

Do Environmental Disclosures Enhance Firm Value? The Moderating Role of Corporate Governance in Indonesia's Plantation Sector

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ABSTRACT

Keywords:

Green Accounting;
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Background: Environmental sustainability has become increasingly important in corporate valuation, particularly in Indonesia's plantation sector, which faces substantial ecological challenges. Environmental disclosures are expected to enhance transparency and investor confidence, although their financial implications remain uncertain.

Research Gap: Previous studies report inconsistent relationships between environmental disclosure and firm value. Limited research has examined the moderating role of Good Corporate Governance (GCG) across distinct environmental disclosure dimensions, particularly within Indonesia's plantation industry.

Novelty: This study distinguishes green accounting, Corporate Social Responsibility (CSR) disclosure, and carbon emission disclosure while examining GCG as a moderator. It also incorporates Islamic principles of environmental stewardship, accountability, and Maqasid al-Shariah into the interpretation of empirical findings.

Method: A quantitative explanatory approach was employed using 96 firm-year observations from plantation companies listed on the Indonesia Stock Exchange during 2019–2023. Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) through WarpPLS 7.0, incorporating a one-year lag structure.

Results: Green accounting negatively affects firm value ($\beta = -0.444$; $p = 0.002$), whereas CSR disclosure demonstrates a significant positive effect ($\beta = 0.726$; $p < 0.001$). Carbon emission disclosure shows no significant effect ($p = 0.122$). GCG does not significantly moderate any examined relationship, although its interaction with carbon disclosure is positive ($p = 0.084$).

Conclusion: CSR disclosure enhances firm value, while environmental performance receives less favorable market recognition. These findings emphasize the importance of credible sustainability reporting, stronger governance oversight, and improved environmental disclosure standards.

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INTRODUCTION

Environmental, Social, and Governance (ESG) issues have become increasingly important in corporate decision-making and investment activities. Companies are no longer evaluated solely based on financial performance, but also on their ability to maintain environmental sustainability and social responsibility. This condition has encouraged firms to improve their transparency regarding environmental and sustainability practices through various disclosure mechanisms, including green accounting, Corporate Social Responsibility (CSR), and carbon emission disclosure.

In Indonesia, the plantation sector represents one of the industries with the highest environmental exposure due to its close relationship with land use, deforestation, and carbon emissions. At the same time, the sector contributes significantly to national economic development. According to national economic statistics, the agricultural sector contributed approximately 12.53% to Indonesia's Gross Domestic Product (GDP) in 2023, while the plantation sub-sector accounted for around 3.88% of total GDP. Despite its strategic role, plantation companies are often subject to public scrutiny related to environmental degradation and sustainability practices.

Increasing environmental awareness among investors has encouraged companies to improve environmental accountability. Companies are expected to disclose environmental costs, sustainability activities, and carbon emission information to reduce information asymmetry and increase investor confidence. However, the relationship between environmental disclosure and firm value remains inconclusive. Several studies found that environmental disclosure improves firm value because it enhances corporate reputation and legitimacy (Barroso-Méndez et al., 2024). In contrast, other studies indicate that environmental expenditure may reduce short-term profitability and negatively affect investor perceptions (Jiang et al., 2021). In addition, studies investigating the moderating role of Good Corporate Governance (GCG) in this relationship remain limited, particularly in Indonesia's plantation sector.

Beyond its economic significance, this issue carries particular weight in the Indonesian context, as Indonesia is the world's largest Muslim-majority country and corporate conduct is increasingly evaluated against Islamic ethical benchmarks alongside conventional financial metrics. Islamic teaching treats the earth as a trust, humankind is placed on it as *khalifah* (Qur'an 2:30), and the Qur'an attributes the corruption (*fasad*) that has appeared on land and sea to what human hands have done (Qur'an 30:41). For plantation firms, the Indonesian Ulema Council (MUI) has made these teachings concrete by declaring forest and land burning forbidden (*haram*) in 2016 and, in its 2023 fatwa on climate change, declaring uncontrolled deforestation forbidden (Majelis Ulama Indonesia, 2016, 2023). Islamic ethics also requires that what a firm reports be truthful and clear, since concealment removes the blessing of a transaction (Sahih al-Bukhari, No. 2079). Yet studies of environmental disclosure in the plantation sector rarely interpret their findings through these principles. This study therefore interprets its results through the Islamic principles of stewardship, trust, and justice alongside stakeholder, legitimacy, and signaling theories.

Stakeholder theory, pioneered by Freeman (1984), explains that companies must consider the interests of stakeholders, including communities, governments, investors, and environmental groups, in their business operations. Legitimacy theory suggests that companies seek social acceptance by aligning their operations with social norms and environmental expectations. Signaling theory further explains that environmental disclosure may serve as a signal regarding company quality and long-term sustainability. However, investors in emerging markets may interpret environmental expenditures differently depending on market conditions and governance quality.

Previous studies regarding green accounting, CSR Disclosure, and Carbon Emission Disclosure have produced inconsistent findings. Some studies found positive relationships between environmental disclosure and firm value, while others reported insignificant or even negative effects. In addition, studies investigating the moderating role of Good Corporate Governance in the relationship between environmental disclosure and firm value remain limited, particularly in Indonesia's plantation sector.

Beyond its economic significance, this issue carries particular weight in the Indonesian context, as Indonesia is the world's largest Muslim-majority country and corporate conduct is increasingly evaluated against Islamic ethical benchmarks alongside conventional financial metrics. Islamic economic thought offers a framework for environmental responsibility that predates and, in several respects, anticipates

contemporary ESG discourse. The Qur'anic concept of khalifah positions human beings, by extension, corporations as collective economic actors, as trustees (stewards) of the earth's resources rather than their owners (Shalhoob, 2025), obligating firms to manage land, water, and biodiversity for the benefit of present and future generations. This is reinforced by the principle of mizan (balance), which frames environmental degradation as a violation of the divinely ordained equilibrium between human economic activity and the natural order. The principle of amanah (trustworthiness) extends this stewardship into an accountability relationship as resources entrusted to a firm must be safeguarded and reported on honestly to stakeholders. Two further principles complete this normative picture. Hifz al-bi'ah (preservation of the environment), recognized within the Maqasid al-Shariah as an extension of the objective to protect life and future generations, positions ecological conservation as a core Sharia objective rather than a peripheral corporate social activity, a mandate of particular weight for plantation firms given their direct exposure to land, water, and biodiversity. The prohibition of maysir (speculative or unearned gain divorced from genuine productive activity) is also relevant, environmental disclosure that overstates performance without corresponding operational substance, effectively rewards investors with a market signal untethered from real environmental value creation, a pattern Islamic transactional ethics treats as impermissible. Recent work operationalizing Maqasid al-Shariah alongside ESG frameworks shows that firms aligning environmental and governance disclosure with these principles build stronger stakeholder trust and ethical legitimacy (Mohd Zain et al., 2024). Hisbah, historically the institution of market and social oversight in Islamic economic governance, is conceptually analogous to the contemporary function of Good Corporate Governance (GCG) examined in this study. This study therefore examines environmental and governance disclosure not only through conventional stakeholder, legitimacy, and signaling theories, but also as an empirical test of how far Indonesia's capital market currently rewards conduct consistent with these Islamic economic principles.

This study contributes to the ESG and firm value literature, as well as to the Islamic finance literature, in four ways. First, it separates environmental responsibility into three distinct dimensions: Green accounting, CSR disclosure, and carbon emission disclosure. Second, it investigates the plantation sector, which has high environmental exposure but remains relatively underexplored in ESG studies. Third, it reveals that green accounting may negatively affect firm value in developing markets, indicating that investors may still perceive environmental expenditures as short-term financial burdens rather than strategic investment. Fourth, by reading these results through the Islamic principles of khalifah, amanah, and adl and through recent MUI fatwas, it offers a Sharia-based explanation of which forms of disclosure the market rewards and propositions for Islamic finance research. Based on these issues, this study aims to examine the effect of green accounting, CSR disclosure, and carbon emission disclosure on firm value with Good Corporate Governance (GCG) as a moderating variable in plantation companies listed on the Indonesia Stock Exchange (IDX), while assessing the extent to which these relationships align with Islamic economic principles of environmental stewardship and accountability.

This study employs the Price to Book Value (PBV) ratio as a proxy for firm value, following Wong et al. (2021). The primary objective is to offer a granular analysis of environmental disclosure by decomposing the 'green' spectrum into accounting (cost-based), CSR (social-based), and carbon (emission-based) dimension, an approach often missed in aggregated ESG studies.

This study employed a quantitative descriptive approach with an explanatory research design, focusing on collecting and analyzing numerical data to identify patterns and relationships between variables using statistical techniques. The research is also categorized as a correlational study, aiming to identify relationships between variables without direct researcher intervention (Creswell & Creswell, 2023; Hair et al., 2022a).

The data analysis technique used was Structural Equation Modeling (SEM) based on Partial Least Squares (PLS), it was chosen for its ability to model complex relationships among latent variables and observed variables. The analysis was performed using WarpPLS 7.0 software. PLS-SEM is advantageous for its ability to handle non-normal data and asymmetric distributions, and it can provide accurate predictions even with a small sample size (Hair et al., 2022b; Ringle et al., 2023).

LITERATURE REVIEW & HYPOTHESIS DEVELOPMENT

Theoretical Foundation

This study integrates three complementary theories. Stakeholder theory (Freeman, 1984) posits that firms must satisfy a broad set of constituencies beyond shareholders, suggesting that environmental disclosure improves relationships with regulators, communities, and long-term investors. Legitimacy theory argues that firms engage in environmental disclosure to gain or maintain social acceptance by conforming to societal expectations. Signaling theory posits that voluntary disclosure of environmental information signals managerial quality and long-term commitment to sustainability, potentially reducing information asymmetry and lowering the cost of capital. Islamic economic ethics offer a complementary normative foundation to the Western theoretical lenses employed in this study. The concept of *khalifah* (stewardship) establishes that humans, and by extension the corporations they operate, hold the earth's resources in trust rather than in absolute ownership (Qur'an 2:30), paralleling but predating stakeholder theory's claim that firms owe obligations beyond shareholders. Throughout this study, *khalifah*, *amanah*, *hisbah*, *hifz al-bi'ah*, *gharar*, and *maysir* are applied as an interpretive lens for reading the quantitative findings against Islamic economic ethics, rather than as separately measured constructs, and no Sharia-compliance index or Islamic-governance variable enters the structural model itself.

Two further Islamic principles complete this interpretive lens. *Amanah* (trust) and *adl* (justice) are joined in the command to render trusts to those entitled to them and to judge with justice (Qur'an 4:58), and the principle of *mizan* (balance) warns against transgressing the balance set in creation (Qur'an 55:7-9). *Shura* (consultation) requires that decisions affecting the community be reached through genuine deliberation with those affected (Qur'an 42:38). On disclosure, the guidance is explicit, parties who speak truthfully and make matters clear are blessed in their transaction, whereas those who conceal and lie lose its blessing (Sahih al-Bukhari, No. 2079; Sahih Muslim, No. 1532), and the Prophet disowned a trader who had hidden damp grain beneath dry grain (Sahih Muslim, No. 102). Concealment of this kind, known as *tadlis*, comes closest to what is now called greenwashing. In this study, these principles inform the expected direction of each hypothesis and the interpretation of the results and not measured as separate constructs.

Green Accounting and Firm Value

Green accounting refers to the identification, measurement, and disclosure of environmental costs associated with company operations. The implementation of green accounting reflects corporate commitment to environmental sustainability. According to signaling theory, environmental disclosure should provide positive signals to investors. However, environmental expenditures may also be perceived as additional operational costs that reduce short-term profitability (Lako, 2019; Lee et al., 2022; Rukmiyati et al., 2023; Cai et al., 2023; Wahyati et al., 2024). Despite broad support, some studies in specific public sectors report insignificant results (Sukmadilaga et al., 2023; Hutabarat, 2024). From an Islamic perspective, recording what a firm owes and consumes is itself part of accountability. The Qur'an instructs that obligations be written down and recorded with justice (Qur'an 2:282), a verse widely cited as the normative basis of Islamic accounting, and Kamla et al. (2006) extend this duty of account to the natural environment. Under this view, better environmental performance should be valued as evidence that the trust over land and water is being kept

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

CSR Disclosure and Firm Value

CSR Disclosure reflects company's responsibility toward social and environmental sustainability. Companies with broader CSR disclosure are generally perceived more positively because they demonstrate commitment toward stakeholders and sustainable business practices (Wu & Liew, 2024). Comprehensive CSR disclosure reduces information asymmetry between management and stakeholders (Wang, 2024). Previous studies have consistently shown that robust CSR reporting correlates positively with firm value (Nguyen, 2025; Tsang et al., 2024) and firm performance (Veeravel et al., 2024), consistent with both stakeholder and legitimacy theories. In Islamic ethics, responsibility toward workers and surrounding communities is an expression of *adl* and part of the duty to secure *maslahah* (public welfare) under *Maqasid al-Shariah* (Dusuki & Abdullah, 2007). Plantation firms that report such conduct are therefore expected to earn investors' trust.

H2: CSR disclosure has a significant positive effect on firm value

Carbon Emission Disclosure and Firm Value

As global investors increasingly decarbonize their portfolios, companies that transparently disclose their carbon footprints should theoretically attract a 'green premium'. Widayanti et al. (2025) find that environmental disclosure is associated with stock returns for both Islamic and conventional banks, suggesting that Islamic-sector investors do respond to environmental transparency. Sudibyo (2018) posits that transparency regarding greenhouse gas emissions and climate-related risks signals preparedness. This view is supported by Sun, Wang & Li (2022), Liu et al. (2025), and Maharani et al. (2024) who found that the act of voluntarily disclosing carbon emission has significant positive impact on firm value. For plantation firms in Indonesia, carbon disclosure also indicates how far a firm complies with a religious norm, since MUI Fatwa No. 86 of 2023 declares uncontrolled deforestation forbidden and urges all parties to reduce their carbon footprint (Majelis Ulama Indonesia, 2023). However in emerging markets where carbon disclosure remains largely voluntary and unstandardized, investor responsiveness to such disclosures may be limited (Choi et al., 2013; Jiang et al., 2021), as the absence of mandatory and uniform reporting standards can undermine the reliability and comparability of disclosed information.

H3: Carbon emission disclosure has a significant positive effect on firm value

The Moderating Role of Good Corporate Governance (GCG)

Good Corporate Governance (GCG) plays an important role in improving corporate transparency and accountability. Strong governance mechanisms ensure that environmental disclosures are not merely symbolic but backed by credible oversight, thereby reducing the probability of greenwashing and increasing investor's confidence in reported environmental information. Nirino et al. (2022) empirically demonstrate that corporate governance acts as a significant moderator in the relationship between corporate social performance and firm outcome, showing that governance mechanisms align managerial decisions with shareholders interests by amplifying the positive effects of environmental and social responsibility practices, resulting in reduced risk and improved firm value. The proportion of independent commissioners is used as a proxy of GCG in this study, following established practice. In emerging market context, Elmanaseer & Gerged (2025) provide robust empirical evidence that governance characteristics significantly strengthen the positive relationship between corporate sustainability disclosure and firm performance, with coercive governance reforms playing a critical role in enhancing this moderating effect. Further supporting the moderating role of governance on CSR-related disclosures, Kuzey et al. (2023) find that sustainability reporting is significantly and positively associated with firm value, and that audit committee independence and expertise positively moderate this relationship, reinforcing the credibility of environmental and sustainability disclosures in the eyes of shareholders. With specific regard to carbon emission disclosure, Hsiao et al. (2024) demonstrate that strong board governance moderates the relationship between carbon emissions and capital market outcomes, mitigating information asymmetry and enhancing the value relevance of firms' environmental transparency signals to investors.

From an Islamic governance perspective, oversight is a form of answerability for what has been entrusted. The Prophet said that every one of you is a shepherd and is responsible for his flock (Sahih al-Bukhari, No. 893; Sahih Muslim, No. 1829), and Islamic corporate governance builds on shura, accountability and transparency while extending the board's duties to stakeholders beyond shareholders (Abu-Tapanjeh, 2009). In Indonesia's two-tier board system, independent commissioners are the closest formal counterpart of this role, so a higher proportion of independent commissioners are expected to make environmental disclosure not only more credible to investors but also more faithful to the firm's obligations of justice (adl) toward affected communities.

H4: Good Corporate Governance moderates the relationship between green accounting and firm value

H5: Good Corporate Governance moderates the relationship between CSR disclosure and firm value

H6: Good Corporate Governance moderates the relationship between carbon emission disclosure and firm value

METHOD

Research Design, Population and Sample Design

This study employs a quantitative explanatory research design using panel data analysis (Creswell & Creswell, 2023). The population consists of all plantation companies listed on the IDX during the 2019–2023 period. Using purposive sampling, the criteria of consistent listing throughout the observation period, complete annual report and sustainability report availability, and submission of PROPER environmental performance data to the Ministry of Environment and Forestry of Indonesia, all qualifying companies were selected, resulting in 96 firm-year observations. To mitigate potential reverse causality, whereby higher firm value may itself induce greater environmental disclosure, a one-year lag structure is adopted: Green Accounting, CSR Disclosure, Carbon Emission Disclosure, and GCG are measured in year t (2019–2022) and matched to firm value in the subsequent year $t+1$ (2020–2023). Secondary data were obtained from companies' annual reports, sustainability reports accessed through the IDX database, and PROPER assessments from the Ministry of Environment and Forestry of the Republic of Indonesia.

Table 1. Selected Sample of Plantation Companies

No.	Code	Company Name
1	AALI	PT Astra Agro Lestari Tbk
2	ANDI	PT Andira Agro Tbk
3	ANJT	PT Austindo Nusantara Jaya Tbk
4	BWPT	PT Eagle High Plantations Jaya Tbk
5	CSRA	PT Cisadane Sawit Raya Tbk
6	DSNG	PT Dharma Satya Nusantara Tbk
7	FAPA	PT FAP Agri Tbk
8	GOLL	PT Golden Plantation Tbk
9	GZCO	PT Gozco Plantation Tbk
10	JAWA	PT Jaya Agra Wattie Tbk
11	LSIP	PT PP London Sumatera Indonesia Tbk
12	MAGP	PT Multi Agro Gemilang Plantation Tbk
13	MGRO	PT Mahkota Group Tbk
14	PALM	PT Provident Agro Tbk
15	PGUN	PT Pradiksi Gunatama Tbk
16	PSGO	PT Palma Serasih Tbk
17	PNGO	PT Pinago Utama Tbk
18	SGRO	PT Sampoerna Agro Tbk
19	SIMP	PT Salim Ivomas Pratama Tbk
20	SMAR	PT Sinar Mas Agro Resources and Technology
21	SSMS	PT Sawit Sumbermas Sarana Tbk
22	TAPG	PT Triputra Agro Persada Tbk
23	TBLA	PT Tuas Baru Lampung Tbk
24	UNSP	PT Bakrie Sumatera Plantations

Variables and Measurement

All variables in this study were measured using secondary data from the resources described above. Independent variables (Green Accounting, CSR Disclosure, Carbon Emission Disclosure) and the moderator (GCG) are measured in year t (2019–2022); firm value is measured in year $t+1$ (2020–2023). The operational definitions of the variables are presented in Table 2.

Table 2. Operational Definitions

Variables	Indicators	Measurement Scale	Primary Source(s)
Firm Value (NP)	PBV Ratio	Price to Book Value	Berk & DeMarzo, 2023

Green Accounting (X_1)	PROPER Rating	Score 1-5 based on environmental performance assessment.	The Ministry of Environment and Forestry of The Republic of Indonesia (2023)
CSR Disclosure (X_2)	Corporate Social Responsibility Disclosure Index (CSRDI)	Σ disclosed CSR items / total CSR disclosure items	Global Reporting Initiative (2021)
Carbon Emission Disclosure (X_3)	Carbon Emission Disclosure Index (CEDI)	Σ disclosed carbon emission items / total carbon disclosure items	Choi et al., 2013
GCG (Z)	Proportion of Independent Commissioners	Number of Independent Commissioners / Total Board Commissioners	Murhadi et al., 2024

Green Accounting is operationalized via the PROPER rating rather than a direct environmental-cost figure because PROPER is Indonesia's official, third-party-audited environmental-performance assessment, issued annually by the Ministry of Environment and Forestry, and prior Indonesian studies (Hutabarat, 2024; Sukmadilaga et al., 2023) similarly use it as a green accounting proxy on the grounds that a firm's audited environmental-compliance rating reflects the underlying environmental costs and management practices that green accounting is intended to capture, in the absence of a standardized, disclosed green-accounting cost figure in Indonesian annual reports. PROPER therefore reflects verified environmental performance, but not the amount of environmental cost incurred or the return expected from it, a distinction that matters for interpreting the results.

Conceptual Framework

Based on the integration of signaling and legitimacy theories, read alongside the Islamic principles discussed above, this study proposes a conceptual model where environmental variables act as independent predictors of firm value, with GCG acting as a moderator variable. The research model, was analyzed using the Structural Equation Modeling (SEM) method via Partial Least Squares (PLS). The visual representation of our conceptual model is shown below.

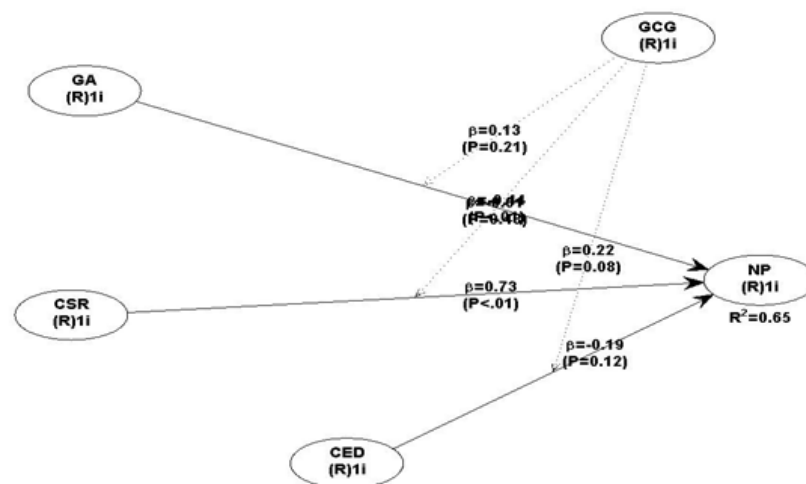


Figure 1. PLS Algorithm

This figure visually represents the research model, in which GCG moderates the effects of green accounting, CSR disclosure, and carbon emission disclosure on firm value. Because each construct is measured by a single indicator, the evaluation focuses on the structural model and its fit indices. The analysis proceeded with a thorough evaluation of the measurement model to confirm its validity and reliability. The results are detailed in the following tables.

Data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) with WarpPLS 7.0. PLS-SEM was selected because the study involves moderating effects and a relatively small sample size. The structural model equation used in this study is as follows:

$$NP = \alpha + \beta_1GA + \beta_2CSR + \beta_3CED + \beta_4(GA*GCG) + \beta_5(CSR*GCG) + \beta_6(CED*GCG) + e$$

Where: NP = Firm Value, GA = Green Accounting, CSR = Corporate Social Responsibility disclosure, CED = Carbon Emission Disclosure, Z = GCG, e = Error term.

RESULTS

Descriptive Statistics

Table 3 presents the descriptive statistics. The mean Green Accounting score of 3.80 indicates high compliance. However, Carbon Emission Disclosure remains low (0.40).

Table 3. Descriptive Statistics

Variable	Min.	Max.	Mean	Std. Dev.
Firm Value	0.45	3.20	1.12	0.55
Green Accounting	3.00	5.00	3.80	0.40
CSR Disclosure	0.25	0.85	0.55	0.15
Carbon Emission Disclosure	0.10	0.90	0.40	0.20
GCG	0.33	0.60	0.42	0.08

Source: Data processed with WarpPLS 7.0 (2025)

Model Fit Evaluation

Table 4. Model Fit & Quality Indices

Indicator	Result
Average Path Coefficient (APC)	0.289 (p=0.018)
Average R-squared (ARS)	0.648 (p=0.001)
Average Adjusted R-squared (AARS)	0.563 (p<0.001)
Average block VIF (AVIF)	2.295 (acceptable <3.3)
Average Full Collinearity (AFVIF)	1.819 (acceptable <3.3)
Tenenhaus GoF (GoF)	0.805 (large effect)
Simpson's Paradox Ratio (SPR)	0.667
R-squared Contribution Ratio (RSCR)	0.922
Statistical Suppression Ratio (SSR)	0.833
Nonlinear Bivariate Causality Direction Ratio (NLBCDR)	0.667

Source: Data processed with WarpPLS 7.0 (2025)

The model fit results indicate acceptable goodness-of-fit. The Average Path Coefficient (APC), Average R-squared (ARS) and Average Adjusted R-squared (AARS) values are statistically significant. The Average block VIF (AVIF) and Average Full Collinearity (AFVIF) values are below the recommended threshold, indicating no multicollinearity problem. Two heuristic fit indices, the Simpson's Paradox Ratio (SPR = 0.667) and the Nonlinear Bivariate Causality Direction Ratio (NLBCDR = 0.667), fall marginally below the conventional 0.70 acceptability benchmark for WarpPLS fit indices, whereas the R-squared Contribution Ratio (RSCR = 0.922) and Statistical Suppression Ratio (SSR = 0.833) both exceed it. An SPR below the ideal threshold indicates that at least one path in the model may be affected by Simpson's paradox, a sign reversal between the bivariate and multivariate association, while a sub-threshold NLBCDR suggests that for one or more relationships the assumed causal direction is not unambiguously supported by the nonlinear structure of the data. Given the moderate sample size and the inclusion of three interaction (moderation) terms in the structural model, both indices are conceivably sensitive to isolated paths, non-significant ones (H3, H4, H5), rather than reflecting a wholesale breakdown of the model. Because SPR and NLBCDR bear directly on the causal and directional integrity of the path estimates, this result is acknowledged as a limitation of the study, and the hypothesis-testing conclusions are interpreted with corresponding caution rather than as definitive evidence of causality.

Table 5 shows $R^2 = 0.648$ which indicates that the model explains approximately 65 percent of the variance in firm value. The remaining 35 percent reflects unobserved determinants, such as firm size, leverage, ownership structure, sub-sector (palm oil, rubber or other plantation crops), crude palm oil price cycles, and governance dimensions beyond board independence, such as ownership concentration and director expertise.

Hypothesis Testing

Table 5. Hypothesis Testing Results

Relationship	Path Coefficient	P value	Conclusion
Green Accounting -> Firm Value	-0.444	0.002	Rejected (Negative)
CSR Disclosure -> Firm Value	0.726	<0.001	Accepted (Positive)
Carbon Emission Disclosure -> Firm Value	-0.191	0.122	Rejected
GCG*GA -> Firm Value	0.135	0.211	Rejected
GCG*CSR Disclosure -> Firm Value	-0.010	0.477	Rejected
GCG*Carbon Emission Disclosure -> Firm Value	0.224	0.084	Rejected
Firm Value: $R^2 = 0.648$ $Q^2 = 0.748$			

Source: Data processed with WarpPLS 7.0 (2025)

DISCUSSION

Beyond statistical significance, the results also reveal meaningful differences in the economic magnitude of the relationships examined. CSR disclosure shows a relatively strong positive effect on firm value ($\beta = 0.726$), while green accounting has a moderate-to-large negative effect ($\beta = -0.444$). Carbon disclosure, although statistically insignificant, still exhibits a small-to-moderate effect ($\beta = -0.191$), rather than a negligible one, which suggests that the effect may not have been sufficiently captured by the available data or statistical power. This finding provides an important nuance to the interpretation of the non-significant result. Rather than indicating that carbon disclosure has no relationship with firm value, the relatively substantial coefficient suggests that the effect may not have been sufficiently captured by the available data or statistical power. Thus, the discussion should consider not only whether the relationship is statistically significant, but also the economic magnitude and possible contextual factors underlying the observed effects.

Contrary to Hypothesis 1 (H1), green accounting exhibits a significant negative effect on firm value ($\beta = -0.444$, $p = 0.002$). This finding indicates that Indonesian capital market participants still tend to perceive environmental expenditures as operational cost burdens that erode short-term profitability rather than as strategic investments that build long-term competitive advantage. From a Signaling Theory perspective, environmental compliance should theoretically convey credible quality signals to investors. However, the negative sign suggests that in an emerging market context, the signal being transmitted is one of cost escalation rather than sustainability commitment. This interpretation is consistent with Jiang et al. (2021), who demonstrated that in markets where ESG literacy remains underdeveloped, environmental expenditure is more likely to trigger negative investor reactions. This finding can also be interpreted through an Islamic finance lens. Green accounting disclosures in Indonesia remain largely narrative, voluntary, and non-standardized, in contrast to the indexed CSR and carbon emission measures used in this study. This lack of standardization introduces a form of informational ambiguity that closely resembles *gharar* (excessive uncertainty) in Islamic transactional ethics. Mohd Noh et al. (2025), in a systematic review of *gharar* in modern Islamic finance transactions, note that *gharar* arises specifically where the value, outcome, or verifiability of a disclosed item is unclear, and that enhanced transparency and standardization are the primary mechanisms through which this uncertainty can be reduced. Unlike CSR spending, which may provide relatively immediate and visible benefits through stronger community relations and reduced reputational risk, green accounting expenditures often involve substantial and recurring investments, such as peatland rewetting, land rehabilitation, and environmental improvements required under PROPER. The economic benefits of these investments are generally less visible in the short term and may only materialize over a longer period through reduced environmental risks, regulatory compliance, and improved operational sustainability. This difference in

the visibility and timing of benefits may help explain the contrasting market responses. Investors may perceive green accounting expenditures as immediate costs with uncertain or delayed financial returns, whereas CSR disclosure can serve as a more readily observable signal of the firm's social and environmental commitment. Thus, the negative market response to green accounting expenditure does not necessarily imply that investors disregard environmental responsibility; rather, it may reflect concerns about the timing, measurability, and financial returns associated with these investments. Applied here, investors may be unable to distinguish genuine environmental investment with future payoff from routine compliance expenditure, and in the presence of this ambiguity, the market appears to default to a conservative, cost-focused interpretation rather than an optimistic, signal-based one. Viewed this way, the negative coefficient may reflect a rational, uncertainty-averse response to disclosure that is not yet sufficiently standardized or independently verified to be treated as a credible signal, rather than investor short-sightedness, a gap that mandatory, audited green accounting standards could help. Unverified environmental claims priced at a premium would resemble the speculative, unearned gain *maysir* prohibits, so the market's current discount reads as a principled refusal to price an unverifiable claim, not a rejection of environmental stewardship.

Plantation companies in Indonesia face particularly high environmental compliance costs due to regulatory requirements associated with PROPER assessments, land management obligations, and peat conservation mandates, while the benefits of these expenditures materialize slowly. When these costs are disclosed transparently through green accounting practices, profit-oriented investors may penalize firms for reduced earnings capacity in the near term. This reflects a market maturity gap. This reflects a market maturity gap, in line with Hutabarat (2024) and Sukmadilaga et al. (2023), who reported insignificant or negative green accounting effects in similar emerging market settings, and with Cai et al. (2023), who noted that environmental disclosure effects are highly context-dependent. Islamic teaching takes a far longer view of such investment. The Prophet counted a planted tree as charity whenever a person, bird, or animal eats from it (Sahih al-Bukhari, No. 2320; Sahih Muslim, No. 1553) and urged a person holding a palm shoot to plant it even if the Hour were about to come (Al-Adab al-Mufrad, No. 479), while the Qur'an asks people not to forget their share of this world yet forbids them to seek corruption in the land (Qur'an 28:77). The result therefore does not imply that green accounting is economically undesirable; it shows that the market's horizon is shorter than the horizon over which environmental investment pays off.

In line with the Hypothesis 2 (H2) CSR Disclosure exerts a strong and significant positive effect on firm value ($\beta = 0.726$, $p < 0.001$), confirming Hypothesis 2. The stronger effect of CSR ($\beta = 0.726$), compared with green accounting ($\beta = -0.444$), suggests that investors may place greater value on corporate activities that directly address stakeholder concerns. This is particularly relevant in the plantation sector, where companies operate in environments characterized by land-use conflicts, community concerns, indigenous rights, and increasing sustainability requirements in international markets. From a stakeholder perspective, CSR can help firms maintain positive relationships with communities and other key stakeholders, which may reduce social and reputational risks that could otherwise disrupt operations. CSR disclosure can also provide investors with a visible signal of how the company manages these stakeholder relationships.

In contrast, green accounting expenditures often require substantial and recurring investments, while their financial benefits may be less visible in the short term. Activities such as peatland rewetting, land rehabilitation and other environmental improvements may reduce long-term environmental and regulatory risks, but these benefits are not always immediately reflected in financial performance. The negative coefficient for green accounting therefore may not indicate that investors are opposed to environmental initiatives. Rather, it may suggest that investors distinguish between environmental expenditures that represent immediate financial costs and CSR activities whose benefits, particularly in terms of stakeholder relations and reputational protection, are more readily observable. This distinction provides a possible explanation for why CSR has a stronger positive association with firm value than green accounting in the plantation sector. This verdict is grounded in both Stakeholder Theory and Legitimacy Theory. Plantation companies operate in a sensitive socio-environmental context because their activities involve land use, community displacement risks, and reputational exposure to global advocacy networks. Robust CSR disclosure functions as a legitimacy signal that demonstrates corporate commitment to the welfare of local communities, indigenous populations, and environmental stewards,

thereby reducing the likelihood of operational disruptions and social conflict that could otherwise translate into financial losses.

The CSR result also has an Islamic social justice dimension. Plantation operations depend on large rural workforces and on land used or claimed by surrounding communities, who are the first to suffer from the haze of land and forest fires, burning that MUI has declared forbidden where it harms others (Majelis Ulama Indonesia, 2016). CSR disclosure covering community development, land-use consultation, benefit-sharing and worker welfare can therefore be read as a visible expression of *adl* and of the objective of *maslahah* in *Maqasid al-Shariah* (Dusuki & Abdullah, 2007). The strong CSR coefficient is consistent with a market that rewards such justice-related conduct, but the data cannot separate this mechanism from the legitimacy-based explanation, since the CSR index does not distinguish worker-related from community-related items..

This finding resonates strongly with the work of Nguyen (2025) and Tsang et al. (2024), who documented a consistent positive relationship between nonfinancial CSR reporting and market valuation across diverse international samples. Furthermore, Wang (2024) demonstrates that companies with voluntary CSR disclosures receive significantly stronger market reactions to major corporate events such as acquisitions, indicating that CSR reporting reduces information asymmetry and improves investor confidence in management quality. The stark contrast between the negative green accounting coefficient and the strongly positive CSR coefficient in this study is theoretically noteworthy: it suggests that investors distinguish meaningfully between cost-intensive environmental compliance activities (green accounting) and the broader relational and reputational capital built through CSR engagement. This divergence underscores the importance of disaggregating ESG constructs in empirical research rather than treating them as a homogeneous index.

The divergent results also raise the question of how the three dimensions interact. They may be complementary, if CSR reporting shows investors how environmental spending protects the firm's relationship with surrounding communities and so makes its value easier to see; in that case the discount on green accounting should be smaller where CSR disclosure is stronger. They may also act as substitutes, if firms with visible CSR programs face less pressure to report carbon information in detail. The model does not include interaction terms between disclosure dimensions, because with 96 observations and three moderation terms already estimated, further interactions would reduce statistical power and raise collinearity, so these conditional effects are left to studies with larger samples.

The direct relationship between Carbon Emission Disclosure and firm value is not statistically significant ($\beta = -0.191$, $p = 0.122$), leading to the rejection of Hypothesis 3 (H3). This result indicates that standalone carbon disclosure, absent supporting institutional mechanisms, does not generate a measurable premium in Indonesia's plantation equity market. Several interconnected explanations are warranted. The first is the early stage of carbon disclosure in Indonesia. During the sample period there was no mandatory and standardized climate disclosure framework; the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) have since been incorporated into IFRS S2 (International Sustainability Standards Board, 2023), adopted in Indonesia as PSPK 2 for annual reporting periods beginning on or after 1 January 2027 (Dewan Standar Keberlanjutan Ikatan Akuntan Indonesia, 2025). In this voluntary environment, the comparability and reliability of carbon disclosures varied widely, and the mean CEDI of 0.40 indicates that firms disclose, on average, less than half of the index items. The second explanation is the absence of a carbon price. The carbon tax introduced by Law No. 7 of 2021 had not yet been applied, and the carbon exchange (IDXCarbon) only opened on 26 September 2023 under OJK Regulation No. 14 of 2023. Without a price, emissions had no direct consequence for plantation firms' cash flows, whereas investors in the United States already demand a premium for carbon risk in anticipation of climate policy (Bolton & Kacperczyk, 2021). Carbon information may therefore need to be complemented by pricing and regulation before it becomes value-relevant.

However, the standard deviation of 0.20 and the relatively wide range of CEDI scores (0.10–0.90) indicate meaningful differences in disclosure practices across firms. This suggests that the non-significant finding cannot be explained solely by firms clustering at a very low level of disclosure. It is therefore possible that both the extent and the perceived credibility of carbon information influence how investors respond to it. This interpretation cannot be directly tested within the current analysis and

recommend that future research examine the issue more closely, for example by comparing firms with high and low levels of carbon disclosure.

These findings are consistent with Choi et al. (2013), who argued that the value relevance of carbon disclosure is contingent upon the institutional and regulatory environment in which it occurs, and with Jiang et al. (2021), who showed that in BRIC economies carbon disclosure effects are weaker relative to developed markets. With PSPK 2, an operating carbon exchange, and MUI's 2023 fatwa on climate change, the information environment after the sample period differs markedly, and the same test on more recent data may yield a different result.

The moderation analysis provides evidence that the role of Good Corporate Governance (GCG) in the relationship between Carbon Emission Disclosure (CED) and firm value is positive, although the effect is not statistically significant at the conventional 5% level ($\beta = 0.224$; $p = 0.084$). Therefore, H6 is not supported at the 5% significance level. Nevertheless, the positive coefficient suggests that a higher proportion of independent commissioners tend to strengthen the value relevance of carbon emission disclosure. This finding indicates that independent board oversight may enhance the credibility of environmental information and increase its potential relevance to investors, although the evidence is not sufficiently strong to establish a statistically significant moderating effect. This positive direction is consistent with the findings of Hsiao et al. (2024), who found that board governance characteristics, including board independence, can mitigate the adverse information effects associated with carbon emissions. Their study shows that stronger board governance can reduce the information problems arising from carbon-related environmental risks. Although their dependent variable is analyst forecast errors rather than firm value, the underlying mechanism is relevant: effective board oversight can improve the credibility and usefulness of environmental information to external stakeholders.

Furthermore, the finding is supported conceptually by Kuzey et al. (2023), who reported that audit committee independence and expertise strengthen the value relevance of sustainability reporting. Their findings indicate that investors attach greater value to sustainability information when stronger governance mechanisms are present, because such mechanisms can enhance the credibility of corporate disclosures and reduce information asymmetry.

However, the non-significant result at the 5% level suggests that the presence of independent commissioners alone may not be sufficient to significantly enhance the effect of CED on firm value. The effectiveness of independent commissioners may depend on their actual involvement in monitoring, environmental expertise, access to reliable carbon information, and the broader quality of the company's governance system. Thus, board independence in terms of formal composition does not necessarily translate into effective oversight of climate-related disclosure. This may explain why the interaction coefficient is positive but fails to reach conventional statistical significance.

This reading can also be framed through Islamic governance ethics. Board independence captures only the formal dimension of oversight. The hadith of the shepherd places responsibility on whoever holds authority (Sahih al-Bukhari, No. 893), and shura requires genuine deliberation with those affected by corporate decisions, so what matters is whether commissioners actually examine environmental and carbon reporting, not merely how many of them are independent. This may help explain why the interaction effect is positive but not significant ($\beta = 0.224$; $p = 0.084$), although the explanation is interpretive and is not tested in the present model.

Conversely, GCG does not significantly moderate the green accounting–firm value relationship (H4: $\beta = 0.135$, $p = 0.211$) or the CSR Disclosure and firm value relationship (H5: $\beta = -0.010$, $p = 0.477$). The non-significant moderation for green accounting may reflect the fact that environmental compliance cost, remain visible to the market as direct earnings diluters, and governance structures cannot alter investors' cost-focused interpretation of this expenditure. For CSR Disclosure, the lack of moderation may stem from CSR's already strong direct valuation effect: when CSR disclosure is inherently credible and value-enhancing, governance oversight may not provide incremental legitimacy beyond what is already reflected in the market's response to the disclosure itself. These differential moderation outcomes are theoretically important because they challenge the assumption that governance uniformly amplifies all types of environmental disclosure, and instead suggest that governance adds the most value precisely where disclosure credibility is most contested, in this study, voluntary and unstandardized carbon reporting.

Two further Islamic perspectives are relevant to these results. First, the concept of *halalan thayyiban* (lawful and wholesome) extends beyond the permissibility of ingredients to ethical and non-harmful production. Halal certification in Indonesia, regulated under Law No. 33 of 2014 on Halal Product Assurance, now applies to a widening range of products, and plantation commodities such as palm oil enter food and cosmetic supply chains. Environmental practices upstream, such as land clearing, peat management and emissions, may therefore increasingly be read as part of the *thayyib* dimension, and credible environmental disclosure may support a firm's claim to responsible stewardship. This study does not measure halal certification or sustainability certification such as ISPO or RSPO, so this link remains a conjecture for future work.

Second, Muslim investors and Islamic financial institutions may weigh environmental disclosure against Sharia-specific credibility criteria (Widayanti et al., 2025). Sharia stock screening in Indonesia, which governs inclusion in the Sharia Securities List and in indices such as ISSI and JII, rests on business activities and financial ratios and does not yet assess environmental conduct, while Islamic banks that finance plantations are bound by the sustainable finance obligations of OJK Regulation No. 51 of 2017. Whether firms seen as responsible stewards earn a premium from these investors, and whether Sharia compliance moderates the relationship between environmental disclosure and firm value, remains an open empirical question, since the present data do not identify investor type or Sharia-compliance status.

The findings also carry implications for sustainable finance. For ESG integration, they suggest that investors in emerging markets reward visible social disclosure but do not yet price environmental performance. For green financial products, the discount on environmental spending points to instruments that tie funding to verified outcomes: corporate green bonds are followed by positive stock market reactions and better environmental performance, particularly when independently certified (Flammer, 2021). Indonesia issued the world's first sovereign green sukuk in 2018 (Musari & El-Khamlichi, 2025), and corporate green sukuk or Sharia-compliant sustainability-linked financing could fund peatland restoration, replanting, and methane capture from palm oil mill effluent, with use-of-proceeds and impact reports supplying the verifiable link between spending and outcomes that the market currently lacks. In terms of the Sustainable Development Goals, CSR disclosure relates to SDG 12 (responsible consumption and production), carbon disclosure to SDG 13 (climate action), and the land, peat, and biodiversity practices assessed by PROPER to SDG 15 (life on land); the market appears to reward the social side of SDG 12 more than SDG 13 and SDG 15, whose benefits accrue over a longer period.

CONCLUSION

This study investigates the effect of Green Accounting, CSR Disclosure, and Carbon Emission Disclosure on firm value in Indonesia's plantation sector listed on the Indonesia Stock Exchange from 2019 to 2023, with Good Corporate Governance as a moderating variable. Using PLS-SEM via WarpPLS 7.0 and a one-year lag structure to address potential reverse causality, the findings produce three principal conclusions.

First, Green Accounting negatively and significantly affects firm value, suggesting that in Indonesia's emerging capital market, investors continue to interpret environmental compliance expenditures as short-term cost burdens when their long-term value is not reported. Second, CSR Disclosure exerts the strongest positive and significant effect on firm value, affirming that disclosure addressing communities and workers strengthens corporate legitimacy and translates into market rewards. Third, Carbon Emission Disclosure does not independently influence firm value, and the positive but non-significant moderating effect of Good Corporate Governance (GCG) suggests tentatively that institutional credibility, carbon pricing, and mandatory standards may be needed for carbon signals to be priced. Read through Islamic principles, the market rewards stewardship that is made clear and verifiable, in line with the Prophetic teaching that blessing follows truthful and clear disclosure.

This study is subject to several limitations. First, the final sample of 96 firm-year observations, though methodologically adequate for PLS-SEM estimation (Hair et al., 2022a; Ringle et al., 2023), is relatively small in absolute terms; it constrains the statistical power available to detect smaller-magnitude effects and precludes more subgroup analyses (e.g., by firm size, ownership structure, or Sharia-compliance status) and interaction terms between disclosure dimensions. Second, the sample is restricted

to plantation companies listed on the Indonesia Stock Exchange between 2019 and 2023, before the carbon exchange opened and before PSPK 2 was issued, which limits the generalizability of the findings to later periods, unlisted firms, and other sectors. Third, GCG is proxied solely by the proportion of independent commissioners, which does not capture audit committee expertise, ownership concentration, or sustainability committees. The study also does not measure halal certification, sustainability certification (e.g., ISPO, RSPO), investor type, or the Islamic governance dimensions of shura and adl, so the Islamic interpretations remain conceptual. Future research should use larger, multi-sector or multi-country (e.g., ASEAN) panels, test whether Sharia-compliance status or Islamic institutional ownership moderates the relationships identified here, examine interactions among disclosure dimensions, and cover the period after 2023.

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AUTHOR CONTRIBUTION STATEMENT

Minda Muliana Sebayang contributed to the research conceptualization, theoretical framework development, and manuscript preparation. Thezar Fiqih Hidayat Hasibuan contributed to the research methodology, data analysis, and interpretation of empirical findings. Asnath Naftali Remtulla contributed to the literature review, theoretical analysis, and critical evaluation of the research findings. Suchi Fitriyani contributed to data collection, data organization, and manuscript development. Muhammad Sufian contributed to the discussion of research implications, manuscript review, and editorial refinement. All authors participated in reviewing the manuscript and approved the final version for publication.

AI DISCLOSURE STATEMENT

The authors acknowledge the importance of transparency and academic integrity in the preparation of scholarly publications. Any use of artificial intelligence (AI)-assisted tools during manuscript preparation, if applicable, was limited to supporting language refinement, grammatical correction, and editorial improvements. The research conceptualization, data collection, statistical analysis, interpretation of findings, and scientific conclusions remain the responsibility of the authors. All authors take full responsibility for the accuracy, originality, and integrity of the published content.

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CONFLICTS OF INTEREST

The authors declare that no conflicts of interest have been identified in relation to the research presented in this article. The study examines the relationships between green accounting, corporate social responsibility disclosure, carbon emission disclosure, good corporate governance, and firm value using secondary corporate data. The authors affirm their commitment to maintaining objectivity, scientific integrity, and independence in the research process, data analysis, interpretation of findings, and presentation of conclusions.

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