resource extraction, environmental performance becomes a financially material factor that can influence expected cash flows, cost of capital, and overall firm risk. As sustainability considerations are increasingly integrated into financial decision-making, investors are more likely to incorporate these sector-specific risks into firm valuation, particularly in contexts where carbon regulations and transition uncertainties threaten long-term profitability [14]. This suggests that the value relevance of both green accounting and corporate governance may be contingent upon industry-specific environmental exposure.

In the context of Vietnam, the regulatory and policy landscape has progressively laid the groundwork for incorporating environmental considerations into economic and financial activities. Notably, key national policies - including the green growth strategy [15], the action plan for implementing the Sustainable Development Goals (SDGs) [16], and the target program on climate change adaptation and green growth [17] - have consistently emphasized the alignment between economic development and environmental protection. Furthermore, regulatory frameworks on greenhouse gas management and carbon market development provide a formal legal foundation for the adoption of carbon accounting within the broader scope of green accounting [18], [19]. Additional regulatory instruments related to environmental taxation and ESG disclosure further reinforce requirements for environmental accounting practices and corporate transparency [20], [21]. Beyond domestic regulations, Vietnam has actively participated in a range of international commitments and sustainability initiatives, which generate both external pressures and internal incentives for firms to adopt green accounting practices. The implementation of the United Nations 2030 Agenda for Sustainable Development [22], the Paris Agreement on climate change [23], and Vietnam's COP26 commitment to achieve net-zero emissions by 2050 [24] collectively highlight the necessity of developing a comprehensive system for environmental data collection, reporting, and transparency at both national and firm levels. Despite this evolving regulatory framework, empirical evidence on how these institutional developments translate into firm-level valuation remains limited.

From a theoretical perspective, prior research on sustainability and firm value has drawn on several established frameworks, including stakeholder theory and signaling theory in explaining environmental disclosure, as well as agency theory, resource dependence theory, and stewardship theory in the corporate governance literature. However, these theories have typically been applied in isolation, with limited attention to how environmental disclosure and governance mechanisms jointly shape firm value. This study addresses this limitation by proposing a unified and conditional perspective in which green accounting is conceptualized as a value-relevant signal whose economic significance depends on governance effectiveness. In addition, industry-specific environmental sensitivity is incorporated as a key contextual

condition, given that the materiality and valuation relevance of environmental information vary across industries. A more detailed discussion of these theoretical foundations is provided in the literature review section.

Within this context, the study examines the impact of green accounting and corporate governance on firm value in Vietnamese listed firms over the period 2020-2024. It further investigates whether these relationships differ between environmentally sensitive and non-sensitive industries, thereby capturing the moderating role of industry-level environmental risk. From a practical perspective, the findings suggest that the value relevance of environmental disclosures is contingent rather than uniform. Specifically, their impact depends on both governance quality and environmental exposure, implying that firms in environmentally sensitive industries are more likely to realize valuation benefits from green accounting when supported by robust governance structures. Overall, the study demonstrates that the value relevance of green accounting and corporate governance is not uniform, but varies systematically with governance quality and industry environmental sensitivity in an emerging market setting.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Green accounting and firm value

Green accounting has increasingly attracted scholarly attention as a mechanism through which firms integrate environmental considerations into financial and managerial decision-making. Broadly defined, green accounting refers to the identification, measurement, and disclosure of environmental costs and impacts associated with business activities, thereby enhancing transparency and supporting sustainable corporate strategies [25], [26]. From a theoretical perspective, this practice is grounded in the notion that internalizing environmental costs enables firms to better align economic performance with ecological responsibility, ultimately contributing to long-term value creation. Empirical evidence generally supports a positive association between green accounting and firm value. Prior studies document that comprehensive and transparent environmental disclosures can enhance financial performance and market valuation [27], [28], [29]. This relationship is further reinforced through mechanisms such as EMA and GAM, which facilitate the transformation of environmental resources into competitive advantages [30], [31]; [32]. Additionally, green accounting contributes to risk management by improving environmental cost control, strengthening corporate reputation, and fostering better stakeholder relations, particularly in environmentally sensitive industries [26]. It also promotes corporate social responsibility (CSR) disclosure under frameworks such as the Global Reporting Initiative (GRI), thereby reducing regulatory risks and enhancing transparency [33], [34]. Drawing on a stakeholder-oriented perspective, firms operate within a network of relationships in which long-term value creation depends on maintaining the trust and support of key stakeholders, including investors, regulators, customers, and local communities. In this context, green accounting enhances the transparency and credibility of environmental performance by systematically identifying and disclosing environmental costs and impacts. This increased transparency reduces uncertainty regarding a firm's environmental practices, thereby strengthening stakeholder trust, improving corporate reputation, and facilitating access to critical resources such as capital and regulatory support. As a result, firms that adopt more comprehensive green accounting practices are more likely to sustain stable stakeholder relationships, which ultimately contributes to improved firm value. From a signaling perspective, green accounting can also be understood as a strategic disclosure mechanism through which firms communicate otherwise unobservable attributes, such as environmental responsibility, managerial quality, and long-term orientation, to external investors. Given that environmental information is often complex and difficult to

verify, the voluntary adoption of consistent and detailed green accounting practices serves as a credible signal that reduces information asymmetry between firms and capital markets. This reduction in information asymmetry enhances investor confidence, lowers perceived firm risk, and leads to more favorable market valuation. Importantly, the effectiveness of this signaling mechanism depends on the credibility of disclosures and is likely to be reinforced by strong internal governance structures. Moreover, by integrating environmental costs into decision-making processes, firms can identify inefficiencies, mitigate environmental risks, and improve long-term operational performance [25], [26], [31].

Importantly, the impact of green accounting is likely to vary across industries, particularly between environmentally sensitive and non-sensitive sectors. Environmentally sensitive firms are those operating in industries with substantial environmental impact, such as pulp and paper, chemicals, metals and mining, oil and gas, and utilities, which are characterized by high emissions, intensive resource consumption, and significant ecological risks [9], [38]. Due to their elevated environmental footprint, these firms face greater scrutiny from regulators, investors, and the public, leading to stronger pressure for transparency and sustainability disclosure. The nature of these industries necessitates more complex environmental management systems and entails higher compliance costs. For instance, sectors such as oil and gas and chemicals are closely monitored due to hazardous waste and emission risks, while metals and mining are associated with ecosystem degradation, and utilities contribute significantly to carbon emissions, particularly when dependent on fossil fuels. As a result, environmental disclosure and green accounting practices are expected to play a more critical role in shaping stakeholder perceptions and firm valuation in these sectors compared to less environmentally sensitive industries. Therefore, while a positive relationship between green accounting and firm value is generally expected, its magnitude may differ across industry contexts. Based on the above arguments, the following hypothesis is proposed:

H1: Green accounting has a positive effect on firm value.

2.2. Corporate governance and firm value

Corporate governance is widely recognized as a critical institutional mechanism that promotes transparency, accountability, and long-term strategic orientation within firms. It encompasses the set of structures and processes designed to align managerial actions with the interests of shareholders and other stakeholders, thereby mitigating agency conflicts and reducing information asymmetry [39]. From a theoretical standpoint, agency theory [40] provides the primary foundation for understanding how governance mechanisms constrain opportunistic behavior, while complementary perspectives such as resource dependence theory [41] and stewardship theory [42] emphasize the advisory, resource-provision, and trust-based roles of boards in enhancing organizational effectiveness. Empirically, a substantial body of literature documents a positive relationship between corporate governance and firm value. Both classical and contemporary studies suggest that well-designed governance structures contribute to improved financial performance and higher market valuation [39], [43], [44], [45]. Firm value, typically measured by market-based indicators such as Tobin's Q and the market-to-book ratio, reflects investors' expectations regarding future growth, managerial quality, and risk exposure [46], [47]. In this context, governance quality serves as a key signal that shapes market perceptions and valuation outcomes.

A prominent stream of research focuses on board characteristics and ownership structure as core governance mechanisms. Prior studies indicate that board gender diversity, the presence of independent directors, and the expertise and monitoring role of audit committees contribute positively to firm value by enhancing oversight effectiveness and decision quality [48]. In addition, ownership structure plays a significant role: managerial and institutional ownership are found to align incentives and improve firm performance, particularly during

periods of economic uncertainty [49]. Nevertheless, the empirical evidence remains mixed. The effects of foreign ownership, board size, and certain governance attributes vary across studies, reflecting strong dependence on institutional environments, industry characteristics, and firm-specific conditions [50]. These inconsistencies suggest that the effectiveness of corporate governance mechanisms is context-dependent and should be examined within specific economic settings, particularly in emerging markets where governance frameworks are still evolving.

Building upon the preceding theoretical and empirical discussion, corporate governance is operationalized through a set of specific board-related and ownership-related mechanisms, each reflecting distinct channels through which governance structures influence firm value. In particular, board size, board independence, CEO duality, ownership concentration, foreign ownership, and board gender diversity are examined to capture both monitoring and resource provision roles of governance

Board size is defined as the total number of directors participating in the board, serving as a primary corporate governance indicator for monitoring and controlling internal operations [51]. From a resource dependence perspective, larger boards provide access to diverse expertise, external networks, and strategic resources, which may enhance decision quality and organizational performance. They also strengthen the board's ability to monitor management and manage complex business environments [51]. Empirical evidence suggests that larger boards are associated with improved firm performance and higher market valuation, particularly in emerging markets where external governance mechanisms remain underdeveloped [52]. Given the resource advantages and the institutional context of emerging economies, a positive relationship is expected:

H2: Board size has a positive effect on firm value.

Board independence refers to the proportion of non-executive directors who are free from managerial influence. Agency theory argues that independent directors enhance monitoring effectiveness, reduce managerial opportunism, and improve transparency [40]. Independent boards are better positioned to protect shareholder interests and strengthen governance credibility, which can improve market perceptions and firm value. Prior empirical studies provide evidence that board independence contributes to stronger governance quality and improved firm performance, although its effectiveness may depend on institutional quality and director expertise [48], [53]. Thus, based on what preceded, the following hypothesis is constructed:

H3: Board independence has a positive effect on firm value.

CEO duality occurs when the same individual simultaneously holds the positions of chief executive officer and board chair. From an agency perspective, this structure weakens the board's monitoring role by concentrating decision-making authority, potentially increasing managerial entrenchment and agency costs. Hsu et al. [54] found that CEO duality negatively impacts firm performance, especially when information costs are high. Jensen and Meckling [40] argued that this consolidation reduces the board's objectivity in evaluating the CEO, leading to lower market valuation. However, stewardship theory suggests that leadership unity may enhance strategic consistency, reduce coordination costs, and improve decision speed, particularly in environments characterized by high uncertainty or institutional constraints. Despite these competing views, the agency perspective predicts that excessive power concentration may reduce governance effectiveness and investor confidence. Accordingly, the following hypothesis is developed:

H4: CEO duality has a negative effect on firm value.

Ownership concentration reflects the extent to which shares are held by large shareholders. Concentrated ownership can enhance monitoring incentives because large

shareholders have both the power and motivation to oversee management. Nevertheless, agency conflicts may shift from manager-shareholder conflicts to majority-minority conflicts. Dominant shareholders may pursue private benefits at the expense of minority investors, increasing expropriation risk and reducing firm value [55]. Fatma and Chouaibi [48] also noted that concentration can lead to power monopolies and reduced monitoring effectiveness, ultimately decreasing firm value. Based on these findings, the following hypothesis is constructed:

H5: Ownership concentration has a negative effect on firm value.

Foreign ownership represents the percentage of shares held by international investors. These investors are typically associated with superior monitoring capabilities, higher transparency demands, and the introduction of advanced management expertise. Empirical studies consistently find that foreign ownership improves firm performance and market valuation, particularly in emerging economies where domestic governance mechanisms are less effective [56]. Ahmed and Iwasaki [57] also found a positive and statistically significant relationship between foreign shareholding and Tobin's Q. Foreign investors also signal credibility and long-term growth potential to the market. Based on what preceded, the following hypothesis is formulated:

H6: Foreign ownership has a positive effect on firm value.

Board gender diversity reflects the representation of female directors within the board. Diversity enhances cognitive perspectives, improves problem-solving quality, and strengthens stakeholder orientation. Female directors are often associated with higher ethical standards, stronger monitoring behavior, and greater attention to long-term sustainability issues. Empirical evidence suggests that gender-diverse boards are positively associated with firm performance and market valuation, although the magnitude of the effect may depend on cultural and institutional contexts [58]. Furthermore, Agyemang-Mintah and Schadewitz [59] indicate a positive relationship between gender-diverse boards and firm value. In emerging markets, gender diversity may also signal progressive governance practices and improve corporate legitimacy. Therefore, the following hypothesis is developed:

H7: Board gender diversity has a positive effect on firm value.

To enhance the robustness of the empirical results, this study incorporates a range of firm-specific control variables that may systematically affect firm value. Existing literature indicates that firm size and firm age reflect differences in resource availability, organizational development, and market visibility, all of which are closely linked to firm valuation [60]; [61]. Financial leverage is also included to capture variations in capital structure and risk exposure, as debt may simultaneously impose managerial discipline and increase the likelihood of financial distress [60]. Moreover, industry type is controlled for, as firms operating across different sectors are subject to heterogeneous risk environments, growth prospects, and valuation patterns [9]. Audit quality (Big4 Audit) is further considered, given that firms audited by Big4 accounting firms are typically associated with higher levels of financial transparency and credibility, thereby shaping investor perceptions and market valuation [61].

Based on hypotheses H1-H7, the conceptual framework of this study is illustrated in Figure 1.

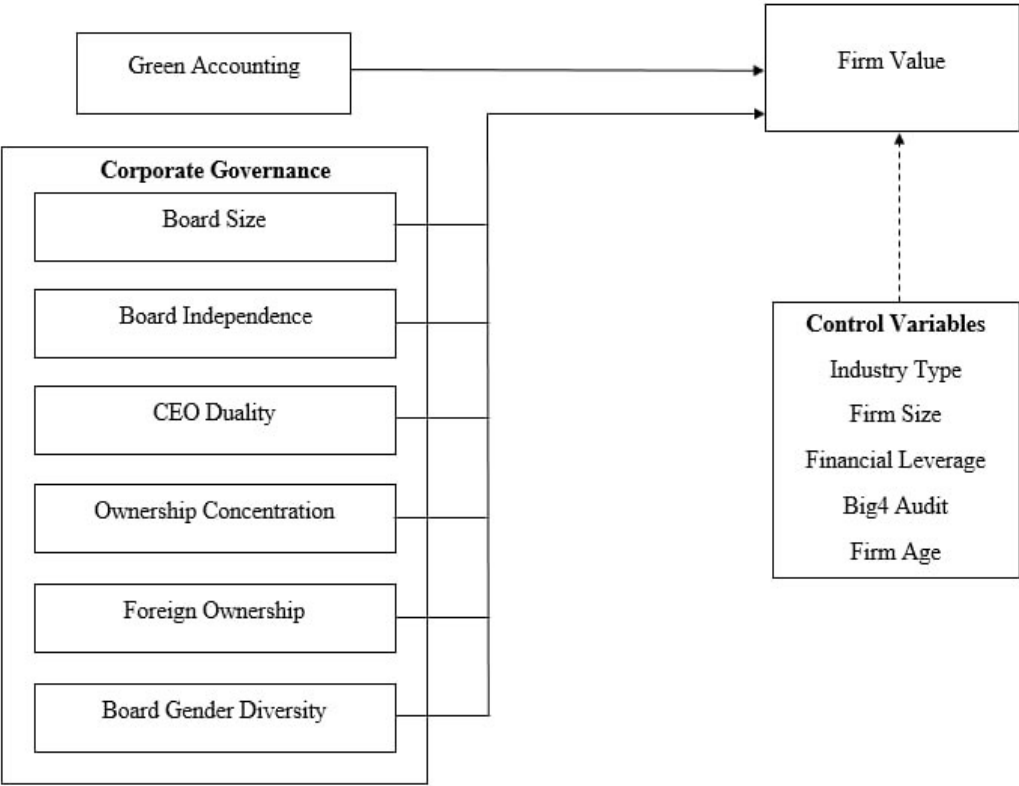


Figure 1. Conceptual Framework. Source: Authors’s own work

3. METHODOLOGY

3.1. Data collection, data source and sample selection

The study focuses on firms listed on Vietnam’s stock market, as publicly traded companies generally have greater access to modern corporate governance practices and are increasingly motivated to adopt green accounting in response to investor expectations and sustainable development pressures. Listed firms are also subject to stricter disclosure requirements and greater market scrutiny, making them an appropriate context for examining sustainability-related corporate practices in emerging markets [62], [63].

The sample is drawn from the three primary trading platforms in Vietnam: the Ho Chi Minh Stock Exchange (HOSE), the Hanoi Stock Exchange (HNX), and the Unlisted Public Company Market (UPCoM). These markets were selected because firms listed on these exchanges are subject to formal regulatory supervision and standardized periodic disclosure requirements under Vietnam’s securities regulations [64]. In addition, they represent a wide range of industries and firm characteristics, thereby reflecting the structural diversity of the Vietnamese economy.

Following a screening process based on the availability of complete financial and non-financial information, the final sample consists of 232 firms. The study covers a five-year period from 2020 to 2024, resulting in a balanced panel dataset of 1160 firm-year observations. The use of balanced panel data improves estimation efficiency and reduces potential bias arising from missing observations across time [65].

Data were collected from multiple official and reliable sources to ensure completeness and accuracy. These sources include audited annual financial statements, annual reports,

corporate governance reports, as well as ESG and integrated reports of listed firms in Vietnam. In addition, the study utilizes data from the FiinPro-X professional financial database to supplement and cross-validate financial indicators, market data, and ownership structure variables. The integration of multiple data sources enhances data reliability and minimizes potential measurement errors associated with reliance on a single source [66].

Following data collection, a structured preprocessing procedure was implemented to transform and standardize the dataset for econometric analysis. First, both qualitative and quantitative information were systematically converted into measurable research variables based on consistent definitions. Environmental-related expenditures were scaled by total assets to ensure comparability across firms of different sizes. Corporate governance variables were coded according to standardized criteria, capturing board structure, ownership characteristics, and monitoring mechanisms. Financial and market variables were aligned based on fiscal year-end to maintain temporal consistency in the panel dataset.

Subsequently, the dataset underwent a rigorous data cleaning and quality control process. Observations with missing values in key variables were removed to ensure data completeness and consistency. Extreme values were carefully examined and treated to mitigate the influence of outliers, which are common in firm-level financial data. Specifically, continuous variables were winsorized at the 1st and 99th percentiles to reduce the impact of extreme observations without distorting the overall distribution. In addition, cross-validation across different data sources was conducted to minimize measurement errors and improve data accuracy.

Finally, all variables were checked for logical consistency and validity before being included in the econometric analysis. The final dataset consists of a balanced panel of firms over the study period. All data processing and quantitative analyses were conducted using STATA version 17, a widely used statistical software for panel data analysis and advanced econometric modeling [67].

3.2. Variables' measurement

3.2.1. Dependent variables: Firm value.

Following the multidimensional approach to firm valuation suggested by Venkatraman and Ramanujam [68], this study employs two distinct market-based indicators to evaluate firm value: tobin's Q (TQ) and the market-to-book value (MB).

Tobin's Q is widely recognized as a foundational metric in corporate finance and strategic management research for its ability to reflect investor expectations regarding future growth and asset efficiency [46]. Additionally, we use the market-to-book value (MB) as a proxy for the market's perception of a firm's growth potential and shareholder wealth maximization [47]. While Tobin's Q provides a comprehensive view of the entire capital structure, MB focuses specifically on equity valuation and shareholder objectives. Utilizing both measures allows us to cross-verify the consistency of our findings across different valuation perspectives. Detailed information regarding the measurement scales, specific formulas, and underlying references for all variables is synthesized and presented in Table 1

3.2.2. Independent variables: Green Accounting and Corporate Governance.

The primary independent variable, Green Accounting (GA) is measured as a dummy variable, taking the value of 1 if a firm discloses at least one type of environmental cost in its annual or sustainability report, and 0 otherwise. The environmental cost categories include remediation, environmental management, wastewater treatment, public relations, and monitoring costs [37], [69]. This approach is appropriate as environmental disclosure is largely voluntary and reflects a strategic reporting decision rather than a standardized quantitative metric. Prior studies emphasize that firms' participation in environmental disclosure serves as

a signal of ecological commitment [70], while the voluntary nature of such reporting leads to selective and potentially inconsistent information [71]. Therefore, using a dummy variable effectively captures the presence of disclosure behavior while avoiding comparability issues associated with heterogeneous environmental cost data.. Furthermore, Corporate Governance is represented through a set of mechanisms capturing both monitoring and resource-provision roles, including board size (BS), board independence (BI), CEO duality (CD), ownership concentration (OC), foreign ownership (FO), and board gender diversity (BD).

To control for firm-specific characteristics and mitigate potential endogeneity concerns, this study includes a set of commonly used control variables. These variables, together with their detailed references and measurement methods, are presented in Table 1.

Table 1. Variable measurement

Variables	Acronym	Measurement	Reference
Dependent variables			
Firm Value	TQ	(Total assets – book value of equity + market value of equity) / total assets.	[57]
	MB	Market value of equity divided by its book value.	[47]
Independent variables			
Green Accounting	GA	Dummy variable: takes the value of 1 if the company reports at least one type of environmental cost in its annual report or sustainability report, and 0 otherwise. The environmental cost categories considered include: a. Environmental remediation costs b. Environmental management costs c. Wastewater treatment costs d. Public relations costs e. Monitoring costs	[37], [69]
Board Size	BS	Total number of current members on the company's board of directors (BOD).	[44], [47], [52]
Board Independence	BI	Percentage of independent directors divided by the total number of board members.	[47]; [50], [53], [57]
CEO Duality	CD	Dummy variable equal to 1 if the CEO is also the chairperson of the board of directors, and 0 otherwise.	[50]; [54]
Ownership Concentration	OC	Percentage of shares held by the largest single shareholder.	[47], [55]
Foreign Ownership	FO	Percentage of shares held by foreign investors.	[57]
Board Gender Diversity	BD	Dummy variable, taking the value of 1 if there is at least one female member on the board, and 0 otherwise.	[47]; [58]
Control variables			
Industry Type	IT	Dummy variable: takes the value of 1 if the firm operates in environmentally sensitive industries (Pulp and Paper, Chemicals, Oil and Gas, Metals and Mining, Utilities); 0 otherwise.	[9]
Firm Size	SZ	Natural logarithm of total assets at the end of the year.	[47]; [61]

Financial Leverage	FL	Total debt divided by total assets.	[47], [60]
Big 4 Audit	BA	Dummy variable: takes the value of 1 if the firm is audited by one of the Big 4 audit firms (PwC, Deloitte, EY, KPMG); 0 otherwise.	[61]
Firm Age	FA	Natural logarithm of the number of years since the firm's establishment until the research year.	[47]

Source: Authors' own work

3.3. Summary statistics and method

3.3.1. Descriptive statistics

Table 2 summarizes the descriptive statistics of the main variables used in this study. Regarding firm valuation, Tobin's Q (TQ) and market-to-book value (MB) report mean values of 1.2706 and 1.5443, respectively. These figures indicate that market valuations generally exceed both asset replacement costs and accounting book values, reflecting a positive investor outlook on the future growth potential of Vietnamese enterprises. Notably, the higher standard deviation of MB (1.3496) compared to TQ (0.8600) suggests a more pronounced dispersion in equity-specific growth expectations across the sample. For the primary independent variables, green accounting (GA) exhibits a mean of 0.5078, indicating that 50.78% of the sampled observations have integrated specific environmental cost disclosures into their reporting frameworks. Corporate governance characteristics reveal an average board size (BS) of six members, while board independence (BI) remains relatively modest at 16.05%. CEO duality (CD) is notably infrequent at 1.38%, signaling a prevalent commitment to the separation of chairman and CEO roles to enhance institutional oversight. Furthermore, the sample is characterized by a mean ownership concentration (OC) of 38.96% and an average foreign ownership (FO) of 9.97%, reflecting the significant influence of major and international shareholders. Board gender diversity (BD) has a mean of 0.6129, indicating a moderate female presence in governance structures. Among the control variables, 40.09% of the firms operate in environmentally sensitive industries (IT). The average firm size (SZ) is 14.0195, accompanied by financial leverage (FL) of 54.42% and firm age (FA) of 1.7828. Additionally, 47.33% of the firms are audited by big four audit firms (BA), underscoring a strong emphasis on financial transparency and reporting integrity.

Table 2. Descriptive statistics

	N (Obs)	Mean	Std. Dev	Min	Max
<i>Dependent variables</i>					
TQ	1160	1.270564	0.8599864	-2.151845	11.25672
MB	1160	1.544287	1.349605	-10.79922	15.45542
<i>Independent variables</i>					
GA	1160	0.5077586	0.5001554	0	1
BS	1160	6.016379	1.741908	0	12
BI	1160	16.04707	17.20676	0	83.33
CD	1160	0.0137931	0.1166816	0	1
OC	1160	38.95917	24.38941	0.74	99.68
FO	1160	9.973618	15.38388	0	86.04

BD	1160	0.612931	0.5313356	0	1
<i>Control variables</i>					
IT	1160	0.4008621	0.4902845	0	1
SZ	1160	14.01947	4.713582	10.71686	32.11
FL	1160	0.5442145	0.5595772	0.01	9.33432
BA	1160	0.4732759	0.4995007	0	1
FA	1160	1.782762	0.775626	0.60206	5.462398

Source: Authors' own work

3.3.2. Normality and multicollinearity tests

To ensure the robustness of the regression analysis, several diagnostic tests were conducted to evaluate the data distribution and potential multicollinearity. The Skewness and Kurtosis tests yielded p-values below 0.01 for nearly all quantitative variables, thereby rejecting the null hypothesis of a normal distribution. While this reflects the inherent heterogeneity and presence of extreme observations in corporate financial data, Wooldridge [65] and Baltagi [72] argue that the normality assumption is not a mandatory requirement for panel regression when the sample size is sufficiently large, as demonstrated by the 1160 observations in this study. Furthermore, the variance inflation factor (VIF) was utilized to assess multicollinearity among the explanatory variables. All VIF values across the models were found to be significantly below the conventional threshold of 10, indicating that multicollinearity does not pose a threat to the stability or reliability of the estimated coefficients.

3.3.3. Spearman correlation analysis

Given the non-normal distribution identified in the diagnostic phase, the study employed the Spearman rank correlation coefficient (Table 3) to provide a robust assessment of monotonic relationships. The correlation matrix shows a strong and statistically significant relationship between the two dependent variables, TQ and MB ($\rho = 0.7297$, $p < 0.01$), confirming their consistency as market-based value proxies. For the independent and control variables, correlation coefficients generally remained at low-to-moderate levels (below 0.50). Although certain pairs, such as board size and foreign ownership ($\rho = 0.4757$), exhibited moderate correlations, all values remained well below the critical threshold of 0.70. These results reinforce the VIF findings and justify the inclusion of these variables in a multi-variable regression framework.

3.3.4. Model selection and econometric diagnostics

The study followed a systematic procedure to identify the most appropriate panel estimation technique.

Model selection: The F-test and the Breusch-Pagan lagrange multiplier (LM) test rejected the pooled OLS model in favor of the fixed effects model (FEM) and the random effects model (REM). Subsequently, the Hausman test produced statistically significant results ($p < 0.01$), indicating that firm-specific effects are correlated with the explanatory variables and therefore supporting the use of the fixed effects model (FEM).

Despite its suitability, further diagnostic testing reveals that the classical assumptions underlying the FEM are violated. The Wooldridge test detects the presence of first-order serial correlation [AR(1)] within panels, while the Modified Wald test indicates groupwise

heteroskedasticity across firms. These results suggest that the error term exhibits a non-spherical variance-covariance structure.

As highlighted by Wooldridge [65], the presence of heteroskedasticity and autocorrelation does not bias the coefficient estimates in fixed effects models but leads to inconsistent standard errors, thereby undermining the reliability of statistical inference. More importantly, as emphasized by Greene [75], when the disturbance term is characterized by heteroskedasticity and serial correlation, conventional estimators such as FEM become inefficient because they fail to account for the true variance-covariance structure of the errors. This issue is particularly relevant in the context of this study. The sample consists of firms operating across diverse industries with varying levels of environmental exposure, governance structures, and financial characteristics. Such heterogeneity naturally gives rise to cross-sectional variation in error variances, while the panel structure ($T = 5$) increases the likelihood of serial dependence over time. Consequently, relying solely on FEM would result in inefficient estimates and unreliable inference. To address these econometric concerns, the study employs the feasible generalized least squares (FGLS) estimator. Unlike conventional panel estimators, FGLS explicitly models the variance-covariance structure of the disturbance term, allowing it to simultaneously correct for both heteroskedasticity and serial correlation. By incorporating this information, FGLS produces more efficient parameter estimates and consistent standard errors. Furthermore, as noted by Baltagi [76], FGLS is particularly appropriate for panel datasets characterized by a large number of cross-sectional units and a relatively short time dimension (large N , small T), which aligns with the structure of this study ($N = 232$ firms, $T = 5$ years). Under such conditions, FGLS offers substantial efficiency gains compared to standard fixed effects estimation. Overall, the use of FGLS is both theoretically justified and empirically appropriate, as it directly addresses the identified violations of classical assumptions and ensures more reliable and robust statistical inference.

3.4. Model specification

3.4.1. Aggregate Sample Models.

To examine the impact of green accounting and corporate governance on firm value for the entire sample, we specify the following baseline regression models:

Model (1)

$$TQ_{it} = \beta_0 + \beta_1 GA_{it} + \beta_2 BS_{it} + \beta_3 BI_{it} + \beta_4 CD_{it} + \beta_5 OC_{it} + \beta_6 FO_{it} + \beta_7 BD_{it} + \sum_{k=1}^5 \gamma_k Control_{k,it} + \epsilon_{it}$$

Model (2):

$$MB_{it} = \alpha_0 + \alpha_1 GA_{it} + \alpha_2 BS_{it} + \alpha_3 BI_{it} + \alpha_4 CD_{it} + \alpha_5 OC_{it} + \alpha_6 FO_{it} + \alpha_7 BD_{it} + \sum_{k=1}^5 \lambda_k Control_{k,it} + \mu_{it}$$

Where $Control_{k,it}$ includes industry type (IT), firm size (SZ), financial leverage (FL), big 4 audit (BA), and firm age (FA).

3.4.2. Sub-sample models by environmental sensitivity.

Recognizing that environmental pressure and regulatory scrutiny are non-uniformly distributed across sectors, we split the sample into two cohorts based on the industry type (IT) variable: Environmentally sensitive ($IT = 1$) and non-sensitive ($IT = 0$). For each sub-sample, we estimate independent regressions to compare the magnitude and mechanism of impact. In these models, the IT variable is excluded as it serves as the grouping criterion. The sub-sample models are specified as follows:

For environmentally sensitive firms ($IT=1$) and non-sensitive firms ($IT=0$):

Models (3) & (5):

$$TQ_{it} = \delta_0 + \delta_1 GA_{it} + \delta_2 BS_{it} + \delta_3 BI_{it} + \delta_4 CD_{it} + \delta_5 OC_{it} + \delta_6 FO_{it} + \delta_7 BD_{it} + \sum_{k=1}^4 \theta_k Control'_{k,it} + \eta_{it}$$

Models (4) & (6):

$$MB_{it} = \pi_0 + \pi_1 GA_{it} + \pi_2 BS_{it} + \pi_3 BI_{it} + \pi_4 CD_{it} + \pi_5 OC_{it} + \pi_6 FO_{it} + \pi_7 BD_{it} + \sum_{k=1}^4 \psi_k Control'_{k,it} + \nu_{it}$$

Where $Control_{k,it}$ includes SZ, FL, BA, and FA.

The mathematical components and parameters utilized in the six regression models (Models 1-6) are defined as follows:

i and t : These represent the cross-sectional and time-series dimensions of the panel data; specifically, i denotes the individual firm ($i = 1, 2, 3, \dots, 232$) and t denotes the specific year within the research period ($t = 2020, \dots, 2024$).

β_0 : Intercept/Constant. This represents the baseline value of the dependent variable. Each model (1 through 6) generates a unique intercept reflecting the specific starting point of firm value within its respective context.

$\beta_1, \beta_2, \dots, \beta_K$: Regression Coefficients. These parameters represent the estimated impact of each independent and control variable. Although the symbols are used consistently across all six equations, their estimated values are distinct for each model.

ε_{it} : Stochastic Error Term. This term accounts for unobserved factors affecting firm value. The error term is specific to each regression model, representing the unique residual variance and idiosyncratic shocks.

4. RESULTS AND DISCUSSION

As reported in Table 4, the FGLS regression results for Tobin's Q (TQ) provide initial empirical evidence on how environmental disclosure and corporate governance mechanisms are reflected in firm valuation. The results provide strong support for H1, indicating that green accounting (GA) is positively and significantly associated with Tobin's Q ($\beta = 0.146$, $p < 0.01$). Rather than treating this as a purely empirical association, the finding can be more meaningfully interpreted through the combined lenses of signaling theory and stakeholder theory. From a signaling perspective, GA functions as a credible and costly signal of firm quality. In an environment characterized by information asymmetry and uneven disclosure standards, the recognition of environmental costs provides verifiable evidence of firms' commitment to managing environmental risks. This reduces uncertainty and allows investors to distinguish between firms with substantive sustainability practices and those engaging in symbolic disclosure. At the same time, stakeholder theory suggests that environmental disclosure reflects a firm's responsiveness to external stakeholder pressures, including regulators, international investors, and society at large. In the Vietnamese context, where sustainability expectations are increasingly shaped by global integration, GA can be interpreted as a mechanism for achieving legitimacy, which is subsequently translated into market valuation. The positive relationship between GA and TQ is consistent with prior studies [73], [74], which document that environmental performance enhances firm value. This alignment may be attributed to the increasing convergence of emerging markets toward global sustainability norms, which amplifies the informational and legitimacy value of environmental disclosure. However, this study extends the literature by demonstrating that accounting-based environmental disclosure retains its signaling and legitimacy functions even in a transitional institutional setting, reinforcing the argument that environmental transparency is not merely

symbolic but economically consequential [29]. Importantly, this relationship should be interpreted with caution. Rather than implying a universal effect, the results indicate that the value relevance of GA depends on how investors interpret environmental information within a specific institutional context.

Building on this foundation, corporate governance mechanisms shape how such environmental signals are interpreted, validated, and executed. Rather than exerting uniform effects, governance operates through distinct but interrelated channels, shaping firm value via three core functions: monitoring (agency theory), efficiency (stewardship theory), and resource and legitimacy provision (resource dependence theory). From an agency theory perspective, governance mechanisms associated with monitoring play a central role in reducing information asymmetry and aligning managerial incentives. The positive and significant effect of ownership concentration (OC) ($\beta = 0.0019$, $p < 0.01$) leads to the rejection of H5, and is consistent with, while also providing context-specific refinement of, the monitoring hypothesis [39], while challenging the universal applicability of the expropriation argument [55] in emerging market settings. In particular, in the Vietnamese context where external investor protection remains relatively underdeveloped, concentrated ownership appears to function as an effective internal governance substitute, mitigating agency conflicts and enhancing firm value. A similar but more nuanced mechanism is observed for foreign ownership (FO), which also exhibits a strong positive effect ($\beta = 0.0064$, $p < 0.01$), providing robust support for H6. Beyond its monitoring role, FO functions as a credibility-enhancing signal, as foreign investors impose higher governance standards and signal firm quality to the market. This effect may be particularly pronounced in Vietnam, where foreign investors act as carriers of international governance practices in an environment characterized by uneven regulatory enforcement. This dual role highlights how governance mechanisms can simultaneously operate within both agency and signaling frameworks. Nevertheless, a cautious interpretation is warranted, as the observed relationship may partially reflect selection effects, whereby higher-quality firms are more likely to attract foreign capital. In contrast, the positive and significant effect of CEO duality (CD) ($\beta = 0.169$, $p < 0.01$), leading to the rejection of H4, challenges the conventional predictions of agency theory and instead provides support for stewardship theory. This finding suggests that unified leadership may enhance strategic coherence, faster decision-making, and organizational alignment. In a dynamic and institutionally evolving environment, investors may prioritize managerial efficiency and responsiveness over formal separation of control, indicating that governance effectiveness is contingent not only on monitoring but also on execution capacity. By comparison, the limited or insignificant effects of board independence (BI) and board size (BS) in the aggregate sample (leading to the rejection of H3 and lack of support for H2) highlight the limited effectiveness of formal governance structures in the absence of substantive expertise and contextual alignment. These findings imply that structural attributes such as independence or board size do not automatically translate into effective governance unless they are accompanied by relevant expertise and active engagement. Similarly, the absence of a significant effect for board gender diversity (BD) (leading to the rejection of H7) suggests that diversity alone may not be sufficient to enhance firm value, but rather depends on whether it translates into improved decision-making processes and strategic outcomes. Taken together, these findings indicate that corporate governance should not be conceptualized as a set of independent mechanisms, but rather as a multi-dimensional system that influences firm value through complementary channels. Importantly, governance does not operate in isolation: its effectiveness is closely intertwined with environmental disclosure. While GA provides a signal of firm quality, governance mechanisms determine the credibility, interpretation, and implementation of that signal. In this sense, firm value emerges from the interaction between signaling and governance, even though such interaction is not explicitly modeled. This integrated interpretation also helps reconcile the apparent divergence from traditional agency

theory predictions. Rather than invalidating existing theories, the results suggest that governance mechanisms perform different functions under different institutional conditions, and that their value relevance depends on whether monitoring, efficiency, or resource provision is most critical in a given context.

Extending this analysis, the sub-sample results suggest that the valuation of both environmental disclosure and governance mechanisms is systematically conditioned by industry context, proxied by environmental sensitivity. Rather than interpreting these results as isolated differences in coefficients, the evidence suggests the emergence of two distinct, though not mutually exclusive, valuation logics. In environmentally sensitive industries, firm value appears to be primarily driven by legitimacy considerations and risk management capacity, rather than internal governance efficiency alone. The continued significance of GA confirms H1; however, its relatively reduced magnitude suggests that environmental disclosure may function less as a differentiating signal and more as a baseline expectation under heightened stakeholder scrutiny. This helps explain why the market places greater emphasis on governance mechanisms that enhance credibility and expertise. The significance of BS, for example, can be understood through resource dependence theory, where larger boards provide access to specialized knowledge and external networks required to manage environmental complexity. Similarly, the strong effect of FO reflects not only monitoring capacity but also institutional legitimacy, as foreign investors signal adherence to international standards. In contrast, traditional governance mechanisms such as CD or BI lose explanatory power, suggesting that when environmental risk is highly salient, investors prioritize substantive capabilities over formal governance structures. The negative effect of BD, while counterintuitive, should be interpreted cautiously, as it may reflect a misalignment between board composition and the technical demands of environmentally complex industries.

In contrast, in non-sensitive industries, the valuation logic shifts toward internal efficiency and governance effectiveness. While GA remains positively associated with firm value, its role appears to be more long-term and less immediate, reflecting lower stakeholder pressure. In this context, governance mechanisms associated with managerial efficiency and internal control become more prominent. The strong effect of CD suggests that unified leadership enhances decision-making speed and strategic coherence, consistent with stewardship theory, while OC continues to support the monitoring hypothesis. Notably, BD exhibits a positive effect, suggesting that cognitive diversity enhances decision quality in less constrained environments. Overall, these findings indicate that in low-risk contexts, firm value is less driven by external legitimacy pressures and more by the effective utilization of internal governance structures. Importantly, these differences should be interpreted with caution. As this study does not formally test coefficient differences across sub-samples (e.g., through interaction terms or structural break tests), the observed variations should be viewed as exploratory rather than confirmatory. Accordingly, the results do not imply definitive structural differences, but rather suggest shifting investor priorities across contexts. Taken together, the sub-sample findings provide indirect but consistent evidence of joint effects between environmental disclosure and governance mechanisms. While interaction effects are not explicitly modeled, the systematic variation in the relevance of these factors across contexts provides indicative evidence of underlying interdependencies. In this sense, “joint effects” are better understood as a context-conditioned configuration rather than a purely statistical interaction. Environmental disclosure provides the signal, governance mechanisms ensure its credibility and execution, and industry characteristics shape its interpretation. In doing so, this study contributes to the literature by demonstrating that the value relevance of environmental disclosure and corporate governance is not intrinsic to individual mechanisms, but emerges from their context-dependent configuration, thereby challenging the implicit

assumption of universal governance effectiveness in prior research and offering new insights into firm valuation in emerging markets.

Robustness Test

MB (Market-to-Book ratio) is used as an alternative dependent variable to assess the robustness of the empirical results. MB measures firm value by comparing a company's market capitalization to its book value of equity, thereby reflecting how the market values shareholders' investment relative to its accounting value. This indicator captures investor expectations regarding future growth opportunities and the value of intangible assets not fully reflected in financial statements. Compared to TQ, MB is more directly derived from equity market pricing and is therefore more sensitive to investor sentiment and short-term market reassessments. However, unlike TQ, MB does not incorporate the role of debt in the capital structure, and thus reflects a narrower, equity-focused perspective on firm valuation. For this reason, MB is widely used in empirical corporate finance studies as an alternative market-based valuation proxy, allowing for comparison and validation of empirical results across different measures of firm value [47].

The results reported in Table 5 indicate a high degree of consistency with the baseline Tobin's Q models, thereby reinforcing the validity of Hypothesis H1. For the full sample, GA remains positive and statistically significant ($\beta = 0.0998$, $p < 0.05$), confirming that the market consistently values environmental transparency regardless of valuation metric. This consistency across both TQ and MB suggests that the observed effect of GA is not sensitive to the choice of dependent variable, but instead reflects a stable pricing of environmental disclosure in the Vietnamese capital market. A more nuanced pattern emerges when comparing industry contexts. In environmentally sensitive industries, the coefficient of GA increases substantially ($\beta = 0.1599$, $p < 0.05$), whereas in non-sensitive industries the effect is smaller and statistically insignificant ($\beta = 0.0879$, $p > 0.10$). Rather than interpreting this as a structural break, this difference reflects variation in the economic materiality of environmental risk across industries. In high-risk sectors environmental costs are directly linked to regulatory exposure, remediation obligations, and transition risks. As a result, green accounting becomes a more informative signal of risk management capability and long-term resilience, which is capitalized more strongly into equity valuation. Importantly, the higher magnitude of GA in sensitive industries under MB compared to TQ suggests that environmental disclosure is more immediately reflected in equity market pricing than in broader asset-based valuation. This indicates that investors may respond more sensitively to environmental information when focusing on equity returns rather than firm-wide asset efficiency.

The robustness analysis further reveals that corporate governance mechanisms operate through distinct but relatively stable channels across valuation measures, although their economic relevance varies depending on industry context and valuation perspective. OC and FO remain consistently positive and statistically significant across all specifications. This stability suggests that both mechanisms function as persistent governance anchors in the Vietnamese institutional environment. From an agency theory perspective, OC continues to mitigate monitoring inefficiencies in contexts where external investor protection is limited. Meanwhile, FO not only enhances monitoring but also operates as a credibility-enhancing signal, as foreign investors are associated with higher governance standards and greater transparency expectations. The consistency of these effects across both TQ and MB models indicates that their role in reducing information asymmetry is robust to alternative valuation approaches. BS also shows a generally positive effect, particularly in environmentally sensitive industries, consistent with resource dependence theory. Larger boards provide access to broader expertise and external networks, which become particularly valuable in managing environmental complexity and regulatory exposure. However, the effect is weaker or insignificant in non-sensitive industries, suggesting that the value of board resource

diversity is conditional on the level of external environmental pressure faced by the firm. In contrast, BI remains statistically weak or negative across specifications. This persistent pattern suggests that formal independence, in isolation, does not necessarily translate into effective monitoring in emerging market contexts. One plausible explanation is that independence without sufficient industry expertise or active engagement may limit the board's ability to influence strategic decisions, particularly in complex regulatory environments. CD exhibits an important divergence between valuation measures. While it is positively associated with Tobin's Q in the baseline models, its effect becomes statistically insignificant under MB. This suggests that although unified leadership may enhance internal coordination and operational efficiency, equity markets do not consistently reward it with higher valuation premiums. This distinction highlights a potential tension between stewardship-based efficiency gains and investor concerns regarding concentrated managerial authority. Finally, BD shows a more pronounced effect under MB than TQ in certain specifications. This indicates that equity investors may place greater value on cognitive diversity and governance inclusiveness when forming expectations about future growth and sustainability. However, this effect is not uniform across industries, suggesting that the value relevance of gender diversity is context-dependent rather than universal.

Overall, the robustness results confirm that the baseline findings are not driven by a specific valuation measure. The consistent significance of GA across both TQ and MB supports its role as a stable determinant of firm value in the Vietnamese market. At the same time, variations in coefficient magnitude across industry groups reflect differences in the economic salience of environmental risk rather than structural breaks in governance effectiveness. Importantly, the robustness analysis highlights that corporate governance mechanisms do not operate in isolation but serve as complementary institutional mechanisms that shape how environmental signals are interpreted by the market. While environmental disclosure provides the informational signal, governance structures influence the credibility and perceived reliability of that signal. The consistency of results across valuation measures therefore strengthens the argument that firm value in emerging markets is shaped by a multi-dimensional system combining transparency, monitoring, and institutional context.

Table 3. Correlation matrix

	TQ	MB	GA	BS	BI	CD	OC	FO	BD	IT	SZ	FL	BA	FA
TQ	1													
MB	0.7297***	1												
GA	0.0996***	0.0402	1											
BS	0.1739***	0.2271***	-0.0832***	1										
BI	-0.0915***	-0.0807***	0.0003	0.1059***	1									
CD	0.0375	-0.0134	0.0425	-0.0823***	0.0475	1								
OC	0.1211***	0.1242***	0.2248***	-0.0907***	-0.2095***	-0.0315	1							
FO	0.1869***	0.2426***	-0.004	0.4757***	0.1567***	0.0500*	-0.1621***	1						
BD	0.0799***	0.1000***	-0.1185***	0.1744***	0.0468	-0.0989***	-0.1155***	0.0401	1					
IT	-0.0464	-0.0986***	0.2389***	-0.2010***	-0.0303	-0.0062	0.2052***	-0.1680***	-0.1712***	1				
SZ	0.1248***	0.1731***	-0.0004	0.3334***	0.1442***	-0.0337	-0.0234	0.3033***	0.0558	0.0662**	1			
FL	-0.0433	0.0019	-0.1304***	0.0989***	-0.0604**	0.0785***	-0.1290***	-0.1158***	-0.0199	-0.0605*	0.3053***	1		
BA	0.2446***	0.2795***	-0.013	0.3436***	0.0359	0.0507*	0.1537***	0.4419***	0.0521	-0.0425	0.4500***	0.0468	1	
FA	0.0174	0.0104	0.2982***	-0.1835***	-0.0339	0.1066***	0.1661***	-0.1054***	-0.0900***	0.1863***	0.0395	-0.0067	-0.1412***	1

*Note: This table reports Spearman rank correlation coefficients among the variables used in the study. Spearman correlation is employed due to the non-normal distribution of the variables. *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.*

Source: Authors' own work

Table 4. FGLS regression results.

FGLS regression results (Dependent variable: TQ)									
Variables	Coefficient			Std. Error			p-value		
	Full sample	Environmentally sensitive industries	Non-sensitive industries	Full sample	Environmentally sensitive industries	Non-sensitive industries	Full sample	Environmentally sensitive industries	Non-sensitive industries
GA	0.1462521	0.0953863	0.1058452	0.0271579	0.0318094	0.0265235	0	0.003	0
BS	0.0071765	0.0268381	-0.0101668	0.0057803	0.0091674	0.0072834	0.214	0.003	0.163
BI	-0.0005261	0.0010381	-0.0022485	0.0005255	0.0008252	0.000714	0.317	0.208	0.002
CD	0.1693693	-0.1174567	0.5020093	0.0569547	0.0883105	0.068802	0.003	0.184	0
OC	0.0019177	0.0003387	0.0048783	0.0005009	0.0006525	0.000622	0	0.604	0
FO	0.006457	0.0073432	0.0151245	0.0010644	0.0015275	0.0010974	0	0	0
BD	0.0207863	-0.0653556	0.1528416	0.0177346	0.0259304	0.0218324	0.241	0.012	0
IT	-0.0306989			0.0232615			0.187		
SZ	-0.0057235	-0.0024108	-0.14143	0.0028878	0.0031167	0.0180337	0.047	0.439	0
FL	0.1446852	-0.084408	0.6615172	0.0473789	0.0644414	0.0498099	0.002	0.19	0
BA	0.0448097	0.0773591	0.0944393	0.0211645	0.0303823	0.0316346	0.034	0.011	0.003
FA	-0.0096343	-0.0228861	-0.0594253	0.0181591	0.0207535	0.0202782	0.596	0.27	0.003
Groups	232	93	139	232	93	139	232	93	139
Time periods	5	5	5	5	5	5	5	5	5
Wald $\chi^2(12)$	139.97	114.08	695.97	139.97	114.08	695.97	139.97	114.08	695.97
Prob > χ^2	0	0	0	0	0	0	0	0	0
AR(1) coefficient	0.6283	0.5768	No autocorrelation	0.6283	0.5768	No autocorrelation	0.6283	0.5768	No autocorrelation
Note: FGLS estimation with heteroskedastic panels and AR(1) autocorrelation. Coefficients and standard errors are reported as in Stata output. The variable IT (Industry Type) was omitted in the subsample regressions because it was used as the criterion for sample stratification (as detailed in Section 3).									

Source: Authors' own work

Table 5. FGLS regression results.

FGLS regression results (Dependent variable: MB)									
Variables	Coefficient			Std. Error			p-value		
	Full sample	Environmentally sensitive industries	Non-sensitive industries	Full sample	Environmentally sensitive industries	Non-sensitive industries	Full sample	Environmentally sensitive industries	Non-sensitive industries
GA	0.0998145	0.1599546	0.0879011	0.0463	0.0650365	0.0552195	0.031	0.014	0.111
BS	0.0576001	0.0593616	0.0163189	0.012891	0.0218524	0.0178239	0	0.007	0.36
BI	-0.0031832	0.0002614	-0.0049549	0.0011417	0.0015689	0.0014333	0.005	0.868	0.001
CD	-0.127656	-0.0782795	-0.1233599	0.1851093	0.1688128	0.2441735	0.49	0.643	0.613
OC	0.0048663	0.0038135	0.0074531	0.0009885	0.0013323	0.0013005	0	0.004	0
FO	0.0107778	0.0169902	0.0138075	0.0021351	0.0032616	0.0023598	0	0	0
BD	0.1566683	0.0505595	0.2420378	0.0404433	0.0552517	0.0533189	0	0.36	0
IT	-0.0542069			0.0490986			0.27		
SZ	-0.0191348	-0.0226269	0.1031368	0.0068636	0.0080238	0.0393074	0.005	0.005	0.009
FL	-0.1160371	0.0402969	-0.1636981	0.041287	0.1308295	0.0304431	0.005	0.758	0
BA	0.3308519	0.2264205	0.1747173	0.0539458	0.0734989	0.0702478	0	0.002	0.013
FA	0.0844466	0.0546576	0.1822069	0.0453739	0.0602199	0.0479181	0.063	0.364	0
Groups	232	93	139	232	93	139	232	93	139
Time periods	5	5	5	5	5	5	5	5	5
Wald $\chi^2(12)$	293.48	134.64	350.56	293.48	134.64	350.56	293.48	134.64	350.56
Prob > χ^2	0	0	0	0	0	0	0	0	0
AR(1) coefficient	0.5117	0.4969	No autocorrelation	0.5117	0.4969	No autocorrelation	0.5117	0.4969	No autocorrelation

Note: FGLS estimation with heteroskedastic panels and AR(1) autocorrelation. Coefficients and standard errors are reported as in Stata output. The variable IT (Industry Type) was omitted in the subsample regressions because it was used as the criterion for sample stratification (as detailed in Section 3).

Source: Authors' own work

5. CONCLUSION

The primary objective of this research was to examine the impact of green accounting and corporate governance on firm value among Vietnamese listed enterprises during the period 2020-2024. Using a balanced panel dataset and the feasible generalized least squares estimation method, the study provides robust evidence that green accounting positively affects both tobin's Q and market-to-book value. These results suggest that environmental transparency reduces information asymmetry and serves as a credible market signal of a firm's long-term sustainability orientation and risk management capability.

This study advances three streams of literature by developing a context-contingent explanation of how environmental disclosure and corporate governance jointly shape firm value in an emerging market setting. First, it extends signaling theory and stakeholder theory by providing evidence of the financial materiality of green accounting in transitional economies. Rather than functioning solely as a mechanism for external impression management, green accounting in the Vietnamese context operates as a credible and value-relevant signal under conditions of high information asymmetry. The finding that its valuation effect is substantially stronger in environmentally sensitive industries further indicates that environmental disclosure becomes particularly economically meaningful when environmental risks, such as regulatory penalties and transition-related costs, are more salient. In such contexts, green accounting helps investors distinguish between firms with substantive risk-management capabilities and those engaging in symbolic disclosure, thereby generating a tangible equity premium associated with higher transparency. Second, the study offers a nuanced reassessment of agency theory in emerging markets by showing that its standard predictions do not fully capture governance dynamics in institutional environments with weak external enforcement. Instead of consistently destroying value, CEO duality and ownership concentration are found to enhance firm value, supporting stewardship theory and the monitoring substitution perspective. This suggests that, in contexts where external governance institutions are less developed, unified leadership and concentrated ownership may function as efficient internal governance substitutes that reduce agency frictions and improve decision-making efficiency. Accordingly, governance effectiveness should not be understood as a fixed structural characteristic, but rather as an adaptive response to institutional constraints. Third, the findings extend resource dependence theory by identifying environmental salience as a key boundary condition for the value relevance of board structures. Board size is found to be value-enhancing primarily in environmentally sensitive industries, indicating that its function shifts from internal oversight to external resource acquisition under conditions of heightened environmental complexity. In such settings, larger boards provide access to diverse expertise and external networks that are critical for navigating regulatory pressures and managing transition risks. This context-dependent configuration highlights that the effectiveness of governance structures is contingent upon the alignment between internal organizational resources and external environmental demands, offering a more integrated view of how firm value is constructed in emerging markets.

From a managerial perspective, the findings suggest that green accounting should not be interpreted as a mere compliance exercise, but as a strategic mechanism for enhancing transparency, reducing information asymmetry, and strengthening firms' positioning in capital markets. The evidence indicates that its value relevance is conditional on the credibility of corporate governance structures, implying that environmental disclosure generates economic value only when it is supported by effective monitoring and governance mechanisms capable of ensuring reliability and preventing symbolic reporting. Accordingly, managers should recognize that the financial benefits of sustainability disclosure arise not only from the act of transparency itself, but from its integration into a broader governance system that translates

disclosure into investor trust and long-term valuation gains. Building on this managerial insight, several implications arise for policy and institutional design in Vietnam's capital market. First, regulatory development should move toward a phased and structured transition from voluntary to mandatory environmental reporting. Such a roadmap should be accompanied by standardized technical guidelines for the measurement and disclosure of environmental costs, liabilities, and sustainability-related investments. Prioritizing large firms and environmentally sensitive industries in the early stages would allow regulators to enhance transparency while maintaining implementation feasibility. Second, environmental disclosure should be more explicitly linked to market-based incentives in order to encourage substantive rather than symbolic compliance. Integrating green accounting indicators into national sustainability assessments and using them as reference criteria for access to green credit, green bonds, and other sustainable financing instruments would strengthen the connection between transparency and capital allocation. This alignment would create direct economic incentives for firms to improve disclosure quality and reduce the risk of superficial reporting practices. Third, improvements in environmental transparency need to be reinforced through governance reforms that embed sustainability at the board level. Strengthening board oversight of environmental risk management, alongside greater disclosure of governance structures related to environmental responsibility, would enhance the credibility of reported information and improve investor confidence in disclosed sustainability performance. Fourth, regulatory design should adopt a differentiated approach across industries, reflecting variation in environmental exposure and stakeholder pressure. More stringent disclosure requirements and monitoring mechanisms are particularly necessary in environmentally sensitive sectors, where environmental risks are financially material, whereas less exposed industries may be better served by a more flexible, incentive-driven framework. Finally, the effectiveness of these reforms depends on broader institutional capacity, including the development of professional expertise in environmental accounting, the expansion of independent assurance mechanisms to mitigate greenwashing risks, and the establishment of centralized ESG data infrastructure. In parallel, facilitating the entry of long-term, ESG-oriented foreign investors through improved disclosure quality and stronger investor protection mechanisms can further reinforce market discipline, thereby accelerating the adoption of substantive green accounting practices.

Despite providing novel insights into the joint effects of green accounting and corporate governance on firm value, this study acknowledges several limitations. First, the empirical results may be subject to potential endogeneity, a common issue in corporate finance and sustainability research. In particular, reverse causality cannot be fully ruled out, as firms with higher valuation and stronger financial performance may have greater capacity to implement and disclose green accounting practices. Although FGLS is employed to improve estimation efficiency and address heteroskedasticity and serial correlation, it does not fully eliminate endogeneity concerns. Second, the measurement of green accounting is based on a binary disclosure indicator, which captures whether firms disclose environmental costs but does not reflect the intensity, quality, or substantive depth of such disclosure. This proxy may therefore capture symbolic reporting rather than actual environmental performance. Third, the corporate governance variables are primarily structural and quantitative in nature, focusing on ownership structure and board composition, while potentially overlooking qualitative dimensions such as boardroom dynamics, managerial behavior, and ESG-related expertise. Finally, the study is confined to the Vietnamese institutional context, which may limit the external validity and generalizability of the findings to other emerging or developed markets.

Building on these limitations, several avenues for future research are suggested. First, future studies could adopt more robust identification strategies, such as instrumental variable approaches or alternative causal inference techniques, to better address endogeneity concerns and strengthen causal interpretation. Second, the measurement of green accounting could be refined by incorporating continuous indicators, ESG scores, or environmental expenditure data

to better capture the intensity and substantive quality of environmental disclosure, thereby distinguishing meaningful transparency from potential greenwashing. Third, future research could complement structural governance variables with qualitative or survey-based data to capture deeper dimensions of corporate governance, including board effectiveness, managerial cognition, and ESG expertise. Finally, extending the analysis to cross-country or regional settings would enhance external validity and allow for a more systematic examination of how institutional differences shape the relationship between environmental disclosure, governance mechanisms, and firm value..

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