



DETERMINANTS OF FRAUDULENT FINANCIAL STATEMENTS IN INDONESIAN INSURANCE COMPANIES: A FRAUD HEPTAGON APPROACH

Jesika Kristina Butarbutar*, Richatul Jannah
Semarang State University
Correspondence*: jesikabutarbutar20@gmail.com

Submitted: 18 March 2026, Accepted: 15 April 2026, Published: 17 April 2026

Abstract

This study investigates the determinants of Fraudulent Financial Statement (FFS) from the perspective of the Fraud Heptagon in insurance companies listed on the Indonesia Stock Exchange during the 2020–2024 period. Using purposive sampling, the study obtained 60 firm-year observations from 12 insurance companies based on annual financial statements published by the Indonesia Stock Exchange and the respective company websites. Fraudulent Financial Statement is measured using the Beneish M-Score, while the independent variables represent the seven dimensions of the Fraud Heptagon: pressure (leverage ratio/LEV), opportunity (proportion of independent board of commissioners/BDOUT), rationalization (total accruals to total assets/TATA), capability (change in directors/DCHANGE), arrogance (CEO pictures/CEOPIC), ignorance (corporate governance education/INEDU), and greed (executive director remuneration/EXREMU). The data were analyzed using panel logistic regression with EViews 12. The results indicate that, on a partial basis, only rationalization (TATA) has a positive and significant effect on the likelihood of Fraudulent Financial Statement, whereas the other six variables do not show statistically significant effects. Simultaneously, however, the Fraud Heptagon variables jointly explain the probability of FFS occurrence. These findings suggest that accrual-based rationalization remains the most salient indicator in detecting financial statement fraud in the Indonesian insurance sector, while the explanatory power of the remaining Fraud Heptagon dimensions appears to be context-dependent.

Keywords: Fraud Heptagon, Fraudulent Financial Statement, Beneish M-Score, Insurance Companies

A. INTRODUCTION

Financial statements function as a principal accountability mechanism through which management reports the use of entrusted resources and communicates the financial condition and performance of the firm to stakeholders. In this regard, financial reporting is expected to provide reliable, relevant, and faithfully represented information to support decision-making by investors, creditors, regulators, and other users (Ikatan Akuntan Indonesia, 2020). The quality of financial statements is therefore fundamental not only to corporate governance, but also to the efficiency of capital markets. When reported information is materially misstated or intentionally manipulated, however, the credibility of financial reporting is undermined and the risk of inefficient decision-making increases substantially.

One of the most serious manifestations of such misconduct is Fraudulent Financial Statement (FFS), namely the intentional manipulation of accounting information in order to mislead users regarding a company's financial performance or position. Fraudulent financial reporting typically arises when managers attempt to preserve a favorable image of corporate performance, avoid contractual consequences, or conceal deteriorating economic conditions (Tiffani & Marfuah, 2015). Unlike unintentional accounting errors, fraudulent financial statement practices involve deliberate efforts to distort reality for private or organizational gain (Lestari & Henny, 2019). As a result, this form of fraud poses particularly severe implications for investor trust, market discipline, and the integrity of financial reporting systems.

Although financial statement fraud occurs less frequently than other forms of occupational fraud, it generates the greatest financial losses. According to the global reports issued by the Association of Certified Fraud Examiners (ACFE), asset misappropriation remains the most common category of fraud, followed by corruption, while financial statement fraud appears least frequently. Nevertheless, ACFE reports consistently show that financial statement fraud causes the highest median loss among the three categories, making it especially damaging despite its lower incidence (ACFE, 2020; ACFE, 2022; ACFE, 2024). In Indonesia, the *Survei Fraud Indonesia* published by ACFE Indonesia Chapter (2025) similarly indicates that financial statement fraud occurs less often than corruption and asset misuse, yet remains highly consequential because of its potential to distort economic judgment and damage institutional credibility.

Within this broader context, the insurance sector deserves particular attention. Insurance companies play a strategic role in financial intermediation and risk management, and their business models are highly dependent on public trust, solvency perception, and the quality of financial disclosures. At the same time, insurance firms operate in a complex accounting environment involving technical reserves, claims recognition, premium revenue allocation, and actuarial estimation. Such complexity may increase the opportunity for earnings management and financial misstatement when governance and monitoring mechanisms are weak. ACFE (2024) indicates that the insurance sector remains among the industries vulnerable to fraudulent practices, while domestic cases such as the alleged premium fraud involving PT Asuransi Jiwa Sinarmas MSIG Life demonstrate that the sector is not immune from misconduct involving financial information and document manipulation (investor.id, 2023).

To explain the drivers of fraud, the literature has progressively developed from the Fraud Triangle to the Fraud Diamond, Fraud Pentagon, and more recently the Fraud Heptagon. The Fraud Heptagon framework extends earlier models by incorporating seven interrelated dimensions: pressure, opportunity, rationalization, capability, arrogance, ignorance, and greed (Yusof, 2016). Compared with earlier frameworks, the Fraud Heptagon offers a broader explanation of fraudulent behavior because it does not only capture financial pressure and control weaknesses, but also accounts for managerial attributes, ethical indifference, and excessive self-interest. This makes it particularly relevant for financial statement fraud, which often involves both organizational incentives and individual-level justification.

Previous studies have applied fraud-based theoretical frameworks to detect fraudulent financial statements across different industries, including mining, banking, logistics, infrastructure, and transportation sectors (Nadziliyah & Primasari, 2022; Handoko et al., 2022; Djami, 2024; Pamungkas & Irwandi, 2024; Satata et al., 2024). Their findings, however, remain inconclusive. Some studies report that leverage, accruals, changes in directors, or governance-related variables significantly explain fraudulent financial reporting, while others find weak or insignificant effects for the same variables. This inconsistency suggests that the relevance of Fraud Heptagon dimensions may vary across sectors and institutional settings. In the case of insurance firms, the evidence remains limited, even though the sector combines reporting complexity, regulatory sensitivity, and high reputational exposure.

Against this background, the present study addresses a specific gap in the literature by examining the determinants of Fraudulent Financial Statement in insurance companies listed on the Indonesia Stock Exchange during 2020–2024 using the Fraud Heptagon framework. The contribution of this study lies not in claiming an entirely new theory, but in testing whether the seven dimensions of the Fraud Heptagon remain relevant in a sector characterized by distinctive financial-reporting complexity and trust dependence. In addition, the study employs the Beneish M-Score as a proxy for fraudulent financial statement indication and uses panel logistic regression to evaluate the predictive role of the seven explanatory variables. In doing

so, the article contributes to the empirical discussion on fraud detection by clarifying which dimensions of the Fraud Heptagon are more salient in the Indonesian insurance context.

Accordingly, this study aims to examine the ability of the seven Fraud Heptagon dimensions to explain the likelihood of Fraudulent Financial Statement in Indonesian listed insurance companies. More specifically, the study evaluates the effects of pressure proxied by leverage ratio (LEV), opportunity proxied by the proportion of independent commissioners (BDOUT), rationalization proxied by total accruals to total assets (TATA), capability proxied by change in directors (DCHANGE), arrogance proxied by CEO pictures in annual reports (CEOPIC), ignorance proxied by corporate governance education (INEDU), and greed proxied by executive director remuneration (EXREMU). Through this focus, the study is expected to enrich the literature on fraud detection while also offering practical insight for corporate governance, financial supervision, and the early identification of financial reporting risk in the insurance sector.

B. LITERATURE REVIEW

1. Fraudulent Financial Statement

Fraudulent Financial Statement (FFS) refers to the intentional manipulation or misstatement of financial reporting in order to mislead users regarding a company's actual financial condition and performance. According to the Association of Certified Fraud Examiners, fraudulent financial reporting occurs when management deliberately distorts accounting information so that the resulting financial statements no longer faithfully represent the underlying economic reality (ACFE, 2022). In this sense, the defining element of FFS is not merely error or misclassification, but **intentional deception**, which distinguishes it from unintentional accounting mistakes or reporting negligence (Lestari & Henny, 2019).

Financial statements fundamentally serve as a communication mechanism between management and external stakeholders concerning the firm's performance, financial position, and prospects. Because of this role, users of financial statements—including investors, creditors, regulators, and policy institutions—depend on the reliability and integrity of reported information in making economic judgments. When management intentionally manipulates that information, the reporting function of financial statements is undermined, and the resulting asymmetry of information may lead to inefficient capital allocation, regulatory risk, and loss of stakeholder trust (Handoko et al., 2022; Sari et al., 2020).

In practice, fraudulent financial reporting often takes the form of overstated revenues and assets, understated expenses and liabilities, or the concealment of material information that would otherwise affect users' perceptions of company performance (ACFE, 2024; Nadziliyah & Primasari, 2022). These manipulations are generally motivated by financial pressure, personal interest, contractual incentives, reputational concerns, or managerial attempts to preserve the appearance of stability and growth (Desai, 2020). Fraudulent reporting therefore represents not only an accounting problem, but also a governance problem, because it reflects the interaction between managerial incentives, monitoring weaknesses, and ethical failure. In addition to financial losses, its consequences may include reputational damage, deteriorating organizational trust, and broader systemic instability in the market environment (Nugroho & Diyanty, 2022).

Within this study, FFS is positioned as the dependent variable and is examined as an indication of possible manipulation in the annual reports of listed insurance companies. This focus is particularly relevant because insurance firms operate in a reporting environment characterized by estimation complexity, reserve recognition, and sensitivity to confidence-based market evaluation, all of which heighten the importance of financial reporting credibility.

2. Fraud Heptagon Theory

The theoretical explanation of fraud has evolved over time. The earliest and most widely known framework is the **Fraud Triangle**, introduced by Cressey (1954), which explains fraud through three interacting elements: **pressure**, **opportunity**, and **rationalization**. Pressure refers to financial or non-financial demands that motivate misconduct; opportunity arises when internal controls or monitoring mechanisms are weak; and rationalization refers to the moral justification used by perpetrators to legitimize their actions. This framework became foundational because it offered a simple and persuasive explanation for why fraud occurs.

Subsequent developments argued that the Fraud Triangle was not sufficient to explain more complex or high-level organizational fraud. Wolfe and Hermanson (2004) therefore introduced the **Fraud Diamond**, adding **capability** as an additional dimension. Capability highlights the fact that fraud requires not only motive and opportunity, but also the technical competence, strategic position, and organizational access necessary to execute and conceal manipulation effectively. This addition is particularly relevant in corporate settings, where sophisticated financial reporting fraud cannot be carried out without a certain degree of authority, expertise, or insider knowledge.

The evolution of fraud theory continued through broader behavioral and governance-based interpretations, culminating in the **Fraud Heptagon** proposed by Yusof (2016). This model extends prior frameworks by incorporating **seven** dimensions: **pressure**, **opportunity**, **rationalization**, **capability**, **arrogance**, **ignorance**, and **greed**. Compared with earlier models, the Fraud Heptagon is more comprehensive because it integrates structural, cognitive, behavioral, and motivational explanations within one analytical framework. Pressure and greed represent economic motives; opportunity reflects structural gaps in governance; rationalization and ignorance address moral and ethical disengagement; capability concerns the competence to carry out the fraud; and arrogance reflects the psychological superiority that may lead executives to believe they are beyond control mechanisms.

This study adopts the Fraud Heptagon because it is theoretically more suitable for examining **fraudulent financial statement** in listed insurance companies. Financial statement fraud in such firms is unlikely to result from a single factor alone. Rather, it may emerge from the interaction of financial pressure, weak oversight, managerial justification, executive power, and personal gain motives. The Fraud Heptagon therefore provides an appropriate basis for analyzing whether the seven dimensions are empirically associated with FFS in the Indonesian insurance sector.

3. Development of Hypotheses

3.1 Pressure and Fraudulent Financial Statement

Within the Fraud Heptagon framework, **pressure** represents the internal or external demands that may motivate management to manipulate financial reports. One of the most common forms of pressure arises from debt-related obligations and the need to maintain favorable financial performance in the eyes of creditors and investors. In this study, pressure is proxied by the leverage ratio (LEV). A higher leverage ratio may increase pressure on management because firms with greater debt exposure face stronger expectations regarding solvency, financial stability, and covenant compliance. Under such conditions, management may be tempted to manipulate financial information in order to reduce perceived risk and preserve access to financing. Prior studies report that leverage is positively associated with indications of FFS (Sari et al., 2022; Khamainy et al., 2022; Jodyan et al., 2024; Pamungkas et al., 2024; Satata et al., 2024).

H₁: Pressure has a positive effect on Fraudulent Financial Statement.

3.2 Opportunity and Fraudulent Financial Statement

Opportunity refers to the existence of weaknesses in control systems or monitoring structures that make fraud easier to commit and less likely to be detected. In this study, opportunity is proxied by the proportion of independent board commissioners (BDOUT) as an indicator of monitoring effectiveness. In principle, a lower proportion of independent commissioners may weaken oversight and create greater room for management to manipulate financial reporting. Fraud theory suggests that when supervision is ineffective, managers face fewer constraints in exploiting reporting discretion for opportunistic purposes. Prior literature also emphasizes that opportunity is often a central enabling factor in fraud occurrence, especially in institutions with weak internal monitoring (Suh et al., 2019; Jodyan et al., 2024; Satata et al., 2024; Prayogi, 2023).

H₂: Opportunity has a positive effect on Fraudulent Financial Statement.

3.3 Rationalization and Fraudulent Financial Statement

Rationalization refers to the cognitive process through which perpetrators justify fraudulent actions as acceptable, necessary, or temporary. In the context of financial reporting, rationalization is commonly associated with the flexible use of accrual accounting to justify adjustments that improve reported performance. In this study, rationalization is proxied by Total Accruals to Total Assets (TATA). A higher level of accruals may indicate greater managerial discretion in recognizing revenues, expenses, and other accounting components, which may in turn facilitate financial statement manipulation. Because accrual choices often involve subjective judgment, management may rationalize aggressive accounting as a legitimate effort to preserve firm stability or protect stakeholders. Prior studies have documented a positive relationship between TATA and fraudulent financial reporting (Rukmana, 2018).

H₃: Rationalization has a positive effect on Fraudulent Financial Statement.

3.4 Capability and Fraudulent Financial Statement

Capability captures the ability of an individual to execute and conceal fraud successfully. In corporate settings, fraud requires not only intent but also knowledge of internal systems, access to critical information, and a strategic position that allows reporting discretion to be exploited. In this study, capability is proxied by change in directors (DCHANGE). This proxy reflects the assumption that directors possess strategic authority and deep organizational knowledge, both of which may influence the likelihood of manipulation. Changes in directors may indicate shifts in power, reporting style, or managerial strategy, while long-standing executive control may also increase the capacity to exploit system weaknesses. Prior research suggests that capability, proxied by changes in directors, may have a positive association with FFS (Pamungkas et al., 2024; Sari et al., 2022).

H₄: Capability has a positive effect on Fraudulent Financial Statement.

3.5 Arrogance and Fraudulent Financial Statement

Arrogance refers to an executive's excessive sense of superiority, self-importance, or immunity from organizational control. Within the Fraud Heptagon perspective, arrogance may encourage managers to disregard governance mechanisms because they believe they are beyond supervision or institutional constraint. In this study, arrogance is proxied by the frequency of CEO pictures (CEOPIC) in the annual report. The use of CEO visual dominance as a proxy is based on the assumption that excessive self-representation may reflect overconfidence, narcissistic tendencies, and symbolic executive centrality. Such attitudes may increase the likelihood of ignoring internal control norms and governance boundaries. Prior

studies by Jodyan et al. (2024) and Pamungkas et al. (2024) suggest that arrogance, proxied by CEO pictures, is positively associated with FFS.

H₅: Arrogance has a positive effect on Fraudulent Financial Statement.

3.6 Ignorance and Fraudulent Financial Statement

In the Fraud Heptagon model, ignorance refers to ethical neglect or a lack of concern for governance standards and regulatory obligations. In this study, ignorance is proxied inversely through corporate governance education (INEDU). The logic is that the more governance-related education or training directors receive, the lower the level of ignorance regarding sound governance principles. Conversely, limited governance education may reflect insufficient awareness of regulatory obligations and ethical oversight responsibilities. From a theoretical perspective, greater ignorance may weaken commitment to compliance and facilitate manipulative behavior. Prior studies suggest that governance education is negatively related to fraudulent financial reporting, implying that stronger education reduces ignorance and fraud risk (Yusof, 2016; Satata et al., 2024; Pamungkas & Irwandi, 2024).

H₆: Ignorance has a negative effect on Fraudulent Financial Statement.

3.7 Greed and Fraudulent Financial Statement

Greed represents an excessive desire for personal gain beyond legitimate compensation or reasonable performance-based reward. In corporate fraud theory, greed is associated with opportunistic behavior motivated by material ambition and self-interest. In this study, greed is proxied by executive director remuneration (EXREMU). The underlying assumption is that higher remuneration may be associated with stronger incentives to preserve or enlarge personal benefits, especially when compensation is tied to performance targets, prestige, or executive status. Under such conditions, management may be more inclined to manipulate financial statements to maintain favorable outcomes. Prior studies report a positive relationship between executive remuneration and indications of FFS (Pamungkas et al., 2024; Yusof, 2016).

H₇: Greed has a positive effect on Fraudulent Financial Statement.

4. Beneish M-Score

This study uses the Beneish M-Score to measure the dependent variable, namely indications of Fraudulent Financial Statement. The Beneish M-Score is a widely used analytical model designed to detect the likelihood of earnings manipulation through a combination of financial ratios derived from published financial statements (Beneish et al., 1999). It is especially useful in fraud-detection research because it provides an early quantitative signal of abnormal reporting patterns that may indicate financial statement manipulation.

The model consists of eight ratios: Days Sales in Receivables Index (DSRI), Gross Margin Index (GMI), Asset Quality Index (AQI), Sales Growth Index (SGI), Depreciation Index (DEPI), Sales, General and Administrative Expenses Index (SGAI), Leverage Index (LVGI), and Total Accruals to Total Assets (TATA). These components are combined to generate an M-Score that classifies firms according to the likelihood of manipulation. A company with an M-Score greater than -2.22 is generally considered more likely to have engaged in earnings manipulation, whereas a score below that cut-off indicates a lower likelihood of manipulation. In this article, the Beneish M-Score provides the operational basis for identifying whether insurance firms are indicated to have engaged in fraudulent financial reporting.

C. METHOD

This study employed a quantitative research design to examine the determinants of Fraudulent Financial Statement (FFS) in insurance companies listed on the Indonesia Stock Exchange (IDX) during the 2020–2024 period. The study relied on secondary data derived from annual reports and audited financial statements published by the IDX and the official websites of the respective companies. The unit of analysis was the firm-year observation, because the study evaluated the financial-reporting characteristics of each sampled company across a five-year period. This design is appropriate because the objective of the study is to test the effect of the seven dimensions of the Fraud Heptagon on the probability of FFS indication in listed insurance firms.

The population consisted of all insurance companies listed on the Indonesia Stock Exchange during the observation period. The sample was selected using purposive sampling in order to ensure data comparability, reporting consistency, and completeness of the variables required for analysis. The sample-selection process is presented in Table 1.

Table 1. Sample Selection Criteria

No.	Sample Criteria	Total
1	Insurance companies listed on the Indonesia Stock Exchange	15
2	Companies not consistently listed during 2020–2024	(1)
3	Companies not publishing annual financial statements ending on 31 December and/or not audited by an independent public accountant during 2020–2024	(2)
4	Companies with incomplete research-variable data	(0)
5	Companies reporting in currencies other than Indonesian rupiah	(0)
	Final sample (12 companies × 5 years)	60

Based on these criteria, the final sample consisted of 12 insurance companies, producing 60 firm-year observations. This sample size was considered sufficient for the intended panel logistic regression, given the sector-specific focus of the study and the restricted number of insurance firms listed on the IDX during the period under investigation.

The dependent variable in this study was Fraudulent Financial Statement (FFS), measured using the Beneish M-Score model. The Beneish M-Score is widely used in accounting research as an early detection tool for possible earnings manipulation because it captures abnormal financial-reporting patterns through a combination of financial ratios (Beneish et al., 1999). In the present study, the M-Score was first calculated using eight financial ratios and then converted into a binary variable. A firm-year observation was coded **1** if the M-Score was greater than -2.22 , indicating a likelihood of financial statement manipulation, and coded **0** otherwise. The ratios used in the M-Score calculation are summarized in Table 2.

Table 2. Beneish M-Score Ratios and Measurement Formula

No.	Ratio	Proxy	Formula
1	DSRI	Days Sales in Receivables Index	$DSRI = \frac{(\text{Receivables}_t / \text{Sales}_t)}{(\text{Receivables}_{t-1} / \text{Sales}_{t-1})}$
2	GMI	Gross Margin Index	$GMI = \frac{[(\text{Sales}_{t-1} - \text{COGS}_{t-1}) / \text{Sales}_{t-1}]}{[(\text{Sales}_t - \text{COGS}_t) / \text{Sales}_t]}$

Table 2. Beneish M-Score Ratios (continue)

3	AQI	Asset Quality Index	$AQI = \frac{[1 - ((\text{Current Assets}_t + \text{PPE}_t) / \text{Total Assets}_t)]}{[1 - ((\text{Current Assets}_{t-1} + \text{PPE}_{t-1}) / \text{Total Assets}_{t-1})]}$
4	SGI	Sales Growth Index	$SGI = \frac{\text{Sales}_t}{\text{Sales}_{t-1}}$
5	DEPI	Depreciation Index	$DEPI = \frac{[\text{Depreciation}_{t-1} / (\text{Depreciation}_{t-1} + \text{PPE}_{t-1})]}{[\text{Depreciation}_t / (\text{Depreciation}_t + \text{PPE}_t)]}$
6	SGAI	Sales, General, and Administrative Expenses Index	$SGAI = \frac{(\text{SGA}_t / \text{Sales}_t)}{(\text{SGA}_{t-1} / \text{Sales}_{t-1})}$
7	LVGI	Leverage Index	$LVGI = \frac{(\text{Total Debt}_t / \text{Total Assets}_t)}{(\text{Total Debt}_{t-1} / \text{Total Assets}_{t-1})}$
8	TATA	Total Accruals to Total Assets	$TATA = \frac{(\text{Income from Operations}_t - \text{Cash Flow from Operations}_t)}{\text{Total Assets}_t}$

Source: Adapted from Beneish et al. (1999).

Following Beneish et al. (1999), the M-Score was calculated using the following equation:

$$\text{M-Score} = -4.84 + 0.920\text{DSRI} + 0.528\text{GMI} + 0.404\text{AQI} + 0.892\text{SGI} \\ + 0.115\text{DEPI} - 0.172\text{SGAI} - 0.327\text{LVGI} + 4.679\text{TATA}$$

If M-Score > -2.22, the firm is indicated to have a higher likelihood of financial statement manipulation.

If M-Score ≤ -2.22, the firm is indicated not to have manipulated its financial statements.

This formulation was used to classify whether each company-year observation was indicated or not indicated as engaging in fraudulent financial reporting.

The independent variables represented the seven dimensions of the **Fraud Heptagon**, namely **pressure, opportunity, rationalization, capability, arrogance, ignorance, and greed**. In order to maintain analytical clarity and consistency with the regression output, each construct was measured using a specific operational proxy. The operationalization of variables is presented in Table 3.

Table 3. Operational Definition of Research Variables

Variable	Symbol	Proxy / Measurement	Operational Definition	Source
Fraudulent Financial Statement	FFS	Beneish M-Score	Dummy variable: 1 if the firm-year observation has an M-Score > -2.22, indicating a likelihood of financial statement manipulation; 0 otherwise	Beneish et al. (1999)

Table 3. Operational Definition of Research Variables

Pressure	LEV	Leverage ratio	Total liabilities divided by total assets	Jodyan et al. (2024)
Opportunity	BDOU	Proportion of independent board commissioners	Number of independent commissioners divided by the total number of board commissioners	Jodyan et al. (2024)
Rationalization	TATA	Total accruals to total assets	Income from operations minus cash flow from operations, divided by total assets	Djami (2024)
Capability	DCHANGE	Change in directors	Dummy variable: 1 if there is a change in directors in year t; 0 if there is no change	Pamungkas et al. (2024)
Arrogance	CEOPIC	CEO pictures	Number of CEO photographs disclosed in the annual report	Pamungkas et al. (2024)
Ignorance	INEDU	Corporate governance education	Number of corporate governance courses or training activities disclosed in the annual report	Jodyan et al. (2024)
Greed	EXREMU	Executive director remuneration	Executive remuneration disclosed in the annual report	Jodyan et al. (2024)

Source: Adapted from Beneish et al. (1999), Jodyan et al. (2024), Djami (2024), and Pamungkas et al. (2024).

To test the research hypotheses, this study applied **panel logistic regression** using **EViews version 12**. Logistic regression was selected because the dependent variable is dichotomous, namely whether a firm-year observation is indicated or not indicated as FFS. The panel structure was retained because the data combine cross-sectional variation across companies and time variation across the five-year observation period.

$$\ln [P(\text{FFS}_{it} = 1) / (1 - P(\text{FFS}_{it} = 1))] \\ = \alpha + \beta_1 \text{LEV}_{it} + \beta_2 \text{BDOU}_{it} + \beta_3 \text{TATA}_{it} + \beta_4 \text{DCHANGE}_{it} \\ + \beta_5 \text{CEOPIC}_{it} + \beta_6 \text{INEDU}_{it} + \beta_7 \text{EXREMU}_{it} + \varepsilon_{it}$$

where:

- $P(\text{FFS}_{it} = 1)$ denotes the probability that firm i in year t is indicated to have committed fraudulent financial statement;
- α is the intercept;
- β_1 to β_7 are the coefficients of the independent variables; and
- ε_{it} is the error term.

To evaluate the adequacy of the estimated model, the study employed several model-fit indicators, namely the **Hosmer–Lemeshow goodness-of-fit test**, **McFadden R-squared**, the **Likelihood Ratio (LR) statistic**, and **classification accuracy**. These indicators were used to assess whether the logistic specification was appropriate for explaining the probability of FFS indication in the sampled insurance companies. Accordingly, the analytical procedure remained consistent with the main objective of the study, namely to identify which dimensions of the Fraud Heptagon are more salient in explaining fraudulent financial statement indication in the Indonesian insurance sector.

D. RESULTS AND DISCUSSION

1. Descriptive Statistics

Descriptive statistics provide an initial overview of the distribution of the dependent and independent variables used in the study. As reported in Table 4, the mean value of **FFS** is

0.383333, indicating that 38.33% of the firm-year observations are classified as having a likelihood of financial statement manipulation based on the Beneish M-Score threshold. Among the explanatory variables, **LEV** has a mean of 0.583921, indicating a relatively high level of leverage among the sampled insurance firms. **BDOUT** records an average of 0.559722, suggesting that more than half of the board commissioners are independent on average. **TATA** has a mean of 0.020069, with both positive and negative values, indicating variation in accrual-based reporting practices. Meanwhile, **DCHANGE** has a mean of 0.366667, implying that director changes occurred in 36.67% of the observations. **CEOPIC** has an average of 1.683333, suggesting that CEO image exposure in annual reports is relatively common. **INEDU** records a mean of 0.685278, while **EXREMU** shows the widest dispersion, indicating substantial variation in executive remuneration across firms.

Table 4. Descriptive Statistics

Variable	N	Mean	Maximum	Minimum	Std. Dev.
FFS	60	0.383333	1.000000	0.000000	0.490301
LEV	60	0.583921	0.791517	0.325261	0.118536
BDOUT	60	0.559722	0.750000	0.333333	0.099258
TATA	60	0.020069	0.143310	-0.173520	0.054065
DCHANGE	60	0.366667	1.000000	0.000000	0.485961
CEOPIC	60	1.683333	2.000000	0.000000	0.624138
INEDU	60	0.685278	2.000000	0.000000	0.370500
EXREMU	60	1.288964	31.102110	-1.455430	4.364570

Source: Secondary data processed using EViews 12.

2. Model Evaluation

Before interpreting the coefficients, the adequacy of the logistic regression model must first be established. The **Hosmer–Lemeshow test** yields a probability value of **0.1669**, which is greater than 0.05, indicating that the model fits the data adequately. The **McFadden R-squared** is **0.2567**, suggesting that the seven Fraud Heptagon dimensions explain 25.67% of the variation in the likelihood of Fraudulent Financial Statement. In addition, the **Likelihood Ratio (LR) statistic** has a probability value of **0.004570**, indicating that the independent variables are jointly significant. The model also achieves a **classification accuracy of 73.36%**, which suggests that the estimated logistic model has acceptable predictive capability for detecting the likelihood of FFS in the sampled insurance companies.

Table 5. Model Evaluation Statistics

Indicator	Value	Interpretation
Hosmer–Lemeshow Prob.	0.1669	Model is fit, since $p > 0.05$
McFadden R-squared	0.2567	Independent variables explain 25.67% of the variation in FFS
Prob. (LR Statistic)	0.004570	Independent variables are jointly significant
Classification Accuracy	73.36%	Model has acceptable predictive accuracy

Source: Secondary data processed using EViews 12.

3. Panel Logistic Regression Results

The panel logistic regression results are presented in Table 6. The findings indicate that only **rationalization (TATA)** has a positive and statistically significant effect on the likelihood of Fraudulent Financial Statement. The remaining six variables—**LEV**, **BDOUT**, **DCHANGE**, **CEOPIC**, **INEDU**, and **EXREMU**—do not show statistically significant effects at the 5% significance level.

Table 6. Panel Logistic Regression Results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.521273	3.296497	-0.158129	0.8744
LEV	-2.470666	3.015519	-0.819317	0.4126
BDOUT	2.534897	3.710043	0.683253	0.4944

Table 6. Panel Logistic Regression Results (continue)

TATA	28.385450	9.118940	3.112802	0.0019
DCHANGE	-0.161267	0.704814	-0.228808	0.8190
CEOPIC	-0.882304	0.624786	-1.412171	0.1579
INEDU	1.172150	1.028150	1.140057	0.2543
EXREMU	0.056749	0.097970	0.579245	0.5624

Source: Secondary data processed using EViews 12.

4. Discussion of Hypothesis Testing

4.1 Pressure and Fraudulent Financial Statement

The regression results show that **pressure**, proxied by the leverage ratio (LEV), has a coefficient of -2.470666 with a probability value of 0.4126, indicating that pressure does not have a significant effect on the likelihood of Fraudulent Financial Statement. Thus, H_1 is rejected. This result suggests that the level of corporate debt does not directly encourage management to manipulate financial statements in the sampled insurance firms. Although fraud theory acknowledges financial pressure as a major driver of misconduct, the present finding implies that leverage alone is insufficient to explain fraudulent financial reporting unless it is accompanied by other enabling conditions, such as opportunity or stronger managerial discretion. This result is in line with Sari et al. (2022), who also find that leverage does not significantly affect FFS.

4.2 Opportunity and Fraudulent Financial Statement

The variable opportunity, proxied by the proportion of independent board commissioners (BDOUT), has a positive coefficient of 2.534897, but the relationship is statistically insignificant ($p = 0.4944$). Therefore, H_2 is rejected. Although the positive sign indicates that the variable moves in the hypothesized direction, the effect is not strong enough to conclude that opportunity significantly increases the likelihood of FFS in this sample. This finding suggests that the formal presence of independent commissioners may not necessarily translate into effective monitoring. In practice, board independence may fulfill regulatory requirements without materially strengthening the oversight of financial reporting. This result is consistent with Pamungkas et al. (2024) and Djami (2024), who also report that opportunity does not significantly affect FFS.

4.3 Rationalization and Fraudulent Financial Statement

Among all explanatory variables, rationalization, proxied by TATA, is the only variable that shows a positive and statistically significant effect on Fraudulent Financial Statement. The coefficient is 28.385450 with a probability value of 0.0019, meaning that H_3 is accepted. This result indicates that higher accrual intensity is associated with a greater likelihood of financial statement manipulation. Substantively, the finding suggests that firms with more aggressive accrual behavior may be more likely to exploit accounting discretion in a way that facilitates reporting distortion. Within the Fraud Heptagon framework, rationalization reflects the internal justification used to legitimize questionable reporting practices. In this context, high accruals may signal managerial willingness to frame reporting manipulation as a reasonable means of preserving performance or meeting strategic targets. This finding is consistent with Rukmana (2018), who also documents a significant positive effect of rationalization on FFS.

4.4 Capability and Fraudulent Financial Statement

The results further indicate that capability, proxied by DCHANGE, has a coefficient of -0.161267 with a probability value of 0.8190, indicating no significant effect. Accordingly, H_4

is rejected. This suggests that director changes do not materially explain the likelihood of financial statement manipulation in the sampled insurance companies. Although the Fraud Heptagon framework emphasizes the technical and positional capacity of individuals to commit fraud, a change in directors does not necessarily reflect the possession of such capability. Director rotation may be driven by routine governance processes, succession arrangements, or organizational restructuring rather than fraud-related motives. This finding is consistent with Jodyan et al. (2024) and Pamungkas et al. (2024), who likewise report no significant relationship between director change and FFS.

4.5 Arrogance and Fraudulent Financial Statement

For arrogance, proxied by CEO pictures (CEOPIC), the estimated coefficient is -0.882304 with a probability value of 0.1579, which is above the 5% threshold. Hence, H_5 is rejected. This result implies that the visual prominence of the CEO in annual reports does not significantly explain the likelihood of fraudulent financial reporting in this study. Although CEO self-exposure may reflect symbolic dominance or overconfidence, the number of CEO photographs does not necessarily capture the actual extent of managerial arrogance in decision-making and reporting behavior. As a result, this proxy may be too indirect to explain FFS in the insurance context. This finding is consistent with Sari et al. (2022), who also find that arrogance does not have a significant effect on fraudulent financial statements.

4.6 Ignorance and Fraudulent Financial Statement

The variable ignorance, proxied by corporate governance education (INEDU), has a positive coefficient of 1.172150, but the effect is not statistically significant ($p = 0.2543$). Therefore, H_6 is rejected. This finding indicates that the number of governance-related training activities disclosed by the company does not significantly explain the likelihood of FFS. Theoretically, greater governance education should reduce ignorance and lower the risk of financial reporting fraud. However, the present result suggests that the existence of training or education programs does not necessarily guarantee effective governance practice or stronger oversight quality. In other words, governance education may be disclosed formally without substantially influencing monitoring behavior. This result is in line with Satata et al. (2024) and Pamungkas and Irwandi (2024), who also find no significant effect of ignorance on FFS.

4.7 Greed and Fraudulent Financial Statement

Finally, greed, proxied by executive director remuneration (EXREMU), yields a positive coefficient of 0.056749 with a probability value of 0.5624, indicating that the effect is statistically insignificant. Thus, H_7 is rejected. This finding suggests that higher executive remuneration does not directly increase the likelihood of fraudulent financial reporting in the sampled insurance firms. While the Fraud Heptagon framework associates greed with excessive personal gain motives, executive remuneration may also reflect legitimate compensation for managerial responsibility and performance rather than opportunistic self-interest. Therefore, remuneration alone is not sufficient to explain fraudulent reporting behavior in this context. This result is consistent with Satata et al. (2024) and Pamungkas and Irwandi (2024), who also report that greed does not significantly affect FFS.

5. Discussion

Overall, the findings indicate that the Fraud Heptagon dimensions are not equally effective in detecting the likelihood of fraudulent financial statement in Indonesian listed insurance companies. Only rationalization, as proxied by accrual intensity, emerges as a statistically significant determinant. This suggests that in the insurance sector, the strongest

signal of possible reporting manipulation lies not in leverage pressure, board composition, executive image projection, governance education, or remuneration level, but in the firm's actual accounting behavior reflected in accrual-based reporting. In other words, the empirical evidence in this study points to the importance of discretionary accounting practices as the most observable pathway through which management may rationalize reporting distortion. At the same time, the significant LR statistic indicates that the Fraud Heptagon variables are jointly relevant, even though most of them do not show individual significance. This suggests that fraud risk in financial reporting remains multidimensional, but its strongest empirical manifestation in this setting is concentrated in the rationalization dimension.

E. CONCLUSION

This study examined the determinants of Fraudulent Financial Statement (FFS) in insurance companies listed on the Indonesia Stock Exchange during the 2020–2024 period by applying the Fraud Heptagon framework. Using the Beneish M-Score as a proxy for the likelihood of financial statement manipulation and panel logistic regression as the analytical tool, the study assessed whether the seven dimensions of the Fraud Heptagon are capable of explaining FFS indications in the Indonesian insurance sector.

The findings indicate that, on a partial basis, only rationalization, proxied by total accruals to total assets (TATA), has a positive and statistically significant effect on the likelihood of Fraudulent Financial Statement. This result suggests that accrual-based reporting discretion remains the strongest observable indicator of potential reporting manipulation in the sampled insurance companies. By contrast, pressure (LEV), opportunity (BDOUT), capability (DCHANGE), arrogance (CEOPIC), ignorance (INEDU), and greed (EXREMU) do not show statistically significant individual effects. Nevertheless, the model evaluation indicates that the seven variables are jointly significant in explaining the probability of FFS occurrence, which implies that fraudulent financial reporting remains a multidimensional phenomenon even though its strongest empirical signal in this context is concentrated in the rationalization dimension.

These findings contribute to the literature in two ways. First, they provide additional empirical evidence on the application of the Fraud Heptagon framework in the insurance sector, which remains relatively underexplored compared with other industries. Second, they suggest that in insurance companies, the most salient indicator of financial statement fraud is more closely associated with accrual-based accounting behavior than with governance structure, executive image exposure, or remuneration-related variables. In practical terms, this implies that regulators, auditors, and internal governance actors should pay closer attention to accrual patterns when assessing the risk of fraudulent financial reporting in this sector.

This study has several limitations. First, the observation period is limited to 2020–2024, which may not fully capture longer-term dynamics in the insurance industry. Second, the sample consists only of 12 listed insurance companies, resulting in a relatively limited number of firm-year observations. Third, the study focuses exclusively on insurance companies listed on the Indonesia Stock Exchange, which restricts the generalizability of the findings to other sectors or non-listed firms. In addition, several Fraud Heptagon dimensions were measured through indirect proxies, which may not fully capture the underlying behavioral constructs they are intended to represent.

Accordingly, future research is encouraged to extend the observation period, enlarge the sample size, and compare results across different sectors in order to obtain broader empirical evidence on the effectiveness of the Fraud Heptagon framework. Further studies may also consider refining the proxies used for behavioral variables such as arrogance, ignorance, and

greed, so that the measurement of these dimensions becomes more robust and contextually appropriate.

REFERENCES

- ACFE. (2020). *Report to the nations*. Association of Certified Fraud Examiners.
- ACFE. (2022). *Occupational fraud 2022: A report to the nations*. Association of Certified Fraud Examiners.
- ACFE. (2024). *Occupational fraud 2024: A report to the nations*. Association of Certified Fraud Examiners.
- ACFE Indonesia Chapter. (2025). *Survei fraud Indonesia 2025*. Association of Certified Fraud Examiners Indonesia Chapter.
- Beneish, M. D. (1999). The detection of earnings manipulation. *Financial Analysts Journal*, 55(5), 24–36. <https://doi.org/10.2469/faj.v55.n5.2296>
- Cressey, D. R. (1954). *Other people's money: A study in the social psychology of embezzlement*. Free Press.
- Desai, N. (2020). Understanding the theoretical underpinnings of corporate fraud. *Vikalpa*, 45(1), 25–31. <https://doi.org/10.1177/0256090920917789>
- Djami, R. A. (2024). Factors that influence fraud heptagon theory on financial statements fraud (Empirical study on the mining sector listed on the Indonesia Stock Exchange for the period 2018–2022). *Journal Research of Social Science, Economics, and Management*, 3(8). <https://doi.org/10.59141/jrssem.v3i08.559>
- Handoko, B. L., Putri, R. N. A., & Wijaya, S. (2022). Analysis of fraudulent financial reporting based on fraud heptagon model in transportation and logistic industry listed on IDX during COVID-19 pandemic. *ACM International Conference Proceeding Series*, 56–63. <https://doi.org/10.1145/3578997.3579003>
- Ikatan Akuntan Indonesia. (2020). *Kerangka konseptual pelaporan keuangan*. Ikatan Akuntan Indonesia.
- Investor Daily. (2023, May 24). *Sinarmas MSIG Life proses indikasi fraud Rp 133 miliar*.
- Jodyan, R., Winowod, T. M., & Prawati, L. D. (2024). Understanding fraud detection with the heptagon fraud model and income tax moderation: Evidence from Indonesia. *Management & Accounting Review*, 23(3). <https://doi.org/10.24191/mar.v23i03-03>

- Khamainy, A. H., Amalia, M. M., Cakranegara, P. A., & Indrawati, A. (2022). Financial statement fraud: The predictive relevance of fraud hexagon theory. *Journal of Accounting and Strategic Finance*, 5(1), 110–133. <https://doi.org/10.33005/jasf.v5i1.249>
- Lestari, M. I., & Henny, D. (2019). Pengaruh fraud pentagon terhadap fraudulent financial statements pada perusahaan perbankan yang terdaftar di Bursa Efek Indonesia tahun 2015–2017. *Jurnal Akuntansi Trisakti*, 6(1), 141–156. <https://doi.org/10.25105/jat.v6i1.5274>
- Nadziliyah, H., & Primasari, N. S. (2022). Analisis fraud hexagon terhadap financial statement fraud pada perusahaan sektor infrastruktur, utilitas dan transportasi. *Accounting and Finance Studies*, 2(1), 21–39. <https://doi.org/10.47153/afs21.2702022>
- Nugroho, D., & Diyanty, V. (2022). Hexagon fraud and fraudulent financial statements: The moderating role of the audit committee. *Jurnal Akuntansi dan Keuangan Indonesia*, 19(1), 46–67. <https://doi.org/10.21002/jaki.2022.03>
- Pamungkas, I. D., & Irwandi, S. A. (2024). Detecting fraudulent financial reporting: Heptagon fraud model. *The Indonesian Accounting Review*, 14(2). <https://doi.org/10.14414/tiar.v14i2.4523>
- Pamungkas, I. D., Oktavianasari, I., Fathimah, & Jasmine, A. N. (2024). The role of audit committee and institutional ownership as moderating: Analysis fraud heptagon in Indonesia. *WSEAS Transactions on Business and Economics*, 21, 2665–2677. <https://doi.org/10.37394/23207.2024.21.218>
- Prayogi, G. D. (2023). Pengaruh fraud heptagon terhadap tingkat fraud dalam pengelolaan keuangan daerah: Peran whistleblowing system di DPPKAD Jawa Timur. *Behavioral Accounting Journal*, 6(2), 1–16. <https://doi.org/10.33005/baj.v6i2.368>
- Rukmana, H. S. (2018). Pentagon fraud affect on financial statement fraud and firm value: Evidence in Indonesia. *South East Asia Journal of Contemporary Business, Economics and Law*, 16.
- Sari, M. P., Pramasheilla, N., Fachrurrozie, Suryarini, T., & Pamungkas, I. D. (2020). Analysis of fraudulent financial reporting with the role of KAP Big Four as a moderation variable: Crowe's fraud pentagon theory. *International Journal of Financial Research*, 11(5), 180–190. <https://doi.org/10.5430/IJFR.V11N5P180>
- Sari, M. P., Mahardika, E., Suryandari, D., & Raharja, S. (2022). The audit committee as moderating the effect of hexagon's fraud on fraudulent financial statements in mining companies listed on the Indonesia Stock Exchange. *Cogent Business & Management*, 9(1), Article 2150118. <https://doi.org/10.1080/23311975.2022.2150118>

- Satata, D. P. I., Pamungkas, I. D., Sumaryati, A., & Minarso, B. (2024). The role of institutional ownership in detecting fraudulent financial reporting: Fraud heptagon model analysis. *Maksimum*, 14(1), 37–47. <https://doi.org/10.26714/mki.14.1.2024.37-47>
- Suh, J. B., Nicolaides, R., & Trafford, R. (2019). The effects of reducing opportunity and fraud risk factors on the occurrence of occupational fraud in financial institutions. *International Journal of Law, Crime and Justice*, 56, 79–88. <https://doi.org/10.1016/j.ijlcj.2019.01.002>
- Tiffani, L., & Marfuah, M. (2015). Deteksi financial statement fraud dengan analisis fraud triangle pada perusahaan manufaktur yang terdaftar di Bursa Efek Indonesia. *Jurnal Akuntansi dan Auditing Indonesia*, 19(2), 112–125. <https://doi.org/10.20885/jaai.vol19.iss2.art3>
- Wolfe, D. T., & Hermanson, D. R. (2004). The fraud diamond: Considering the four elements of fraud. *The CPA Journal*, 74(12), 38–42.
- Yusof, K. M. (2016). *Fraudulent financial reporting: An application of fraud models to Malaysian public listed companies*