

Strengthening Firm Value through ESG Assurance, Internal Audit, and Enterprise Risk Management: Asessing Audit Quality as Potential Boundary Condition

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ABSTRACT

Purpose – This study examined the influence of ESG assurance, internal audit and enterprise risk management on firm value and analyzed the role of audit quality as a moderating variable. The study was conducted on basic materials companies listed on the Indonesia Stock Exchange (IDX) for the 2022-2024 period, using agency theory and signaling theory.

Design/methodology/approach – The research employed a quantitative method. The sample was selected using purposive sampling within the basic materials sector. Firm value was measured using Tobin's Q, ESG assurance was measured using the existence of external assurance, internal audit implementation was proxied by its implementation indicators, ERM was measured using a strategy-based and operations-based index, and audit quality was measured using the reputation of the Public Accounting Firm. Data were analyzed using moderated regression analysis (MRA).

Finding/Results – The F-test results demonstrate that the regression model is overall statistically significant in explaining firm value. Individually, however, only internal audit implementation exerts a significant positive effect on firm value, whereas ESG assurance and ERM do not exhibit partial significance. This indicates that the simultaneous significance of the model is primarily driven by the robust individual contribution of internal audit practices.

Originality/Value – This study contributes to the governance and sustainability literature by providing evidence from the basic materials sector, a high-risk and capital-intensive industry. The findings highlight the importance of internal audit implementation as a governance mechanism that is directly valued by investors, while ESG assurance and ERM appear to have limited individual relevance in market valuation. The results also suggest that governance mechanisms may be more effective when implemented collectively rather than separately. Practical implications emphasize the need for stronger integration between internal audit, risk management, and sustainability practices, while regulators may consider enhancing ESG reporting standards to improve transparency and comparability.

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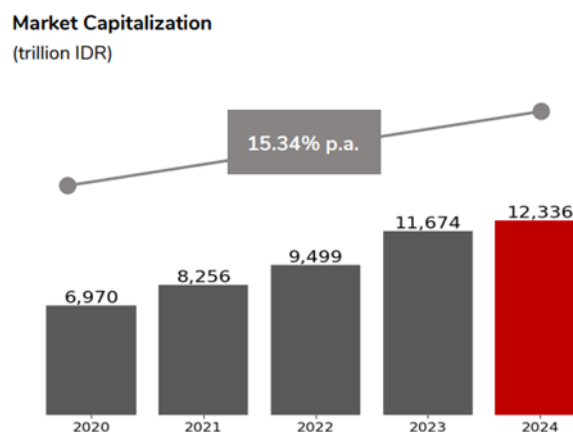


1. Introduction

Firm value represents an important benchmark for investors and shareholders when evaluating management's ability to deploy corporate assets efficiently and create economic value. Higher firm value generally strengthens investor confidence and influences investment decisions by signaling favorable financial performance. Accordingly, firm value functions as an indirect indicator of a company's financial condition and long-term prospects, with stronger valuations typically receiving a more positive market response. Nevertheless, its relevance is greater when interpreted alongside industry-specific characteristics, particularly in sectors with complex and asset-intensive operations such as the basic materials industry.

The basic materials sector plays a pivotal role in supporting national industrial activity by providing critical inputs for manufacturing, construction, energy, and technology. Because firms in this sector rely heavily on commodities such as nickel, coal, copper, and basic chemicals, their market value is highly sensitive to fluctuations in global commodity prices. Rising commodity prices generally enable firms to generate stronger earnings, whereas declining prices reduce profitability, highlighting the sector's exposure to commodity market volatility.

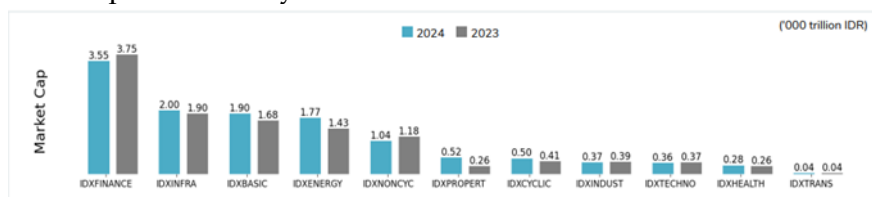
Figure 1. Market Capitalization



Source: Bursa Efek Indonesia (IDX)

Indonesia's capital market continued to expand despite persistent global economic uncertainty. Data published by the Indonesia Stock Exchange (IDX) show that total market capitalization rose from IDR 11,674 trillion in 2023 to IDR 12,336 trillion in 2024, representing a 5.7% increase. Although this growth was more moderate than in earlier periods, it nevertheless indicates that investment inflows into the capital market remained resilient (IDX, 2024).

Figure 2. Market Capitalization by sector

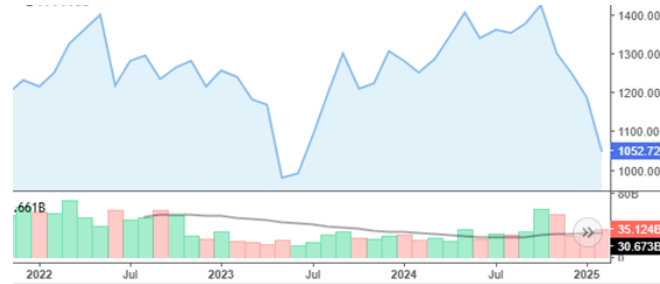


Source: Bursa Efek Indonesia (IDX)

The sustained increase in market capitalization suggests that the basic materials sector has emerged as a key contributor to market growth despite the limited expansion of the energy

sector (IDX, 2024). This development highlights the importance of examining how Enterprise Risk Management (ERM), internal audit disclosure, and ESG security influence firm value within basic materials companies. Beyond reflecting stronger sectoral performance, the growth in market capitalization underscores the need for firms to continuously enhance their value in order to strengthen competitiveness and maintain investor confidence.

Figure 3. Basic Materials Sector Stock Price & Volume



Source: Investing.com

Sustained growth in firm value requires stronger governance mechanisms to preserve investor confidence. ESG disclosure plays a central role by providing stakeholders with relevant information that enhances transparency and supports long-term decision-making. Consequently, the preparation of credible ESG reports has become increasingly important (Li et al., 2025).

Prior evidence suggests that governance mechanisms contribute differently to firm value. Studies by Li et al. (2025), Indyanti & Zulaikha (2017), and Ikhsan et al. (2024) report that assurance, audit quality, and internal audit strengthen firm value. Consistent with these findings, Vaihekoski & Yahya (2025) demonstrate that superior audit quality enhances the contribution of ESG practices to firm value. However, empirical evidence remains mixed. Naibaho & Raudhotuzanah (2025) indicate that ESG and external assurance may reduce firm value, whereas Azahra & Hasnawati (2024) find no significant partial effect of internal audit. Similar inconsistencies emerge for ERM. Positive associations are documented by Kurniawan et al. (2025), Sari et al. (2025), and Nguyen & Nguyen (2026), while McShane et al. (2011) report no significant relationship.

The literature also reports conflicting evidence regarding moderating effects. Vaihekoski & Yahya (2025) find that audit quality reinforces the ESG–firm value relationship, whereas Azmiyah & Subardjo (2024) conclude that such a moderating role is absent. Moreover, existing studies primarily emphasize ESG disclosure or ESG scores instead of ESG assurance, despite its role in improving information credibility. Research has also examined governance mechanisms independently across sectors such as banking, manufacturing, and hospitality, limiting its relevance to the basic materials industry, whose performance is particularly sensitive to external shocks.

To address these gaps, this study simultaneously investigates the effects of ESG assurance, internal audit implementation, and ERM on firm value. It further proposes audit quality as a boundary condition to assess whether external oversight influences these relationships within the basic materials sector. This integrated approach is expected to provide more context-

specific empirical evidence and deepen understanding of governance mechanisms in a cyclical, capital-intensive industry.

Firms operating in the basic materials industry face persistent challenges arising from commodity price fluctuations, environmental scrutiny, complex operations, and intensive capital requirements. In this high-risk setting, governance mechanisms that enhance operational reliability, reinforce sustainability credibility, reduce uncertainty, and strengthen long-term resilience are particularly valued by investors. Accordingly, ESG assurance, internal audit, and enterprise risk management (ERM) should be viewed not merely as governance or monitoring functions, but also as strategic capabilities that support value creation. Building on prior governance research, this study conceptualizes these mechanisms as complementary strategic resources that improve firm value within an industry characterized by substantial operational and environmental exposure.

In the basic materials sector, however, governance mechanisms are unlikely to contribute equally to firm value. Investors in commodity-based industries face substantial uncertainty arising from commodity price fluctuations, operational disruptions, environmental exposure, and large irreversible capital investments. Under these conditions, governance mechanisms that directly influence operational efficiency and asset protection may be perceived as more value-relevant than mechanisms primarily aimed at enhancing disclosure credibility. Internal audit, for example, provides continuous oversight of operational processes, compliance, and resource utilization, which are critical determinants of performance in basic materials firms. In contrast, ESG assurance mainly enhances the credibility of sustainability disclosures, while ERM primarily focuses on risk identification and monitoring whose benefits may materialize over a longer time horizon. Consequently, the market may respond differently to these governance mechanisms depending on their perceived ability to reduce operational uncertainty and protect future cash flows.

2. Literature Review and Hypothesis Development

2.1. Teori Keagenan (Agency Theory)

Agency theory explains that conflicts emerge when principals and agents pursue different objectives (Shalsabilla, 2023). Principals seek to maximize returns on invested capital, whereas agents are often motivated by incentives linked to the resources under their control. These divergent interests create agency conflicts. Such problems are particularly significant in the basic materials sector, where managers oversee substantial operational assets, environmental obligations, and long-term investments that shareholders cannot easily observe. To mitigate information asymmetry and agency costs, firms rely on governance mechanisms including ESG assurance, internal audit, and enterprise risk management (ERM). Although these mechanisms share the same governance objective, their effectiveness varies because each targets a distinct source of uncertainty. Internal audit strengthens oversight of operational processes, ESG assurance enhances the reliability of sustainability reporting, and ERM supports strategic risk management.

2.2. Teori Sinyal (Signalling Theory)

According to Butar-Butar et al. (2025), reliable, independently audited ESG disclosure serves as an important signal that helps distinguish companies with genuine ESG performance from those that simply pretend.

The effectiveness of governance-related signals is not uniform across mechanisms. In cyclical, commodity-dependent industries, investors tend to prioritize information that has an immediate influence on operational performance and cash-flow stability. Consequently, effective internal audit functions often provide more credible and timely signals than ESG assurance or ERM disclosures, whose economic value is generally indirect and materializes over a longer horizon.

2.3. Environment, Social & Governance (ESG) Assurance on Firm Value

ESG assurance is an independent verification mechanism for sustainability reports aimed at increasing the credibility of non-financial information. From an agency theory perspective, ESG assurance can reduce information asymmetry between management and investors. Meanwhile, from a signaling theory perspective, assurance provides a positive signal regarding a company's transparency and commitment to sustainability. In capital-intensive industries, ESG assurance reduces perceived environmental and regulatory risk, thereby lowering investor uncertainty and enhancing market confidence. Assured sustainability disclosures also strengthen corporate legitimacy and signal that firms possess the governance capability required to manage long-term environmental and social obligations. Consequently, ESG assurance may contribute to firm value not only through transparency enhancement, but also through the reduction of perceived risk and improvement of sustainability credibility.

Research by Wenwen Li, Ting Li, and Hongjun Zhu (2025) found that ESG assurance can improve audit quality and firm value through reputational effects and knowledge spillover. This finding is supported by research by Indyanti and Zulaikha (2017), which shows that sustainability report assurance positively impacts firm value. However, Naibaho and Raudhotuzanah (2025) found different results, where ESG and external assurance negatively impact firm value.

Despite equivocal empirical evidence surrounding the valuation effects of ESG assurance, this study argues for a positive association. Cross-country and cross-industry variations in institutional frameworks, stakeholder awareness, and sustainability disclosure maturity often drive these past inconsistencies. Within the basic materials sector, heightened environmental liabilities and stringent regulatory oversight amplify the strategic necessity for external verification. Independent assurance mitigates information asymmetry and validates corporate sustainability claims, thereby signaling robust governance. Consequently, investors evaluate this third-party attestation as a risk-mitigation mechanism, ultimately rewarding firms with enhanced market valuations.

H1: ESG Assurance has a positive effect on Firm Value

2.4. Implementation of Internal Audit on Firm Value

Internal audit is an internal control mechanism that functions to improve operational efficiency and minimize fraud risk. According to agency theory, internal audits help mitigate conflicts of interest between managers and shareholders. Meanwhile, in signaling theory, internal audit effectiveness provides a positive signal of the quality of corporate governance. In the basic materials sector, internal audits play a critical role in safeguarding operational efficiency, controlling production-related risks, and ensuring compliance with environmental

and safety standards. Therefore, effective internal audit systems may contribute directly to value creation by minimizing operational disruption and strengthening investor confidence in managerial discipline. Research by Azahra and Hasnawati (2024) shows that internal audit simultaneously influences firm value. Ikhsan et al. (2024) found that internal auditor effectiveness positively contributes to increasing firm value. However, previous research has found conflicting results, indicating that internal audit does not always have a significant partial effect.

Compared with ESG assurance and ERM, internal audit is expected to have a stronger influence on firm value in the basic materials sector because it directly affects operational effectiveness, production continuity, inventory control, and compliance with environmental and safety regulations. Since operational performance is a key determinant of profitability in commodity-based industries, investors may perceive effective internal audit as a more immediate source of value protection and value creation.

Prior empirical evidence regarding the effect of internal audit on firm value remains inconclusive. Some studies report a significant positive effect, whereas others find no significant association. Despite these inconsistencies, a positive relationship is expected in the context of the basic materials sector. This industry is characterized by operational complexity, large-scale asset utilization, and substantial compliance requirements. Effective internal audit functions improve internal control quality, enhance operational efficiency, and reduce the likelihood of fraud and failure. These benefits may increase investor confidence and strengthen firm value, particularly in industries where operational reliability is critical to the long-term performance.

H2: Implementation of Internal Audit has a positive effect on Firm Value

2.5. Enterprise Risk Management on Firm Value

Enterprise Risk Management (ERM) is an integrated approach to managing corporate risk. From an agency theory perspective, ERM helps minimize risks that could harm shareholders' interests. In signaling theory, the implementation of ERM signals that a company can manage risk effectively. ERM enables firms operating in volatile commodity markets to anticipate and manage strategic, operational and financial risks in an integrated manner. In highly cyclical industries, effective ERM supports corporate resilience and stabilizes future cash flows, thereby increasing firm value from the perspective of long-term investors. Research by McShane et al. (2011) shows that ERM can increase firm value to a certain extent. This is supported by Kurniawan et al. (2025), who found a positive effect of ERM on firm performance. Furthermore, research by Thuy Anh Nguyen and Tuan Le Nguyen (2025) shows that ERM increases market-based firm value (Tobin's Q), especially when supported by strong ESG disclosure.

Previous studies have provided mixed evidence on the value relevance of ERM. While several studies document the positive impact of ERM on firm value, others report insignificant results. Nevertheless, a positive effect is expected in this study because firms operating in the basic materials sector are highly exposed to commodity price volatility, environmental risks and operational uncertainty. ERM enables companies to identify, assess, and manage risks in a more integrated manner, thereby enhancing organizational resilience and reducing cash flow uncertainty. Therefore, investors may perceive comprehensive ERM implementation as an indicator of stronger long-term sustainability and value creation potential.

H3: Enterprise Risk Management has a positive effect on Firm Value

2.6. Audit Quality as Moderation

Audit quality reflects an auditor's ability to ensure the reliability of financial reports. In agency theory, audit quality is an external monitoring mechanism. In signaling theory, high-quality audits strengthen the credibility of information provided by a company. Research by Vaihekoski and Yahya (2025) shows that ESG only increases firm value if supported by high-quality audits (Big Four). This is in line with research by Li et al. (2025)

which shows that the combination of audit and ESG assurance increases firm value. However, Azmiyah and Subardjo (2024) found that audit quality does not moderate the relationship between ESG and firm value.

External audit quality is expected to strengthen the effectiveness of internal audits in increasing firm value. According to agency theory, the combination of internal and external oversight can reduce the risk of moral hazard. In signaling theory, audit quality increases the credibility of internal audit results. Research by Ikhsan et al. (2024) shows that internal audit and audit quality jointly have a positive effect on firm value. However, previous research suggests that the moderating role of audit quality is not always significant, depending on industry characteristics and the effectiveness of governance.

Audit quality is expected to strengthen the relationship between ERM and firm value by increasing the reliability of risk management-related information. In agency theory, high-quality audits help ensure that ERM practices are implemented effectively. In signaling theory, audits validate a firm's risk management. Research by Vaihekoski and Yahya (2025) shows that audit quality can strengthen the relationship between governance and firm value.

Although audit quality is generally expected to enhance the credibility of governance-related information, its moderating role may be limited in the basic materials sector. Investors often evaluate firms based on commodity prices, production capacity, and operational efficiency, which may reduce the incremental information value provided by external auditors. Therefore, while high audit quality can theoretically strengthen the market's confidence in ESG assurance, internal audit effectiveness, and ERM implementation, the magnitude of this moderating effect may depend on whether investors perceive the audited information as relevant to future cash flow generation.

From a signaling perspective, audit quality enhances the credibility of firms' governance-related information. High-quality auditors, particularly those with strong reputations and greater industry expertise, are more likely to detect material misstatements and to challenge managerial opportunism. Consequently, information associated with ESG assurance, internal audit effectiveness, and ERM implementation becomes more credible to investors. In agency theory, reputable external auditors serve as an additional monitoring mechanism that reduces information asymmetry and strengthens stakeholder confidence in the governance practices reported by the management. Therefore, audit quality is expected to increase the market relevance of these governance mechanisms and strengthen their contribution to firm value. While audit quality is widely theorized to act as a critical boundary condition that reinforces internal governance practices, its effectiveness may depend on industry-specific dynamics. In highly volatile and capital-intensive sectors, such as basic materials, the standardized monitoring provided by high-quality external audits may operate independently rather than

interactively with internal strategic mechanisms. Therefore, audit quality was evaluated as a proposed boundary condition.

H4: Audit Quality Strengthens Environment, Social & Governance (ESG) Assurance on Firm Value

High-quality auditors may provide additional assurance regarding the consistency between ESG disclosure and underlying corporate practices. Consequently, investors are more likely to trust ESG assurance information when it is associated with firms audited by reputable auditors.

H5: Audit Quality Strengthens Implementation of Internal Audit on Firm Value

External auditors often rely on the effectiveness of internal controls and internal audit functions during the audit process. When audit quality is high, the market may perceive that internal audit findings have undergone more rigorous external scrutiny, thereby increasing confidence in governance effectiveness and firm value.

H6: Audit Quality Strengthens Enterprise Risk Management on Firm Value

High-quality auditors can indirectly validate the effectiveness of ERM by assessing risk management processes and internal controls. This additional validation may increase investor confidence that risk disclosures accurately reflect a firm's risk profile, thereby strengthening the value relevance of ERM implementation.

2.7. Firm Value

Firm value is a cumulative reflection of investors' assessments of a company's performance, development prospects, and sustainability. A high firm value reflects positive growth prospects, encouraging investors to invest their funds owing to promising potential returns and confidence in the company's future (Situmorang and Bimo, 2023; Oktaviani, 2019). Firm value refers to the amount investors or potential stock buyers are willing to pay, based on financial market prices. The Tobin's Q ratio is often used as a tool to assess a firm's value (Heng et al., 2023; Aydoğmuş et al., 2022; Naeem et al., 2021). A firm's value, as determined by market perception and future growth potential, is represented by Tobin's Q concept. Fauzi and Mukhibad (2024) used stock prices seven days after the annual financial report was released in their study, which is also adopted in this study.

3. Methodology

3.1 Research Design

Sugiyono (2020) defines a research method as a scientific path or method for obtaining necessary data. This study employed quantitative methods.

3.2 Population and Sample

The population of this study consisted of basic materials manufacturing companies listed on the Indonesia Stock Exchange (IDX). The researchers used a purposive sampling technique that considered specific criteria.

Initially, the purposive sampling procedure yielded an initial pool of 225 firm-year observations. An outlier screening procedure was executed to ensure that the ordinary least squares (OLS) assumptions were strictly met and to prevent severe distortion in the moderated regression analysis (MRA). Outliers were identified based on a standardized residual threshold exceeding ± 2.5 standard deviations. Using this method, 17 extreme data points characterized by abnormal fluctuations in Tobin's Q (firm value) and extreme corporate

sizes were detected and subsequently removed, resulting in a final analytical sample of 208 observations. To confirm the empirical validity of this procedure, robustness checks were conducted by running the regression models with and without the 17 outliers. The comparative analysis demonstrated that the inclusion of outliers caused heteroskedasticity violations and artificially inflated standard errors, whereas their removal stabilized the model's predictive power without altering the substantive direction or statistical significance of the primary hypothesized paths (i.e., the persistent significant impact of internal audit and the non-significance of the ESG assurance and ERM interaction).

3.3 Data Collection

This study employed a purposive sampling method based on predetermined criteria. The criteria included companies that publish sustainability reports, annual reports, and internal audit charters prepared in accordance with applicable standards, and are listed as public companies on the Indonesia Stock Exchange (IDX).

3.4 Variable Measurement

Table 1. Variable Operationalization

Variabel	Variable Definition	Measurement Indicator
Firm Value (Y)	Firm value refers to the amount a stock buyer (investor) is willing to pay for a stock based on financial market valuation (market price). Firm value is measured using the Tobin's Q ratio (Heng et al., 2023).	Tobin's Q = $\frac{MVE + DEBT}{TA}$ (Heng et al., 2023).
Environment, Social & Governance (ESG) Assurance (X1)	ESG report assurance services are essentially a process in which an assurer conducts a scientific audit of a company's non-financial information and expresses an opinion. Auditors can obtain non-financial information beyond that contained in the annual report through ESG report assurance, thereby assisting in the annual report audit. (Li et al. 2025)	Dummy: 1 = The company has conducted an ESG Assurance Report by an Independent. 0 = The company has NOT conducted an ESG Assurance Report by an Independent. (Li et al. 2025)
Implementation of Internal Audit (X2)	An internal control and monitoring mechanism designed to improve corporate governance, operational efficiency, and risk mitigation by ensuring strict compliance with capital market regulations (OJK No. 56/POJK.04/2015).	The indicators for measuring internal audit implementation consist of: 1. Contents of the Internal Audit Charter. 1 = If the audit charter complies with OJK regulations (at least 7 items in the Internal Audit Charter) and 0 = If the audit charter contains fewer than 7 items.

2. Access to the Internal Audit Charter. 1 = If the Internal Audit Charter is accessible on the website, annual report, and sustainability report. 0 = If the Internal Audit Charter is not accessible on the website, annual report, or sustainability report.
 3. Evaluation of the Internal Audit Charter. 1 = If the Internal Audit Charter has been revised (less than 3 years). 0 = If the Internal Audit Charter has been revised (more than 3 years).
- Ratio: (Amount 1 + Amount 2 + Amount 3) / 3

Enterprise Risk Management (X3)

Enterprise Risk Management (ERM) is defined as an integrated corporate framework that embeds risk management culture, capabilities, and practices into strategic formulation and operational execution to protect and enhance firm value (COSO, 2020). Following Rahman et al. (2022), this study specifically captures the operationalization of ERM through a structured disclosure index based on strategic and operational risk dimensions.

$$ERM = \text{Strategy Indexes} + \text{Operation Indexes}$$

Description:

- $\text{Strategy Indexes} = \frac{\text{Salesi} - \text{Average Sales Industry}}{SD(\text{Sales Industry})}$
- $\text{Operational Indexes} = \frac{\text{Sales}}{\text{Total Assets}}$

(Rahman et al., 2022)

Audit Quality (M)

Audit quality refers to the auditor's ability to find and report material errors in the client's financial statements, which is determined by the auditor's competence and independence (Dangelo, 1981; Zahrani et al., 2023).

Big four, National/Regional public accounting firm, and Local public accounting firm (KAP).

Dummy:

- 3 = If KAP Big-4
- 2 = If National/Regional KAP
- 1 = If KAP is Local.

(Alvin A. Arens, 2017; Shalsabila, 2023)

Based on OJK Regulation No. 56/POJK.04/2015, Issuers or Public Companies are required to have an internal audit charter that contains at least:

- a. The structure and position of the Internal Audit Unit;
- b. The duties and responsibilities of the Internal Audit Unit;
- c. The authority of the Internal Audit Unit;
- d. The Internal Audit Unit's code of ethics, which refers to the code of ethics established by the Indonesian Internal Audit Association or the internationally accepted Internal Audit Code of Ethics.
- e. Requirements for internal auditors in the Internal Audit Unit;
- f. Accountability of the Internal Audit Unit; and
- g. Prohibition of concurrent duties and positions of internal auditors and implementers within the Internal Audit Unit in carrying out company operational activities, whether at the Issuer or Public Company or its subsidiaries.

Audit quality is proxied by the classification of the Public Accounting Firm (KAP) responsible for the external audit, categorized into three hierarchical tiers: local firms (scored 1), national or regional firms (scored 2), and Big Four firms (scored 3). Following the econometric approach of previous governance studies (e.g., Johnson et al., 2019), this three-level classification is treated as a quasi-continuous, ordinal scale. This approach is justified on the grounds that audit quality, reputation, and resource capability increase monotonically across the three segments. By treating the variable as a single interaction scale in the Moderated Regression Analysis (MRA), we preserve the degrees of freedom and prevent severe multicollinearity that typically arises from generating multiple dummy interaction terms while effectively capturing the incremental effect of the auditor reputation hierarchy on firm value.

3.5. Data Analysis

3.5.1 Multiple Linear Regression Analysis and Moderated Regression Analysis (MRA)

Multiple linear regression analysis was used to test the effects of the independent variables on the dependent variable. The regression model used in this study was formulated as follows: Model 1 (Direct effect):

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \dots \dots \dots (1)$$

According to Ghazali (2018), moderated regression analysis is an analytical method that aims to maintain the integrity of the sample used and to evaluate the influence of moderating variables. Moderated regression analysis (MRA) was used in this study to analyze the impact of ESG Assurance, Internal Audit Implementation, and Enterprise Risk Management (ERM) on Firm Value.

Model 2 (Moderation)

$$Y = \alpha + M + \beta_1 X_1 \times M + \beta_2 X_2 \times M + \beta_3 X_3 \times M + \varepsilon \dots \dots (2)$$

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M + \beta_5 (X_1 \times M) + \beta_6 (X_2 \times M) + \beta_7 (X_3 \times M) + \varepsilon (3)$$

Description:

Y = Firm Value

α = Constant

β_1 = Regression Coefficient for Environmental, Social, and Governance (ESG) Assurance

β_2 = Regression Coefficient for Internal Audit Implementation

- β_3 = Enterprise Risk Management (ERM)
 X_1 = Environmental, Social, and Governance (ESG) Assurance
 X_2 = Internal Audit Implementation
 X_3 = Enterprise Risk Management (ERM)
 M = Audit Quality
 ε = Error Rate
 $X_1 \times M, X_2 \times M, X_3 \times M$ = Interaction Terms

To isolate the structural impact of non-financial oversight on signaling quality, this study explicitly restricts its scope to Enterprise Risk Management (ERM), internal audit capabilities, and ESG assurance. Traditional valuation models rely heavily on financial fundamentals such as profitability, leverage, and firm size. However, the current framework intentionally segregates these behavioral and compliance-driven variables to examine their pure mechanisms under the moderating effect of external audit quality. Furthermore, by confining the empirical observation to the basic materials sector from 2022 to 2024, macroeconomic and industry-specific confounding factors were controlled. Consequently, this homogenous research design mitigates structural variance without necessitating conventional financial control variables.

3.5.2 Hypothesis Testing

3.5.2.1 t-Test (Partial)

The t-test was used to determine the effect of each independent variable on the dependent variable. Regression results are usually tested at a 95% confidence level or a 5% significance level ($\alpha = 0.05$), in accordance with the standard t-statistical test (Ghozali, 2018). If the Sig value < 0.05 then the hypothesis is accepted. If the Sig value > 0.05 then the hypothesis is rejected.

3.5.2.2 F-Test (Simultaneous)

A simultaneous test is conducted to test whether the independent variables simultaneously influence the dependent variable (Ghozali, 2018), with a significance level of 5%. If the Sig value is < 0.05 , then the independent variables have a simultaneous effect, if the Sig value is > 0.05 , then there is no effect.

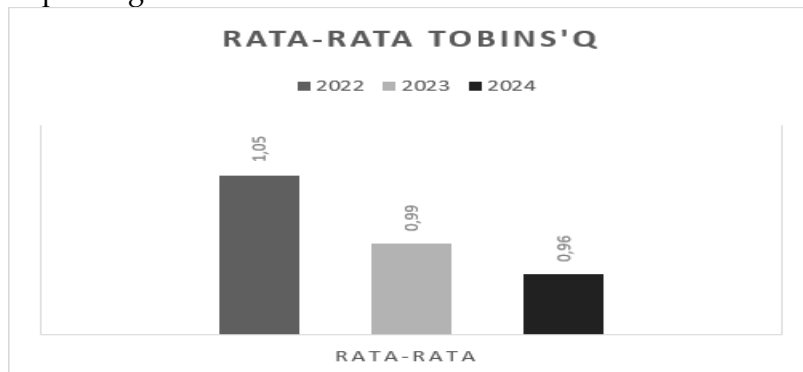
3.5.2.3 Coefficient of Determination

The coefficient of determination is used to measure the extent to which an independent variable explains a dependent variable. The R^2 value ranges from 0 to 1; the higher the R^2 value, the greater the model's ability to explain the dependent variable.

4. Result and Discussion

The number of samples eligible for this study was determined based on established criteria. Consequently, there were 113 companies in the basic materials sector listed on the IDX. Of these, 18 companies failed to publish annual reports and sustainability reports for three consecutive years, from 2022 to 2024. Furthermore, 20 companies did not meet the criteria, leaving 75 eligible companies with a total of 225 samples observed over three consecutive years. The data in the table has undergone an outlier process, with 17 data points removed, resulting in 208 remaining data points.

Figure 4. Tobin's q average



4.1. Descriptive Statistics

The following presents the results of the descriptive analysis:

Table 2. Descriptive Statistics

Column 1	N	Minimum	Maximum	Mean	Std. Deviation
Firm Value	208	.2373	2.8561	.983392	.4432191
Firm Value (Log10)	208	-.6247	.4557	-.0497	.1950
ESG Assurance	208	0	1	.18	.387
Implementation of Internal Audit	208	.0000	1.0000	.512821	.3571915
Implementation of ERM	208	-.5532	3.0939	.571811	.7458965
Audit Quality	208	1	3	1.96	.697
Valid N (listwise)	208				

The firm's value using Tobins'Q has a minimum value range from 0.2373 to 2.8561. The average Tobins'Q is 0.9833, and the standard deviation is 0.4432. To measure the independent variable ESG Assurance, a dummy is used, with a range of 0 to 1. The internal audit implementation variable has a minimum value of 0.00 to 1.00, with an average of 0.5128 and a standard deviation of 0.3571. The ERM variable has a value range of -0.55 to 3.0939, with an average value of 0.5718 and a standard deviation of 0.7458. A positive ERM value ($ERM > 0$) indicates that the company's risk management and strategy execution are well-executed and competitive. The company has successfully dominated the market or at least demonstrated strong sales performance (above or not far below the industry average). The asset's sales-generating capacity (Operational Index) is capable of offsetting or overcoming any strategic weaknesses. Business risks are at a manageable level. The company has a stable market position and healthy capital utilization to weather uncertainties. A negative ERM value ($ERM < 0$) indicates a yellow flag (warning) for the company's risk management. The company's sales are significantly below the industry average (the Strategy Index has a large negative value). The company's operational efficiency (Operational Index) is insufficient to boost or offset the sales lag in the market. The company faces high strategic and market risks. There are indications of competitive disadvantage, under-utilization of products, or severe inefficiencies where substantial assets fail to generate adequate sales compared to competitors.

The moderating variable, audit quality, had a minimum value of 1 to 3, with an average of 1.96 and a standard deviation of 0.697.

4.2. Classical Assumption Test

The test results showed that the data were normally distributed, there was no multicollinearity between the independent variables, no heteroscedasticity, and no autocorrelation. Therefore, the regression model in this study was deemed suitable for further analysis.

Table 3. Normality Test Results

	Unstandardized Residual	
	Model 1	Model 2
Test Statistic	.043	.044
Asymp. Sig. (2-tailed)	.200 ^{c,d}	.200 ^{c,d}

The test results table shows that the Kolmogorov-Smirnov test is at 0.200, meaning $0.200 > 0.05$. Thus, it can be concluded that regression models 1 and 2 meet the normality assumption and that the residual data are normally distributed.

Table 4. Multicollinearity Test Results

The test	Model	Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	ESG Assurance	.877	1.140
	Internal Audit Implementation	.831	1.203
	ERM	.919	1.089
2	(Constant)		
	ESG Assurance	.771	1.297
	Internal Audit Implementation	.766	1.305
	ERM	.842	1.187
	Quality Audit	.886	1.129
	ESG Assurance*quality audit	.711	1.407
	Internal Audit Implementation	.710	1.409
	ERM* Quality Audit	.867	1.154

table above shows that the calculated VIF values for each variable are all <10 , with each variable's tolerance value >0.10 . Therefore, these test results indicate no signs of multicollinearity between the independent variables for the two regression model equations.

Table 4.a Autocorrelation Test Results (Durbin-Watson)

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimati	Durbin Watson
1	0,203	0,041	0,027	0,19239	1,132
2	0,243	0,059	0,026	0,19246	1,127

1. Predictor (constant), Quality audit, internal audit implementation, ESG Assurance,ERM.
2. Predictor (constant) , ESG Assurance, internal audit implementation, ERM, quality audit. ESG assurance*quality audit, internal audit implementation*quality audit, ERM*quality audit.
Dependent variable : firm value. Source : output, 2026

Table 5. Heteroscedasticity Test Results

Model		Collinearity Statistics	
		t	.Sig
1	(Constant)	11.326	.000
	ESG Assurance	1.232	.219
	Internal Audit Implementation	-.319	.750
	ERM	-1.035	.302
2	(Constant)	18.855	.000
	ESG Assurance	1.354	.177
	Internal Audit Implementation	-.040	.968
	ERM	-1.240	.216
	Quality Audit	-.054	.957
	ESG Assurance*Quality audit	-1.230	.220
	Internal audit implementation *Quality audit	.981	.328
	ERM*Quality audit	-1.872	.063

The table above shows that the Glejser test results show that each independent variable in Model 1 has a significance value >0.05. Similarly, for Model 2, each value is also >0.05. Therefore, it can be concluded that both regression models are free from heteroscedasticity.

4.3. Hypothesis Testing

Hypothesis testing was carried out by SPSS, using t-test (partial), F-test (Simultaneous) and R-Square for each variable to determine its influence and significance level.

Table 7. t-Test Results (Partial)

Model		B	t	.Sig
1	(Constant)	-.107	-4.473	.000
	ESG Assurance	.019	.519	.604
	Internal Audit Implementation	.095	2.305	.022
	ERM	.009	.501	.617

	(Constant)	-.049	-3.478	.001
	ESG Assurance	.007	.186	.853
	Internal Audit Implementation	.115	2.697	.008
	ERM	.007	.366	.715
2	Quality Audit	.004	.216	.829
	ESG Assurance*Quality Audit	-.012	-.212	.832
	Internal Audit Implementation * Quality audit	.123	1.690	.093
	ERM* Quality audit	-.036	-1.297	.196

4.3.1.

Effect of ESG Assurance on Firm Value (H1)

In model 1, the regression coefficient of ESG Assurance shows a positive value of 0.019 and t count of $0.519 < t \text{ table } 1.971$ with a significance of 0.604. The significance value is greater than 0.05 or $0.604 > 0.05$, so it can be concluded that there is no significant influence between ESG Assurance (X1) partially on Firm Value (Y). Therefore, H0 is accepted and H1 is rejected.

The insignificant effect of ESG assurance may indicate that the Indonesian capital market has not yet fully incorporated assured sustainability information into valuation decisions, particularly in sectors dominated by commodity-based performance indicators. Investors may still prioritize short-term financial performance and commodity price movements over sustainability credibility.

4.3.2. Effect of Implementation of Internal Audit on Firm Value (H2)

In model 1, the regression coefficient of Internal Audit Implementation shows a positive value of 0.095 and t count of $2.305 > t \text{ table } 1.971$ with a significance of 0.022. The significance value is smaller than 0.05 or $0.022 < 0.05$, so it can be concluded that there is a significant positive influence between Internal Audit Implementation (X2) partially on Firm Value (Y). Therefore, H0 is rejected and H2 is accepted.

The significance of internal audit indicates that investors in the basic materials sector place greater emphasis on governance mechanisms that directly influence operational reliability and control effectiveness. Since firms in this sector are highly dependent on production continuity, capital utilization, and operational efficiency, internal audit may be perceived as a practical governance mechanism capable of protecting assets, minimizing operational disruption, and improving managerial accountability. Consequently, internal audit contributes to firm value through both monitoring effectiveness and operational value protection.

4.3.3. Effect of ERM on Firm Value (H3)

In model 1, the regression coefficient of Enterprise Risk Management (ERM) shows a positive value of 0.009 and t count of $0.501 < t \text{ table } 1.971$ with a significance of 0.617. The significance value is greater than 0.05 or $0.617 > 0.05$, so it can be concluded that there is no significant influence between Enterprise Risk Management (X3) partially on Firm Value (Y). Therefore, H0 is accepted and H3 is rejected.

ERM implementation may not immediately translate into market value because its benefits are often long-term, intangible, and difficult to observe directly by external investors.

4.3.4. Moderating Effect of Audit Quality on ESG Assurance (H4)

In model 2, the regression coefficient of ESG Assurance with Audit Quality shows a negative value of 0.012 and t count of $-0.212 < t \text{ table } -1.971$ with a significance of 0.834. This significance value is greater than 0.05 or $0.834 > 0.05$, this indicates that differences in audit quality levels cannot strengthen or weaken the relationship between ESG Assurance and Firm Value. Therefore, H0 is accepted and H4 is rejected.

4.3.5. Moderating Effect of Audit Quality on Implementation of Internal Audit (H5)

In model 2, the regression coefficient of Internal Audit Implementation with Audit Quality shows a positive value of 0.123 and t count of $1.690 < t \text{ table } 1.971$ with a significance of 0.093. The significance value is greater than 0.05 or $0.093 > 0.05$, this indicates that the interaction of audit quality can strengthen the relationship between Internal Audit Implementation and Firm Value, but is not statistically strong enough. Therefore, H0 is accepted and H5 is rejected.

4.3.6. Moderating Effect of Audit Quality on ERM (H6)

In model 2, the regression coefficient of Enterprise Risk Management with Audit Quality shows a negative value of -0.036 and t count of $-1.297 < t \text{ table } 1.971$ with a significance of 0.196. The significance value is greater than 0.05 or $0.196 > 0.05$, this indicates that the interaction of audit quality can weaken the relationship between Enterprise Risk Management and Firm Value, but is not statistically strong enough. Therefore, H0 is accepted and H6 is rejected.

Table 7. F-Test Results (Simultaneous)

Model	Sum of Squares	df	Mean Square	F	Sig.	Model
Regression	.324	3	.108	2.920	.035	Regression
Residual	7.551	204	.037			Residual
Total	7.875	207				Total

The calculated F-value of 2.920 with a probability of 0.035 is greater than the value of 0.05 obtained based on the f-test results shown in Table 4.18 above. This means that the calculated F-value is greater than the F-table, which is $2.920 > 2.65$. Therefore, we can say that ESG Assurance, Internal Audit Implementation, and Enterprise Risk Management simultaneously affect the underlying firm value on the Indonesia Stock Exchange. Thus, H0 is rejected, and H7 is accepted.

Table 8. Results of the Determination Coefficient Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.203	.041	.027	.19239
2	.243	.059	.026	.19246

Based on these findings, we can conclude that the independent variables in model 1 can only explain about 4.1% of the variation in the dependent variable, while 95.9% of the remaining variation can be explained by variables not included in this study.

Table 8 presents the coefficient of determination for both models. Model 1 yields an R-squared of 0.041 and an Adjusted R-squared of 0.027, indicating that ESG assurance, internal audit implementation, and ERM collectively explain 4.1% of the variation in firm value. In Model 2, while the descriptive R-squared increases to 0.059, the Adjusted R-squared experiences a slight decline to 0.026.

This low explanatory power and the lack of improvement in the moderated model suggest that corporate governance and risk management mechanisms add very limited incremental value to standard market valuations within the basic materials sector. This finding aligns with the prior partial results showing that the interaction terms are statistically insignificant. It implies that market participants in highly volatile, capital-intensive industries like basic materials may heavily anchor their valuation decisions on macro-commodity price cycles and direct financial performance rather than subtle variations in moderated governance quality.

4.4. Regression Analysis Results

Based on the results of the multiple linear regression analysis, namely model 1, the regression equation can be seen as follows:

$$Y = -0,107 + 0,019X_1 + 0,095X_2 + 0,009X_3 + \varepsilon \quad (1)$$

The results of the multiple regression test above indicate that operational internal governance mechanisms, namely the implementation of internal audits, are more appreciated by the market compared to symbolic mechanisms such as ESG Assurance and the ERM index.

Based on the results of the moderated regression test analysis for model 2 above, the regression equation for the second model can be seen as follows:

$$Y = -0,049 + 0,004M - 0,012X_{1M} + 0,123X_{2M} - 0,036X_{3M} + \varepsilon \quad (2)$$

Meanwhile, the interaction between audit quality and internal audit (0.123) is positive, indicating a potential strengthening effect, although this influence is still limited.

In terms of practical and theoretical implications, this study provides a nuanced perspective on corporate governance within the basic materials sector. Contrary to traditional agency theory assumptions that emphasize the dominance of external oversight, our findings reveal that audit quality does not serve as a significant moderating boundary condition for ESG assurance, internal audit, or ERM deployment. This underscores a crucial sectoral characteristic: in highly volatile and capital-intensive industries, such as basic materials, market participants place greater emphasis on substantive, day-to-day internal monitoring mechanisms. Specifically, effective internal audit implementation appears substantially more value-relevant to investors than the reputational signal of external audit quality (e.g., Big Four affiliation). Consequently, instead of relying on external audit reputation to amplify governance signals, firms in this sector should prioritize the operational rigor and independence of their internal audit functions to convey strong corporate oversight and secure long-term firm valuation.

This lack of statistical significance invites a deeper critical reflection on both proxy appropriateness and underlying theoretical assumptions. First, from a methodological standpoint, using external audit reputation (Big Four vs. Non-Big Four) as a proxy for audit quality may suffer from an inherent construct mismatch in this context. Traditional financial auditors are primarily trained to validate historical, quantitative financial statements, whereas ESG assurance, internal audit frameworks, and ERM processes encompass complex, forward-looking operational and non-financial data. Therefore, a high-reputation financial audit firm does not automatically guarantee or signal superior validation of a firm's sustainability or risk management practices.

Second, this finding challenges the classical expansion of Agency and Signaling Theories. In the basic materials sector, where operational risks and global commodity price shocks dominate market valuation, investors appear to recognize the decoupling or boundaries of external audit assurance. The market does not perceive external financial audit reputation as a mechanism that validates the substance of internal governance metrics. Instead, the non-significant moderation suggests a potential model misspecification in prior literature that blindly treats financial audit quality as a universal panacea for all governance dimensions. Ultimately, the validation of specialized mechanisms like ESG and ERM requires professional competencies beyond traditional financial auditing, rendering the conventional KAP reputation proxy insufficient to generate incremental value relevance in highly cyclical industries.

While audit quality was systematically tested as a proposed boundary condition, all interaction terms failed to reach statistical significance at the 5% level. This lack of empirical support suggests that within capital-intensive and highly volatile sectors like basic materials, market participants may view core governance mechanisms (such as internal audit) as standalone pillars of corporate credibility, rather than structures whose value depends heavily on the reputation of the external auditor. Therefore, audit quality should be conceptualized as a potential, rather than an active or effective, boundary condition in this specific industrial context.

5. Conclusion and Suggestion

Conversely, the implementation of internal audits has a positive and significant impact on firm value because it improves operational efficiency and provides a strong signal regarding governance quality. Meanwhile, audit quality, as a moderating variable, failed to strengthen the relationship between ESG assurance, implementation of internal audit, and ERM and firm value, due to a time lag and the dominance of external factors beyond the control of management and auditors. Furthermore, the simultaneous test (F-test) indicates that the corporate governance and risk management model as a whole is statistically significant in determining firm value. However, this joint significance should not be misinterpreted as an indication that all individual components are uniformly effective. While internal audit implementation yields a positive and highly significant impact individually, ESG assurance and Enterprise Risk Management (ERM) remain statistically insignificant in the partial analysis. This implies that the overall statistical fitness of the model is predominantly sustained by the strong value relevance of internal audit implementation within the basic materials sector.

This suggests that corporate governance effectiveness is more optimal when implemented in an integrated manner rather than individually. The combination of these three mechanisms is able to provide more comprehensive signals to investors and reduce information asymmetry and agency costs more comprehensively, especially in the basic materials sector which has a high level of operational risk and dependence on external factors.

In high-risk and capital-intensive industries, investors tend to assign greater value to governance mechanisms that directly affect operational reliability rather than symbolic governance mechanisms. The findings therefore extend agency and signaling theory by highlighting that the effectiveness of governance mechanisms depends not only on information transparency, but also on their perceived ability to reduce operational uncertainty and protect long-term firm sustainability.

6. Limitations and Future Research

This study has several limitations that should be considered. First, the study focused only on companies in the basic materials sector for the 2022–2024 period. Therefore, generalizations to other sectors should be made with caution, given the high volatility of this sector due to commodity price fluctuations, environmental regulations, and significant capital intensity. Second, ERM measurements using strategy- and operations-based indices are not fully capable of capturing qualitative aspects such as risk culture and oversight effectiveness. Third, the use of transformations on the firm value variable (Tobin's Q) to meet classical assumptions does improve model validity, but can reduce extreme variations in the data and limit direct comparisons with previous studies that used untransformed data.

Future research should expand the sample coverage to various sectors and observation periods to enhance external validity and assess the consistency of the effects of ESG assurance, Implementation of internal audit, and ERM on firm value across different sector characteristics. Furthermore, variable measurement indicators can be further developed to obtain more comprehensive proxies, such as the COSO-based ERM index and audit quality indicators other than public accounting firm reputation.

We acknowledge that the models intentionally focus exclusively on the specific mechanisms of internal and external governance infrastructure (ESG assurance, internal audit, and ERM) to capture their direct, unconditioned signaling effects on firm value. Consequently, standard financial fundamentals were omitted from the baseline models, which explains the relatively low R-squared values (Model 1 = 0.041; Model 2 = 0.059). This approach is methodologically justified on two grounds. First, this study focuses strictly on a highly homogeneous sector—the basic materials industry listed on the IDX—during a tight crisis-recovery window (2022–2024), which naturally controls for unobserved industry-wide financial shocks and capital intensity variations. Second, in alignment with Signaling Theory within highly volatile sectors, non-financial governance credibility and risk oversight quality operate as distinct, isolated signals that are evaluated by long-term investors independently of short-term financial noise (Li et al., 2025). However, to minimize potential omitted variable bias, future extensions should formally integrate financial metrics like firm size and leverage as covariates to observe whether these governance signals hold across asymmetric firm capacities.

Acknowledgement

The implications of this study extend to both theory and practice. The findings reinforce Agency and Signaling Theory by demonstrating that governance mechanisms such as ESG Assurance, Implementation of Internal Audit, and ERM are more effective in enhancing firm value when supported by high audit quality, thus demonstrating that governance is systemic and mutually reinforcing, rather than partial. Practically, for raw materials sector management, the integration of ESG, risk management, and internal control needs to be complemented by high-quality external audits to enhance credibility. For investors, this combination serves as a comprehensive indicator in assessing high-risk companies, and for regulators, it demonstrates the need to strengthen ESG Assurance standards, ERM transparency, and audit quality.

During the preparation of this work, the author used Google Translate and ChatGPT to assist in language editing and improving the clarity of the manuscript. After using this tool, the author reviewed and edited the content as needed and take full responsibility for the content of the publication.

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