

The Effect of Green Accounting, Environmental Performance, Independent Commissioner, and Firm Size on Firm Value: Evidence from Basic Materials Sector Companies Listed on the Indonesia Stock Exchange (2021-2024)

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Abstract

This study was motivated by the inconsistencies in the results of previous studies and the phenomenon of declining firm value in the basic materials sector. The analysis focuses on assessing the extent to which green accounting implementation, environmental performance, board independence represented by independent commissioners, and firm size influence firm value. Employing a quantitative approach, this study relies exclusively on secondary information extracted from annual reports, sustainability reports, and PROPER environmental assessment reports covering the 2021–2024 period. Sample selection followed a purposive sampling strategy, producing a balanced panel dataset consisting of 24 publicly listed firms and 96 firm-year observations. The proposed relationships were examined using panel data regression estimated through the Fixed Effects Model (FEM). The findings suggest that neither green accounting, environmental performance, nor board independence exerts a statistically meaningful influence on firm value. In contrast, firm size is found to be negatively associated with firm value.

INTRODUCTION

The concept of firm value refers to the market perception of a company's overall economic performance, which is shaped by its ability to produce sustainable future cash flows and enhance shareholder prosperity (Nguyen & Phan, 2026). One of the principal goals pursued by corporate managers is the maximization of firm value, since this objective is closely tied to shareholder wealth maximization and long-term financial sustainability (Butt et al., 2023). Investors frequently rely on firm value as an essential measure when assessing a company's long-term growth opportunities and overall business prospects. However, this assessment is not entirely objective, as it is influenced by both fundamental factors and investor behavior itself (Atawnah et al., 2024; Ding et al., 2022; Fosu et al., 2016). Optimizing firm value is meaningful only if market responds appropriately to the company's performance and positive prospects. Therefore, companies need to communicate this information to external parties, drawing upon the signaling theory formulated by Spence (1973), which emphasizes the importance of conveying relevant information from the sender to the receiver. Connelly et al. (2011) note that this theory serves to minimize information asymmetry between the two parties through three core components: the signaler (management), signals (corporate information), and receiver (investors).

Tobin's Q has become one of the most commonly employed indicators for assessing market value, as it assesses a company's performance from the perspective of investors direct market valuation (Hapsari et al., 2025). This indicator is considered highly informative because it

can comprehensively assess a company's value by linking market data, management efficiency, and investment strategies (Saraswati et al., 2024). Companies release various types of information both financial and non-financial which are used as a signal to influence investors' decision. Under Indonesia's regulatory framework, this transparency is mandated by Financial Services Authority Regulation (POJK) No.29/POJK.24/2016, which requires issuers to publish annual reports as a form of accountability (Otoritas Jasa Keuangan, 2016). The paradigm shift toward greater transparency in the areas of the environment, social issues, and corporate governance is also reflected in OJK Regulation No. 51/POJK.03/2017 for implementing sustainable finance, which makes reporting on environmental responsibility mandatory rather than voluntary (Otoritas Jasa Keuangan, 2017).

However, strict regulations and market demands have not yet been fully reconciled with empirical performance, particularly among publicly listed firms engaged in the basic materials industry. The phenomenon of declining enterprise value, reflected in falling stock prices, was significant. In the cement subsector, PT Indocement Tunggul Prakarsa Tbk (INTP) recorded the sharpest price decline in 2023 at 10.68%, followed by PT Semen Baturaja Tbk (SMBR) at 8.25% and PT Semen Indonesia Tbk (SMGR) at 6.08%, which was attributable to financial performance weighed down by high operating costs (Bloombergtechnoz, 2023). This negative trend is consistent with the general weakness in the commodities sector, which contracted by 4.32% in early 2024 (Indopremier, 2024; Republik News, 2023), where structural pressures such as oversupply are severely eroding profit margins (CNBC Indonesia, 2024). A similar phenomenon has affected the metals subsector, where the stock price of PT Aneka Tambang Tbk (ANTM) has steadily declined from 1,985 rupiah in 2022 to around 1,525 rupiah in 2024. This decline in profitability resulted from global commodity price fluctuations, macroeconomic uncertainty, and a rise in operating costs, which together sent negative signals and undermined investor confidence (Indonesian Mining Association, 2024; Liputan 6, 2023; Market Bisnis, 2024).

Various recent studies have sought to identify the key factors that influence fluctuations in corporate value, particularly in relation to environmental and governance aspects. The first key factor is green accounting, according to Sukmadilaga et al. (2023) and Kurnia et al. (2020), is a financial reporting framework that extends beyond financial information by incorporating non-financial dimensions incorporates the environmental costs and benefits arising from a company's operational activities into its financial statements. By providing this information, companies seek to balance financial achievements with their environmental commitments, as it is used to support operational activities while highlighting the costs and risks that are expected to contribute to an increase in firm value (Maama & Gani, 2022). According to signaling theory, environmental information that is presented transparently can strengthen stakeholders' confidence by conveying favorable information about the company's future prospects, thereby encouraging them to invest (Lestari & Restuningdiah, 2021; Ratmono et al., 2023). Anggita et al. (2024) have demonstrated that greater adoption of green accounting is associated with a statistically meaningful improvement in increasing corporate value, which demonstrates that the transparent recognition of environmental expenditures in corporate disclosures reflects an organization's commitment to ecological stewardship

Attention is also focused on the second factor, namely environmental performance, which essentially reflects an entity's genuine commitment to managing aspects of environmental sustainability and mitigating the negative impacts of its operational activities (Majidah & Aryanty, 2022). Variations in environmental performance communicate valuable information to capital

market participants, which may shape investors' perceptions and ultimately influence a firm's market valuation. Accordingly, transparent disclosure of sustainability-related initiatives functions as a credible mechanism for reducing information asymmetry between companies and external stakeholders (Khanifah et al., 2020). These findings are based on an assessment of environmental performance conducted through the PROPER mechanism. Wahidahwati & Ardini (2021) state that stronger environmental performance is associated with a statistically significant increase in firm value. A company's participation in PROPER is positioned to attract investor attention, and such participation adds value to the company's public reputation as well as to the products and services it produces. The current results reinforce the evidence presented by (Sari & Sutopo, 2023), a firm's environmental achievements provide credible evidence of its commitment to sustainable development, allowing market participants to form more favorable expectations regarding its future performance.

From the perspective of corporate governance and firm characteristics, the next factor relates to the proportion of independent commissioner. An independent commissioner is an external party who oversees management and provides objective advice to managers, without being bound by any financial, shareholding, managerial, family, or other ties and free from any conflicts of interest or ties to internal or external parties (Islahuddin & Diantimala, 2026; Napitupulu et al., 2023). A firm value can increase, in part due to the involvement of independent commissioner in reinforcing decision-making practices that safeguard shareholders' interests (Putri Halimah et al., 2025). This increase occurs because an adequate proportion of independent commissioner reflects good governance and oversight, thereby sending a positive signal to investors (Wijaya, 2025). The study by Van Khanh et al. (2020) explains that board independence contributes positively to firm value in Vietnam, as evidenced by the fact that a high proportion of independent members can mitigate divergent managerial and shareholder objectives, resulting in more robust corporate oversight. In Indonesia's two-tier board structure, this function is performed by independent commissioners, consistent with the findings of (Umairoh et al., 2025) companies with stronger board independence tend to exhibit higher market valuations.

In addition, company size is a measurement scale that classifies companies into three categories: large, medium, and small (Hutauruk, 2024). These categories can be based on several factors, with total assets serving as one of its primary indicators (Ahmed et al., 2023; Bodjongo et al., 2023). According to signaling theory, larger enterprises command wider financing opportunities and external funding, which attracts investors and send a positive signal that increases the company's value (Kammagi & Veny, 2023). This statement is supported by the findings of studies by Zahra & NR (2024), which indicate that there is a positive relationship between firm size and firm value. A large firm size enables the achievement of economies of scale, thereby reducing costs per unit and improving the efficiency of the firm's operations.

There is a research gap in the existing literature both empirical and theoretical. A study by Fernando et al. (2024) found that the allocation of resources to green accounting has no significant impact on firm value. This is confirmed by a study by Avelyn & Syofyan (2023), which concludes that environmental performance assessments have not yet proven to be relevant indicators for influencing stock prices. This inconsistency also extends to internal governance mechanisms, with Dwi Astuti et al. (2022) demonstrate that the presence of independent board members generally serves only to meet regulatory requirements, without having a noticeable impact on investor valuation. Br Aritonang et al. (2025) confirm that company size has no significant impact on market value. These differing results suggest that the response to external and internal information

signals is related to structural complexity. This is supported by the fact that previous studies often focused on stable industries without taking into account the crisis conditions, structural pressures, and cost fluctuations that the commodities sector faced in the post-pandemic period.

Given the conflict results of previous studies and the complexity of this market phenomenon, this study introduces a novel approach by integrating external resilience variables green accounting, environmental performance, independent commissioner, and firm size into a single comprehensive model, with a specific focus on basic materials firms listed on the Indonesia Stock Exchange throughout 2021–2024. To address this gap, this study aims to examine and identify descriptive statistics for all observed variables and to conduct an empirical investigation of these variables both simultaneously and individually. Through this research question, the study seeks to make a conceptual contribution by extending the application of signaling theory to companies in the basic materials sector that face the tension between creating corporate value and complying with environmental sustainability regulations.

METHODS

The research follows a quantitative paradigm by integrating descriptive assessment with explanatory analysis to empirically test hypotheses based on secondary data. A deductive approach was chosen to confirm existing theories regarding the effects of green accounting, environmental performance, independent board members, and company size on firm value. All firms categorized within the basic materials industry and listed on the Indonesia Stock Exchange during the 2021–2024 timeframe constituted the study sample. This study employs a non-contrived or field study as its research framework, meaning that events unfold naturally without intervention by the researchers. Secondary data were compiled from annual reports and sustainability reports available on the official IDX websites, as well as from PROPER assessment records provided by the Ministry of Environment and Forestry (KLHK).

The study subjects were selected through a targeted sampling process to ensure that the collected data were relevant, appropriate, and suitable for achieving the research objectives. The selection criteria were defined as follows: (1) Companies in the basic materials sector that were continuously listed on the Indonesia Stock Exchange (IDX) during the observation period of 2021–2024; (2) Companies maintaining uninterrupted sustainability reporting throughout the study period; (3) Companies that continuously evaluated under the PROPER program during the same years. Based on these selection criteria, 27 companies were selected as the initial sample. By combining cross sectional and time series data over four years, this study yielded 108 observations. After excluding eight outliers from the data of three companies, the final sample comprised 96 observations from 24 companies.

The data were accurately measured using ratio, nominal, and ordinal scales that capture the relevant variables. The study measured firm value through Tobin's Q, a market-oriented valuation metric that relates the combined market value of equity and liabilities to the accounting value of total assets. The independent variables are as follows: green accounting measured using a dummy variable, where a value of 1 represents companies that disclose environmental costs such as environmental operating costs, product recycling costs, and research and development costs and a value of 0 represents those that do not. Environmental performance is measured using an ordinal scale based on the PROPER color rating. The number of independent commissioner members is measured as the percentage of independent supervisory board members relative to the total

number of supervisory board members. Last, firm size is measured using the natural logarithm (Ln) of total assets.

In analyzing the data, this study relies on a panel data regression analysis that combine time-series data from 2021 to 2024 with cross-sectional data from the 24 companies in the sample. The choice of this regression method is based on the characteristics of the observational data, which were collected over several years and encompass many companies simultaneously. All data processing steps were performed using Eviews 13 software. The data analysis included descriptive statistical analyses, tests of classical assumptions with a focus on multicollinearity and heteroscedasticity and tests to determine the best estimation model for the panel data regression. In addition, hypothesis tests were conducted using simultaneous significance tests (F-test), partial significance tests (t-test), and an analysis of the coefficient of determination to draw comprehensive conclusions regarding the research question.

RESULTS AND DISCUSSION

Descriptive Statistical Analysis

Table 1. Result of Descriptive Statistics

Variable	Mean	Maximum	Minimum	Std. Deviation
Firm Value	.998750	2.010000	.370000	.340511
Green Accounting	.864583	1.000000	.000000	.343964
Environmental Performance	3.500000	5.000000	2.000000	.807856
Independent Commissioner	.449688	.750000	.250000	.127159
Firm Size	9.212500	12.16000	6.760000	1.509485

Source: Eviews 13 Output (2026)

The result of the descriptive statistical analysis show that the firm value has an mean of 0.998 indicating a sustained shift from overvaluation at the beginning of the period to undervaluation toward the end of the period. The majority of companies (86%) reported environmental costs in their reports (mode = 1), and the “Blue PROPER” rating dominated environmental performance assessments (60%). By contrast, the proportion of independent supervisory board members and company size tended to remain stable, although a moderate upward trend was observed throughout the entire observation period.

Classical Assumptions Test

According to the guidelines for panel data regression, the required and commonly performed tests of classical assumptions consist of only two main tests: the multicollinearity test and heteroscedasticity test (Basuki, 2021). In this study, green accounting is abbreviated as GA, environmental performance as EP, independent commissioners as IC, and firm size as FS.

Table 2. Result Multicollinearity Test

	GA	EP	IC	FS
GA	1.000000	-.094704	.013462	-.037050
EP	-.094704	1.000000	-.057895	.539934
IC	.013462	-.057895	1.000000	.019621
FS	-.037050	.539934	.019621	1.000000

Source: Eviews 13 Output (2026)

Based on the table 1, it can be seen that all correlation coefficients between the independent variables are relatively low, specifically below 0.54. These values are well below the multicollinearity threshold of 0.85. Therefore, it can be concluded that the data in this study show no signs of multicollinearity.

Table 3. Result Heteroscedasity Test

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	.123309	.092073	1.339253	.1838
GA	.004162	.034643	.120139	.9046
EP	.044975	.017569	2.559943	.0121
IC	-.001208	.093604	-.012902	.9897
FS	-.016081	.009353	-1.719278	.0890

Source: Eviews 13 Output (2026)

Table 3 shows that the environmental performance variable has a p-value of 0.0121, which is below 0.05, indicating that the model exhibits heteroscedasticity. To address this, the model estimation was repeated using the Robust Standard Error Method with the White-Diagonal approach. The signs of heteroscedasticity were successfully eliminated, so the resulting parameter estimates and probability values are unbiased and reliable and can serve as a basis for conclusions.

Panel Data Regression Equation

Based on the results of the Chow test and the Hausman test, the Fixed Effect Model (FEM) was determined to be the most appropriate approach for estimating panel data regression in this study. The model estimates were adjusted using the Robust Standard Error Method with the White-Diagonal to address the findings of heteroscedasticity.

Table 4. Result Panel Data Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.692954	1.825722	3.118194	.0027
GA	-.227397	.117406	-1.936846	.0569
EP	-.139173	.071266	-1.952870	.0550
IC	.129688	.329548	.393534	.6952
FS	.441662	.201268	-2.194405	.0316

Source: Eviews 13 Output (2026)

The panel data regression equation, based on the results of the regression analysis, is formulated as follows:

$$FV = 5.692954 + -0.227397 \text{ GA} + -0.139173 \text{ EP} + 0.129688 \text{ IC} + -0.441662 \text{ FS} + e$$

The constant value of 5.692954 indicates that if all independent variables are set to zero, the firm's value in the raw materials sector will be 5.692954. In addition, the green accounting variable shows a negative coefficient of -0.227397, meaning that every one-unit increase in environmental cost disclosure is followed by a 0.227397 decrease in firm value. Similar negative trends are also shown by the environmental performance and firm size variables, with coefficients of -0.139173 and -0.441662, respectively. On the other hand, the independent commissioner variable shows a positive effect with a coefficient of 0.129688, indicating that a one-unit increase in the proportion of independent directors contributes to a 0.129688 increase in firm value, assuming all other variables in the model remain constant.

Coefficient of Determination (R^2)

Table 5. Result Coefficient of Determination

R-squared	.721062
Adjusted R-squared	.610307

Source: Eviews 13 Output (2026)

Table 5 shows that Adjusted R-Squared value is 0.610307, which means that 61.03% of the variation in the firm value variable can be explained by the variables green accounting, environmental performance, independent commissioner, and firm size. The remaining 38.97%, however, can be explained by other variables outside the scope of this study model.

F-test

Tabel 6. Result F-test

F-statistic	6.510442
Prob (F-statistic)	0.000000

Source: Eviews 13 Output (2026)

This finding is based on the probability value of the F-statistic, which is < 0.05 , indicating that the independent variables simultaneously influence the dependent variable. Table 6 shows that the probability value of the F-statistic is 0.000000, which is less than 0.5. This suggests that the variables green accounting, environmental performance, independent commissioner, and firm size all have a significant influence on firm value.

T-test

Hypothesis testing using the t-test was evaluated by comparing the p-values of each independent variable at a significance level of 0.05. Based on the estimation results in Table 4, the variables green accounting, and environmental performance have probability values of 0.0569 and 0.0550, respectively ($p > 0.05$), indicating that these two environmental factors do not have a significant impact on firm value. Similar results were observed for the proportion of independent commissioner had no significant impact on firm value, with a probability value of 0.6952 ($p > 0.05$). In contrast, the analysis of the firm size variable yielded a probability value of 0.0316 ($p < 0.05$) with a negative regression coefficient. These results indicate that firm size has a negative and significant impact on changes in firm value in the raw materials sector.

DISCUSSION

The Effect of Green Accounting on Firm Value

The fact that green accounting has no significant impact on corporate value suggests that the market does not yet view the disclosure of environmental costs as a positive signal. Although the level of disclosure of environmental costs in the basic materials sector is relatively high, investors tend to view these costs as a normal and inevitable consequence of operations. This result stands in direct contradiction to the assumptions of signaling theory as presented in the existing literature (Astuti & Ahmar, 2025; Zhang et al., 2023), transparency regarding environmental costs should foster stakeholder trust. However, these results are fully consistent with the findings of Fernando et al. (2024), this shows that investors place greater emphasis on financial information in annual reports than on sustainability reports. This situation suggests than

the signals being conveyed are not yet strong enough to elicit a market response, as disclosure remains voluntary and the information is therefore still limited.

The Effect of Environmental Performance on Firm Value

Environmental performance achievements have been shown to have no impact on a company's value. This contradicts the expectations of Signaling Theory, which posits that achieving a good PROPER rating will increase a company's value in the eyes of investors (Hapsoro & Adyaksana, 2020). These research findings further supported by Avelyn & Syofyan (2023) which concluded that the PROPER rating instrument has not yet been able to explain the variability in corporate value, as the rating is considered to reflect only regulatory compliance and is insufficient to guarantee a rise in stock prices. This is because investors still prioritize financial performance indicators in their investment decision-making processes, causing the market to fail to respond consistently to sustainability signals.

The Effect of Independent Commissioner on Firm Value

Independent commissioner do not have a significant impact in firm value. Information regarding the composition of independent commissioner has not yet been recognized by the market as a strong indicator in determining firm value. This contradicts signaling theory, which states that an adequate proportion of independent commissioner can increase investor confidence and firm value (Wijaya, 2025). This finding aligns with the research by Petricia & Sakti (2024), which concluded that the oversight function of independent commissioner over management does not always operate optimally, thereby failing to enhance investor confidence. Furthermore, the presence of independent commissioner is often merely a formality to meet regulatory requirements and is therefore not strong enough to send positive signals regarding firm value.

The Effect of Firm Size on Firm Value

Contrary to initial expectations, firm size surprisingly had a significant negative impact on firm value. The findings suggest that an increase in total assets actually leads to a decline in investor's perception of the firm's value. In theory, large companies should be able to send positive signals regarding their operational stability in order to attract investors (Kammagi & Veny, 2023). In line with study Putra et al. (2021), firm size has a negative effect on firm value because larger firms generally exhibit a greater tendency to rely on external funding to finance their operations. This high tendency can serve as a negative signal to investors regarding financial risk, thereby reducing the firm's value in the eyes of the market.

CONCLUSION

Based on the research findings, green accounting does not have a significant impact on firm value. Similarly, environmental performance and independent commissioner do not have a significant impact on firm value. Meanwhile, firm size has a significant negative effect on firm value. This indicates that investors have not yet fully considered environmental and governance aspects but are still influenced by the firm's fundamental factors, one of which is firm size.

These findings indicate that investors' investment preferences do not fully take environmental and governance aspects into account, but are instead more influenced by a company's fundamentals, particularly its firm size. The results of this study also show that large companies are not always well-received by the market, especially if their growth is accompanied by financial risks resulting from dependence on external funding.

Future research is recommended to include other variables that may contribute to firm value, such as free cash flow and dividend policy, in order to gain a more comprehensive

understanding of the factors that determine firm value. In addition, extending the study period and ensuring greater homogeneity across the sectors observed should be considered to make the research more representative.

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