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The Impact of the Fraud Triangle and Corporate Governance on Financial Statement Fraud at Metal and Mineral Companies Listed on the Indonesia Stock Exchange for the 2020–2024 Period

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ABSTRACT

This study examines the effect of the Fraud Triangle (Pressure, Rationalization, Opportunity) and corporate governance mechanisms—Rights and Equitable Treatment of Shareholders, Sustainability and Resilience, Disclosure and Transparency, and Responsibility of the Board—on Financial Statement Fraud (FSF) in listed metals and minerals companies on the Indonesia Stock Exchange. Using a quantitative approach with 90 firm-year observations from 2020 to 2024, FSF was measured using the Beneish M-Score and analyzed through logistic regression. The results reveal that only Pressure has a significant positive effect, while Disclosure and Transparency has a significant negative effect on fraud likelihood. Rationalization, Opportunity, and the remaining governance variables are not statistically significant. The model demonstrates an adequate fit, as indicated by a Nagelkerke R^2 value of 23.56%. These findings provide partial support for the Fraud Triangle and agency theory, suggesting that in emerging markets, pressure dominates as the primary fraud driver while transparency effectively deters fraudulent reporting. The study offers practical implications for prioritizing pressure monitoring and strengthening disclosure practices as strategic fraud prevention tools.

Keywords: Financial Statement Fraud, Pressure, Rationalization, Opportunity, Corporate Governance.

JEL Code: M42, M41, O16, G30, K13

I. Introduction

The recent developments in the investment landscape of the metals and minerals industry have attracted particular interest from investors. This is evidenced by the proliferation of companies in the metals and minerals industry that are listed on the Indonesia Stock Exchange, which has undergone consistent annual growth. In 2020, the number of companies operating in the metals and minerals industry was 28 (Indonesia Stock Exchange, 2021), but by 2024 had increased to 36 (Indonesia Stock Exchange, 2021). The number of companies operating in the metals and minerals industry has remained relatively static in comparison to other sectors, primarily due to the presence of significant capital barriers. Investors are advised



to exercise caution when considering investment in metals and minerals companies, given the industry's limited range of investment options, characterized by a reduced number of listed firms, minimal analyst coverage, and limited independent scrutiny (Tobuhu et al., 2025). This combination of factors leads to an increased concentration of risk and a concomitant reduction in the potential for diversification. This problem is further compounded by the elevated risk of fraud, which is inherent to the nature of precious metals as physical assets which contributes to the risk of fraud especially financial statement fraud (Williams, 2018). Furthermore, the opacity of extractive operations and the complexity of revenue recognition in commodity-based businesses create an environment where financial misstatements can remain undetected for extended periods. These structural characteristics make the metals and minerals sector a uniquely high-risk setting for financial statement fraud, warranting focused empirical investigation.

The phenomenon of financial statement fraud can be perpetrated by individuals at all levels of an organization, from the board of directors to the most junior staff, and is often facilitated by factors such as pressure, rationalization and opportunity, or known as fraud triangle (Adha & Indrayani, 2024). In instances where challenges are deemed unsolvable through legitimate methods, there is a risk of resorting to fraudulent practices. Fraud Financial Reporting affected by Pressure, especially from pressure from external parties like debt (Adha & Indrayani, 2024), but in some cases, pressure fails to effect financial statement fraud (Almalita, 2025). Fraudulent activities in financial reporting driven by rationalization (Syafiqoh & Harjanto, 2025), but in some cases, rationalization cannot affect the financial statement fraud (Amalia et al., 2025). Same with Pressure and Rationalization, Opportunity can affect fraud financial reporting (Arum et al., 2026), but in some cases fail to affect financial statement fraud (Almalita, 2025). These inconsistent findings suggest that the relationship between fraud triangle elements and financial statement fraud is not universal but rather contingent on contextual factors such as industry characteristics, regulatory enforcement, and organizational governance. The mixed evidence also highlights the need for sector-specific studies that can identify which fraud drivers are most salient in particular economic environments. Without such contextualized evidence, both researchers and practitioners risk applying generalized fraud prevention strategies that may be ineffective in specific industry settings.

Corporate governance minimizes fraudulent financial reporting through a multi-layered defense system in which independent boards of directors and audit committees serve as the cornerstone of objective oversight, challenging management's judgments and ensuring accountability in the financial reporting process (Committee of Sponsoring Organizations, 2016). Beneath this oversight layer, robust internal control systems and an independent internal audit function create preventive barriers that reduce opportunities for fraud by establishing segregation of duties, authorization protocols, and continuous monitoring of transactions (Organisation for Economic Co-operation and Development, 2026). Complementing these preventive measures, whistleblowing mechanisms and communication channels enable early detection of suspicious activities by encouraging employees and stakeholders to report misconduct without fear of retaliation. Together, these interconnected layers—oversight, prevention, and detection—form a comprehensive governance framework that not only deters fraudulent financial reporting but also increases the likelihood that any misconduct will be identified and addressed before it materially affects the integrity of financial statements. Corporate governance in some cases can affect fraudulent activities in financial statements but in some cases fail to affect fraud financial reporting (Tanjaya & Kwarto, 2022). This inconsistency raises important questions about whether formal governance structures are sufficient to deter fraud or whether their effectiveness depends on enforcement quality and the broader institutional environment. In emerging markets, where regulatory oversight may be weaker and ownership structures more concentrated, the gap between formal governance adoption and substantive implementation can be particularly pronounced. Consequently, examining governance mechanisms through a regionally grounded framework such as the ASEAN Corporate Governance Scorecard provides a more nuanced understanding of how governance operates in practice. Such an approach allows researchers to move beyond simple binary measures of governance presence and instead assess the quality and depth of governance implementation.

Consequently, this study aims to examine the influence of the Fraud Triangle (pressure, rationalization, opportunity) and the four ACGS-based corporate governance mechanisms on the likelihood of financial statement fraud in metals and minerals companies listed on the Indonesia Stock Exchange during the period from 2020 to 2024. Consequently, this study contributes by (i) providing sector-specific evidence from a high-risk industry that has not been extensively studied in emerging markets; (ii) testing the Fraud Triangle in conjunction with a comprehensive governance framework grounded in regional conditions, rather than merely isolated governance proxies; and (iii) identifying which mechanisms remain effective, thereby providing practical guidance for prioritising the monitoring of pressures and the prevention of disclosure-based fraud.

The study population comprises all 36 metals and minerals companies listed on the Indonesia Stock Exchange in 2024. The sampling method employed is purposive sampling, a non-probability technique in which firms are selected based on specific eligibility criteria aligned with the research objectives. The criteria are: (1) firms publicly listed on the IDX and classified in the metals and minerals sector throughout the 2020–2024 study period; (2) firms that issued complete annual reports and consolidated financial statements for each year from 2020 to 2024; and (3) firms that provided all data required for the computation of the Beneish M-Score and the corporate governance variables. Applying these criteria yielded 18 eligible firms. With five years of observation per firm, the final sample consists of 90 firm-year observations.

II. Literature Review and Hypothesis Development

2.1. Fraud Triangle on Financial Statement Fraud

The Fraud Triangle, originally developed by criminologist Donald Cressey in 1953, remains one of the most influential frameworks for understanding why financial statement fraud occurs (Schuchter & Levi, 2016). It posits that fraud emerges when three conditions converge: pressure, opportunity, and rationalization. A recent systematic literature review analyzing 50 journal articles published between 2014 and 2024 confirms that these three elements continue to be the dominant predictors of fraudulent financial statements, with pressure emerging as the most frequently examined factor in empirical research. This framework has been adopted by major auditing standards, including International Standard on Auditing 240, as known fraud risk factors (International Auditing and Assurance Standards Board, 2025). The enduring appeal of the Fraud Triangle lies in its simplicity and intuitive logic: when individuals face financial or personal pressure, perceive an opportunity to act without detection, and can rationalize their misconduct as justified or temporary, the likelihood of fraud increases substantially. Unlike more complex fraud models that incorporate numerous variables, the Fraud Triangle offers a parsimonious yet powerful lens for identifying the conditions under which fraudulent behavior is most likely to occur. Its widespread acceptance in both academic research and professional practice attests to its explanatory power across diverse organizational and cultural contexts. Moreover, the framework's integration into international auditing standards underscores its practical relevance for auditors, regulators, and corporate governance bodies seeking to assess fraud risk systematically. By focusing attention on the three fundamental conditions that enable fraud, the Fraud Triangle provides a structured basis for designing preventive controls and detection mechanisms. However, while the framework is widely used, its application requires careful consideration of how each element manifests in specific industry and institutional settings. The relative importance of pressure, opportunity, and rationalization may vary across sectors, depending on factors such as regulatory intensity, ownership concentration, and the complexity of financial transactions. Understanding these contextual variations is essential for developing targeted fraud prevention strategies that address the most salient risk factors in a given environment. Consequently, the Fraud Triangle serves not only as a theoretical foundation but also as a practical diagnostic tool that can be adapted to different organizational and market conditions.

Pressure refers to the financial or personal incentives that motivate an individual to commit fraud. In the context of financial statement fraud, pressure often stems from unrealistic earnings targets, debt covenant

requirements, or executive compensation tied to short-term profitability. A comprehensive systematic review of corporate governance and fraud research published between 2010 and 2024 found that financial statement fraud, corporate fraud, and fraudulent financial reporting are the most frequently studied types of fraud, with pressure consistently identified as a central driver (Aristiana, 2025). Recent empirical evidence from Indonesian manufacturing firms (2015–2024) further demonstrates that Fraud Heptagon elements—including pressure—show significant positive associations with fraudulent financial reporting (Novita et al., 2025). This evidence supports the expected relationship in the metals and minerals sector specifically because these firms are capital-intensive, heavily exposed to volatile commodity prices, and often debt-financed, meaning their reported earnings are unusually sensitive to external shocks while their fixed cost structures leave little margin for missing performance targets; the pressure to sustain Return on Assets at prior-year levels is therefore a structurally embedded condition of the industry rather than a generic incentive, which is why pressure is expected to be the dominant fraud driver among listed metals and minerals companies.

Hypothesis 1: Pressure has an effect on Financial Statement Fraud in listed metals and minerals companies.

Rationalization is the psychological process by which fraudsters justify their actions as acceptable or necessary. Common rationalizations include beliefs such as "everyone does it," "it is only a temporary fix," or "the company owes me this." A 2024 systematic literature review examining the Fraud Triangle's role in financial statement fraud found that six out of nine analyzed publications confirmed a significant relationship between the framework and fraud occurrence, even when internal control systems were in place—indicating that rationalization can override formal controls (Gading et al., 2024). The same study noted that weaknesses in the execution of internal controls still allow fraud to occur, highlighting how rationalization interacts with organizational conditions. This evidence is relevant to the sector because the inherent earnings volatility of extractive industries provides managers with a readily available justification: aggressive accounting or discretionary expense reporting can be framed as a legitimate means of smoothing cyclical results and presenting a "fairer" picture of firm performance to investors and lenders.

Hypothesis 2: Rationalization has an effect on Financial Statement Fraud in listed metals and minerals companies.

Opportunity refers to the circumstances that allow fraud to be committed and concealed, often arising from weak internal controls or ineffective oversight. Recent empirical research on Saudi listed companies (2014–2019) found that the likelihood of financial statement fraud is negatively and significantly related to board independence, providing direct evidence that governance mechanisms reduce opportunity by strengthening oversight (Ebaid, 2023). A recent study of Indonesian companies confirmed that an effective internal control system genuinely suppresses fraudulent practices rather than operating as a mere compliance formality, and it consistently moderates the relationship between fraud drivers and fraudulent reporting (Harjanto & Nursyifa, 2026). These findings collectively demonstrate that opportunity is not merely a theoretical construct but a measurable condition that can be systematically reduced through corporate governance reforms. Consequently, auditor change, the proxy used here, serves as a meaningful signal of weakened oversight in a setting where such oversight is already scarce.

Hypothesis 3: Opportunity has an effect on Financial Statement Fraud in listed metals and minerals companies.

2.2. Corporate Governance on Financial Statement Fraud

Company governance is the core mechanism for restraining financial statement fraud, and the ASEAN Corporate Governance Scorecard (ACGS) provides a systematic regional evaluation framework. Research

based on Indonesian non-financial listed companies demonstrates that corporate governance measured by ACGS has a significant negative impact on the likelihood of financial statement fraud (Nurhidayati & Hidayat, 2022). This indicates that the higher the quality of corporate governance, the lower the probability of fraud, providing direct empirical support for corporate governance as a fraud prevention mechanism. The ACGS framework is particularly valuable because it evaluates governance quality across multiple dimensions rather than relying on a single proxy. This multidimensional approach is especially important in emerging markets, where formal governance structures may exist on paper but operate inconsistently in practice. The scorecard also enables cross-country comparisons within the ASEAN region, allowing researchers to identify how institutional differences shape governance effectiveness. Its application in the Indonesian context is particularly relevant given the country's unique ownership structures and regulatory environment. By using the ACGS, this study can provide more nuanced insights into which specific governance dimensions are most effective in reducing fraud risk.

Rights and equitable treatment of shareholders require companies to protect shareholders' right to information and participation, and treat all shareholders fairly, especially minority shareholders. This governance principle reduces the "opportunity" element in the fraud triangle, because when shareholders' rights are effectively protected, management cannot easily conceal information or manipulate financial data. Institutional investor oversight—a typical manifestation of shareholder rights—has been shown to have a significant negative impact on fraudulent financial statements (Rahayuningsih, 2021). Effective shareholder rights mechanisms compel management to disclose financial information truthfully, increasing the difficulty of fraud. This evidence is directly applicable to the sector because ownership in Indonesian metals and minerals firms is often concentrated in founding families or controlling groups, leaving minority shareholders particularly vulnerable to expropriation and information asymmetry, so strong shareholder rights provisions represent a critical counterweight.

Hypothesis 4: Rights and equitable treatment of shareholders has an effect on Financial Statement Fraud in listed metals and minerals companies.

Sustainability and Resilience is an increasingly important dimension of corporate governance, emphasizing the board's role in reviewing capital structure and ensuring long-term strategic alignment. A study of energy sector companies across five ASEAN countries (Indonesia, Malaysia, Thailand, Philippines, and Vietnam) found that sustainability disclosure significantly affects earnings manipulation practices as a form of fraud financial statement (Ramadanti, 2025). Companies with higher sustainability disclosure quality demonstrate greater financial transparency and reduced earnings manipulation practices. By promoting long-term thinking and stakeholder-oriented decision-making, this dimension strengthens the integrity of financial reporting. This finding transfers directly to the metals and minerals sector because it shares the energy sector's extractive, capital-intensive nature, long investment horizons, and exposure to environmental and social scrutiny, meaning firms committing to substantive sustainability practices signal a longer-term orientation inconsistent with short-term earnings manipulation and raise the reputational cost of detected fraud.

Hypothesis 5: Sustainability and Resilience has effect on Financial Statement Fraud in listed metals and minerals companies.

Disclosure and Transparency is widely recognized as a cornerstone of effective corporate governance and a direct deterrent to fraud. Research on ASEAN Star companies confirmed that corporate governance mechanisms, especially disclosure and shareholder rights, influence how investors respond to earnings information (Faliana & Utami, 2021). Transparent disclosure of financial reports, related party transactions, and governance practices reduces information asymmetry between management and stakeholders. When transparency is high, the opportunity to conceal fraudulent activities diminishes significantly, as manipulation is more likely to be detected. The sector's most fraud-prone items—related-party transactions in a

concentrated-ownership environment and complex asset valuations—are precisely those transparency requirements bring into public view, disclosure functions as the primary mechanism through which outsiders can observe and challenge management's accounting judgments in a setting where external monitoring is otherwise thin.

Hypothesis 6: Disclosure and Transparency has an effect Financial Statement Fraud in listed metals and minerals companies.

Responsibility of the Board addresses the central oversight role that directors play in monitoring management and ensuring the integrity of financial reporting. A study of companies implementing the ACGS in Indonesia found that board characteristics—including board size, independence, and meeting frequency—play an important role in conducting effective oversight to reduce the likelihood of financial statement fraud (Arum & Wendry, 2024). Research on Indonesian energy sector companies further confirmed that independent commissioners and audit committees have a negative and significant effect on financial statement fraud (Satria et al., 2026). This dimension directly strengthens governance through competent, independent oversight that makes fraud more difficult to execute and conceal. This evidence is especially pertinent to the sector because listed metals and minerals firms are few, thinly covered, and often controlled by dominant shareholders, making the board—particularly its independent members and audit committee—one of the few credible internal checks on management's discretion over complex accounting estimates

Hypothesis 7: Responsibility of the Board has an effect on Financial Statement Fraud in listed metals and minerals companies.

The conceptual framework used in the study is illustrated in Figure 1.

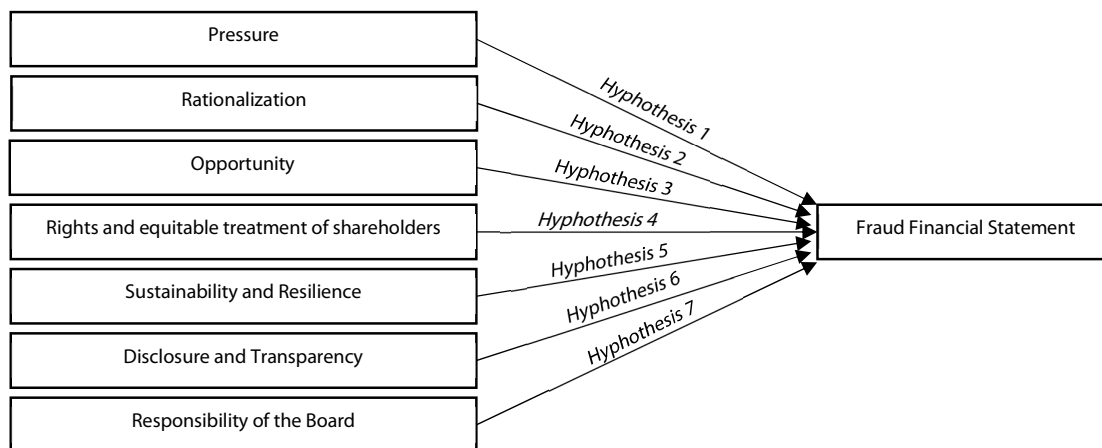


Figure 1. Conceptual Framework

III. Research Method

This study employs a quantitative approach using secondary data obtained from annual reports and financial statements of publicly listed companies The Indonesia Stock Exchange from 2020 until 2024. The research design is causal-explanatory, aiming to test whether fraud triangle proxied pressure, rationalization, and opportunity also corporate governance proxied Rights and equitable (independent variables) affect the likelihood of financial statement fraud (dependent variable). Financial statement fraud (FSF) is operationalized

as a dichotomous variable (1 = fraud indication, 0 = no fraud indication) which used measurement model is the Beneish M-Score (Wahyutari et al., 2025):

$$M\ Score = -4.84 + (0.92 \times DSRI) + (0.528 \times GMI) + (0.404 \times AQI) + (0.892 \times SGI) + (0.115 \times DEPI) - (0.172 \times SGAI) + (4.679 \times TATA) - (0.327 \times LVGI)$$

A company is classified as a fraud suspect if M-Score > -2.22. A company is classified a non-fraud suspect if M-Score < -2.22. All index used in M-Score formula as follows:

Tabel 1. M-Benesih Formula

Description	Formula
Days sales in receivable Index (DSRI)	$\frac{Receivables_t / Revenue_t}{Receivables_{t-1} / Revenue_{t-1}}$
Gross Margin Index (GMI)	$\frac{Gross\ Profit\ Margin_t}{Gross\ Profit\ Margin_{t-1}}$
Asset Quality Index (AQI)	$\frac{1 - \left((Current\ Asset_{t0} + PPE_{t0} + Securities_{t0}) / Total\ Assets_{t0} \right)}{1 - \left((Current\ Asset_{t-1} + PPE_{t-1} + Securities_{t-1}) / Total\ Assets_{t-1} \right)}$
Sales Growth Indeks (SGI)	$Revenue_{t0} / Revenue_{t-1}$
Depreciation Indeks (DEPI)	$\frac{Dep_{t-1} / PPE_{t-1} + Dep_{t-1}}{Dep_{t0} / PPE_{t0} + Dep_{t0}}$
Sales, General & Administrative Index (SGAI)	$\frac{SG\&A\ Expense_{t0} / Revenue_{t0}}{SG\&A\ Expense_{t-1} / Revenue_{t-1}}$
Total Accrual to Total Assets	$\frac{(WC_{t0} - WC_{t-1}) - (Cash_{t0} - Cash_{t-1}) + (Income\ Tax_{t0} - Income\ Tax_{t-1}) + (Current\ Maturities\ LTD_{t0} - Current\ Maturities\ LTD_{t-1}) - Dep\ Expense}{Total\ Asset_{t0}}$
Leverage Index	$\frac{Total\ Liabilities_{t0} / Total\ Assets_{t0}}{Total\ Liabilities_{t-1} / Total\ Assets_{t-1}}$

Pressure (PRESS) is proxied by external pressure, specifically the pressure to fulfill Return on Asset (ROA) targets. It is measured as the difference between the current year's ROA and the previous year's ROA (Narsa et al., 2023). A positive value indicates that the firm has met or exceeded its prior-year ROA, while a negative value indicates a shortfall, which may create pressure to manipulate earnings. Rationalization (RATIONAL) is measured by the portion of operating expenses relative to total revenue (Thanh & Huy, 2025). This proxy captures the extent to which management exercises discretion over operating expenses, which can be used to rationalize earnings management as a legitimate smoothing mechanism. A higher ratio indicates greater discretionary expense flexibility.

Opportunity (OPPORT) measured as dichotomous variable based on change of auditor (Narsa et al., 2023). A value of 1 indicates that the firm changed its auditor in the current year, signaling weakened oversight and increased opportunity for fraud; a value of 0 indicates no auditor change. Corporate governance measured with Rights and equitable treatment of shareholders (RETSH); Sustainability and Resilience (SUSNRES); Disclosure and Transparency (DISCNTRANS); Responsibility of the Board (RBOARD) based on ASEAN Corporate Governance Scorecard version 2024.

Rights and Equitable Treatment of Shareholders (RETSH): The ACGS score for this dimension, ranging from 0 to 1, captures the extent to which the company protects shareholder rights, ensures equitable treatment, and facilitates shareholder participation. The score is constructed from binary and ordinal items covering basic shareholder rights, the right to participate in decisions, and minority protection mechanisms. Higher scores indicate stronger protection. **Sustainability and Resilience (SUSNRES):** The ACGS score for this dimension, ranging from 0 to 1, reflects the board's role in reviewing capital structure, ensuring long-term strategic alignment, and integrating sustainability considerations. The score is based on disclosure and practice items related to strategic planning, risk oversight, and sustainability governance. **Disclosure and Transparency (DISCNTRANS):** The ACGS score for this dimension, ranging from 0 to 1, measures the quality and timeliness of financial and non-financial disclosure, including related-party transactions and governance practices. The score is constructed from items covering annual report quality, disclosure of material information, and independent verification.

Responsibility of the Board (RBOARD): The ACGS score for this dimension, ranging from 0 to 1, captures the board's accountability for strategy, risk, and financial reporting integrity. The score is based on items related to board composition, independence, committee structures, and performance evaluation. For each dimension, the ACGS provides a normalized score between 0 and 1, where higher values indicate better governance quality. The scoring procedure follows the ACGS methodology: each item is scored on a binary or ordinal scale, and the dimension score is calculated as the weighted average of item scores. The authors should provide the specific item-level coding scheme and weights in an appendix to facilitate replication. The data used in this study are secondary data derived from the annual reports and consolidated financial statements of metals and minerals companies listed on the Indonesia Stock Exchange (IDX). The data sources are the official IDX website (www.idx.co.id) and the companies' official websites. Financial statement data were extracted from audited annual reports for fiscal years 2020–2024. All variables—both dependent and independent—were derived from the same reporting period (fiscal year *t*) to ensure internal consistency and to avoid temporal mismatches that could distort causal interpretation. Corporate governance scores were obtained from the ASEAN Corporate Governance Scorecard (ACGS) assessments for the corresponding years. Observations with incomplete data required for the computation of any variable were excluded from the analysis, resulting in a final balanced panel of 90 firm-year observations. The data extraction process involved: (1) downloading annual reports and ACGS scorecards; (2) coding the financial variables into a standardized spreadsheet; (3) computing the Beneish M-Score for each firm-year; and (4) merging the financial and governance data by firm and year.

The analysis proceeds in two stages. First, a baseline model (Block 0) is estimated with only the constant term to establish the initial –2 Log Likelihood. Second, the full model (Block 1) is estimated with all seven independent variables. The logistic regression equation is:

$$\ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 PRESS + \beta_2 RATIONAL + \beta_3 OPPORT + \beta_4 RETSH + \beta_5 SUSNRES + \beta_6 DISCNTRANS + \beta_7 RBOARD + \varepsilon$$

where *p* is the probability of fraud indication. Model fit is assessed using the Hosmer-Lemeshow test and Nagelkerke *R*². Statistical significance is evaluated at the 5% level. All analyses were conducted using SPSS version 26.

IV. Result and Discussion

4.1. Result

Tabel 2. Descriptive

	N	Minimum	Maximum	Mean	Std. Deviation
FSF	90	.00	1.00	.2556	.43862
PRESS	90	-.16	.13	.0134	.05600
RATIONAL	90	-.01	.14	.0497	.02994
OPPORT	90	.00	1.00	.3778	.48755
RETSH	90	.33	.97	.5660	.16102
SUSNRES	90	.41	.91	.6566	.15495
DISCNTRANS	90	.50	.90	.7250	.09567
RBOARD	90	.30	.84	.5691	.16223

Tabel 2 presents descriptive statistics for eight variables—FSF, PRESS, RATIONAL, OPPORT, RETSH, SUSNRES, DISCNTRANS, and RBOARD—each measured across a consistent sample size of 90 observations (N=90). The data reveals considerable variation in central tendency and dispersion; DISCNTRANS has the highest mean at .7250, while PRESS has the lowest at .0134. Variability differs significantly across the dataset, with OPPORT showing the highest standard deviation (.48755) and widest range (0.00 to 1.00), suggesting it, along with FSF, acts as a binary variable, whereas PRESS exhibits the tightest clustering of data around its mean with the lowest standard deviation (.05600). Additionally, PRESS and RATIONAL are the only variables containing negative values in their ranges, with minimums of -.16 and -.01, respectively, while the remaining variables generally reflect moderate to high average scores with standard deviations ranging from approximately .09 to .16.

Tabel 3. Model Validation

	-2 Log Likelihood	Hosmer and Lemeshow Test	Nagelkerke R Square
Blok 0	102.449415	-	-
Blok 1	86.610610	0.605044	0.235621

Table 3 presents the model validation results for a logistic regression analysis, comparing the initial model (Blok 0) with the final model that includes the predictor variables (Blok 1). The -2 Log Likelihood value decreased from 102.449415 in Blok 0 to 86.610610 in Blok 1, indicating an improvement in the model's fit after the independent variables were added. Furthermore, the Hosmer and Lemeshow Test yielded a value of 0.605044; since this is greater than 0.05, it confirms that the model is a good fit for the data and there is no significant difference between the observed and predicted classifications. Finally, the Nagelkerke R Square value of 0.235621 suggests that approximately 23.56% of the variance in the dependent variable can be explained by the independent variables in the model.

Tabel 4. Model Validation

	B	Wald	Sig.
PRESS	18.897	7.713	.005
RATIONAL	2.805	.095	.758
OPPORT	.307	.311	.577
RETSH	-4.070	1.249	.264
SUSNRES	.787	.043	.836
DISCNTRANS	-11.238	5.260	.022
RBOARD	-2.853	1.026	.311

Table 4 presents the partial regression coefficients for seven independent variables predicting the likelihood of Financial Statement Fraud (FSF). The analysis reveals that only two variables significantly influence the occurrence of fraud at the 5% significance level ($\text{Sig.} < 0.05$). PRESS has a significant positive effect ($B = 18.897$, $\text{Sig.} = .005$), indicating that higher values of PRESS dramatically increase the probability of financial statement fraud. Conversely, DISCNTRANS has a significant negative effect ($B = -11.238$, $\text{Sig.} = .022$), suggesting that stronger DISCNTRANS mechanisms reduce the likelihood of fraud. The remaining variables—RATIONAL ($\text{Sig.} = .758$), OPPORT ($\text{Sig.} = .577$), RETSH ($\text{Sig.} = .264$), SUSNRES ($\text{Sig.} = .836$), and RBOARD ($\text{Sig.} = .311$)—are not statistically significant predictors, as their significance values exceed the 0.05 threshold, meaning they do not have a reliable impact on the dependent variable in this model.

4.2. Discussion

The logistic regression results offer partial support for the Fraud Triangle theory in the context of financial statement fraud. The finding that PRESS (Pressure) significantly increases the likelihood of fraud ($B = 18.897$, $\text{Sig.} = .005$) aligns with Cressey's foundational proposition that financial or non-financial pressure creates the incentive to commit fraud, a notion that is empirically validated by most fraud studies and highlights pressure as the dominant explanatory factor (Saikhu et al., 2025; Siregar et al., 2026). However, RATIONAL (Rationalization) and OPPORT (Opportunity) were not statistically significant, which departs from the classical model. While rationalization is inherently difficult to observe and measure, often producing inconsistent results in empirical literature, the non-significance of opportunity is more surprising given that weak internal controls are widely theorized as a primary enabler of fraud. This finding echoes mixed prior evidence where some studies found that opportunity, particularly regarding board effectiveness, did not significantly affect fraud (Herawati et al., 2022). This result is consistent with Adha and Indrayani (2024), who found that external pressure from debt and performance targets is a primary driver of fraudulent financial reporting in Indonesian state-owned banks. The magnitude of the coefficient ($B = 18.897$) is notably large, suggesting that even small changes in pressure conditions can substantially increase fraud probability in this sector.

However, RATIONAL (Rationalization) and OPPORT (Opportunity) were not statistically significant, which departs from the classical model. This finding contrasts with Syafiqoh and Harjanto (2025) and Arum et al. (2026), who reported significant effects for rationalization and opportunity, respectively, in other Indonesian contexts. Several explanations may account for this discrepancy. First, rationalization is inherently difficult to observe and measure using archival data; the proxy used here—the portion of operating expenses—may not adequately capture the psychological justifications that underlie fraud. Prior studies that found significant rationalization effects often used survey-based or qualitative methods (Gading et al., 2024), which are better suited to capturing cognitive processes. Second, opportunity, proxied by auditor change, may be a weak signal in the Indonesian metals and minerals sector because auditor rotation is mandatory every five years under Indonesian regulations (OJK Regulation No. 13/POJK.03/2017), meaning that auditor change is a routine compliance event rather than a reliable indicator of weakened oversight. Third, the industry context matters: metals and minerals firms in Indonesia often operate within conglomerate structures where internal control quality varies widely, and the presence of strong informal oversight by controlling families may substitute for formal governance mechanisms, thereby neutralizing the opportunity channel (Dwinanda & Utama, 2025). Fourth, the relatively small sample of 90 observations limits statistical power, making it difficult to detect small-to-moderate effects. These explanations should be treated as hypotheses for future research rather than definitive conclusions.

Regarding the corporate governance variables, the results show a fragmented rather than uniform pattern. DISCNTRANS (Disclosure and Transparency) was significant and negative ($B = -11.238$, $\text{Sig.} = .022$), suggesting that greater transparency reduces the likelihood of fraud, which confirms agency theory and the general literature that strong corporate governance mechanisms constrain managerial self-interest and deter fraudulent reporting (Devi, 2024; Rahman et al., 2024). This finding is particularly relevant for the metals and

minerals sector, where related-party transactions and complex asset valuations are common fraud-prone items; enhanced disclosure requirements directly reduce the informational gaps that enable such fraud.

Conversely, RETSH (Rights and Equitable Treatment of Shareholders), SUSNRES (Sustainability and Resilience), and RBOARD (Responsibility of the Board) were insignificant. This could reflect the contextual nature of governance effectiveness; the literature indicates that having formal governance structures in place is often insufficient, as their actual impact depends heavily on enforcement quality and the specific institutional environment (Dwinanda & Utama, 2025). In the Indonesian context, several factors may explain this insignificance. First, ownership concentration in metals and minerals firms means that controlling shareholders may dominate decision-making regardless of formal shareholder rights provisions, rendering RETSH ineffective in practice. Second, sustainability and resilience mechanisms may be adopted as symbolic compliance rather than substantive commitments, particularly in extractive industries where environmental and social pressures are high but enforcement is weak. Third, board responsibility may be formally assigned but not effectively exercised, especially when boards lack independence or when family ties blur accountability lines. These interpretations are consistent with the broader literature on governance in emerging markets, which emphasizes the gap between formal adoption and substantive implementation (Dwinanda & Utama, 2025; (Tanjaya & Kwarto, 2022). The overall model fit, with a Nagelkerke R^2 of 23.56%, indicates that the Fraud Triangle and ACGS governance variables explain a moderate portion of the variance in fraud likelihood. This suggests that other factors—such as internal control quality, audit quality, and industry-specific pressures—may also play important roles. The findings should therefore be interpreted as partial and context-dependent rather than universal.

V. Conclusion

The study provides partial support for the Fraud Triangle framework, demonstrating that Pressure remains the most robust predictor of financial statement fraud, while Rationalization and Opportunity failed to exhibit significant effects. This finding suggests that the classical Fraud Triangle may require contextual modification in emerging market settings, where pressure—often stemming from financial distress or performance targets—dominates as the primary fraud driver, while opportunity and rationalization may be neutralized or rendered less observable due to weak measurement or environmental factors. However, this interpretation should be treated with caution given the limited sample of 90 observations and the measurement limitations discussed above. The evidence is insufficient to establish a general revision of the Fraud Triangle; rather, it points to the need for further research using alternative proxies and larger samples. Furthermore, the significant negative effect of Disclosure and Transparency reinforces agency theory, confirming that transparency mechanisms can effectively reduce information asymmetry and constrain fraudulent behavior. However, the insignificance of Rights and Equitable Treatment of Shareholders, Sustainability and Resilience, and Responsibility of the Board indicates that the mere presence of governance structures does not guarantee fraud deterrence, challenging the assumption that formal governance mechanisms uniformly translate into effective monitoring. This implies that models of fraud prevention must account for enforcement quality and institutional context rather than assuming that governance adoption alone ensures effectiveness.

From a practical standpoint, the findings offer several actionable insights for managers and policymakers, given that PRESS is the strongest predictor of fraud, managers and regulators should prioritize early warning systems that monitor financial distress indicators, performance pressure, and external stressors. Specific actions include: (1) establishing defined early warning indicators such as declining ROA relative to prior-year levels, increasing debt-to-equity ratios, and negative operating cash flows; (2) implementing regular financial health assessments at the board level; and (3) integrating pressure indicators into internal audit risk assessments. The significant role of Disclosure and Transparency suggests that firms should strengthen disclosure practices and transparency mechanisms, not merely as a compliance exercise but as a strategic fraud deterrence tool. Specific actions include: (1) enhancing disclosure controls over related-party

transactions and complex asset valuations; (2) establishing verification mechanisms for substantive board oversight rather than relying on formal governance structures alone; and (3) providing training for disclosure officers on fraud risk indicators. The non-significance of RETSH, SUSNRES, and RBOARD warns managers against relying solely on formal governance structures—such as board composition or shareholder rights provisions—as sufficient safeguards against fraud. Instead, organizations should focus on the actual implementation and enforcement of governance practices, ensuring that boards are genuinely independent, sustainability commitments are substantive, and shareholder rights are actively protected. This may require: (1) periodic independent evaluations of governance effectiveness; (2) whistleblowing mechanisms with guaranteed protection for reporters; and (3) performance-based incentives for board members tied to fraud prevention outcomes.

This study has several limitations that should be acknowledged. First, the sample is limited to 90 firm-year observations from a single industry in one country, which restricts generalizability. Second, the proxies used for Rationalization and Opportunity may not fully capture the underlying constructs, and the ACGS scoring procedure, while systematic, involves judgment that may affect reliability. Third, the study period is relatively short, limiting the ability to observe long-term trends. Fourth, the logistic regression model, while appropriate for binary outcomes, assumes linearity in the logit and may not capture complex non-linear relationships. Future research should address these limitations in several ways: (1) Alternative proxies for Rationalization and Opportunity: Future studies could use survey-based measures of management attitudes, qualitative case analyses, or text-mining of management discussion and analysis (MD&A) sections to capture rationalization. For opportunity, internal control quality indices or audit committee effectiveness measures could be used instead of auditor change. (2) Broader governance indicators: Future research could incorporate additional governance dimensions, such as board diversity, audit committee expertise, and ownership structure, to provide a more comprehensive assessment of governance effectiveness. (3) Larger and more diverse samples: Expanding the sample to include multiple industries and countries would allow for comparative analysis and improve generalizability. Cross-country studies within ASEAN could leverage the ACGS framework to examine how institutional contexts moderate the relationship between governance and fraud. (4) Longitudinal and comparative designs: Longitudinal studies tracking firms over longer periods could identify temporal patterns in fraud occurrence and governance effectiveness. Comparative designs contrasting high-fraud and low-fraud industries could isolate industry-specific factors. (5) Integration of additional theoretical frameworks: Future research could integrate the Fraud Triangle with other frameworks, such as the Fraud Diamond or the GONE theory, to provide a more nuanced understanding of fraud.

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