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The Effect of Fraud Star on Financial Statement Fraud with Audit Quality as a Moderating Variable

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Abstract

Background: Financial statement fraud can materially distort stakeholders' assessment of corporate performance and remains difficult to detect when managerial incentives and monitoring weaknesses coexist.
Objective: This study examined the effects of Fraud Star elements—pressure, opportunity, rationalization, capability, and integrity—on financial statement fraud and assessed audit quality as a moderating mechanism in manufacturing companies listed on the Indonesia Stock Exchange (IDX) during 2020–2024.
Methods: A quantitative causal-comparative design was applied to secondary financial and annual-report data. Purposive sampling yielded 120 manufacturing companies and 600 firm-year observations. Financial statement fraud was measured using the Beneish M-Score. Audit quality was operationalized using public accounting firm size (Big Four versus non-Big Four) and audit tenure. The hypotheses were tested using pooled multiple linear regression and Moderated Regression Analysis (MRA).
Results: Pressure, opportunity, rationalization, and capability were positively and significantly associated with financial statement fraud, whereas integrity showed a significant negative association. The model produced an Adjusted R^2 of 0.684. The interaction estimates indicated that audit quality weakened the positive associations of pressure, opportunity, rationalization, and capability with financial statement fraud and strengthened the negative association of integrity with financial statement fraud.
Conclusion: The findings support the importance of stronger internal controls, management integrity, and rigorous external auditing in reducing financial statement fraud risk. The rationalization result should be interpreted cautiously because Total Accruals to Total Assets (TATA), used as its proxy, is also an input in the Beneish M-Score.

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INTRODUCTION

Financial statement fraud involves the deliberate misstatement or omission of financial information intended to mislead users of financial statements (Arens, Elder, & Beasley, 2021; Situmorang & Agoes 2023). Such manipulation may include overstating assets, understating liabilities, or otherwise altering material amounts to conceal a company's actual financial condition, thereby exposing investors and creditors to substantial losses. The Association of Certified Fraud Examiners (2022) reported that corruption represented 69.9% of occupational fraud cases in Indonesia, followed by asset misappropriation (20.9%) and financial statement

fraud (9.2%). Although financial statement fraud accounted for the smallest proportion, its potential financial consequences and delayed detection warrant serious attention.

Agency theory links financial statement fraud to conflicts of interest between principals (shareholders) and agents (management) (Jensen & Meckling, 2020). Performance targets imposed on management can create incentives to present results more favorably than the underlying economic condition warrants. Information asymmetry further increases this risk because managers possess more detailed knowledge of operational performance and future prospects than external stakeholders, allowing opportunistic reporting behavior to remain concealed (Donaldson & Davis, 2021; Mukhtaruddin et al., 2022).

Information asymmetry can enable management to conceal unfavorable conditions through income inflation, liability understatement, aggressive accounting estimates, or transaction manipulation. Such actions may be motivated by compensation incentives, position retention, earnings targets, share-price considerations, or debt-covenant constraints. Effective monitoring mechanisms—including external audit, the board of commissioners, the audit committee, and internal audit—are therefore important for limiting managerial discretion and reducing opportunities for financial statement fraud.

Fraud Star is used in this study to organize five behavioral and organizational dimensions associated with financial statement fraud: pressure, opportunity, rationalization, capability, and integrity. Pressure reflects incentives created by financial or performance demands; opportunity arises when internal controls or oversight are weak; rationalization concerns the justification of unethical conduct; capability reflects the ability to exploit weaknesses in systems and controls; and integrity represents ethical commitment that can restrain fraudulent behavior (Vousinas, 2019; Wolfe & Hermanson, 2020; Yousefi Nejad et al., 2024).

These dimensions are particularly relevant to manufacturing companies because their operations involve complex estimates and high-volume transactions. Pressure may arise from volatile input costs, intense competition, declining sales, or profitability targets. Opportunity may be concentrated in judgment-intensive accounts such as inventory valuation, credit-sales revenue recognition, and production-cost allocation. Rationalization may occur when manipulation is framed as temporary or necessary for organizational survival. Capability is more likely among individuals with extensive access to accounting systems and decision authority, whereas integrity can constrain whether incentives and opportunities are ultimately translated into fraudulent reporting.

Financial statement fraud was detected using the Beneish M-Score, which combines eight financial ratios to identify patterns associated with earnings manipulation (Beneish, 2020). Higher M-Scores indicate a greater likelihood that a company exhibits characteristics consistent with manipulation (Warshavsky, 2020). The model was selected because it provides a quantitative screening measure that has been widely applied in studies of financial statement manipulation, including manufacturing-sector research (Aprilia, 2021; Scott, 2020; Khan et al., 2023).

Previous studies report relationships between individual fraud indicators and financial statement fraud. Pressure proxied by Return on Assets (ROA) has been associated with greater fraud risk (Palupi, 2020; Kurniawan & Pratama, 2023), while opportunity measured through changes in receivables has also shown significant associations (Khamainy & Setiawan, 2021; Wahyudi, Boedi, & Kadir, 2020). Total Accruals to Total Assets (TATA) has been used as a rationalization proxy (Sihombing, 2021), director change (DCHANGE) as a capability proxy (Wijanarko, 2020), and the Market-to-Book Ratio (MTB) as an integrity-related indicator through accounting conservatism (Dewi & Ratnadi, 2020; Scott, 2020).

Evidence regarding audit quality as a monitoring mechanism remains mixed. Several studies report that audit quality, often proxied by Big Four versus non-Big Four public accounting firms, is associated with a lower risk of fraudulent financial statements (Nurjannah & Cahyati, 2020; Hadi & Tifani, 2020; Dewi & Ariyanto, 2021). Other findings indicate that audit-firm size alone does not guarantee superior fraud detection (Suripto & Jayadih, 2022). Research that treats audit quality as a moderator also shows inconsistent evidence regarding whether it systematically changes the relationships between fraud indicators and financial statement fraud (Rahayu, 2020).

These inconsistencies create a research gap concerning whether audit quality changes the

effects of Fraud Star dimensions on financial statement fraud in Indonesian manufacturing companies. The persistence of audit failures even when large audit firms are involved further suggests that reputation alone may not be sufficient to ensure effective monitoring (Hassan, Karim, & Habib, 2023). Accordingly, the present study tests audit quality as a moderating mechanism while also considering audit tenure, rather than assuming that public accounting firm size is an adequate stand-alone representation of audit effectiveness (Francis, 2021; Putri & Sari, 2024).

Major corporate failures illustrate why this question remains relevant. Cases such as Enron and Toshiba demonstrate that financial pressure, weak oversight, and deficiencies in audit governance can coexist with external auditing. Similar concerns have arisen in Indonesia when listed companies have faced allegations of financial-report manipulation despite having audited financial statements. These cases underscore the need to distinguish the formal presence of an external audit from its actual monitoring effectiveness and strengthen the rationale for testing audit quality as a moderator of fraud-related risk factors.

The study has practical relevance for company management, auditors, investors, and creditors. For manufacturing firms, the findings can inform stronger internal controls and integrity-oriented governance. For external auditors, they provide evidence on the conditions under which professional skepticism and audit quality are particularly important. Investors and creditors may also use the results as complementary information when evaluating financial statement reliability. Academically, the study integrates Fraud Star dimensions with the Beneish M-Score and tests audit quality as a moderating mechanism in an Indonesian manufacturing context.

Accordingly, this study examined the effects of pressure, opportunity, rationalization, capability, and integrity on financial statement fraud and tested whether audit quality moderated those relationships among manufacturing companies listed on the IDX during 2020–2024. The hypotheses were: H1, pressure, opportunity, rationalization, and capability are positively associated with financial statement fraud; H2, integrity is negatively associated with financial statement fraud; H3, audit quality weakens the positive associations of pressure, opportunity, rationalization, and capability with financial statement fraud; and H4, audit quality strengthens the negative association between integrity and financial statement fraud.

METHOD

Types and Approaches to Research

This study used a quantitative causal-comparative approach to examine the relationships between Fraud Star dimensions and financial statement fraud and to test the moderating role of audit quality. Secondary data were obtained from financial statements and annual reports of manufacturing companies listed on the Indonesia Stock Exchange (IDX).

Population and Sample

The population comprised manufacturing companies listed on the IDX during 2020–2024. The number of listed issuers was 161 in 2020, 195 in 2021, 202 in 2022, 209 in 2023, and 215 in 2024. Purposive sampling was applied using the following criteria: (1) continuous IDX listing during 2020–2024; (2) consistent publication of complete financial statements; (3) no permanent delisting or suspension during the observation period; (4) complete data for all research variables; and (5) financial statements presented in rupiah. These criteria yielded 120 companies and 600 firm-year observations. Purposive sampling was necessary because calculation of the Beneish M-Score and the Fraud Star proxies required complete, comparable financial data across the five-year period.

Research Variables and Operational Definitions

The study included independent variables representing the Fraud Star dimensions, financial statement fraud as the dependent variable, and audit quality as the moderating variable, as summarized in Table 1. A specific measurement caveat applies to rationalization: TATA was retained as the study proxy, but TATA is also one of the eight components of the Beneish M-Score used as the dependent variable. This creates partial mathematical overlap between the predictor

and outcome measure; therefore, the rationalization coefficient is interpreted cautiously and not as fully independent evidence of a causal effect.

Table 1
Variable Operational Definition

Variable	Proxies	Measurement
Pressure (X1)	Return on Assets (ROA)	Net profit after tax divided by total assets
Opportunity (X2)	Change in Receivable (COR)	Changes in accounts receivable divided by sales for the current year
Rationalization (X3)	Total Accrual to Total Assets (TATA)	Total accrual divided by total assets
Capability (X4)	DCHANGE	Dummy variables: 1 in case of change of directors, 0 if not
Integrity (X5)	Market to Book Ratio (MTB)	Stock market price divided by book value per share
Financial Statement Fraud (Y)	Beneish M-Score	M-Score = –4.84 + 0.92· DSRI + 0.528· GMI + 0.404· AQI + 0.892· SGI + 0.115· DEPI – 0.172· SGAI + 4,679· TATA – 0.327· LVGI; M-Score > –2.22 indicates manipulation
Audit Quality (Z)	Public Accounting Firm Size and Audit Tenure	Dummy 1 = Big Four audit firm (Deloitte, PwC, EY, or KPMG); 0 = non-Big Four. Audit tenure = length of the auditor-client relationship.

Data were collected through documentation by retrieving annual reports and financial statements from the official IDX website, company websites, and publications of the Financial Services Authority (Otoritas Jasa Keuangan, 2023).

Data analysis was conducted in two stages. First, pooled multiple linear regression was used to estimate the associations of the five Fraud Star dimensions with financial statement fraud (Ghozali, 2021). Second, Moderated Regression Analysis (MRA) was used to assess whether audit quality changed the strength or direction of each Fraud Star relationship. Before hypothesis testing, normality, multicollinearity, heteroscedasticity, and autocorrelation diagnostics were performed. The base and moderation specifications were expressed as follows: Because each company contributed repeated annual observations, the dataset has a firm-year (panel) structure. The reported regression and MRA treat the 600 firm-year records as pooled observations to estimate average associations and interaction effects. This specification does not explicitly absorb unobserved firm-specific heterogeneity; consequently, the coefficients should be interpreted as pooled associations rather than within-firm causal effects, and panel estimators should be examined in future robustness analyses.

Base model: $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$

Moderation model: $Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6Z + \beta_7(X_1 \times Z) + \beta_8(X_2 \times Z) + \beta_9(X_3 \times Z) + \beta_{10}(X_4 \times Z) + \beta_{11}(X_5 \times Z) + \varepsilon$

RESULTS AND DISCUSSION

Overview of Research Objects

The research covered manufacturing companies listed on the IDX from 2020 through 2024. After application of the purposive sampling criteria, 120 firms remained, providing 600 firm-year observations. The manufacturing sector was selected because its complex transactions, inventory accounting, asset intensity, and judgment-dependent estimates create settings in which financial statement fraud risk can be particularly salient.

The observation window also covered the post-COVID-19 recovery period, when manufacturers faced supply-chain disruption, production-cost increases, and changing demand. These conditions provide a relevant setting for examining whether financial and organizational pressures are associated with financial statement fraud indicators.

Descriptive Statistics

The mean Beneish M-Score was -2.304, below the -2.22 screening threshold, indicating that the average observation was not classified as a likely manipulator. Variation in COR suggests meaningful differences in receivable changes across firms, while the mean DCHANGE value of 0.364 indicates that director changes occurred in approximately 36.4% of the firm-year observations.

Table 2

Descriptive Statistical Results

Variable	Minimum	Maximum	Mean	Std. Deviation
ROA (Pressure)	-0.152	0.384	0.072	0.081
COR (Opportunity)	-0.241	0.516	0.094	0.112
TATA (Rationalization)	-0.183	0.297	0.041	0.065
DCHANGE (Capability)	0.000	1.000	0.364	0.481
MTB (Integrity)	0.412	5.842	2.137	1.281
Beneish M-Score	-3.981	-1.214	-2.304	0.518

The Kolmogorov-Smirnov normality test yielded p = 0.087 (> 0.05). Multicollinearity diagnostics showed tolerance values above 0.10 and VIF values below 10. The Glejser test produced p-values above 0.05, and the Durbin-Watson statistic was 1.927. Under the diagnostic criteria applied in this study, these results did not indicate material violations of the classical regression assumptions.

Classical Assumption Tests

Pressure, opportunity, rationalization, and capability were positively and significantly associated with financial statement fraud, whereas integrity was negatively and significantly associated with the outcome. The corresponding p-values were below 0.05, supporting the stated directional hypotheses in the pooled regression model.

Table 3

Multiple Linear Regression t-Test Results

Variable	Coefficients	t-statistic	p-value	Remarks
Pressure	0.421	4.921	0.000	Significant
Opportunity	0.538	6.337	0.000	Significant
Rationalization	0.317	3.864	0.001	Significant
Capability	0.286	2.973	0.004	Significant
Integrity	-0.264	-2.715	0.008	Significant

The Adjusted R^2 was 0.684, indicating that the predictors in the pooled regression model accounted for 68.4% of the observed variation in the Beneish M-Score. The remaining 31.6% was associated with factors outside the specified model, such as governance characteristics, internal audit, ownership structure, and other firm-specific conditions.

Determination Coefficient Test (Adjusted R^2)

The MRA interaction coefficients were negative for pressure, opportunity, rationalization, and capability and positive for the integrity interaction. Within the model specification, this pattern indicates that higher audit quality attenuated the positive relationships of the four fraud-driving dimensions and reinforced the negative relationship of integrity with financial statement fraud.

Moderated Regression Analysis (MRA) Results

Table 4

Moderated Regression Analysis (MRA) Results

Moderation Interaction	Coefficient	p-value	Remarks
Pressure × Audit Quality	-0.218	0.012	Weakening
Opportunity × Audit Quality	-0.331	0.001	Weakening
Rationalization × Audit Quality	-0.174	0.028	Weakening
Capability × Audit Quality	-0.146	0.037	Weakening
Integrity × Audit Quality	0.214	0.019	Strengthen

Discussion

The Effect of Pressure on Financial Statement Fraud

Pressure was positively associated with financial statement fraud (β = 0.421; p < 0.001). This relationship is consistent with agency theory: when managers face demanding profitability or financing expectations, incentives to present performance more favorably may intensify (Jensen & Meckling, 2020). In manufacturing firms, such pressure may arise from shrinking margins, leverage, sales deterioration, or earnings targets. The finding is also consistent with prior evidence linking ROA-based financial targets with fraud risk (Kurniawan & Pratama, 2023; Palupi, 2020).

Opportunity produced the largest positive coefficient (β = 0.538; p < 0.001), suggesting that the conditions enabling manipulation were more strongly associated with the fraud indicator than the other Fraud Star dimensions. Manufacturing accounting contains several judgment-intensive areas—including receivables, inventory, and revenue recognition—where weak controls or insufficient monitoring can create room for misstatement. This pattern aligns with research linking changes in receivables and industry characteristics with financial statement fraud (Khamainy & Setiawan, 2021; Wahyudi, Boedi, & Kadir, 2020).

Opportunity has been proven to have a positive and significant effect on financial statement fraud with a coefficient of 0.538 (sig. 0.000), as well as being the variable with the most dominant influence compared to other Fraud Star variables. The weakness of the internal control system and the weak supervision of the company provide a great opportunity for management to manipulate, especially in inventory accounts, accounts receivable, and revenue recognition. These findings are consistent with the results of research that proves that the nature of the industry proxied by changes in receivables has a significant effect on financial statement fraud (Khamainy & Setiawan, 2021; Wahyudi, Boedi, & Kadir, 2020).

Rationalization, proxied by TATA, was positively associated with financial statement fraud (β = 0.317; p = 0.001). Accrual-based discretion can reflect management judgment that may be used aggressively when managers justify reporting choices as necessary to maintain performance or organizational stability. However, this coefficient requires particular caution because TATA is also a component of the Beneish M-Score. The association may therefore be partly amplified by mathematical overlap between the predictor and dependent measure rather than representing an entirely independent behavioral relationship. This limitation should be considered when comparing the finding with Sihombing (2021).

The Effect of Rationalization on Financial Statement Fraud

Capability was positively associated with financial statement fraud (β = 0.286; p = 0.004). Director changes may coincide with shifts in authority, access, policies, and control routines, creating circumstances in which knowledgeable decision makers can exploit temporary weaknesses in organizational systems. The result is consistent with prior research using director change as a capability indicator (Wijanarko, 2020), although DCHANGE should be interpreted as an organizational proxy rather than a direct measure of an individual's fraudulent skill.

Integrity was negatively associated with financial statement fraud (β = -0.264; p = 0.008), supporting the view that ethical commitment and conservative reporting practices can restrain opportunistic financial reporting. Firms characterized by stronger integrity-related reporting behavior may be less willing to exploit accounting discretion even when pressure and opportunity are present. This interpretation is consistent with prior evidence linking integrity with a lower tendency toward accounting fraud (Dewi & Ratnadi, 2020; Scott, 2020).

Capability has a positive and significant effect on financial statement fraud with a coefficient of 0.286 (sig. 0.004). The change of directors (DCHANGE) as a proxy capability shows

that individuals with strategic positions, extensive access to information, and a deep understanding of the company's systems have a greater chance of manipulating financial statements, because the change of directors is often followed by policy changes and the use of unstable internal control loopholes. These findings are consistent with the results of research that changes in directors have a significant effect on financial statement fraud (Wijanarko, 2020).

Audit quality moderated all five relationships in the directions hypothesized by the study. The negative interaction coefficients for pressure, opportunity, rationalization, and capability indicate an attenuating role, whereas the positive integrity interaction is consistent with a reinforcing role. This pattern supports the monitoring argument that more rigorous auditing can constrain managerial discretion and increase the likelihood that irregular reporting is challenged. It is broadly consistent with studies associating stronger audit quality with lower earnings management or financial statement fraud risk (Hadi & Tifani, 2020; Nurjannah & Cahyati, 2020; Dewi & Ariyanto, 2021; Francis, 2021).

Audit quality should nevertheless not be equated with audit-firm size alone. Audit failures involving major firms demonstrate that independence, professional skepticism, competence, audit execution, and the auditor-client relationship also influence monitoring effectiveness (Hassan, Karim, & Habib, 2023; Putri & Sari, 2024). The inclusion of audit tenure in the audit-quality construct is therefore important, although the study's proxy-based measurement cannot capture every dimension of audit performance.

Taken together, the findings extend the agency perspective by showing that financial statement fraud risk reflects a combination of incentives, opportunities, justificatory processes, managerial capability, and integrity, while external audit quality can condition those relationships. Practically, the evidence supports a layered prevention approach combining internal-control quality, an integrity-oriented organizational culture, and independent external auditing. The pooled design, however, means that these relationships describe average firm-year associations and should not be interpreted as firm-specific causal effects without additional panel-data robustness testing.

The Role of Audit Quality as a Moderation Variable

The results of the MRA show that the quality of the audit weakens the influence of pressure, opportunity, rationalization, and capability on financial statement fraud (H3 accepted), and strengthens the negative influence of integrity on financial statement fraud (H4 accepted). High-quality auditors, especially Big Four KAPs, have better resources, independence, and risk-based audit procedures so that they are able to detect indications of financial statement manipulation more effectively than Non-Big Four KAPs. These findings are in line with the results of research showing that audit quality has a negative effect on profit management and the risk of fraudulent financial statements (Hadi & Tifani, 2020; Nurjannah & Cahyati, 2020; Dewi & Ariyanto, 2021), and consistent with the idea that high-quality auditors have better ability to assess fraud risks and improve the quality of financial reporting (Francis, 2021).

However, the effectiveness of audit quality as a monitoring mechanism is not absolute. Several international cases show that even Big Four auditors can experience audit failures if professional independence and skepticism are not applied optimally (Hassan, Karim, & Habib, 2023). This confirms that audit quality is not only determined by the size of the KAP alone, but also by the auditor's independence, professional competence, the application of audit standards, and the length of the audit's relationship with the client (audit tenure), which has also been proven to affect the effectiveness of fraud detection in manufacturing companies (Putri & Sari, 2024).

Overall, the findings of this study broaden the understanding of agency theory in the context of financial statement fraud by showing that conflicts of interest between principals and agents are not only triggered by pressure and opportunity alone, but are also shaped by moral rationalization, technical capabilities of the perpetrators, and the level of integrity of individuals involved in the preparation of financial statements. Audit quality has been proven to act as an external oversight mechanism that minimizes management's room to maneuver in utilizing pressure and opportunities to manipulate, while strengthening the positive effect of integrity in reducing fraud risk. The practical implications of these findings are the importance of a combination of strengthening the company's internal control, building a culture of management

integrity, and strengthening the independence of external auditors as three lines of defense in preventing and detecting financial statement fraud in manufacturing companies in Indonesia.

CONCLUSION

The study found that pressure, opportunity, rationalization, and capability were positively associated with financial statement fraud, while integrity was negatively associated with it among IDX-listed manufacturing companies during 2020–2024. Opportunity had the largest direct coefficient, and the model explained 68.4% of the observed variation in the Beneish M-Score. Audit quality moderated the relationships in the hypothesized directions, supporting its role as an external monitoring mechanism. These findings emphasize the combined importance of effective internal controls, management integrity, and rigorous external auditing rather than reliance on any single fraud-prevention mechanism.

The findings should be interpreted within several limitations. The analysis used pooled firm-year regression and MRA and therefore did not explicitly model unobserved firm-specific heterogeneity. In addition, each Fraud Star dimension was represented by a single proxy, and TATA—used for rationalization—is also embedded in the Beneish M-Score, creating potential mechanical overlap. Future research should apply panel-data or other robustness estimators, consider alternative rationalization measures, extend the analysis beyond manufacturing, and incorporate governance variables such as audit committee effectiveness, whistleblowing systems, and financial distress. For practice, companies should strengthen control environments and ethical governance, while auditors should maintain professional skepticism and risk-focused procedures in firms exhibiting elevated fraud indicators.

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AUTHOR CONTRIBUTION STATEMENT

Ibnu Aburizal Nashruddien MS contributed to the conceptualization of the study, research design, data collection, data analysis, interpretation of findings, and preparation of the original manuscript draft. Ahmad Juanda contributed to methodological development, supervision, critical review of the analysis, and manuscript revision. Eko Handayanto contributed to data validation, interpretation of results, manuscript editing, and overall supervision of the research process. All authors read, reviewed, and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

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