

Decoding Financial Fraud: The Impact of Corporate Governance and the Fraud Triangle on F-Score

Yuliani Almalita

(Accounting, Trisakti School of Management, Indonesia)

ABSTRACT

This research aims to bridge the gap in fraud detection studies by integrating director attributes into fraud detection models, developing a comprehensive framework to assess their impact on fraudulent activities and governance improvement. The study focuses on manufacturing companies listed on the Indonesia Stock Exchange (IDX) from 2021 to 2023, with 72 companies selected through purposive sampling. Using logistic regression analysis, the findings reveal that while Directors' Age can decrease financial statement fraud, other factors such as Pressure, Opportunity, Rationalization, Managerial Ownership, Female Board Representation, and Directors' Education do not show a statistically impact. These results suggest that corporate governance mechanisms in Indonesia may operate differently from established fraud models, highlighting the need for further research to refine methodologies or adapt contextual frameworks for more effective fraud detection. This study underscores the importance of enhancing governance strategies in developing economies, where regulatory enforcement, cultural factors, and corporate structures may shape financial reporting integrity.

KEYWORDS: *Fraud, Directors' Education, Directors' Age, Female Board, Managerial Ownership*

1. INTRODUCTION

The phenomenon of financial fraud has been extensively studied, with a particular focus on the role of corporate governance and the fraud triangle in detecting and preventing fraudulent activities. Financial fraud refers to the intentional misrepresentation of financial information to deceive stakeholders, which can lead to significant financial losses and erosion of trust in financial markets. The F-Score, developed by [1], is a widely used metric to detect financial fraud by analyzing financial statements for red flags such as aggressive revenue recognition, expense management, and other manipulative practices [2], [3], and [4]. Financial fraud have been a major concern in corporate governance, as they undermine investor confidence and distort financial markets. The fraud triangle theory, developed by Cressey in 1953, identifies pressure, opportunity, and rationalization as key drivers of fraudulent behavior. Pressure refers to the incentives or motivations that drive individuals or organizations to commit fraud, such as financial difficulties or the desire to meet performance targets. Opportunity refers to the circumstances that enable fraud, such as weak internal controls or lack of oversight. Rationalization refers to the justifications or excuses used by individuals to justify their fraudulent actions [5].

Indonesia has witnessed several high-profile cases of financial report fraud involving corporate executives, highlighting weaknesses in corporate governance and financial oversight. One notable case is the financial scandal surrounding Garuda Indonesia in 2019, where the airline's executives manipulated financial statements to report a false profit of USD 809,000 instead of the actual net loss of USD 175 million. The fraudulent accounting practice involved premature revenue recognition from a contract with Mahata Aero Teknologi. This manipulation led to sanctions against Garuda's former directors by Indonesia's Financial Services Authority. Studies analyzing this case have identified indications of earnings manipulation in Garuda Indonesia's financial statements, particularly in 2018, including recording income too early and recognizing fictitious revenue [6]. These cases underscore systemic issues, such as weak internal controls, regulatory loopholes, and conflicts of interest, which enable financial fraud in Indonesia. Strengthening financial transparency, corporate governance, and enforcement mechanisms is critical to preventing similar fraudulent activities in the future. Beyond these psychological and organizational factors, corporate governance which encompasses the systems, processes, and practices by which companies are directed and controlled, plays a critical role in mitigating financial fraud. Corporate governance attribute such as director education, managerial ownership, board gender diversity, and director age also play a crucial role in influencing the likelihood of financial statement fraud [1].

Previous research has identified critical factors influencing fraudulent activities, including corporate governance mechanisms and director characteristics. For instance, studies have explored how financial stability, external pressure, and audit quality contribute to financial statement fraud. Research by [7] highlights that external pressure positively affects fraudulent reporting, while audit quality and financial stability show limited influence. [8] suggest that better-educated boards may improve short-term performance but not sustain it long-term. Managerial ownership has been linked to reduced financial reporting fraud, as demonstrated by [9], although its effectiveness varies across ownership types. Gender diversity on boards has shown positive effects, with [10] and [11] showing its role in improving governance mechanisms and financial outcomes. Despite these insights, gaps remain in understanding the interplay of these characteristics collectively and their practical application in fraud detection and governance improvement. This research aims to address these gaps by integrating director attributes with fraud detection models to develop a comprehensive framework for evaluating their impact on fraudulent activities and governance improvement.

Despite the significant progress in financial fraud detection, there are several research gaps that remain to be addressed. One of the key gaps is the lack of integration between corporate governance and fraud triangle theories in fraud detection models. While corporate governance mechanisms have been shown to mitigate financial fraud, there is limited research on how these mechanisms interact with the elements of the fraud triangle to influence fraudulent behavior [2]. The novelty of the research lies in its integration of corporate governance and fraud triangle theories, which have traditionally been studied in isolation. By examining how corporate governance mechanisms interact with the elements of the fraud triangle, the research will provide new insights into the ways in which these mechanisms can be optimized to mitigate financial fraud.

The study of corporate governance effectiveness in developing countries, particularly in Indonesia. This study was conducted during the 2021–2023 period. The unique regulatory framework, economic policies, and business environment within the Indonesian context may offer distinct perspectives and contribute valuable insights to the existing literature on corporate governance and the likelihood of corporate fraud.

This research aims to provide valuable insights for policymakers and regulators by identifying which aspects of corporate governance should be reinforced to combat financial statement fraud, improve earning quality, and restore investor confidence. It also offers strategic guidance for organizations, highlighting the role of corporate governance in reducing fraudulent financial reporting. Additionally, the findings will assist shareholders and other stakeholders in recognizing red flags of corporate fraud, minimizing fraud-related losses, and serving as a deterrent to fraudulent practices. While advanced techniques for detecting fraud exist. This research holds the potential to benefit investors and strengthen fraud prevention mechanisms across firms

2. LITERATURE REVIEW

Fraud Theory

The Fraud Triangle Theory, conceptualized by Donald Cressey in 1953, is a widely recognized framework for understanding the motivations behind fraudulent behavior. It identifies three key elements that must coexist for fraud to occur: pressure, opportunity, and rationalization. Pressure refers to the financial or emotional stress that drives individuals to commit fraud, such as debt or addiction. Opportunity arises from weak internal controls or poor governance, enabling individuals to exploit systems. Rationalization involves the perpetrator justifying their unethical actions, often by convincing themselves that their behavior is acceptable or deserved. Despite its widespread adoption, the theory has faced criticism for its inability to account for all motivations behind fraud, prompting researchers to propose additional factors and refine its application. Studies have demonstrated its relevance across various industries, emphasizing the importance of robust internal controls and ethical organizational cultures to mitigate fraud risks [12], [5].

Pressure and Fraudulent Financial Statement

Pressure, often proxy by leverage, significantly influences fraudulent financial reporting, as evidenced by studies employing the F-Score model. Leverage, which reflects a company's financial obligations, creates external pressure on management to meet debt covenants or maintain favorable credit ratings. This pressure often leads to manipulative practices in financial reporting to present a more stable financial position [13]

The F-Score model, developed by [1], is a widely recognized tool for detecting financial anomalies and fraudulent activities. Empirical research, such as studies on manufacturing firms in Indonesia, has demonstrated a positive correlation between high leverage and elevated F-Score values, indicating a higher likelihood of financial statement fraud. These findings underscore the importance of robust corporate governance and effective internal controls to mitigate the risks associated with financial pressures [7] [14]. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated.

H1: Pressure increase fraudulent financial statement

Opportunity and Fraudulent Financial Statement

The opportunity for fraudulent financial reporting is closely linked to the effectiveness of independent commissioner monitoring, which serves as a critical component of corporate governance. Independent commissioners play a vital role in overseeing management activities, ensuring compliance with financial reporting standards, and mitigating the risk of opportunistic behavior [15]. When independent commissioners fail to perform their monitoring duties effectively, the likelihood of earnings manipulation and fraudulent reporting increases, as weak oversight creates an environment conducive to unethical practices [16]. Empirical studies suggest that firms with a higher proportion of independent commissioners and stronger governance mechanisms exhibit greater financial reporting quality and lower instances of financial fraud [17]. Enhancing the effectiveness of independent commissioner monitoring is therefore essential to reducing fraud risk and strengthening financial transparency, ultimately fostering investor confidence and regulatory compliance. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated.

H2: Opportunity increase fraudulent financial statement

Rationalization and Fraudulent Financial Statement

Rationalization serves as a pivotal determinant of fraudulent financial reporting, as it encapsulates the reasoning employed by management to justify unethical accounting practices. A frequently utilized proxy for rationalization is the accrual-to-total-assets ratio, which evaluates the extent to which earnings are shaped by discretionary accounting practices instead of genuine cash flows [1]. Elevated accrual ratios often point to aggressive earnings management, shedding light on the potential rationale behind financial misstatements [18]. Empirical findings indicate that organizations exhibiting unusually high accrual levels are more inclined to manipulate earnings to achieve financial objectives, obscure weak performance, or sustain positive perceptions in the market [19]. The scrutiny of accrual-based earnings management is crucial for identifying fraudulent financial reporting, as significant accrual adjustments often serve as a warning sign of financial discrepancies. Enhancing the robustness of internal controls and reinforcing corporate governance frameworks are vital measures to diminish the incidence of fraudulent reporting by reducing the ability of management to rationalize unethical behaviors. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated.

H3: Rationalization increase fraudulent financial statement

Managerial Ownership and Fraudulent Financial Statement

Corporate governance plays a critical role in mitigating financial reporting fraud, particularly through the proxy of managerial ownership. Managerial ownership, defined as the percentage of equity possessed by management, has the potential to affect financial reporting practices in both advantageous and disadvantageous manners. Specifically, an increase in managerial ownership harmonizes the objectives of managers with those of shareholders, thereby mitigating agency conflicts and promoting enhanced financial transparency [20]. Research conducted in emerging markets, including Indonesia, highlights the importance of managerial ownership as a governance mechanism to deter fraudulent practices and uphold the integrity of financial statements. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated.

H4: Managerial Ownership decrease fraudulent financial statement

Female Board and Fraudulent Financial Statement

Corporate governance structures that integrate gender diversity, especially through the appointment of female directors, have demonstrated a substantial capacity to mitigate instances of financial reporting fraud. Research indicates that firms with gender-diverse boards experience fewer financial restatements and a lower incidence of fraud, suggesting that the presence of women enhances board oversight and ethical standards. Moreover, studies have found that independent female directors, especially those with financial expertise, play a crucial role in mitigating financial fraud. Furthermore, organizations that include female members on their boards exhibit a diminished propensity to partake in fraudulent financial statement, thereby underscoring the critical role of board gender diversity in fostering financial integrity [21]. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated.

H5: Female Board decrease fraudulent financial statement

Directors' Age and Fraudulent Financial Statement

The chronological age of corporate directors, serving as an indicator of governance practices, has been recognized as a critical determinant affecting the propensity for financial reporting fraud. Older directors often bring extensive experience, stability, and a long-term perspective to governance, which can deter unethical practices and enhance oversight. In contrast, less experienced directors may demonstrate elevated risk-taking behaviors, thereby potentially augmenting the likelihood of financial misrepresentation. Recent studies have explored the relationship between director age and fraudulent financial reporting, highlighting that firms with older directors tend to demonstrate stronger adherence to ethical standards and regulatory compliance. For instance, research by [22] found that director age negatively correlates with financial statement fraud in Indonesian manufacturing firms, emphasizing the importance of age diversity in governance structures. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated

H6: Directors' Age decrease fraudulent financial statement

Directors' Education and Fraudulent Financial Statement

Corporate governance literature underscores the significance of directors' educational backgrounds in mitigating financial reporting fraud. Directors with expertise in financial and industry-specific domains are better equipped to oversee complex financial transactions and reporting processes, thereby enhancing the board's oversight capabilities and reducing the likelihood of fraudulent activities. For instance, a study by [23] highlights that robust corporate governance mechanisms, including board financial expertise, significantly diminish companies' propensity toward fraudulent financial reporting. Similarly, research by [24] indicates that board members' educational qualifications and professional expertise play a crucial role in ensuring financial statement integrity. Furthermore, [25] demonstrate that board characteristics, such as financial literacy and educational background, are instrumental in reducing the likelihood of financial statement fraud in Indonesian public companies. These findings collectively suggest that the educational qualifications of board members are pivotal in strengthening corporate governance frameworks and safeguarding against financial misreporting. Drawing upon this analysis and the underlying theoretical framework, the subsequent hypothesis can be formulated

H7: Directors' Education decrease fraudulent financial statement

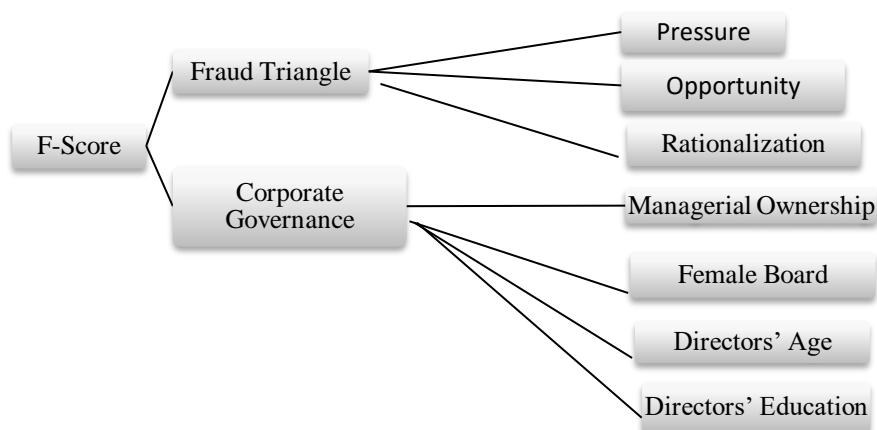


Figure 1 Research Model

3. METHODOLOGY

The research objects used in this study are focused on companies in the manufacturers sectors listed on the Indonesia Stock Exchange (IDX) during the period 2021-2023. However, due to this study using variables from t-1, the sample collection was conducted by the researcher from the year 2020. The sample used in this study is selected using purposive sampling method.

Table 1 Sample Selection Procedure

No	Description	Number of Companies	Total of Data
1	During the research period, companies in the manufacturers sectors that were listed on the Indonesia Stock Exchange were examined.	159	477
2	inconsistently publish annual reports	-15	-45
3	Companies that do not present financial reports as of December 31	-3	-9
4	Companies that experience losses	-69	-207
Total Sample		72	216

Operational Definition and Measurement

Fraudulent Financial Statement

Fraudulent financial statements can be measured using the F-Scores Model. The F-Score was conceived by [1], which employed the aggregate of accrual quality alongside financial performance metrics. F-Scores are the sum of two variables, namely accrual quality and financial performances, which can be described in the following equation:

$$F\text{-Scores} = \text{Accrual Quality} + \text{Financial Performances}$$

Accrual quality is calculated using RSST accrual (Richardson, Sloan, Soliman, and Tuna)

$$RSST\ accrual = \frac{\Delta WC + \Delta NCO + \Delta FIN}{\text{Averages Total Assets}}$$

WC = Current Assets - Current Liability

NCO = (Total Assets - CA - Investment and Advances) - (Total Liabilities - CL - Long Term Debt)

FIN = Total Investment - Total Liabilities

Financial performances = Change in Receivables + Change in Inventories + Change in Cash Sales + Change in Earnings

$$\text{Change in Receivables} = \frac{\Delta \text{Receivables}}{\text{Average Total Assets}}$$

$$\text{Change in Inventories} = \frac{\Delta \text{Inventories}}{\text{Average Total Assets}}$$

$$\text{Change in Cash Sales} = \frac{\Delta \text{Sales}}{\text{Sales}(t)} - \frac{\Delta \text{Receivables}}{\text{Receivables}(t)}$$

$$\text{Change in Earnings} = \frac{\text{Earnings}(t)}{\text{Average Total Assets}(t)} - \frac{\text{Earnings}(t-1)}{\text{Average Total Assets}(t-1)}$$

The measurement of the average value of the dependent variable fraudulent financial statement using the F-score measurement can be measured with a dummy variable. If the lowest score of the fraudulent financial statement is 0, this indicates that the company does not commit fraud that is close to the value of $f < 1.00$. If the highest score of the fraudulent financial statement is 1, this indicates that the company commits fraud that is close to the value of $f > 1.00$.

Table 2. Definition Independent Variables

Independent variables	Measurement
Pressure	Total debt / Total assets
Opportunity	Number of Independent Commissioners / Total Number of Commissioners
Rationalization	(Net Income - Cash flow Operation) / Total Assets
Managerial Ownership Female Board	Shares Owned by Management / Outstanding Common Shares

	Number of Female Directors / Total Board of Directors
Directors' Age	Total Age of Directors / Number of Directors
Directors' Education	Total Education Level of Directors / Number of Directors, a score of 1 for a diploma, 2: for a bachelor's degree, 3: for a master's degree, and 4: for a doctoral degree

Hypothesis testing, wherein the regression equation framework employed in the study is delineated as follows:

$$\text{Fraud} = \beta_0 + \beta_1 \text{Pressure} + \beta_2 \text{Opportunity} + \beta_3 \text{Rationalization} + \beta_4 \text{Managerial Ownership} + \beta_5 \text{Female Board} + \beta_6 \text{Directors' Age} + \beta_7 \text{Directors' Education} + \varepsilon$$

Fraud, serves as the dependent variable. Seven independent variables have been defined earlier section. In the above logistic regression model is used for testing H1 to H7

4. RESULT

Table 3 Descriptive Statistical Test Results

	N	Minimum	Maximum	Mean	Std. Deviation
Fraud	216	0	1	0.0324	0.17749
Pressure	216	0.03	0.8	0.3406	0.16342
Opportunity	216	0.25	0.83	0.4381	0.1139
Rationalization	216	-0.21	0.45	-0.0097	0.07374
Managerial Ownership	216	0	0.71	0.0854	0.16857
Female Board	216	0	0.75	0.1381	0.17723
Directors' Age	216	35.67	74.33	54.7978	6.28447
Directors' Education	216	1	3	2.2563	0.35005

Table 4 Results of Fraudulent Financial Statement Frequency Testing

Value	Description	Frequency	Percent (%)
0	Companies with no financial statement fraud	209	96.8
1	Companies with financial statement fraud	7	3.2
	Total	216	100

Table 5 t-Test Results

Variables	B	Sig.	Exp (B)	Result
Pressure	1.616	0.625	5.031	H1 not accepted
Opportunity	-6.565	0.232	0.001	H2 not accepted
Rationalization	6.59	0.118	727.441	H3 not accepted
Managerial Ownership	3.808	0.073	45.055	H4 not accepted
Female Board	2.858	0.225	17.422	H5 not accepted
Directors' Age	-0.177	0.042	0.838	H6 accepted
Directors' Education	-0.578	0.613	0.561	H7 not accepted
Constant	8.133	0.163	3405.114	-

Table 3 presents the results of descriptive statistical tests. Fraudulent financial reporting is relatively rare, with an occurrence rate of only 3.24%. Financial pressure, measured by total debt to total assets, has a moderate mean of 0.3406, indicating that firms in the dataset generally rely on some level of debt financing. Opportunity, represented by the number of independent commissioners relative to the total commissioners, has a mean of 0.4381, suggesting that nearly half of the board members are independent, which may enhance oversight but still leaves room for governance weaknesses. Rationalization, has a near-zero mean (-0.0097) with both positive and negative values, implying that some firms may manipulate earnings while others show financial

transparency. Managerial ownership is relatively low, averaging only 8.54%, which may weaken the alignment between management and shareholder interests. Female representation on corporate boards remains relatively low, averaging 13.81% of board positions. However, certain companies stand out by having a much higher share of female directors, reaching up to 75% in some cases. The average age of directors is 54.8 years, indicating experienced leadership, while the education level of directors averages 2.2563, meaning that most hold at least a bachelor's degree, with some attaining higher qualifications.

Table 4 shows that financial statement fraud is an uncommon occurrence among the companies examined. Among the 216 companies analyzed, only 7 firms (3.2%) were found to have committed fraudulent financial reporting, while the vast majority, 209 firms (96.8%), adhered to ethical reporting standards. This implies that most companies in the sample uphold ethical reporting standards, potentially due to robust regulatory measures, effective corporate governance, or strong internal controls. However, even this small fraction of fraud cases highlights the critical need for stringent financial monitoring, as such misconduct, although infrequent, can lead to severe financial losses and reputational harm for stakeholders.

Table 5 shows that hypothesis testing results presented in the table reveal mixed findings on the factors influencing financial reporting fraud. Hypothesis 6 (H6), examining the impact of Directors' Age, is accepted with statistical significance (Sig. = 0.042) and an Exp (B) of 0.838, implying that younger directors may have a higher likelihood of detecting or engaging in fraud due to their decision-making dynamics and experienced directors tend to exhibit stronger ethical decision-making and corporate governance effectiveness consistent with prior studies such as [22]. These findings suggest that while Directors' Age is a crucial factor, other variables might require refined methodologies or different contextual frameworks to uncover their influence on financial reporting fraud, emphasizing the need for continued research in governance mechanisms in developing countries like Indonesia.

5. CONCLUSION

This study has several limitations that should be acknowledged. The sample size of 216 companies may restrict the applicability of the findings to a broader population. Broadening the sample to encompass companies from various industries and regions could improve the applicability of the findings. Future studies could benefit from investigating governance mechanisms and fraud dynamics across diverse industries and regulatory environments. Expanding the scope to emerging markets or conducting cross-country comparisons may uncover global patterns and unique local influences on financial fraud. The study highlights the importance of robust policies to combat financial statement fraud effectively. Policymakers should strengthen regulatory frameworks by enhancing board independence and oversight capabilities, including mandatory qualifications and training programs for board members. Promoting diversity in corporate boards—encompassing gender, age, and educational backgrounds—can improve governance outcomes and foster ethical practices. Increased transparency in corporate reporting, including detailed disclosures on internal controls and fraud prevention measures, is vital for building stakeholder confidence. Moreover, initiatives aimed at educating investors can strengthen their ability to spot warning signs and ensure corporate accountability, fostering greater transparency and ethical practices within the business landscape.

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