

## Fraud Risk in Soes: Audit Quality and Board Gender Diversity

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### Abstract

Financial reporting fraud in State-Owned Enterprises (SOEs) has become a serious concern due to its detrimental impact on public trust and economic stability. This study aims to examine and analyze the influence of fraud hexagon theory elements on financial reporting fraud in Indonesian SOEs during the 2019–2024 period, while positioning audit quality and board gender diversity as moderating variables. Utilizing the Fixed Effect Model (FEM) on 162 data points from 27 companies, with fraud measured by the Beneish M-Score, the results indicate that none of the fraud hexagon elements pressure, opportunity, rationalization, capability, arrogance, and collusion exert a significant effect on financial reporting fraud. Furthermore, the moderation tests failed to demonstrate any interaction effects on these relationships, which is likely due to the limited variation in both audit quality and board gender diversity within the SOE sector. These findings confirm that multi-layered oversight by the BPK, OJK, and relevant ministries has successfully restricted the opportunities for fraudulent financial reporting in Indonesian SOEs. By shifting the focus from individual behavioral traits to structural monitoring, this study challenges the universal applicability of the fraud hexagon theory, demonstrating that robust institutional oversight can effectively neutralize micro level fraud drivers a pivotal insight for reshaping corporate governance and anti fraud frameworks in state controlled economies globally.

**Keywords:** Fraud Hexagon; Soe's; Fraudulent Financial Reporting, Audit Quality

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## INTRODUCTION

Financial reporting fraud in public enterprises like PT Asuransi Jiwasraya and PT Garuda Indonesia has resulted in significant state losses, disrupted economic stability, and damaged investor's image (Khamainy et al., 2022; Kirana et al., 2023). State-owned enterprises (SOEs) accounted for 25.9 percent of fraud cases, with losses ranging from 1 billion to 50 billion rupiah per case, much more than the percentage of cases in the private sector, according to the Indonesian Fraud Survey (ACFE) of 2025 (Rahardyan et al., 2025). In order to hide the company's actual financial situation, management manipulates earnings, which is a major agency problem rather than just an accounting error (Hioda & Urumsah, 2025; Khamainy et al., 2022). The triangle, diamond, and hexagon fraud models (SCORE Model), first proposed by Vousinas, (2019), are only a few examples of the several fraud trigger hypotheses that have developed. Further research is required because literature reviews have produced conflicting results about the hexagon elements' involvement in financial statement manipulation (Kirana et al., 2023; Maulida et al., 2024; Sukmadilaga et al., 2022).

Concerns regarding conflicting study findings are mounting, and traditional oversight is frequently ineffectual. Kirana et al., (2023) examined the impact of the hexagonal element on fraud incentives and discovered that audit committees' internal controls were unable to lessen these impacts. According to Achmad et al., (2022) and Suri & Rahman, (2023), this situation demonstrates an information asymmetry between management and the government, where

political approaches and leadership haughtiness frequently breach current regulations. This study fills a gap in the literature by revisiting the factors that contribute to fraud in state-owned firms while broadening the area of moderating variables thought to be more effective than audit committees. This study employs dual moderation of audit quality and board gender diversity by offering professional and ethical safeguards. This study shifts the focus of earlier research on audit committee effectiveness and offers a fresh viewpoint on whether the strict standards of Big Four accounting firms and the presence of female board members can lessen management's manipulative intentions (Kirana et al., 2023; Nugroho & Diyanty, 2022). The public sector is susceptible to opportunistic management choices due to a number of political and financial limitations. It is envisaged that the combination of gender equality in governance structures and good external auditing will result in a better control system.

**Table 1.**  
**Research Gap**

| <b>Comparison Aspect</b>      | <b>Kirana et al. (2023)</b>                                                                         | <b>Tebila &amp; Suryani (2025)</b>                   | <b>This Study (Aisyah et al., 2026)</b>                                                             | <b>Research Gap</b>                                                                                                                          |
|-------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Research Object</b>        | 17 parent SOEs listed on the Indonesia Stock Exchange (IDX)                                         | 4 state-owned banks listed on IDX                    | 27 parent SOEs and SOE subsidiaries listed on IDX                                                   | Although SOE subsidiaries have similar fraud risk exposure, previous studies mainly focused on parent SOEs or specific subsectors.           |
| <b>Research Period</b>        | 2017–2021                                                                                           | 2017–2023                                            | 2019–2024                                                                                           | The post-COVID-19 period (2019–2024) related to financial reporting fraud risk in Indonesian SOEs has not been specifically examined.        |
| <b>Theoretical Foundation</b> | Fraud Hexagon Theory (Vousinas, 2019)                                                               | Good Corporate Governance (GCG)                      | Fraud Hexagon Theory (Vousinas, 2019) + Agency Theory (Jensen & Meckling, 1976)                     | The integration of Agency Theory and Fraud Hexagon Theory in a single framework has not been widely applied in Indonesian SOE studies.       |
| <b>Independent Variables</b>  | Pressure, Opportunity, Rationalization, Capability, Arrogance, Collusion (6 Fraud Hexagon elements) | Good Corporate Governance as an independent variable | Pressure, Opportunity, Rationalization, Capability, Arrogance, Collusion (6 Fraud Hexagon elements) | Governance mechanisms have rarely been examined as moderating variables within the Fraud Hexagon framework, particularly in Indonesian SOEs. |
| <b>Moderating Variables</b>   | Audit Committee (single moderation)                                                                 | None                                                 | Audit Quality (Z1) and Board Gender Diversity (Z2) simultaneously (dual moderation)                 | Prior Fraud Hexagon studies in Indonesia have not applied dual moderation using                                                              |

|                                                  |                                                                            |                                                |    |                                                                                                                                                            |                                                                                                                                                                              |
|--------------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                  |                                                                            |                                                |    |                                                                                                                                                            | both external monitoring (audit quality) and internal governance (board gender diversity).                                                                                   |
| <b>Measurement of Dependent Variable (Fraud)</b> | F-Score (Dechow et al., 2011)                                              | F-Score (Dechow et al., 2011)                  | et | Beneish M-Score (8 financial ratio indices)                                                                                                                | The Beneish M-Score remains underutilized as a fraud detection tool in Indonesian SOE studies compared to F-Score.                                                           |
| <b>Analytical Tool</b>                           | Partial Least Squares (PLS) – SmartPLS                                     | Logistic Regression – SPSS                     |    | Panel Regression with Fixed Effect Model (FEM) – EViews 12                                                                                                 | Panel data regression using FEM is more suitable for analyzing cross-sectional and time-series data simultaneously but remains rarely used in Fraud Hexagon studies of SOEs. |
| <b>Sample Size / Observations</b>                | 17 companies × 5 years = 85 observations                                   | 4 companies × 7 years = 28 observations        |    | 27 companies × 6 years = 162 observations                                                                                                                  | A larger sample including SOE subsidiaries provides more representative and reliable findings than prior studies with limited samples.                                       |
| <b>Main Findings</b>                             | Arrogance and Collusion are significant; Audit Committee fails to moderate | GCG negatively affects fraud                   |    | All Fraud Hexagon elements are non-significant; both moderating variables are also non-significant                                                         | Inconsistent findings indicate the need for replication across different contexts, periods, and measurement methods to produce more robust conclusions.                      |
| <b>Novelty Contribution</b>                      | Testing audit committee effectiveness in SOE context                       | Direct effect of GCG on state-owned bank fraud |    | (1) Expanded sample to SOE subsidiaries; (2) Post-COVID period; (3) Dual moderation: Audit Quality + Gender Diversity; (4) Beneish M-Score; (5) FEM-EViews | This study addresses previous gaps through five simultaneous novelties: research object, period, dual moderation, measurement approach, and analytical method.               |

The empirical study's findings have advanced our knowledge of financial reporting fraud in the SOE setting, although this study differs from other research in a number of important ways. Tebila & Suryani, (2025) used four state-owned banks from 2017 to 2023, but Kirana et al., (2023) only examined 17 state-owned holding corporations listed on the Indonesia Stock Exchange

between 2017 and 2021. By incorporating subsidiaries listed on the Indonesia Stock Exchange between 2019 and 2024 in addition to state-owned holding businesses, this study broadens the object's reach. This growth is crucial because, despite the possibility of similar fraud dangers, state-owned subsidiaries are frequently disregarded in study. The Beneish M-Score is used in this study as a fraud detection tool, but the F-Score model from Dechow et al. (2011) is used in both studies as a proxy for financial reporting fraud. The Beneish M-Score was selected because, in contrast to the F-Score, it can identify manipulation using eight more different financial ratio indexes and has demonstrated efficacy in a variety of emerging market scenarios. There are also differences in the analytical methods employed. While Tebila & Suryani, (2025) used SPSS-based logistic regression and Kirana et al., (2023) used partial least squares (PLS), this study uses EViews with a panel data regression approach, which is thought to be more appropriate for simultaneously analyzing panel data across companies and time periods. The changeable structure created in this work, however, is the most significant novelty.

Tebila & Suryani, (2025) positioned GCG as an independent variable without moderation, whereas Kirana et al., (2023) employed the audit committee as a single moderating variable. This study presents a dual moderation model that has not been used in comparable studies in Indonesia, namely audit quality and board gender diversity as simultaneous moderating variables. These two moderating factors were selected based on distinct but complimentary theoretical considerations: board gender diversity reflects a behavioral and psychological aspect of internal governance, whereas audit quality represents a formal and technical external oversight mechanism. By combining the two, this study aims to close the gap created by earlier research regarding whether strengthening external oversight systems at the same time as increasing the diversity of the company's internal leadership mix can increase the effectiveness of fraud prevention. Additionally, this study offers innovation by utilizing data from 2019 to 2024, in contrast to Kirana et al., (2023) and Tebila & Suryani, (2025), which concentrated on the years 2017–2021 and 2017–2023, respectively. This time frame is more realistic since it includes both the COVID-19 pandemic and the post-pandemic recovery, which was a time of significantly greater financial strain and has not been extensively researched in relation to Indonesia's risk of SOE fraud.

## METHOD

Secondary data was the main source of information used in the quantitative design of this study. Annual reports from State-Owned Enterprises (SOEs) that were formally posted on the websites of each firm and the Indonesia Stock Exchange (IDX) served as the source of the data. The period of 2019 to 2024 was selected for a reason: it is seen as critical since it includes the dynamics of business situations throughout the COVID-19 epidemic and the recovery phase, when financial manipulation is generally more likely due to economic pressures. To guarantee the correctness of the panel data regression analysis, the complete data gathering process was carried out online and processed using EViews software. All SOEs listed on the Indonesia Stock Exchange make up the population under study. The research sample was chosen using a purposive sampling strategy because not every company has data qualities that satisfy the research criteria. This approach was selected to guarantee that the sample acquired is genuinely representative and satisfies specific requirements, specifically:

**Table 2.**  
**Sampling Qualifications**

| Sample Qualification                                                                                    | Amount |
|---------------------------------------------------------------------------------------------------------|--------|
| State-Owned Enterprises and Subsidiaries of State-Owned Enterprises registered for the 2019-2024 period | 88     |
| State-owned companies and subsidiaries of state-owned companies that are not registered with the IDX    | (49)   |
| Companies with incomplete financial reports throughout 2019-2024                                        | (12)   |
| Number of Companies                                                                                     | 27     |
| Total Financial Reports (27 companies × 6 years)                                                        | 162    |

Six independent variables pressure, opportunity, rationalization, capability, hubris, and collusion that represent each component of the hexagon fraud theory are operationalized in this study. Fraudulent financial reporting is the dependent variable, whereas audit quality and board

gender diversity are two moderating factors. In the context of Indonesian state-owned firms, this study is unique in that it concurrently tests these two moderating variables in two models. Each variable's measuring scale is displayed in Table 3.

**Table 3.**  
**Variable Operational Table**

| <b>Variable</b>                                  | <b>Operational Definition</b>                                                                                                                                                                                                                                                                         | <b>Operational Definition</b>                                                                               | <b>Reference</b>           |
|--------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------|
| <b><i>Pressure (X1)</i></b>                      | A scenario in which the board of directors or shareholders put pressure on management to achieve certain financial goals. A conflict of interest between the owner (principal), who wants the best outcomes, and the manager (agent), who has to get them, is frequently the source of this pressure. | Net profit after tax / Total assets                                                                         | (Mentari & Indriani, 2024) |
| <b><i>Opportunity (X2)</i></b>                   | Inadequate oversight frequently results in gaps or flaws in an organization's internal control system that make manipulation possible without simple detection.                                                                                                                                       | Accounts receivable / Sales                                                                                 | (Sukmadilaga et al., 2022) |
| <b><i>Rationalization (X3)</i></b>               | Is the mindset or rationale of management that considers dishonest behavior to be normal or appropriate for particular goals. This keeps the offender from feeling bad about the abnormalities.                                                                                                       | Dummy variables<br>1 = there is a change in KAP<br>0 = no KAP changes                                       | (Kirana et al., 2023)      |
| <b><i>Capability (X4)</i></b>                    | This is the ability or ability of an individual to conduct fraud by taking advantage of weaknesses and getting around internal controls. Pressure and opportunity won't lead to a dishonest act in the absence of sufficient capacity.                                                                | Dummy variable<br>1 = there is a change in the main director<br>0 = there is no change in the main director | (Kirana et al., 2023)      |
| <b><i>Arrogance (X5)</i></b>                     | Reflects an attitude of superiority, inflated ego, and narcissism from company leaders who feel that internal regulations or processes do not apply to them. This attitude encourages unethical activity due to a lack of fear of penalty.                                                            | Total number of appearances of CEO photos in company annual reports                                         | (Mentari & Indriani, 2024) |
| <b><i>Collusion (X6)</i></b>                     | A covert arrangement or partnership between two or more people to act manipulatively in order to get an advantage. This frequently entails intimate relationships between management and politicians or government representatives in the case of state-owned businesses.                             | Number of members of the board of commissioners who hold dual positions                                     | (Mentari & Indriani, 2024) |
| <b><i>Fraudulent Financial Reporting (Y)</i></b> | Management's intentional use of false accounting data to portray a better-than-actual financial situation.                                                                                                                                                                                            | A combination of eight financial ratios: DSRI, GMI, AQI, SGI, DEPI, SGAI, LVGI, and TATA.                   | (Sukmadilaga et al., 2022) |

| Variable                           | Operational Definition                                                                                                                                                                                         | Operational Definition                                                                                                                            | Reference                |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
|                                    |                                                                                                                                                                                                                | Interpretation:<br>M-Score > -2.22 = manipulation found.<br>M-Score ≤ -2.22 = no manipulation found.                                              |                          |
| <b>Audit Quality (Z1)</b>          | It serves as a formal, technical external oversight tool for finding irregularities in financial reporting. It is thought that using trustworthy auditors will reduce the agent's capacity for manipulation.   | Dummy variables<br>1 = audited by Big Four KAP<br>0 = audited by a non-Big Four KAP                                                               | (Tebila & Suryani, 2025) |
| <b>Board Gender Diversity (Z2)</b> | Representing internal governance's psychological and behavioral aspects. It is thought that having more women on boards increases risk aversion and ethical commitment, which improves supervisory discipline. | Number of female members of the board of directors and commissioners / Total number of members of the board of directors and commissioners × 100% | (Tebila & Suryani, 2025) |

Data were processed using EViews 12 through a multi-step procedure. In the first stage, descriptive statistical analysis was used to gather information about each variable. The minimum, maximum, mean, and standard deviation values were recorded. Next, the best estimation model was selected. First, the Chow test selected the Fixed Effect Model (FEM) and the Common Effect Model (CEM). Next, the Hausman test compared the FEM with the Random Effect Model (REM). If neither test yields conclusive results, the Lagrange Multiplier test may be employed. The next step is to do classical assumption tests, with an emphasis on testing for heteroscedasticity and multicollinearity, because normality and autocorrelation difficulties in panel data have been addressed. The correlation matrix was used to identify multicollinearity with a cutoff below 0.80 (Achmad et al., 2022), and the Glejser test was used to determine heteroscedasticity. The last step was assessing hypotheses using the F-test and t-test after the classical assumptions had been tested. The interaction between the independent variables and each moderating variable in the regression equation is examined using moderated regression analysis (MRA) in order to explicitly investigate the influence of moderation:

$$FFS = \alpha + \beta_1PRE + \beta_2OPP + \beta_3RAT + \beta_4CAP + \beta_5ARO + \beta_6COL + \beta_7Z1 + \beta_8Z2 + \beta_9PREZ1 + \beta_{10}OPPZ1 + \beta_{11}RATZ1 + \beta_{12}CAPZ1 + \beta_{13}ARZ1 + \beta_{14}COLZ1 + \beta_{15}PREZ2 + \beta_{16}OPPZ2 + \beta_{17}RATZ2 + \beta_{18}CAPZ2 + \beta_{19}ARZ2 + \beta_{20}COLZ2 + e$$

Information:

*FFS* : Fraudulent Financial Reporting

*PRE* : Pressure

*OPP* : Opportunity

*CAP* : Capability

*ARO* : Arrogance

*COL* : Collusion

*Z1* : Audit Quality

*Z2* : Board Gender Diversity

*e* : Error Term

## RESULT AND DISCUSSION

Each research variable was explained using descriptive statistical analysis to give a summary of its features. Table 4 displays the computation results.

**Table 4.**  
**Descriptive Statistical Test**

| Variables | N   | Min       | Max      | Mean      | Std. Dev. |
|-----------|-----|-----------|----------|-----------|-----------|
| Y         | 162 | -341,5530 | 29,35400 | -9,386438 | 34,85913  |
| X1        | 162 | -0,881000 | 0,599000 | 0,000691  | 0,143760  |
| X2        | 162 | 0,017000  | 24,48600 | 1,846753  | 4,379572  |
| X3        | 162 | 0,000000  | 1,000000 | 0,228395  | 0,421100  |
| X4        | 162 | 0,000000  | 1,000000 | 0,296296  | 0,458039  |
| X5        | 162 | 1,000000  | 22,00000 | 4,938272  | 3,818379  |
| X6        | 162 | 0,000000  | 12,00000 | 5,080247  | 2,439271  |
| Z1        | 162 | 0,000000  | 1,000000 | 0,561728  | 0,497714  |
| Z2        | 162 | 0,000000  | 0,667000 | 0,127623  | 0,147620  |

*Source: Research Data, 2026*

According to the Beneish M-Score, the dependent variable has a mean of -9.386 and a standard deviation of 34.859. The fact that this number is far less than the -2.22 criterion suggests that the SOEs in the sample are not often regarded as manipulators. The maximum result of 29.354, however, suggests that over a specific time period, there were observations that above the fraud threshold (Mentari & Indriani, 2024; Sukmadilaga et al., 2022). The opportunity variable (X2) has a large standard deviation of 4.379, and the pressure variable (X1) has a mean that is close to zero (0.000691), indicating that the composition of independent commissioners has not been dispersed equally. The extremely large variety in financial conditions among SOEs is reflected in this huge standard deviation (Kirana et al., 2023; Sukmadilaga et al., 2022). The averages of the rationalization (X3) and capability (X4) variables are 0.228 and 0.296, respectively. When it comes to SOEs, sectoral regulatory rotation has a greater impact on these values than fraud indicators (Sukmadilaga et al., 2022). The arrogant element (X5) contains 4,938 images of CEOs that demonstrate a range of corporate communication techniques, according to Kirana et al., (2023) and Mentari & Indriani, (2024). However, the cooperation variable (X6) shows more institutional expertise networks than criminal conspiracies, with an average of 5,080 commissioners holding dual posts. Researchers discovered that 0.562, or more than half of the sample, had employed one of the biggest Big Four accounting firms using audit quality (Z1) as a moderator. The gender diversity variable is still low at 0.128, meaning that there aren't enough women in SOE leadership to have a major impact on the dynamics of strategic decision-making at the board level (Mentari & Indriani, 2024; Sukmadilaga et al., 2022). CEM, FEM, and REM were compared to determine which model was the best. Table 5 displays the test results.

**Table 5.**  
**Chow Test Results**

| Effect Test              | Statistic  | d.f.     | Prob.  |
|--------------------------|------------|----------|--------|
| Cross-section F          | 18,923032  | (26,115) | 0,0000 |
| Cross-section Chi-square | 269,502345 | 26       | 0,0000 |

*Source: Research Data, 2026*

The suitability of the Common Effect Model (CEM) in comparison to the Fixed Effect Model (FEM) was assessed using a Chow test. The test statistically verified that the FEM offers a better fit for the panel data, with a cross-section F-probability of 0.0000, which is significantly below the alpha level of 0.05. A Hausman test was then conducted based on this result to determine whether the Random Effect Model (REM) should take the place of the FEM.

**Table 6.**  
**Hausman Test Results**

| Test Summary         | Chi-Sq. Statistic | Chi-Sq. d.f. | Prob.  |
|----------------------|-------------------|--------------|--------|
| Cross-section random | 63,787156         | 20           | 0,0000 |

*Source: Research Data, 2026*

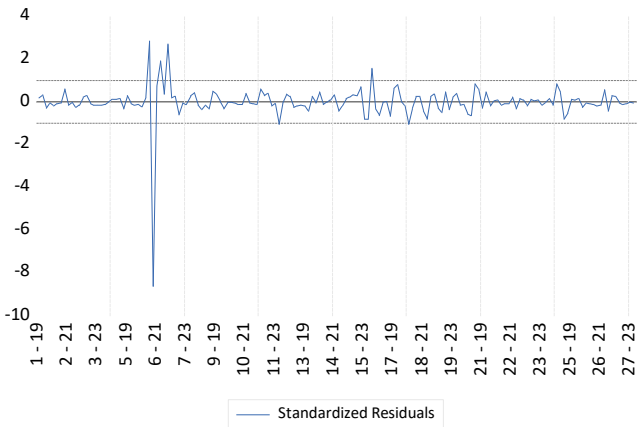
The FEM was the study's final model since the Hausman test findings indicated that the probability value did not surpass 0.05. This choice is in line with the sample's features, which call for explicit control for fixed effects due to the substantial individual uniqueness of each state-owned firm (SOE) (Sukmadilaga et al., 2022). It is anticipated that the FEM model will distinguish between intra-firm and inter-firm variance, leading to more precise coefficient estimates. Following the identification of FEM as the optimal model, multicollinearity and heteroscedasticity were the main topics of traditional assumption testing. Table 7 displays the multicollinearity test findings.

**Table 7.**

| Multicollinearity Test |          |          |          |          |          |          |          |          |
|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
|                        | X1       | X2       | X3       | X4       | X5       | X6       | Z1       | Z2       |
| X1                     | 1,000000 | 0,024774 | -        | -        | -        | 0,095080 | 0,202789 | -        |
|                        |          |          | 0,071880 | 0,190179 | 0,021070 |          |          | 0,010694 |
| X2                     | 0,024774 | 1,000000 | -        | 0,143283 | -        | 0,351790 | 0,322239 | 0,062997 |
|                        |          |          | 0,130202 |          | 0,000881 |          |          |          |
| X3                     | -        | -        | 1,000000 | -        | 0,198103 | -        | -        | -        |
|                        | 0,071880 | 0,130202 |          | 0,031010 |          | 0,144938 | 0,349221 | 0,022288 |
| X4                     | -        | 0,143283 | -        | 1,000000 | -        | -        | 0,055500 | 0,070923 |
|                        | 0,190179 |          | 0,031010 |          | 0,092466 | 0,143715 |          |          |
| X5                     | -        | -        | 0,198103 | -        | 1,000000 | 0,063887 | -        | 0,084244 |
|                        | 0,021070 | 0,000881 |          | 0,092466 |          |          | 0,223492 |          |
| X6                     | 0,095080 | 0,351790 | -        | -        | 0,063887 | 1,000000 | 0,244023 | 0,083933 |
|                        |          |          | 0,144938 | 0,143715 |          |          |          |          |
| Z1                     | 0,202789 | 0,322239 | -        | 0,055500 | -        | 0,244402 | 1,000000 | 0,093690 |
|                        |          |          | 0,349221 |          | 0,223492 | 3        |          |          |
| Z2                     | -        | 0,062997 | -        | 0,070923 | 0,084244 | 0,083933 | 0,093690 | 1,000000 |
|                        | 0,010694 |          | 0,022288 |          |          |          |          |          |

Source: Research Data, 2026

To make sure there was no significant linear correlation between the independent variables in the model, a multicollinearity test was performed. According to the test results, the model was deemed free of multicollinearity because all correlation coefficients between variables were less than 0.80 (Mentari & Indriani, 2024). Because each variable offers distinct and non-overlapping information, the coefficients can be analyzed separately (Kirana et al., 2023).



**Figure 1.**

**Heteroscedasticity Test**

Source: Research Data, 2026

This research model is free of heteroscedasticity problems and is highly suitable for use in the next testing phase (Mentari & Indriani, 2024). Heteroscedasticity testing was carried out visually by looking at the distribution of points on the graph. The results showed that the data points were randomly distributed around zero and did not form a specific pattern, such as a widening or narrowing funnel, indicating that the data variance is stable or consistent across observations (Kirana et al., 2023; Mentari & Indriani, 2024).

**Table 8.**  
**F-Test Results**

| Dependent Variable | F-Test                   | Sig.     |
|--------------------|--------------------------|----------|
| FFS                | <i>F-statistic</i>       | 12,00250 |
|                    | <i>Prob(F-statistic)</i> | 0,000000 |

*Source: Research Data, 2026*

A Prob(F-statistic) of 0.0000 ( $p < 0.05$ ) indicates that the independent factors taken together have a highly significant effect on the dependent variable according to the F-test. This empirical result confirms the strong explanatory power of the pooled predictors and supports the earlier research by (Kirana et al., 2023).

**Table 9.**  
**t-Test Results**

| Variable | Coefficient | Prob.  |
|----------|-------------|--------|
| PRE      | -14,15151   | 0,6452 |
| OPP      | -30,81305   | 0,0954 |
| RAT      | -0,745226   | 0,9036 |
| CAP      | 1,482047    | 0,7996 |
| ARO      | 0,673012    | 0,4484 |
| COL      | 2,461935    | 0,3002 |
| Z1       | -0,429878   | 0,9745 |
| Z2       | -27,29943   | 0,4914 |

*Source: Research Data, 2026*

Sukmadilaga et al., (2022) state that t-test results indicate that the PRE variable has no effect on the dependent variable ( $p$ -value  $0.6452 > 0.05$ ). The following variables did not meet the 5% significance level: OPP ( $p$ -value 0.0954), RAT ( $p$ -value 0.9036), CAP ( $p$ -value 0.7996), ARO ( $p$ -value 0.4484), and COL ( $p$ -value 0.3002) (Mentari & Indriani, 2024; Sukmadilaga et al., 2022). Gender diversity (Z2) had a  $p$ -value of 0.4914 and the audit quality variable (Z1) had a  $p$ -value of 0.9745, both of which indicated no significance (Kirana et al., 2023)

**Table 10.**  
**MRA Test Results**

| Variables | Coefficient | Prob.  |
|-----------|-------------|--------|
| PRE*Z1    | 16,02471    | 0,6364 |
| OPP*Z1    | 32,33883    | 0,0796 |
| RAT*Z1    | 4,285110    | 0,6187 |
| CAP*Z1    | -6,663711   | 0,3559 |
| ARO*Z1    | -0,776198   | 0,4951 |
| COL*Z1    | -4,250394   | 0,0560 |
| PRE*Z2    | 52,15437    | 0,5704 |
| OPP*Z2    | -7,264266   | 0,5305 |
| RAT*Z2    | 0,108897    | 0,9969 |
| CAP*Z2    | -15,59606   | 0,4660 |
| ARO*Z2    | -0,496115   | 0,8890 |
| COL*Z2    | 10,99656    | 0,1505 |

*Source: Research Data, 2026*

The association between financial statement fraud and the Fraud Hexagon elements was unaffected by any of the MRA interaction factors at the 5% significant level. This suggests that this effect was not lessened by gender diversity or audit quality. The only link that came close to X6Z1 (collusion  $\times$  audit quality) was a moderating tendency with a probability of 0.0560, but it was not statistically significant. The regression equation model that emerged from the regression testing is as follows:

$FFS = -9,492 - 14,152 PRE - 30,813 OPP - 0,745 RAT + 1,482 CAP + 0,673 ARO + 2,462 COL - 0,430 Z1 - 27,299 Z2 + 16,025 PREZ1 + 32,339 OPPZ1 + 4,285 RATZ1 - 6,664 CAPZ1 - 0,776 AROZ1 - 4,250 COLZ1 + 52,154 PREZ2 - 7,264 OPPZ2 + 0,109 RATZ2 - 15,596 CAPZ2 - 0,496 AROZ2 + 10,997 COLZ2 + e$

Information:

*FFS* : *Fraudulent Financial Reporting*

*PRE* : *Pressure*

*OPP* : *Opportunity*

*CAP* : *Capability*

*ARO* : *Arrogance*

*COL* : *Collusion*

*Z1* : *Audit Quality*

*Z2* : *Board Gender Diversity*

*e* : *Error Term*

## DISCUSSION

This study offers several points of novelty relative to prior Fraud Hexagon research on Indonesian state-owned enterprises (SOEs). Unlike earlier studies that generally examine only listed parent SOEs over pre-pandemic periods (Achmad et al., 2022; Kirana et al., 2023), this research extends the unit of analysis to SOE subsidiaries, covers the post-COVID recovery period (2019-2024), incorporates two moderating variables simultaneously (audit quality and board gender diversity), and employs the Beneish M-Score as the fraud-detection proxy within a Fixed Effect Model (FEM) framework. This combination of scope, timeframe, and analytical design has not been jointly applied in the SOE context, positioning the study to test the robustness of Fraud Hexagon theory under conditions of heightened institutional turbulence and intensified state supervision.

The empirical results show that none of the six Fraud Hexagon elements pressure, opportunity, rationalization, capability, arrogance, and collusion significantly influence fraudulent financial reporting in Indonesian SOEs, and that neither audit quality nor board gender diversity moderates these relationships. This finding is substantively important: it indicates that in a governance setting where multi-layered oversight from the BPK, OJK, and relevant ministries is already in place, the behavioral and situational indicators central to Fraud Hexagon theory lose much of their explanatory power. In other words, institutional monitoring appears to substitute for, rather than complement, the individual-level fraud drivers that the theory assumes to be dominant. This has clear relevance for readers interested in fraud detection in tightly regulated, state-controlled entities, where the conventional behavioral fraud lens may need to be re-evaluated.

When compared with prior studies, these results present a mixed pattern of convergence and divergence. The non-significance of pressure and opportunity is consistent with Kirana et al., (2023) and Sukmadilaga et al., (2022), who likewise found limited behavioral fraud symptoms among Indonesian SOEs and ministerial institutions due to strong external supervision. However, this contrasts with Achmad et al., (2022), who reported that opportunity and pressure significantly increased fraud likelihood in SOEs measured with the F-Score model, and with Adhitama et al., (2023) and Alfarago et al., (2023), who found significant pressure and rationalization effects in non-SOE, privately listed companies. Similarly, the non-significant rationalization (auditor switching) finding aligns with Sukmadilaga et al., (2022) but diverges from Kirana et al., (2023) and Maisyarah & Nelvirita, (2025), who documented a significant rationalization effect in their SOE samples. The insignificance of capability and arrogance corroborates Mentari & Indriani, (2024) but differs from Hakim et al., (2024) and Junus et al., (2025), who found these elements to be significant predictors of fraud in manufacturing and non-financial firms. Finally, while collusion was non-significant here consistent with Mentari & Indriani, (2024) it was found to be a significant driver of fraud in Suri & Rahman, (2023) and Hioda & Urumsah, (2025), both of which examined SOEs using different fraud-measurement models and shorter observation windows. Beyond this immediate comparison set, the pattern of limited significance is broadly echoed by Achmad et al., (2024), whose replication of the Fraud Hexagon model on Indonesian SOEs likewise found several elements to be non-significant once institutional oversight was accounted for, and by Anwar & Hamzah, (2024) and Octaviana, (2022), who reported comparable difficulty in detecting fraud through hexagon indicators alone in state-affiliated firms. It diverges, however, from Maulida et al., (2024) and Susanto & Triyani, (2025), who found several hexagon elements to be significant predictors of fraud among IDXBUMN20-indexed firms and food-and-beverage manufacturers respectively, and from Utami & Idayanti, (2023), who reported a stronger pattern of significance among privately listed companies. Outside the Indonesian setting, this divergence is echoed by Marzuki et al.,

(2019), who found audit committee and board-diversity attributes meaningfully associated with fraudulent reporting in Malaysia, and by Parvin & Akter, (2023), who documented a stronger corporate-governance fraud nexus within the Bangladeshi banking sector both indicating that the muted hexagon effects observed here may reflect the heavily regulated Indonesian SOE environment rather than a universal pattern.

These convergences and divergences can largely be attributed to differences in institutional context, measurement model, and study period. Studies reporting significant effects predominantly use the F-Score or Dechow F-Score models, which are more sensitive to accrual-based earnings management, whereas the Beneish M-Score applied in this study has a comparatively higher detection threshold and is calibrated toward more severe, deliberate financial statement manipulation (Kirana et al., 2023; Mentari & Indriani, 2024; Hajek et al., 2026; Jain et al., 2026). In addition, studies conducted on privately owned or non-SOE firms (Adhitama et al., 2023; Alfarago et al., 2023; Hakim et al., 2024) operate under weaker external oversight than SOEs, which are subject to layered supervision from the BPK, OJK, and line ministries; this structural difference plausibly explains why individual-level behavioral indicators carry less weight in the SOE context. The inclusion of the 2020–2022 pandemic period in this study's sample is also a likely contributing factor, as SOEs during this period were observed to prioritize operational survival and long-term stability over aggressive profit targets, further muting incentives associated with pressure, arrogance, and collusion (Kirana et al., 2023; Sukmadilaga et al., 2022).

The failure of both audit quality and board gender diversity to moderate the Fraud Hexagon fraud relationship also merits comparison with the literature. This null moderation result for audit quality is consistent with Yousefi Nejad et al., (2024), who found that Big Four engagement alone does not guarantee stronger fraud deterrence once baseline audit standards are already high and homogeneous across firms, but it contrasts with Balboula & Elfar, (2023) and Pham et al., (2025), who reported that audit quality meaningfully strengthens fraud-prevention outcomes in more heterogeneous audit markets. Likewise, the non-significant moderating role of board gender diversity aligns with Sharawi & Almohamad, (2024), who attributed similar findings to female directors' minority status limiting their structural influence, but diverges from Askarany et al., (2025) and Vidalis et al., (2025), who found gender diversity to have a measurable moderating effect once female board representation approached a critical mass threshold (generally above 20–30%). Given that the average board gender diversity in this study's sample is only 12.8%, the absence of a moderating effect is consistent with Critical Mass Theory's prediction that token representation is insufficient to alter collective board decision-making (Askarany et al., 2025), while the near-uniform adoption of Big Four auditors across the sample (56.2%) similarly compresses the variation needed for audit quality to function as an effective moderator. This pattern of weak moderation is further corroborated by evidence from adjacent governance contexts: Mappadang & Bernadine, (2024) similarly found that women's board representation had little independent effect on fraud tendencies within Indonesia's energy sector, while Arifin & Koerniawan, (2025) reported that gender-diverse boards only strengthened fraud deterrence in auditor judgments when combined with strong liquidity positions, again suggesting a threshold effect rather than a linear one. By contrast, Harakeh et al., (2023a) and Alipour & Mostafazadeh, (2024) found board gender diversity to meaningfully moderate firm-level financial reporting outcomes in more developed capital-market contexts, where female board representation typically exceeds the critical-mass threshold observed in this study's sample (Alipour & Mostafazadeh, 2024; Almaqtari et al., 2024; Bona-Sánchez et al., 2024). On the audit-quality side, the absence of a moderating effect is consistent with Luthfiyyah & Dongoran, (2024) and Serly & Delnecca, (2022), who likewise found limited incremental influence of audit-quality proxies once other governance mechanisms were controlled for among Indonesian manufacturing firms, but contrasts with Wang & Liang, (2025) and Yulianti & Trilestari, (2026), who found internal and external audit quality to significantly strengthen financial reporting integrity in more heterogeneous, less state-dominated audit markets.

Taken together, these findings make a distinct contribution to the Fraud Hexagon literature. Rather than reaffirming the theory's individual-level behavioral assumptions, this study provides empirical evidence that in state-owned, heavily regulated environments, institutional and regulatory oversight mechanisms rather than the six Fraud Hexagon dimensions are the more decisive determinants restricting opportunities for fraudulent financial reporting. This extends the theoretical boundary conditions of Fraud Hexagon theory by showing that its predictive strength is

context-dependent, weakening under conditions of strong external monitoring, and by empirically demonstrating that both audit quality and board gender diversity require a sufficient variation threshold before they can function as effective moderators an insight that has not been jointly tested within the Indonesian SOE and subsidiary context.

These findings carry several practical, academic, and policy implications. Practically, the results suggest that state supervisory institutions such as the BPK, OJK, and relevant ministries should continue strengthening cross-institutional oversight mechanisms, as these appear more effective at restricting fraud opportunities than relying solely on internal governance attributes such as auditor reputation or board composition. Academically, the study encourages future Fraud Hexagon research to incorporate boundary-condition variables such as regulatory intensity or ownership type when testing the theory's applicability outside conventional private-sector settings. From a policy perspective, given the critical-mass threshold implied by the gender diversity findings, policymakers and SOE ministries may consider setting more ambitious board diversity targets (e.g., above 30%) to allow gender diversity to meaningfully influence governance outcomes, rather than treating it as a symbolic compliance requirement. Future research is recommended to broaden the sample to non-listed SOEs and other regulated sectors, apply complementary fraud-detection models (e.g., F-Score, Dechow F-Score) alongside the Beneish M-Score, and incorporate additional institutional, political, or ownership-structure variables to more comprehensively capture the determinants of fraudulent financial reporting in state-owned contexts.

## CONCLUSION

The findings reveal that none of the Fraud Hexagon elements significantly affect fraudulent financial reporting. These results indicate that financial statement manipulation in Indonesian SOEs cannot be sufficiently explained by the Fraud Hexagon framework alone, particularly within a governance environment characterized by relatively strong oversight and regulatory monitoring. The findings also show that audit quality is unable to moderate the relationship between Fraud Hexagon elements and fraudulent financial reporting. This suggests that external oversight mechanisms, including audits conducted by Big Four accounting firms, have not significantly strengthened the effectiveness of fraud prevention in the observed sample. Similarly, board gender diversity does not moderate the relationship between Fraud Hexagon dimensions and fraudulent financial reporting. This indicates that the presence of female board members has not yet reached a sufficient level to create meaningful influence on strategic governance decisions or significantly reduce opportunistic managerial behavior.

The study contributes to the literature by expanding Fraud Hexagon research within the Indonesian SOE context through the inclusion of SOE subsidiaries, the use of the post-COVID period, dual moderating variables, Beneish M-Score as a fraud detection proxy, and FEM-based panel regression analysis. These findings provide empirical evidence that fraud risk in SOEs may be influenced by broader institutional, political, and structural factors beyond the conventional Fraud Hexagon dimensions. This study has several limitations, including the relatively limited sample size, the focus on listed SOEs only, and the use of proxy variables that may not fully capture complex fraud behavior. Future studies are recommended to expand the sample to non-listed SOEs and other sectors, incorporate alternative fraud detection models, and examine additional governance, political, or institutional variables to obtain a more comprehensive understanding of fraudulent financial reporting.

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