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Fraud Pentagon and financial statement fraud: The moderating role of audit opinion in Indonesian Pharmaceutical Companies

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Abstract

Financial statement fraud can diminish investor confidence and distort assessments of a company's performance. Therefore, identifying potential fraud requires an understanding of the factors that may drive the manipulation of financial statements, as well as the conditions that allow these factors to emerge. This study examines the influence of the elements within the "fraud pentagon" on financial statement fraud, with the audit opinion serving as a moderating variable, focusing on pharmaceutical companies in Indonesia. Employing a quantitative approach, this research analyzes secondary data from audited financial statements and annual reports of 10 pharmaceutical companies listed on the Indonesia Stock Exchange (IDX) between 2019 and 2023, resulting in 50 firm-year observations selected via purposive sampling. Financial statement fraud is measured using the Beneish M-Score, while the elements of the fraud pentagon – pressure, competence, opportunity, rationalization, and arrogance – are proxied, respectively, by financial stability, changes in the board of directors, ineffective monitoring, auditor turnover, and the frequency of the CEO's photograph appearing in annual reports. Logistic regression and moderation analysis were used to test the hypotheses. The results indicate that pressure has a significant relationship with financial statement fraud, whereas the other four elements of the fraud pentagon do not show a significant individual influence. Audit opinion is found to moderate the relationship between pressure, opportunity, and arrogance with financial statement fraud, but it does not moderate the relationships involving the elements of competence and rationalization. These findings underscore the importance of considering the audit opinion when evaluating fraud risk indicators in pharmaceutical companies.

Keywords:
Audit opinion, Beneish M-Score, Financial statement fraud, Fraud Pentagon, Pharmaceutical companies

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1. Introduction

Financial statements are an important source of information for investors, creditors, and other stakeholders in evaluating a company's financial performance and position. The reliability of this information is essential because financial reporting influences investment decisions, resource allocation, and assessments of management performance. However, management may face incentives to present a more favorable financial position than the company's actual condition, creating a risk of financial statement manipulation. Such manipulation can mislead stakeholders and undermine confidence in corporate reporting. Beneish (1999) demonstrates that financial statement data can be

used to identify patterns associated with earnings manipulation, although indicators of manipulation do not necessarily establish that fraud has occurred. Therefore, identifying the factors associated with potential financial statement fraud remains an important issue in accounting and corporate governance research.

The importance of this issue is also reflected in documented cases of financial irregularities in Indonesia. In May 2024, the Audit Board of the Republic of Indonesia reported investigative audit findings concerning financial management at PT Indofarma Tbk and its subsidiaries for the 2020–2023 period. The investigation identified irregularities indicating potential criminal acts and estimated state losses of approximately IDR 371.83 billion (Audit Board of the Republic of Indonesia [BPK], 2024). In addition, Kimia Farma's 2023 annual report disclosed suspected integrity violations involving financial reporting data at its subsidiary, Kimia Farma Apotek, during 2021–2022 (PT Kimia Farma Tbk, 2024). These cases illustrate the importance of examining financial reporting risks in Indonesia's pharmaceutical industry. However, the existence of financial irregularities in individual companies does not establish that all pharmaceutical companies face the same risks or that every unusual financial indicator represents fraud. A systematic empirical approach is therefore needed to examine the factors associated with potential financial statement fraud in this sector.

One theoretical framework that can help explain these factors is the fraud pentagon theory. This framework extends earlier fraud theories by incorporating five elements: pressure, opportunity, rationalization, competence, and arrogance. Pressure refers to incentives or demands that may encourage individuals to manipulate financial information, while opportunity concerns conditions that enable such actions. Rationalization refers to the justification of unethical behavior, competence reflects an individual's ability to exploit weaknesses in organizational controls, and arrogance represents an attitude of superiority or perceived exemption from established rules. These elements provide a basis for examining why financial statement manipulation may occur under particular organizational conditions. Empirical research applying the fraud pentagon perspective has reported that the relationships between individual fraud indicators and financial statement fraud vary across research settings and operational measures (Dewi & Anisykurlillah, 2021; Inayah & Chariri, 2024). This variation indicates that the explanatory power of individual fraud indicators requires further empirical investigation.

Despite its theoretical relevance, the fraud pentagon framework does not imply that every element will consistently predict financial statement fraud. Pressure, for example, may arise when management faces expectations to maintain financial stability, whereas changes in directors or auditors may occur for legitimate business and governance reasons. Similarly, the proportion of independent commissioners and the frequency of CEO photographs in annual reports may not fully capture the actual effectiveness of oversight or the psychological characteristics of senior executives. Previous studies have reported inconsistent findings regarding several fraud indicators, including ineffective monitoring and financial pressure (Gunawan & Siregar, 2023; Inayah & Chariri, 2024; Navila & Ardianto, 2020). Such inconsistencies may reflect differences in sample characteristics, research periods, variable measurements, and institutional settings. Consequently, further research is needed to evaluate the fraud pentagon elements in a specific industry context, particularly the pharmaceutical sector, where reliable financial reporting is important to investors and other stakeholders.

In addition to the characteristics of management and corporate governance, the external auditor's opinion may provide relevant information about the reliability of financial statements. An audit opinion communicates the auditor's conclusion regarding whether financial statements are presented fairly, in all material respects, in accordance with the applicable financial reporting framework. Research on auditing emphasizes the importance of audit quality and the information conveyed by auditors in assessing the credibility of financial reporting (DeFond & Zhang, 2014). An opinion other than an unmodified opinion may indicate material reporting issues or limitations affecting the auditor's conclusion, although it does not by itself establish the existence of fraud. Audit opinion may therefore be relevant when examining the relationship between fraud risk indicators and potential financial statement manipulation. For example, the relationship between financial pressure and potential manipulation may differ depending on the audit opinion received by a company. Nevertheless, the role of audit opinion as a moderator of the individual fraud pentagon elements requires further empirical examination.

Previous research has examined the fraud pentagon framework in relation to financial statement fraud, including studies that consider corporate governance mechanisms as moderating variables (Dewi & Anisykurlillah, 2021). However, the findings concerning individual fraud indicators remain inconsistent, and the moderating role of audit opinion across all five fraud pentagon elements remains an important question in the context of Indonesian pharmaceutical companies. This study addresses that issue by examining financial stability as a proxy for pressure, director turnover as a proxy for competence, the proportion of independent commissioners as a proxy for ineffective monitoring, auditor turnover as a proxy for rationalization, and the frequency of CEO photographs in annual reports as a proxy for arrogance. Potential financial statement fraud is assessed using the Beneish M-Score, which provides an indicator of the likelihood of earnings manipulation rather than definitive evidence of fraud (Beneish, 1999). Using data from pharmaceutical companies listed on the Indonesia Stock Exchange during 2019–2023, this study aims to examine the effects of the five fraud pentagon elements on potential financial statement fraud and to test whether audit opinion moderates each of these relationships. The findings are expected to contribute to the literature on financial statement fraud detection by providing industry-specific evidence on the explanatory role of fraud risk indicators and the potential moderating role of audit opinion.

2. Literature Review and Hypotheses Development

Agency Theory

Agency theory explains the relationship between principals and agents, in which principals delegate decision-making authority and responsibilities to agents (Jensen & Meckling, 1976; Nadziliyah & Primasari, 2022). In a corporate setting, shareholders act as principals, while managers serve as agents responsible for managing the company and making decisions on behalf of its owners. In return for the authority delegated to them, managers are expected to be accountable for their decisions and organizational performance, particularly through financial statements and managerial reports. These reports provide information that enables shareholders to evaluate management performance and assess whether managers have acted in the company's best interests.

However, the relationship between principals and agents may involve conflicts of interest because both parties may have different objectives. While shareholders generally seek to maximize firm value, managers may pursue personal interests, such as maintaining their positions, increasing compensation, or demonstrating favorable performance. Malau & Aryati (2023) explain that agency relationships require mechanisms that align the interests of the parties involved. When such interests are not adequately aligned, information asymmetry may arise because managers generally have greater access to internal corporate information than shareholders. This condition may create opportunities for managers to make decisions that do not fully reflect the interests of the principals.

In the context of financial reporting, agency conflicts and information asymmetry may create incentives for managers to present the company's financial condition more favorably than its actual performance. For example, managers facing pressure to meet financial targets may manipulate accounting information to maintain investor confidence or conceal unfavorable results. Such behavior can undermine the reliability of financial statements and potentially lead to financial statement fraud. Accordingly, agency theory provides a theoretical foundation for examining the factors that may motivate management to engage in financial statement manipulation, including the pressures and opportunities associated with the fraud pentagon elements.

Fraud Pentagon Theory

The Association of Certified Fraud Examiners (ACFE) describes fraud as an intentional act involving deception or the misrepresentation of information for the benefit of the perpetrator or another party (Association of Certified Fraud Examiners [ACFE], 2024; Ramadhan, 2020). Understanding the factors that motivate and enable fraudulent behavior is important for identifying potential risks of financial statement manipulation. One framework used to explain these factors is the fraud pentagon theory, which was introduced by Crowe Horwath (2011) and subsequently discussed in the fraud examination literature. The theory extends earlier fraud models by incorporating five elements: pressure, opportunity, rationalization, competence, and arrogance. These elements represent the conditions and individual characteristics that may contribute to fraudulent behavior.

Pressure and Financial Statement Fraud

From the perspective of fraud pentagon theory, *pressure* refers to circumstances or incentives that may motivate individuals to engage in fraudulent activities (Inayah & Chariri, 2024). Such pressure may arise from financial or non-financial factors, including financial difficulties, performance targets, and poor organizational performance. In a corporate setting, management may experience pressure to meet stakeholders' expectations and maintain the company's financial performance, particularly when the company faces financial challenges or is expected to demonstrate continuous growth.

Financial stability reflects a company's ability to maintain a sound financial condition over time. Shareholders and creditors generally favor companies with stable financial conditions because stability may indicate the company's capacity to manage its resources and meet its financial obligations. Therefore, maintaining financial stability may become a source of pressure for management, especially when the company experiences unfavorable financial conditions or when its performance falls short of stakeholders' expectations. Under such circumstances, management may have incentives to present the company's financial condition more favorably than its actual condition, potentially increasing the risk of financial statement manipulation.

In this study, pressure is proxied by financial stability, measured using changes in total assets (ACHANGE). Although changes in total assets do not necessarily indicate financial instability, substantial or unfavorable changes may reflect conditions that require further examination of the company's financial stability. Accordingly, ACHANGE is used as an indicator of financial stability-related pressure rather than as direct evidence of fraudulent behavior. Previous studies by Maulida et al. (2024) and Gunawan & Siregar (2023) examined the relationship between pressure, proxied by financial stability, and fraudulent financial statements. These findings provide a basis for further investigating whether financial stability-related pressure is associated with the likelihood of potential financial statement manipulation.

Based on the theoretical arguments and previous empirical evidence, the Hypothesis 1 is proposed.

H_1: Pressure is associated with the likelihood of financial statement fraud

Competence and Financial Statement Fraud

Competence refers to an individual's ability to carry out fraudulent acts, encompassing their talents, expertise, and proficiencies. In the "fraud pentagon" theory, the term "competence" carries the same meaning as "capability" in the "fraud diamond" theory. Capability consists of six elements: position, intelligence, self-confidence/ego, coercion (the skill to compel others), deception (the ability to appear honest or persuasive), and stress management (Septriani & Handayani, 2018). According to Handoko (2021), changes in the composition of the board of directors can serve as a signal for detecting fraud in a company's financial statements (Rahma & Sari, 2023).

In this study, competence is proxied by change in director, which indicates whether a change in the board of directors occurred during the observation period. Previous studies by Puspitha & Yasa (2019) examined the relationship between competence, measured by director turnover, and financial statement fraud. Building on this theoretical perspective and previous empirical research, this study proposes the following hypothesis:

H_2: Competence is associated with the likelihood of financial statement fraud

Opportunity and Financial Statement Fraud

Opportunity refers to the circumstances that allow an individual to commit fraud, stemming from weak internal controls within a company and poor management supervision. This fourth element represents the opening for a perpetrator to engage in fraudulent activity when a company lacks effective oversight (Wijaya & Witjaksono, 2023). Ineffective supervision can be exploited by management as an opportunity to commit financial statement fraud.

In this study, opportunity is proxied by ineffective monitoring, measured using the proportion of independent commissioners (BDOUT). Independent commissioners are expected to provide objective oversight of management decisions and financial reporting practices. An adequate and effective monitoring system can help reduce opportunities for management to engage in financial statement manipulation. Conversely, limitations in the effectiveness of monitoring may weaken oversight and increase the risk of potential financial statement fraud. Nevertheless, the proportion of independent commissioners does not necessarily reflect the actual effectiveness of the monitoring process.

Previous studies by Gunawan & Siregar (2023) and Sapulette & Risakotta (2020) examined the relationship between opportunity, proxied by monitoring effectiveness, and fraudulent financial statements. These findings provide a basis for further examining whether monitoring-related opportunity is associated with the likelihood of financial statement fraud. Accordingly, the following hypothesis is proposed:

H_3: Opportunity is associated with the likelihood of financial statement fraud

Rationalization and Financial Statement Fraud

In Fraud Pentagon Theory, rationalization refers to the justification individuals use to perceive their improper or fraudulent actions as acceptable. Individuals who engage in fraud may convince themselves that their actions are reasonable or necessary under certain circumstances. In the context of financial reporting, management may attempt to conceal irregularities or reduce the likelihood that potential financial statement manipulation will be detected by the existing auditor. One possible response is to replace the incumbent auditor with a new auditor (Istanto, 2022). However, auditor turnover may also occur for legitimate reasons and should not be interpreted as direct evidence of fraudulent behavior.

In this study, rationalization is proxied by change in auditor, which indicates whether a company changes its external auditor during the observation period. Auditor changes may be relevant to the assessment of financial reporting risk because a new auditor may have different approaches, knowledge, and experience in examining the company's financial statements. Nevertheless, auditor turnover alone cannot establish that management has attempted to conceal fraudulent activities.

Previous studies by Agustini & Iskak (2021), Syavira & Aliyah (2023), and Wijaya & Witjaksono (2023) examined the relationship between auditor changes and financial statement fraud. Based on the theoretical arguments and previous empirical research, the following hypothesis is proposed:

H_4: Rationalization is associated with the likelihood of financial statement fraud.

Arrogance and Financial Statement Fraud

In fraud pentagon theory, arrogance refers to an attitude of superiority that may lead individuals to believe that they are above organizational rules and internal control procedures (Maulida et al., 2024). Individuals with high levels of arrogance may perceive themselves as more powerful or important than others and believe that their authority exempts them from accountability. In a corporate setting, such attitudes may weaken adherence to internal controls and increase the risk of inappropriate managerial behavior.

In this study, arrogance is proxied by the frequency of CEO photographs presented in the company's annual report. The number of CEO photographs may reflect the extent to which the CEO's image and status are emphasized in corporate communications. Frequent visual representation of the CEO may indicate an emphasis on personal prominence and public recognition, which may be associated with an arrogant leadership attitude. However, the number of photographs alone does not establish that a CEO is arrogant or involved in fraudulent activities, as annual report design and communication policies may also influence the number of photographs presented.

Previous studies by Oktavia et al. (2022), Oktavia et al. (2024), and Rahma & Sari (2023) examined the relationship between the frequency of CEO photographs in annual reports and fraudulent financial statements. Based on the theoretical arguments and previous empirical research, the following hypothesis is proposed:

H_5: Arrogance is associated with the likelihood of financial statement fraud

Audit Opinion Roles as a Moderator

An audit opinion serves not only as a form of attestation regarding financial statements but also as an external oversight mechanism and a signal to the market concerning the quality of information (Arens et al., 2020; DeFond & Zhang, 2014). An audit opinion acts as a moderating variable that can either weaken or strengthen the influence of elements within the "fraud pentagon" on the occurrence of financial statement fraud. An audit opinion refers to the assessment and evaluation provided by an auditor following an audit of a company's financial statements or performance.

Accordingly, audit opinion may condition the relationship between pressure and potential financial statement fraud. Sanulika & Hidayati (2021) examined the moderating role of audit opinion in the relationship between financial stability and fraudulent financial reporting. Building on this

argument, the present study investigates whether audit opinion moderates the relationship between pressure, proxied by financial stability, and potential financial statement fraud.

H_6: Audit opinion moderates the relationship between pressure and the likelihood of potential financial statement fraud

Such manipulative actions can lead to an audit opinion other than an "unqualified" (clean) opinion, as company managers may attempt to conceal audit evidence. In a study by Sanulika & Hidayati (2021), it was found that the audit opinion moderates the effect of changes in the board of directors on fraudulent financial reporting.

H_7: Audit opinion moderates the relationship between competence and the likelihood of potential financial statement fraud

An audit opinion other than "unqualified" (clean) indicates ineffective oversight within a company. This lack of effective oversight creates opportunities for individuals to commit fraud. A study by Sanulika & Hidayati (2021) found that an audit opinion does not moderate the influence of the proportion of independent commissioners on fraudulent financial reporting. Therefore, the role of an audit opinion as a moderating variable—particularly regarding the influence of "rationalization" in the detection of financial statement fraud—warrants further investigation.

H_8: Audit opinion moderates the relationship between opportunity and the likelihood of potential financial statement fraud

Furthermore, if a company receives an audit opinion other than an "unqualified" (clean) opinion, this may serve as a justification for the company to replace its external auditor in order to obtain a more favorable audit opinion. A study by Sanulika & Hidayati (2021) found that the audit opinion can moderate the effect of auditor turnover on fraudulent financial reporting.

H_9: Audit opinion moderates the relationship between rationalization and the likelihood of potential financial statement fraud

When a company receives an audit opinion other than an "unqualified" (clean) opinion, it typically makes every effort to maintain a positive corporate image. Consequently, CEOs tend to feature themselves more prominently in the company's annual report to increase their visibility to the public and other stakeholders. A study by Sanulika & Hidayati (2021) found that an audit opinion does not moderate the influence of "arrogance" on financial reporting fraud. Therefore, the relationship between arrogance and financial reporting fraud warrants further investigation.

H_{10}: Audit opinion moderates the relationship between arrogance and the likelihood of potential financial statement fraud

3. Methodology

This study uses a quantitative approach, utilizing secondary data obtained from the official website of the Indonesia Stock Exchange (IDX) at www.idx.co.id. The data consist of annual reports and financial statements of companies for the 2019–2023 period. The research population comprises 13 pharmaceutical companies listed on the IDX during the observation period. The sample was selected using a purposive sampling method, based on predetermined criteria relevant to the research objectives.

The sample was selected using purposive sampling based on the following criteria: (1) pharmaceutical companies listed on the Indonesia Stock Exchange (IDX) before 2019; (2) companies that published audited annual reports and financial statements for fiscal years ending December 31, throughout the 2019–2023 period, with financial statements presented in Indonesian rupiah; and (3) companies whose annual reports contained CEO photographs that could be identified and counted for the measurement of arrogance.

Table 1. Sample selection

Sample selection criteria	Number of companies
Pharmaceutical companies listed on the IDX in 2024	13
Companies listed on the IDX after 2019	(3)
Companies that did not publish audited annual reports and financial statements for fiscal years ending December 31, in Indonesian rupiah, during 2019–2023	(0)
Companies whose annual reports did not include a CEO profile	(0)
Final sample of companies	10
Observation period (years)	5
Total firm-year observations	50

Based on these criteria, 13 pharmaceutical companies listed on the IDX in 2024 were initially identified. Three companies were excluded because they were listed after 2019, while no companies were excluded based on the availability of audited financial statements or the presence of CEO profiles in their annual reports. Consequently, 10 companies met the sample selection criteria. With a five-year observation period from 2019 to 2023, the final dataset consisted of 50 firm-year observations. The sample selection process is summarized in Table 1.

Dependent Variable: Financial Statement Fraud

Financial statement fraud is the dependent variable in this study and is measured using the Beneish M-Score model. The model comprises eight financial ratios designed to identify potential earnings manipulation. The M-Score is calculated using the following formula (Equation 1/Eq. 1).

$$M - Score = -4.84 + 0.920\ DSRI + 0.528\ GMI + 0.404\ AQI + 0.892\ SGI + 0.115\ DEPI + (-0.172)\ SGAI + 4.697\ TATA + (-0.327)\ LVGI \quad \text{(Eq.1)}$$

Following the classification threshold reported by Maulida et al. (2024), the M-Score is converted into a binary variable. An M-Score below or equal to −2.22 is coded as 0, indicating a lower likelihood of earnings manipulation, whereas an M-Score above −2.22 is coded as 1, indicating a higher likelihood of potential earnings manipulation. This classification is used to identify potential manipulation indicators and does not establish that fraud has actually occurred.

Independent Variable: Pressure (X_1)

Pressure refers to circumstances or incentives that may motivate individuals to engage in fraudulent activities. In this study, pressure is proxied by financial stability, measured using the change in total assets (ACHANGE). This indicator reflects the proportionate change in a company's total assets between two consecutive years. ACHANGE is calculated as following Equation 2 (Eq. 2).

$$ACHANGE = \frac{TA_t + TA_{t-1}}{TA_{t-1}} \quad \text{(Eq. 2)}$$

Independent Variable: Competence (X_2)

Competence refers to an individual's ability to recognize and exploit opportunities to commit fraud. In this study, competence is proxied by changes in the board of directors (*change in director*). This variable is measured using a dummy variable, coded 1 if a company experiences a change in its board of directors during the observation year and 0 otherwise. Director turnover is treated as an indirect indicator of competence-related fraud risk and does not necessarily indicate fraudulent behavior.

Independent Variable: Opportunity (X_3)

Opportunity refers to circumstances that may enable individuals to engage in fraudulent activities, particularly when corporate monitoring and internal controls are ineffective (Wijaya & Witjaksono, 2023). In this study, opportunity is proxied by monitoring-related corporate governance characteristics, measured using the proportion of independent commissioners (BDOUT). The ratio is calculated as followsing Equation 3 (Eq. 3).

$$BDOUT = \frac{Number\ of\ Independent\ Commissioners}{Total\ Number\ of\ Commissioners} \quad \text{(Eq. 3)}$$

A higher BDOUT value indicates a greater proportion of independent commissioners on the board. Although this indicator is commonly used as a proxy for monitoring-related opportunity, it measures board independence rather than the actual effectiveness of corporate monitoring.

Independent Variable: Rationalization (X_4)

Rationalization refers to the justification individuals use to perceive fraudulent actions as acceptable. In this study, rationalization is proxied by auditor turnover (change in auditor), which may be associated with changes in external audit oversight (Gunawan & Siregar, 2023). This variable is measured using a dummy variable, coded 1 if the company changes its external auditor during the observation year and 0 otherwise. Auditor turnover is an indirect indicator of rationalization-related fraud risk and does not necessarily reflect an attempt to conceal fraudulent activities.

Independent Variable: Arrogance (X_5)

Arrogance refers to an attitude of superiority that may lead individuals to believe that organizational rules and internal control procedures do not apply to them. In this study, arrogance is proxied by the frequency of CEO photographs presented in the company's annual report. This variable is measured by counting the number of CEO photographs

appearing in the annual report for each observation year. A higher frequency indicates greater visual prominence of the CEO in corporate reporting. However, the number of photographs does not directly establish the CEO's level of arrogance, as annual report design and corporate communication practices may also influence this measure.

Model Specification and Data Analysis

The first model examines the relationship between the five fraud pentagon elements and the likelihood of potential financial statement fraud. The model is specified as following Equation 4 (Eq. 4).

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \varepsilon_i \quad \text{(Eq. 4)}$$

Where, (P_i) represents the probability that observation (i) is classified as having a higher likelihood of potential financial statement manipulation. (X_1) represents pressure, measured by changes in total assets (ACHANGE); (X_2) represents competence, measured by changes in the board of directors; (X_3) represents opportunity, measured by the proportion of independent commissioners (BDOUT); (X_4) represents rationalization, measured by changes in the external auditor; and (X_5) represents arrogance, measured by the frequency of CEO photographs in annual reports. (β_0) is the intercept, (β_1) to (β_5) are the regression coefficients, and (ε_i) represents the error term.

The second model examines whether audit opinion moderates the relationships between the five fraud pentagon elements and potential financial statement fraud. Audit opinion is coded 1 for opinions other than an unqualified opinion and 0 for an unqualified opinion. The moderation model is specified as following Equation 5 (Eq. 5).

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 M_i + \beta_7 (X_{1i} \times M_i) + \beta_8 (X_{2i} \times M_i) + \beta_9 (X_{3i} \times M_i) + \beta_{10} (X_{4i} \times M_i) + \beta_{11} (X_{5i} \times M_i) + \varepsilon_i \quad \text{(Eq. 5)}$$

Where, (M) represents audit opinion. The interaction terms capture whether the relationship between each fraud pentagon element and the likelihood of potential financial statement fraud differs according to audit opinion. Specifically, the coefficients of the interaction terms indicate whether audit opinion moderates the relationships involving pressure, competence, opportunity, rationalization, and arrogance, respectively.

The data analysis begins with descriptive statistics to summarize the research variables. The suitability of the data for logistic regression is then assessed by examining multicollinearity and potential issues affecting estimation stability. Model fit is evaluated using appropriate statistics, including the omnibus test, Hosmer–Lemeshow test, –2log-likelihood, and pseudo-(R^2). Hypotheses are tested by examining regression coefficients and their statistical significance using the Wald test or an equivalent procedure. Odds ratios may also be reported to facilitate interpretation. The moderating role of audit opinion is assessed through the significance of the five interaction terms between audit opinion and the fraud pentagon elements. Significant interaction coefficients indicate evidence of moderation, whereas nonsignificant coefficients indicate insufficient statistical evidence. All findings are interpreted in consideration of the research design, measurement limitations, and sample characteristics.

4. Results

Descriptive statistics are used to summarize the characteristics of the research variables based on 50 firm-year observations from pharmaceutical companies listed on the Indonesia Stock Exchange during 2019–2023. Table 2 presents the minimum, maximum, mean, and standard deviation of the dependent variable, the five fraud pentagon variables, and audit opinion as the moderating variable. These statistics provide an overview of the distribution and variation of the variables before conducting the logistic regression analysis.

Based on Table 3, the variables for financial statement fraud, financial stability, change of directors, and change of auditors exhibit standard deviation values that are greater than their respective means, indicating a higher degree of data dispersion. Conversely, the proportion of the board of commissioners, the frequency of CEO appearances (in company materials/media), and the audit opinion show standard deviation values that are smaller than their respective means, suggesting that the data are more homogeneous and possess less variation.

The mean values for financial stability and opportunity approach the maximum possible values, implying that the levels of pressure and opportunity within these pharmaceutical companies are relatively high.

Logistic Regression Analysis

Binary logistic regression was employed because the dependent variable, financial statement fraud, was measured using a dummy variable. The overall model was evaluated using the Hosmer–Lemeshow goodness-of-fit test, pseudo-(R^2) statistics, and the omnibus test of model coefficients. Individual regression coefficients were subsequently examined using the Wald test. The results of the logistic regression analysis are presented in Table 3.

Based on Table 3, the Hosmer–Lemeshow test yields a significance value of 0.091, which exceeds the 0.05 threshold. This result indicates no statistically significant evidence of a lack of model fit. The Nagelkerke (R^2) value is 0.510, indicating the model's relative explanatory performance according to this pseudo-(R^2) measure. However, it should not be interpreted directly as the percentage of variation in financial statement fraud explained by the independent variables.

The omnibus test produces a chi-square value of 17.713 with a significance value of 0.003, indicating that the predictors jointly improve the model compared with the intercept-only model. This result suggests that the predictors, considered collectively, contribute to the model's ability to distinguish between the two outcome categories. It does not imply that every independent variable has a statistically significant individual effect.

Wald Test

The Wald test is used to examine the individual relationships between the fraud pentagon elements and the likelihood of potential financial statement fraud. Table 4 presents the regression coefficients, Wald statistics, significance values, and hypothesis testing results.

The Wald test results (Table 4) indicate that pressure, proxied by changes in total assets (ACHANGE), has a statistically significant positive association with the likelihood of potential financial statement fraud, with a coefficient of 7.941 and a significance value of 0.017. This finding suggests that ACHANGE is positively associated with the likelihood of an observation being classified as having a higher risk of potential earnings manipulation under the Beneish M-Score classification.

Table 2. Descriptive statistics

Variables	Minimum	Maximum	Mean	Std. Deviation
Financial Statement Fraud	0.000	1.000	0.160	0.370
Financial Stability	-0.487	2.527	0.095	0.402
Change in Director	0.000	1.000	0.240	0.431
Proportion of Independent Commissioners	0.250	0.750	0.502	0.136
Change in Auditor	0.000	1.000	0.380	0.490
Frequency of CEO Photographs	0.000	13.000	3.180	2.210
Audit Opinion	0.000	1.000	0.540	0.503

Table 3. Logistic regression model evaluation

Evaluation Measure	Statistic	Value	Significance
Hosmer–Lemeshow test	Chi-square	13.679	0.091
Model explanatory power	−2 Log-likelihood	26.254	–
Cox & Snell R Square	Pseudo-(R^2)	0.298	–
Nagelkerke R Square	Pseudo-(R^2)	0.510	–
Omnibus test	Chi-square	17.713	0.003

Table 4. Wald test results

Variable	Coefficient (B)	Wald	Sig.	Decision
X_1: Pressure (ACHANGE)	7.941	5.727	0.017	H_1: Supported
X_2: Competence (CID)	1.054	0.849	0.357	H_2: Not supported
X_3: Opportunity (BDOUT)	1.216	0.076	0.783	H_3: Not supported
X_4: Rationalization (CIA)	−3.165	1.945	0.163	H_4: Not supported
X_5: Arrogance (CEOP)	0.023	0.013	0.909	H_5: Not supported
Constant	−2.966	1.858	0.173	–

In contrast, competence, opportunity, rationalization, and arrogance do not exhibit statistically significant individual relationships with the dependent variable, as their significance values exceed the 0.05 threshold. Therefore, the results support the hypothesis concerning pressure, while the hypotheses concerning the other four fraud pentagon elements are not supported by the regression results.

Moderated Regression Analysis

Moderated regression analysis is used to examine the nature of a moderating variable within the relationship between an independent variable and a dependent variable—specifically, whether the variable strengthens or weakens that relationship. Based on Table 5, the following results were obtained.

Table 5. Moderation model evaluation

Model Fit Statistic	Value
−2 Log-likelihood	15.718
Cox & Snell R Square	0.432
Nagelkerke R Square	0.738

Table 6 presents the model evaluation statistics after audit opinion and the interaction terms were included in the logistic regression model. The Nagelkerke R Square increased from 0.510 in the initial model to 0.738 in the moderation model, representing an increase of 0.228. This indicates an improvement in the model's pseudo-(R^2) measure after the inclusion of the moderating variable and interaction terms. However, this increase does not, by itself, establish that audit opinion significantly moderates the relationships between the fraud pentagon elements and potential financial statement fraud. The significance of the individual interaction terms must be examined separately.

Table 6 presents the results of the interaction tests examining the moderating role of audit opinion. Based on the reported significance values, audit opinion significantly moderates the relationships between pressure, opportunity, and arrogance and the likelihood of potential financial statement fraud. Accordingly, H_6, H_8, and H_{10} are supported by the reported results. In contrast, the interactions involving competence and rationalization are not statistically significant; therefore, H_7 and H_9 are not supported. These findings suggest that the moderating role of audit opinion varies across the fraud pentagon elements. However, the direction and substantive interpretation of the moderating effects require further examination of the regression coefficients and verification of the statistical output.

5. Discussion

The Effect of Pressure on Financial Statement Fraud

The research results indicate that pressure proxied by the change in total assets (ACHANGE) has a positive and significant effect on indications of financial statement fraud. This finding suggests that changes in assets are linked to the likelihood of a company engaging in financial statement manipulation, as classified by the Beneish M-Score. From the perspectives of the Fraud Pentagon Theory and Agency Theory, the pressure to maintain performance and meet shareholder expectations may drive management to present the company's financial position in a more favorable light. These results are consistent with studies conducted by Maulida et al. (2024) as well as Gunawan & Siregar (2023). However, changes in assets do not always reflect the presence of pressure or fraud, as such changes could also arise from business expansion or investments. Therefore, ACHANGE should be interpreted as a risk indicator rather than direct evidence of fraud.

These findings align with those of Abadi et al. (2023), Inayah & Chariri (2024), and Sapulette & Risakotta (2020), but differ from the results of Sanulika & Hidayati (2021), who found that pressure has no effect on financial statement fraud. Such discrepancies may stem from differences in sample characteristics, observation periods, and the specific proxies employed. Consequently, changes in assets can be considered an indicator of the risk of financial

Table 6. Moderation regression results

Interaction Term	Coefficient (B)	Wald	Sig.	Hypothesis Decision
Pressure × Audit Opinion	13.127	1.780	0.005	H_6: Supported
Competence × Audit Opinion	−17.539	0.000	0.366	H_7: Not supported
Opportunity × Audit Opinion	−46.254	1.766	0.011	H_8: Supported
Rationalization × Audit Opinion	17.091	0.000	0.462	H_9: Not supported
Arrogance × Audit Opinion	1.752	1.549	0.005	H_{10}: Supported

statement manipulation, provided that the limitations of this measurement are taken into account.

The Effect of Competence on Financial Statement Fraud

The research results indicate that competence measured through changes in the board of directors (director turnover) does not have a significant influence on indications of financial statement fraud. This finding may be related to the low frequency of director turnover among the pharmaceutical companies included in the research sample. Furthermore, changes in the board of directors do not necessarily reflect management's capacity to commit fraud, as such changes may occur due to leadership transitions, corporate restructuring, or strategic business requirements. Consequently, director turnover may not be an adequate proxy for measuring an individual's ability to exploit weaknesses in internal controls. These findings are consistent with the research of Syavira & Aliyah (2023) and Oktaviani et al. (2023), but differ from the results obtained by Puspitha & Yasa (2019). These discrepancies likely reflect variations in sample characteristics, research contexts, and the approaches used to measure these variables.

The Effect of Opportunity on Financial Statement Fraud

The research results indicate that "opportunity"—proxied by the proportion of independent commissioners (BDOUT)—does not have a significant effect on indications of financial statement fraud. Descriptive statistics show that the proportion of independent commissioners in pharmaceutical companies listed on the Indonesia Stock Exchange (IDX) during the study period was relatively high, with limited variation. This condition may diminish the capacity of the BDOUT variable to explain differences in the risk of financial statement manipulation across companies. Furthermore, the proportion of independent commissioners does not necessarily reflect the actual effectiveness of oversight, as such effectiveness also depends on factors like competence, practical independence, access to information, and follow-up actions taken regarding oversight findings. Consequently, the structure of the board of commissioners alone is insufficient to explain indications of financial statement fraud. These findings are consistent with those of Agustini & Iskak (2021) as well as Qintharah & Riyanti (2023), who also found that the proportion of independent commissioners has no significant effect on financial statement fraud.

The Effect of Rationalization on Financial Statement Fraud

The research results indicate that rationalization—proxied by auditor turnover—does not have a significant effect on indications of financial statement fraud. Rationalization is a psychological process through which individuals justify unethical actions, whereas auditor turnover can occur for various professional and operational reasons. Consequently, a change in auditors does not directly signify an attempt by management to conceal fraud. Furthermore, descriptive statistics reveal that the rate of auditor turnover among the pharmaceutical companies sampled in this study is relatively low; thus, the variation in this proxy is limited in its ability to explain indications of financial statement fraud. These findings suggest that auditor turnover is insufficient to represent rationalization as a behavioral factor within the Fraud Pentagon Theory. This study's results align with those of Ramdany et al. (2020) as well as Inayah & Chariri (2024), who also found that rationalization does not have a significant impact on financial statement fraud.

The Effect of Arrogance on Financial Statement Fraud

The research results indicate that arrogance—proxied by the frequency of a CEO's photographs in the annual report—does not have a significant effect on indications of financial statement fraud. The number of a CEO's photographs does not necessarily reflect an attitude of superiority or a tendency to disregard internal controls. Furthermore, the frequency of such photographs may be influenced by the design of the annual report and the company's communication policies. Additionally, descriptive statistics show that the frequency of CEO photographs in the pharmaceutical companies sampled for this study is relatively low. This condition may limit the indicator's ability to explain variations in indications of financial statement fraud. Consequently, the frequency of a CEO's photographs is insufficient to capture the psychological characteristics of a CEO that are relevant to fraud risk. These findings are consistent with the research of Zahara & Novita (2019), which states that the frequency of a CEO's photographs does not have a significant impact on financial statement fraud.

The Role of Audit Opinion in Moderating the Influence of Pressure

The research results indicate that the interaction between pressure and audit opinion has a significant effect on indications of financial statement fraud. Audit opinion moderates the relationship between pressure and indications of financial statement fraud. In agency theory, an external audit serves to reduce information asymmetry between management and shareholders, while an audit opinion provides information regarding the auditor's assessment of the fairness of financial statements. The interaction coefficient of 13.127 is higher than the coefficient for pressure prior to the interaction (7.941). This suggests that an audit opinion has the potential to strengthen the relationship between pressure and indications of financial statement fraud. However, the interpretation of the direction of this moderation requires confirmation through an examination of the regression results and conditional effects, as a difference in the magnitude of the coefficients alone is insufficient to conclude that the moderation is reinforcing in nature. These findings are consistent with the research of Sanulika & Hidayati (2021), who found that audit opinion can moderate the influence of financial stability on indications of financial statement fraud.

The Role of Audit Opinion in Moderating the Influence of Competence

The research results indicate that the interaction between competence and audit opinion does not have a significant effect on indications of financial statement fraud. Consequently, there is insufficient statistical evidence to conclude that audit opinion moderates the relationship between competence and indications of financial statement fraud. In this study, competence is proxied by the turnover of directors; while this reflects a change in leadership, such a turnover does not necessarily represent an individual's actual capacity to commit or conceal fraud. On the other hand, an audit opinion is an auditor's professional conclusion regarding the fair presentation of financial statements, rather than a guarantee that those statements are entirely free from fraud. Therefore, an audit opinion is not always capable of altering the relationship between the turnover of directors and indications of financial statement fraud.

These findings should be understood within the context of the *Fraud Diamond Theory* developed by Wolfe & Hermanson (2004), which identifies "capability" as a factor that enables an individual to commit fraud. However, an individual's capability cannot be directly measured solely through the turnover of directors. Thus, the results of this study indicate that audit opinion does not moderate the influence of the "competence" proxy on indications of financial statement fraud. These findings also underscore the need for caution when using the turnover of directors as an indicator of competence to explain the risk of financial statement fraud.

The Role of the Audit Opinion in Moderating the Influence of Rationalization

The research results indicate that the interaction between rationalization and audit opinions does not have a significant effect on indications of financial statement fraud. This suggests that there is insufficient statistical evidence to conclude that the relationship between auditor changes and indications of financial statement fraud varies based on the category of the audit opinion. Rationalization relates to an individual's internal process of justifying unethical actions, whereas an auditor change is an organizational event that may occur for various professional or operational reasons. Meanwhile, an audit opinion focuses on the fairness of the presentation of financial statements and does not directly measure management's motivations or moral considerations.

These findings can be explained through the Fraud Triangle Theory proposed by Cressey (1953), which identifies rationalization as one of the underlying elements of fraud. Perpetrators may justify their actions, leading them to perceive the fraud as acceptable or as having a valid rationale. In the context of this study, an audit opinion does not necessarily influence this internal justification process. Skousen et al. (2009) discuss fraud risk factors within a corporate context, while Wolfe & Hermanson (2004) emphasize the role of "capability" in the Fraud Diamond Theory. Dechow et al. (2011) also examine corporate characteristics associated with financial statement manipulation. While this literature provides a framework for understanding fraud risk, it does not, in itself, prove that rationalization cannot be moderated by an audit opinion. Consequently, the results of this study indicate that audit opinions do not moderate the relationship between the proxy for rationalization—namely, auditor changes—and indications of financial statement fraud.

The Role of Audit Opinions in Moderating the Influence of Arrogance

The research results indicate that the interaction between arrogance and audit opinions has a significant effect on indications of financial statement fraud. This finding suggests that the relationship between the frequency of a CEO's photographs and indications of financial statement fraud varies according to the category of the audit opinion. Within the framework of the Fraud Pentagon Theory, arrogance is associated with an excessive belief in one's personal power and a tendency to disregard internal controls. An audit opinion can serve as an external oversight mechanism, providing information regarding the fairness of the presentation of financial statements. However, because the frequency of a CEO's photographs is an indirect proxy for arrogance, these results should be interpreted with caution. Furthermore, the significance of the interaction alone is insufficient to determine whether an audit opinion strengthens or weakens this relationship.

These findings relate to the Fraud Pentagon concept developed by Jonathan Marks, which identifies arrogance as a factor that can drive the occurrence of fraud. Vousinas (2019) also emphasizes the role of behavioral factors—including ego—in explaining fraudulent actions. In this context, an independent external audit has the potential to enhance accountability and limit management's opportunities to abuse their authority. Additionally, Siddiq et al. (2017) discuss the factors within the Fraud Pentagon in relation to indications of financial statement fraud. Consequently, this prior research provides a theoretical and empirical foundation for examining the link between arrogance and financial statement fraud. Nevertheless, as these results specifically point to a moderating effect by the audit opinion, the direction of this moderation must be confirmed through the interaction coefficient and verified conditional effects.

Overall, the results of this study provide partial support for the Fraud Pentagon theory. Of the five elements tested, only "pressure" has a significant direct influence on indications of financial statement fraud. Meanwhile, competence, opportunity, rationalization, and arrogance do not show a significant direct influence based on the proxies employed. These results underscore that the theoretical relevance of a factor is not always reflected in a statistically significant relationship when measured using indirect indicators.

The audit opinion is found to moderate the relationships involving pressure, opportunity, and arrogance, but it does not moderate those involving competence and rationalization. These findings suggest that the role of an audit opinion may vary depending on the specific risk factor being analyzed. However, the interpretation regarding the direction of this moderation requires further verification through regression analysis. In practice, fraud risk assessment should not rely on a single indicator; rather, it must take into account financial conditions, the effectiveness of oversight, management characteristics, and other audit evidence. Furthermore, these results should be interpreted with caution, given that the study is based on only 50 firm-year observations and utilizes the Beneish M-Score as an indicator of potential manipulation—not as definitive proof that fraud has occurred.

6. Conclusion

This study finds that pressure, proxied by changes in total assets, has a significant positive effect on indications of financial statement fraud, while competence, opportunity, rationalization, and arrogance have no significant direct effects. Audit opinion significantly moderates the relationships involving pressure, opportunity, and arrogance, but does not moderate the relationships involving competence and rationalization. These findings should be interpreted cautiously because the study uses a relatively small sample of 50 firm-year observations, and the Beneish M-Score identifies potential earnings manipulation rather than confirming actual fraud.

Companies should strengthen internal controls and financial monitoring, particularly when experiencing substantial changes in financial conditions. Auditors and audit committees should assess fraud risks comprehensively and not rely solely on audit opinions as indicators of fraud prevention. Future research should use larger samples, longer observation periods, and more comprehensive measures of the Fraud Pentagon elements. Further studies should also verify the robustness of statistical estimates and examine additional corporate governance and audit quality variables to improve the understanding of potential financial statement fraud.

References

Abadi, R., Safriliana, R., Zuhroh, D., Chandrarin, G., & Sitinjak, N. D. (2023). Pentagon fraud analysis of fraud financial statement actions: The role of family ownership as moderation variable. *Indonesian Interdisciplinary Journal of Sharia Economics, 6*(2), 541–555. https://doi.org/10.31538/iijse.v6i2.2815

Agustini, M., & Iskak, J. (2021). Faktor-faktor yang mempengaruhi fraudulent financial statement: Studi pendekatan fraud pentagon theory. *Jurnal Kontemporer Akuntansi, 1*(2), 105–114. https://doi.org/10.24912/jka.v1i2.15094

Arens, A. A., Elder, R. J., Beasley, M. S., & Hogan, C. E. (2020). *Auditing and assurance services* (17th ed.). Pearson.

Association of Certified Fraud Examiners. (2024). Occupational fraud 2024: A report to the nations. Association of Certified Fraud Examiners. Retrieved from: https://www.acfe.com/-/media/files/acfe/pdfs/rttn/2024/2024-report-to-the-nations.pdf

Audit Board of the Republic of Indonesia. (2024). Laporan hasil pemeriksaan investigatif atas pengelolaan keuangan PT Indofarma Tbk dan anak perusahaan periode 2020–2023. Audit Board of the Republic of Indonesia.

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. (1953). *Other people's money: A study in the social psychology of embezzlement*. Free Press.

Crowe Horwath. (2011). *Why the fraud triangle is no longer enough*. Crowe Horwath LLP.

Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. G. (2011). Predicting material accounting misstatements. *Contemporary Accounting Research, 28*(1), 17–82. https://doi.org/10.1111/j.1911-3846.2010.01041.x

DeFond, M., & Zhang, J. (2014). A review of archival auditing research. *Journal of Accounting and Economics, 58*(2–3), 275–326. https://doi.org/10.1016/j.jacceco.2014.09.002

Dewi, K., & Anisykurlillah, I. (2021). Analysis of the effect of fraud pentagon factors on fraudulent financial statement with audit committee as moderating variable. *Accounting Analysis Journal, 10*(1), 39–46. https://doi.org/10.15294/aaj.v10i1.44520

Gunawan, G. O., & Siregar, A. (2023). Fraudulent financial reporting: Analisis pengaruh elemen fraud hexagon pada perusahaan farmasi. *BALANCE: Jurnal Akuntansi, Auditing dan Keuangan, 20*(2), 168–197. https://doi.org/10.25170/balance.v20i2.4638

Handoko, B. L. (2021). Fraud hexagon dalam mendeteksi financial statement fraud perusahaan perbankan di Indonesia. *Jurnal Kajian Akuntansi*, *5*(2), 176-192. https://doi.org/10.33603/jka.v5i2.5101

Inayah, J. Z., & Chariri, A. (2024). The determinants of financial statement fraud: Fraud pentagon perspective. *Jurnal Akuntansi Aktual, 11*(1), 19–34. https://doi.org/10.17977/um004v11i12024p019

Istanto, C. H. P. (2022). Analisis pengaruh hexagon fraud terhadap kecurangan laporan keuangan (studi empiris pada perusahaan manufaktur yang terdaftar di Jakarta Islamic Index tahun 2015–2020) [Skripsi, Universitas Islam Indonesia].

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/j.jacceco.2014.09.002

Malau, A. S., & Aryati, T. (2023). Pengaruh fraud hexagon dalam mendeteksi financial statement fraud. *Jurnal Ekonomi Trisakti, 3*(2), 2587–2596. https://doi.org/10.25105/jet.v3i2.17298

Maulida., Rahmazaniati, L., Vonna, S. M., & Mahdani, S. (2024). Pendeteksian financial statement fraud menggunakan fraud hexagon pada perusahaan yang terindeks IDXBUMN20. *Jurnal Aplikasi Akuntansi, 9*(1), 60–76. https://doi.org/10.29303/jaa.v9i1.432

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

Navila, I. L., & Ardianto. (2020). Fraud pentagon in detecting fraudulent financial reporting. *International Journal of Innovation, Creativity and Change, 13*(8), 1232–1250.

Oktavia, R., Saphira, N., & Rinaldo, M. (2024). Unveiling fraud: The hexagon theory's revolutionary approach to detecting financial statement manipulations. *Jurnal ASET (Akuntansi Riset), 16*(1), 137–150. https://doi.org/10.17509/jaset.v16i1.56062

Oktavia, S., Bahari, A., & Kartika, R. (2022). Pengaruh elemen fraud hexagon theory terhadap fraud laporan keuangan. *Jurnal Akuntansi dan Ekonomika, 12*(2). https://doi.org/10.37859/jae.v12i2.4207

Oktaviani, N., Wenny, C. D., & [penulis lain bila ada]. (2023). Fraud pentagon dalam mendeteksi financial statement fraud. In *Proceedings of the 2nd MDP Student Conference, 2*(2), 36–45. https://doi.org/10.35957/mdp-sc.v2i2.3957

PT Kimia Farma Tbk. (2024). *Laporan tahunan 2023*. PT Kimia Farma Tbk.

Puspitha, M., & Yasa, G. (2019). Fraud pentagon analysis in detecting fraudulent financial reporting (Study on Indonesian capital market). *International Journal of Sciences: Basic and Applied Research, 45*(3), 93–109.

Qintharah, Y. N., & Riyanti, C. I. (2023). Analisis pengaruh fraud pentagon terhadap fraudulent financial reporting pada perusahaan subsektor consumer goods. JATI: *Jurnal Akuntansi dan Teknologi Informasi, 16*(1), 88–105. https://doi.org/10.24123/jati.v16i1.5274

Rahma, N. N., & Sari, S. P. (2023). Detection of fraud financial statements through the hexagon model Vousinas fraud dimensions: Review on Jakarta Islamic Index 70. *International Journal of Latest Research in Humanities and Social Science, 6*(1), 152–159.

Ramadhan, D. (2020). Root cause analysis using fraud pentagon theory approach: A conceptual framework. *Asia Pacific Fraud Journal, 5*(1), 118–125. https://doi.org/10.21532/apfjournal.v5i1.142

Ramdany, R., Musfita, R., & Darwis, H. (2020). Analisa faktor-faktor yang mempengaruhi kecurangan laporan keuangan: Model Fraud Diamond. *Jurnal Ekonomi Bisnis*, *19*(2), 157-166. https://doi.org/10.32722/eb.v19i2.3605

Sanulika, A., & Hidayati, W. N. (2021). Analisis perbandingan fraud pentagon dengan Beneish ratio dalam pendeteksian fraudulent financial reporting dengan opini audit sebagai variabel moderating. *Jurnal Ilmiah Akuntansi Universitas Pamulang, 9*(1), 1–16. https://doi.org/10.32493/jiaup.v9i1.4399

Sapulette, S. G., & Risakotta, K. A. (2020). Pengaruh Crowe's fraud pentagon dalam mendeteksi kecurangan pelaporan keuangan. *Jurnal REKSA: Rekayasa Keuangan, Syariah, dan Audit, 7*(1), 37–54. https://doi.org/10.12928/j.reksa.v7i1.2605

Septriani, Y., & Handayani, D. (2018). Mendeteksi kecurangan laporan keuangan dengan analisis fraud pentagon. *Jurnal Akuntansi dan Keuangan, 11*(1), 11–23.

Siddiq, F. R., Achyani, F., & Zulfikar, Z. (2017). Fraud pentagon dalam mendeteksi financial statement fraud. In *Seminar Nasional dan the 4th Call for Syariah Paper*.

Skousen, C. J., Smith, K. R., & Wright, C. J. (2009). Detecting and predicting financial statement fraud: The effectiveness of the fraud triangle and SAS No. 99. In M. Hirschey, K. John, & A. K. Makhija (Eds.), Corporate governance and firm performance (Advances in Financial Economics, Vol. 13, pp. 53–81). Emerald Group Publishing Limited. https://doi.org/10.1108/S1569-3732(2009)0000013005

Syavira, C., & Aliyah, S. (2023). Fraudulent financial statement: Pengujian fraud pentagon theory pada sektor industri dan barang konsumsi yang terdaftar di Bursa Efek Indonesia. *Jurnal Dinamika Ekonomi dan Bisnis, 20*(1), 111–132. https://doi.org/10.34001/jdeb.v20i1.4701

Vousinas, G. L. (2019). Advancing theory of fraud: The S.C.O.R.E. model. *Journal of Financial Crime, 26*(1), 372–381. https://doi.org/10.1108/JFC-12-2017-0128

Wijaya, T., & Witjaksono, A. (2023). Unmasking financial deception: Unraveling the fraud hexagon's influence on detecting financial statement fraud in Indonesian public companies. *Journal of Applied Finance and Accounting, 10*(1), 47–56. https://doi.org/10.21512/jafa.v10i1.9927

Wolfe, D. T., & Hermanson, D. R. (2004). The fraud diamond: Considering the four elements of fraud. *The CPA Journal, 74*(12), 38–42.

Zahara, A. Y. M., & Novita, N. (2020). Crowe's fraud pentagon dalam mengindikasikan kecurangan laporan keuangan. *E-Prosiding Akuntansi*, *2*(1), 1–13. https://doi.org/10.31326/.v2i1.766