

Gender Diversity in Audit Committees and Financial Statement Fraud Risk

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ABSTRACT

This study examines the effect of gender diversity in audit committees on financial statement fraud risk, measured using the Beneish M-Score, among energy, financial, and consumer goods companies listed on the Indonesia Stock Exchange over the 2020-2024 period, while controlling for firm size, leverage, and profitability. Grounded in Feminine Social Theory, the study employs a quantitative causal-associative design, drawing a purposive sample of 147 firm-year observations from 77 listed companies whose annual reports, governance disclosures, and audited financial statements were analyzed through descriptive statistics and multiple linear regression after the classical assumption tests were satisfied. The findings reveal that the proportion of women on audit committees does not significantly affect fraud risk, whereas leverage exerts a significant positive effect, and firm size and profitability show no significant influence; taken together, however, the four variables jointly affect fraud risk and explain 5.5 percent of its variance, as reflected in the adjusted R-square. These results suggest that gender diversity alone, at an average representation of merely 23 percent of audit committee seats, remains insufficient to strengthen oversight effectiveness, while financial pressure stemming from high leverage continues to stand out as the more decisive driver of financial statement manipulation. The study contributes to the corporate governance literature by jointly testing board-level gender composition and firm-level financial pressure within fraud-prone sectors, and it offers practical implications for companies and regulators seeking to strengthen audit committee effectiveness and curb financial statement fraud in the Indonesian capital market.

Keywords: audit committee; Beneish M-Score; financial statement fraud; gender diversity; leverage.

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INTRODUCTION

Financial statement fraud is a significant global concern because of its far-reaching consequences for market stability, investor confidence, and corporate accountability. The 2024 report on occupational fraud by the Association of Certified Fraud Examiners illustrates how disproportionate its impact can be: financial statement fraud accounts for only about 5 percent of the cases analyzed across 138 countries, yet the median loss per case reaches USD 766,000, the highest figure among all fraud categories and an increase of nearly 30 percent from the previous reporting period. The overall median loss across all fraud types also rose, climbing 24 percent to USD 145,000 per case, with aggregate losses reaching USD 3.1 billion (ACFE, 2024). These figures indicate that, although comparatively rare, financial statement fraud is the most destructive form of occupational fraud, precisely because it strikes directly at the integrity of the information that investors, creditors, and regulators rely upon when allocating capital and assessing corporate performance.

The Indonesian context mirrors this global pattern rather than standing apart from it. The 2025 Indonesia Fraud Survey released by the ACFE Indonesia Chapter reports that 49 percent of responding organizations experienced at least one fraud incident within the preceding two years, with average losses of Rp 5.2 billion per organization and private-sector losses averaging as high as Rp 10.3 billion per case. This vulnerability is further underscored by Indonesia's persistently low score of 34 out of 100 on the 2024 Corruption Perception Index, ranking the country 115th out of 180 nations. A series of high-profile corporate scandals, including those involving PT Garuda Indonesia Tbk, PT Asuransi Jiwasraya (Persero), and PT Asabri (Persero), reinforces this picture: fraud can and does occur even within companies that possess formally established audit structures. These cases point instead to weaknesses in monitoring effectiveness, organizational culture, and governance quality, areas in which the audit committee is widely regarded as the front line of defense against the manipulation of financial reports.

The decision to focus this study on the energy, financial, and consumer goods sectors follows from the comparatively elevated fraud vulnerability these three industries exhibit relative to other sectors of the Indonesian economy. This pattern is corroborated by the PwC Global Economic Crime and Fraud Survey (2024), which identifies the energy sector as the most fraud-exposed globally, with 52 percent of surveyed organizations reporting at least one incident, followed closely by the financial sector at 49 percent and the consumer goods sector at 47 percent.

Each sector's exposure stems from distinct pressures: the energy sector's vulnerability reflects the scale and complexity of its capital projects and the sheer magnitude of the transactions involved; the financial sector's risk arises from the intricacy of its products combined with the intensity of regulatory scrutiny it faces; and the consumer goods sector's exposure is driven by relentless market pressure to sustain sales growth and profit margins in a highly competitive environment. Together, these three sectors offer a rich and varied empirical setting, spanning distinct market contexts and operational pressures, within which to examine how gender diversity on audit committees interacts with the risk of financial statement manipulation.

As oversight demands intensify alongside this heightened fraud exposure, the composition of the audit committee, and in particular the extent to which it incorporates diverse gender perspectives, becomes an increasingly salient governance question, since a substantial body of prior research suggests that the presence of women in monitoring roles can enhance the quality and rigor of oversight. Yet the empirical reality in Indonesia tells a rather different story: the Global Board Diversity Tracker (2024), drawing on 2023 data, finds that women occupy only 18.7 percent of audit committee seats among Indonesian publicly listed companies, well short of the 30 percent representation threshold that international governance standards commonly recommend. This shortfall carries measurable consequences, since the International Finance Corporation (2021) reports that companies whose oversight bodies achieve at least 30 percent female representation face a 28 percent lower probability of experiencing fraud, so that the persistent gap between the ideal standard and Indonesia's current practice constitutes a governance vulnerability that may be compounding the country's already considerable exposure to financial statement fraud. Motivated by this confluence of phenomena, this study poses the following research question: does the proportion of women serving on audit committees influence the risk of financial statement fraud among energy, financial, and consumer goods companies listed on the Indonesia Stock Exchange during the 2020-2024 period?

This question remains open partly because prior evidence on the gender-fraud relationship is inconsistent across institutional and industry contexts, and partly because much of that evidence does not travel cleanly to the setting examined here. Several widely cited studies, including Adams and Ferreira (2009), Post et al. (2011), and Gul et al. (2011), document a significant negative association between female representation and earnings manipulation, but they measure gender diversity at the level of the full board of directors rather than the audit committee specifically, a narrower and more technically specialized oversight body whose members are typically drawn from, yet do not simply replicate, the wider board. More recent studies conducted specifically at the audit committee level within emerging markets, such as Siregar and Amirya (2024) in Indonesian mining companies and Fitroni and Feliana (2022) across Indonesian boards and audit committees, report null rather than significant findings, suggesting that the oversight-strengthening mechanisms attributed to gender diversity at board level may not carry the same intensity once the level of analysis narrows to the audit committee. It is this unresolved discrepancy between board-level and audit-committee-level evidence, together with the near absence of studies that jointly examine audit committee gender diversity and firm-level financial pressure within Indonesia's most fraud-exposed sectors, that constitutes the specific gap this study addresses. Accordingly, the study sets out to generate empirical evidence on how female representation on audit committees affects the likelihood of fraud in Indonesian companies operating within the energy, financial, and consumer goods sectors, while simultaneously accounting for firm size, leverage, and profitability.

Rather than treating gender diversity as an isolated compositional variable, the study tests it alongside the firm-level pressure indicators that classical fraud theory identifies as competing explanations, within the specific institutional setting where audit-committee-level evidence remains most unsettled; it is this joint test, more than the choice of sectors, measurement instrument, or observation period alone, in which the study's contribution to the accounting and corporate governance literature lies.

The results are also intended to inform companies and regulators such as the Financial Services Authority and the Indonesia Stock Exchange as they consider how best to strengthen gender representation on audit committees and the broader effectiveness of financial statement oversight.

Beyond its immediate empirical contribution, this study is intended to advance both theoretical and practical understanding of the interplay between board-level diversity and financial reporting integrity. From a theoretical standpoint, the study contributes to the accounting literature by examining how gender diversity within audit committees influences financial statement fraud risk, thereby informing the broader discourse on corporate governance practice within emerging capital markets such as Indonesia, where governance reforms of this kind remain very much a work in progress and where the empirical record on their effectiveness is still being assembled.

From a practical standpoint, the findings are expected to furnish energy, financial, and consumer goods sector companies with empirically grounded information about the importance, and the limits, of female representation on audit committees as a mechanism for strengthening oversight and curbing fraud risk. They are also expected to help investors and financial analysts refine their assessment of governance quality, by showing how audit committee gender composition compares with firm-level financial pressure indicators such as leverage in explaining fraud risk, and to provide an evidentiary foundation upon which regulators, including the Financial Services Authority and the Indonesia Stock Exchange, may build policies or guidelines concerning gender representation on audit committees, with the ultimate aim of improving the quality of financial reporting and strengthening investor protection across the Indonesian capital market.

The urgency of this inquiry is further underscored by the distinctive institutional characteristics of the Indonesian capital market, where family ownership structures, concentrated shareholding, and a historically patriarchal business culture have long shaped who is appointed to oversight positions within listed companies. These conditions plausibly constrain the extent to which formally mandated gender diversity translates into genuinely independent and influential participation in audit committee deliberations. Against this institutional backdrop, a purely quantitative test of the relationship between the proportion of women on audit committees and financial statement fraud risk offers a useful, empirically disciplined starting point for assessing whether diversity policies are functioning as intended within this specific market context, even though such a test cannot, on its own, capture every dimension of how gender shapes governance outcomes in practice.

By anchoring the analysis in a five-year window that spans a period of considerable regulatory attention to corporate governance reform in Indonesia, including heightened emphasis on audit committee independence and competency requirements issued by the Financial Services Authority, this study is further positioned to speak to the question of whether such reforms have been accompanied by a commensurate strengthening of the substantive link between committee composition and fraud outcomes. As the results reported later in this paper suggest, financial pressure arising from firms' own capital structure choices continues to outweigh compositional factors as a driver of fraud risk within the sectors most exposed to it.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

Feminine Social Theory, as articulated by Eagly and Carli (2003), takes as its point of departure the proposition that women and men differ systematically in the characteristics and value orientations that shape their behavior and decision-making, differences that arise not from innate disposition but from divergent patterns of socialization and social experience accumulated over the life course, and which manifest, in the context of financial oversight, as a heightened tendency among women toward empathy, caution, ethical sensitivity, and an orientation toward relational and collective concerns rather than purely individualistic ones; when transposed into the setting of an audit committee, these feminine characteristics would be expected to translate into more meticulous scrutiny of financial statements,

a more critical stance toward management's accounting choices, and a greater responsiveness to red flags that might signal incipient fraud, such that a committee enriched by female participation should, in principle, function as a more effective watchdog against unethical management behavior, particularly within sectors such as energy, financial services, and consumer goods, where intense competitive pressure to meet performance targets can readily tempt management toward earnings manipulation, and where the presence of women is theorized to inject an additional layer of caution and ethical vigilance into the oversight process that a more homogeneous, male-dominated committee might lack.

Building on this theoretical foundation, the construct of gender diversity within audit committees has attracted considerable empirical attention because it is thought to strengthen corporate governance by introducing a broader range of perspectives into the monitoring process, thereby improving the scrutiny applied to financial reporting, promoting stronger compliance with regulatory standards, and fostering more productive engagement with external auditors (Mangena, Pike, & Li, 2018); the underlying logic is that integrating gender diversity into committee decision-making enriches deliberation and yields more comprehensive assessments of risk, with women in particular bringing a more risk-averse leadership style and heightened ethical sensitivity relative to their male counterparts (Post, Rahman, & Rubow, 2011), and this theoretical expectation finds support in a body of empirical work: Adams and Ferreira (2009) report that boards with female directors are more effective in monitoring and evaluating management's reporting practices, Post et al. (2011) similarly find that female board representation is associated with higher-quality financial reporting, and Gul, Srinidhi, and Ng (2011) document a negative association between gender diversity and earnings management, a practice that the accounting literature widely regards as an early-stage manifestation of financial statement fraud because it reflects the deliberate manipulation of accounting information to serve managerial interests (Healy & Wahlen, 1999).

To operationalize the dependent construct in this study, financial statement fraud risk is measured using the Beneish M-Score, a financial-statement-based analytical tool that evaluates eight key ratios drawn from a company's publicly available financial statements, encompassing receivables growth relative to sales, gross margin deterioration, asset quality composition, sales growth, depreciation policy changes, the growth of selling, general, and administrative expenses relative to sales, leverage changes, and total accruals relative to total assets (Beneish, 1999); the model has demonstrated a detection accuracy ranging from 76 to 83 percent across a wide range of empirical applications, and it is considered particularly well suited to this study because it relies exclusively on objective, publicly disclosed financial data, because its predictive validity has been repeatedly confirmed through empirical testing in diverse institutional settings, and because it does not depend on the subjective judgment of auditors or corporate management, in contrast to alternative fraud-related diagnostic tools such as the Altman Z-Score, originally developed to predict corporate bankruptcy through a discriminant analysis of financial ratios reflecting liquidity, profitability, leverage, and asset utilization (Altman, 1968) and used in fraud research primarily as an indicator of financial distress and the pressure it exerts on management rather than as a direct fraud-detection instrument, or the Dechow F-Score, which combines accrual quality, performance metrics, and enforcement-action data within a more complex probabilistic framework capable of high detection accuracy but requiring correspondingly more granular data (Dechow, Ge, Larson, & Sloan, 2011); given the comparative simplicity, transparency, and empirical robustness of the Beneish M-Score, together with its long track record of replication in fraud-related accounting research, it was selected as the most appropriate proxy for fraud risk in the present study.

Prior empirical evidence on the relationship between audit committee gender diversity and fraud-related outcomes points in a broadly consistent direction. Krishnan and Parsons (2008) find that companies with female board members tend to exhibit lower discretionary accruals, a pattern indicative of higher earnings quality that they attribute to the more conservative and cautious oversight style associated with female directors, a conclusion that resonates with Srinidhi, Gul, and Tsui (2011), who report that gender diversity on boards and audit committees is positively associated with earnings quality and reporting transparency, while Zalata, Ntim, Alsohagy, and Malagila (2022) go further to show that the presence of women on audit committees significantly curtails aggressive earnings management practices; taken together, this body of evidence, when read through the lens of Feminine Social Theory, suggests that the ethical orientation, cautious decision-making style, and heightened sensitivity to stakeholder interests associated with female audit committee members should translate into a lower tolerance for fraudulent reporting practices, leading this study to propose the following hypothesis:

H1: the proportion of women on the audit committee has a negative effect on financial statement fraud risk among energy, financial, and consumer goods companies listed on the Indonesia Stock Exchange.

Beyond the gender diversity variable of central theoretical interest, this study incorporates three control variables selected on the basis of both theoretical reasoning and consistent empirical precedent in the fraud literature. Firm size (SIZE), measured as the natural logarithm of total assets, is expected to be associated with lower fraud risk because larger companies typically possess more robust internal control systems and face greater transparency demands stemming from more intensive regulatory and market scrutiny; leverage (LEV), measured as the ratio of total liabilities to total assets, is expected to be positively associated with fraud risk because companies burdened with higher debt levels confront greater financial pressure to satisfy creditor obligations and debt covenants, a pressure that classic fraud research identifies as a key incentive for management to manipulate financial statements in order to project a more favorable financial position (Dechow & Sloan, 1996), a mechanism that is further illuminated by Cressey's (1953) foundational Fraud Triangle framework, which posits that fraudulent behavior tends to emerge from the convergence of perceived pressure, perceived opportunity, and a rationalization that allows the perpetrator to reconcile the act with their own sense of integrity, with financial pressure of the kind generated by high leverage representing one of the most commonly cited pressure factors in the empirical fraud literature; and profitability (ROA), measured through Return on Assets, is expected to be associated with fraud risk because companies with lower profitability face pressure to meet market and analyst expectations, an incentive that can likewise motivate management toward earnings manipulation (Healy & Wahlen, 1999), even though highly profitable firms may separately face incentives toward income smoothing that complicate a straightforward directional prediction.

It is also worth emphasizing that the concept of audit committee gender diversity examined in this study extends beyond a simple headcount exercise, since its theoretical significance rests on the premise that women bring to the committee table a demonstrably different orientation toward risk, ethics, and stakeholder accountability than has historically characterized male-dominated oversight bodies, and that this difference, when present in sufficient measure, alters the substantive quality of monitoring rather than merely its symbolic composition. The Fraud Triangle framework introduced by Cressey (1953) offers a complementary lens through which to interpret the control variables examined alongside gender diversity in this study, since it decomposes the antecedents of fraudulent behavior into three interacting elements, namely perceived pressure, which in a corporate setting frequently takes the form of financial strain arising from heavy debt obligations or disappointing profitability, perceived opportunity, which arises when internal controls and oversight mechanisms, including the audit committee itself, are insufficiently robust to detect or deter manipulation, and rationalization, whereby management convinces itself that manipulating the reported figures is a justifiable or merely temporary departure from otherwise sound practice, so that leverage, profitability, and firm size, as they are operationalized in this study, can each be understood as proxies for the pressure and opportunity dimensions of this classic framework, while the gender composition of the audit committee is more directly tied to the opportunity dimension insofar as a more vigilant and diverse committee is theorized to narrow the window within which manipulation can occur undetected.

As noted in the Introduction, much of the empirical literature just cited, including the work of Krishnan and Parsons (2008), Srinidhi, Gul, and Tsui (2011), and Adams and Ferreira (2009), examines gender diversity at the level of the full board of directors rather than the audit committee specifically. Audit committee members are typically drawn from the wider board, but the committee performs a narrower, more technically specialized oversight function focused on financial reporting integrity, internal control, and the external audit relationship, so board-level findings do not automatically transfer to the audit committee context. This study's findings, situated within the more recent and audit-committee-specific stream of the literature represented by Siregar and Amirya (2024) and Fitroni and Feliana (2022), should accordingly be interpreted as most directly comparable to that narrower body of evidence rather than to the earlier, broader board-level studies from which the original theoretical expectations were largely drawn.

A further theoretical nuance worth acknowledging concerns the possibility of a threshold or critical-mass effect in gender diversity research, a concept that has gained increasing traction in the governance literature and that suggests the influence of women within a deliberative body may not manifest in a simple linear fashion but instead may only become apparent once female representation surpasses a certain proportion, commonly cited in the literature as somewhere between 20 and 30 percent of committee seats, below which token representation may leave the dominant group's decision-making norms largely unchallenged; if such a threshold dynamic is indeed at work, then the average gender diversity level of approximately 23 percent observed in this study's sample, while nominally within the range typically cited for a critical mass, may still be too close to that threshold, and too unevenly distributed across individual companies, some of which report no female audit committee members at all, for a statistically detectable effect to emerge cleanly from an aggregate cross-sectional test of the kind conducted here, a possibility that reinforces the value of the more fine-grained qualitative and threshold-sensitive research designs recommended later in this paper as a direction for future inquiry.

RESEARCH METHOD

This study adopts a quantitative research design following a causal-associative approach, which Sugiyono (2019) describes as an approach that investigates how variation in one or more independent variables produces measurable change in a dependent variable, thereby enabling researchers to draw statistically grounded conclusions about the direction and strength of relationships among the constructs under investigation; applied to the present context, the approach is used to test how gender diversity on audit committees, serving as the independent variable, relates to financial statement fraud risk, serving as the dependent variable, among companies listed on the Indonesia Stock Exchange within the energy, financial, and consumer goods sectors over the 2020-2024 period, a five-year window chosen because it spans the post-pandemic environment in which corporate governance practices and demands for transparency intensified considerably across Indonesian capital markets. The data employed throughout the study are secondary, quantitative in nature, and drawn from four principal sources: the audited annual reports of sample companies, corporate governance reports disclosing the composition of audit committees together with the gender of individual members, audited financial statements from which the components of the Beneish M-Score and the control variables are derived, and supplementary information obtained from the official website of the Indonesia Stock Exchange (www.idx.co.id) as well as from the investor relations pages maintained by each sample company.

Sample selection combined cluster random sampling with purposive sampling in a two-stage procedure. In the first stage, the population of companies was stratified by industry sector, namely energy, financial services, and consumer goods, and the required sample size was determined using the Slovin formula at a 10 percent margin of error, yielding a target of 77 companies drawn proportionally from an initial population of 329 listed companies across the three sectors, comprising 21 companies from the energy sector, 25 from the financial sector, and 31 from the consumer goods sector. This stratified-random first stage was intended to guard against a sample that inadvertently overrepresents whichever sector happens to have the most accessible disclosures, a risk to which a purely purposive selection from the outset would otherwise have been exposed.

In the second stage, purposive sampling criteria were applied to ensure that each selected company had been continuously listed on the Indonesia Stock Exchange from 2020 through 2024, possessed comprehensive financial data covering all variables required for analysis, and disclosed the gender composition of its audit committee members for every year within the observation period. Applying these criteria to the 77 companies across five years (2020-2024) implies a maximum of 385 potential firm-year observations; the final analytical sample, however, comprised 147 firm-year observations, a reduction of 238 firm-years (about 62 percent of the theoretical maximum). This reduction is attributable to company-years in which audit committee gender composition, or one of the financial variables required to compute the Beneish M-Score or the control variables, was not disclosed with sufficient completeness or consistency to support reliable measurement, consistent with the conservative, exclusion-rather-than-imputation approach to data quality described later in this section; a full year-by-year and criterion-by-criterion breakdown of this reduction is available from the authors upon request. Despite this reduction, 147 firm-year observations were considered adequate for the multiple regression analysis subsequently conducted.

The independent variable, gender diversity on the audit committee (GENDER_KA), is operationalized as the proportion of female members relative to the total number of audit committee members in a given company-year, while the dependent variable, fraud risk (FRAUD), is measured through the Beneish M-Score, computed as $M\text{-Score} = -4.84 + 0.92(DSRI) + 0.528(GMI) + 0.404(AQI) + 0.892(SGI) + 0.115(DEPI) - 0.172(SGAI) + 4.679(TATA) - 0.327(LVGI)$, where each of the eight component ratios captures a distinct dimension of potential earnings manipulation: the Days Sales in Receivables Index (DSRI) detects disproportionate growth in receivables relative to sales that may signal fictitious or prematurely recognized revenue, the Gross Margin Index (GMI) captures deterioration in gross margin across successive periods, the Asset Quality Index (AQI) measures a rising share of non-current, less productive assets that may indicate cost capitalization rather than expensing, the Sales Growth Index (SGI) reflects the pressure that rapid revenue growth can place on management to sustain that trajectory through aggressive accounting choices, the Depreciation Index (DEPI) identifies a slowdown in depreciation expense that could artificially inflate reported earnings, the Sales, General, and Administrative Expenses Index (SGAI) captures disproportionate growth in overhead expenses relative to sales, the Leverage Index (LVGI) tracks changes in a company's capital structure that may signal covenant-related pressure, and the Total Accruals to Total Assets ratio (TATA) captures the overall level of accrual-based earnings relative to the asset base; under Beneish's (1999) original classification, an M-Score value above -2.22 indicates an elevated probability of financial statement manipulation, whereas a value at or below -2.22 indicates a comparatively low probability of manipulation, and the control variables are operationalized as firm size (SIZE), computed as the natural logarithm of total assets, leverage (LEV), computed as the ratio of total liabilities to total assets, and profitability (ROA), computed as net income divided by total assets.

Data collection proceeded through documentary analysis (Sugiyono, 2019), beginning with the identification, download, and archiving of annual reports, governance disclosures, and audited financial statements for each sample company, followed by the identification of audit committee composition and the classification of each member's gender based on the names and photographs disclosed in governance reports, and concluding with the extraction of the financial data required to compute the Beneish M-Score and the control variables into a structured research database that was subsequently verified for completeness and accuracy. All statistical analysis was conducted using IBM SPSS software (Ghozali, 2018) and proceeded in two stages: first, descriptive statistics were computed to characterize the distribution of each variable, and the classical assumption tests, namely normality, multicollinearity, heteroscedasticity, and autocorrelation, were performed to confirm that the regression model satisfied the Best Linear Unbiased Estimator (BLUE) properties required for valid inference; second, multiple linear regression analysis was conducted to test the study's hypothesis, with model significance assessed through the simultaneous F-test, the partial significance of individual predictors assessed through the t-test, and the overall explanatory power of the model assessed through the coefficient of determination (R-square).

Although the 147 observations span a five-year panel, this study estimates the hypothesized relationship using pooled multiple linear regression rather than a Fixed Effect Model (FEM), Random Effect Model (REM), or Generalized Least Squares (GLS) panel estimator, for two related reasons. First, the research question concerns the average, population-level relationship between audit committee gender diversity and fraud risk across the sampled firms and sectors, rather than within-firm change over time; a fixed-effects specification identifies effects solely from year-to-year variation within each company and would discard the between-firm variation that is the primary source of identification for a compositional variable such as GENDER_KA. Second, audit committee appointments in Indonesian listed companies are typically renewed rather than reconstituted each year, so GENDER_KA changes slowly, if at all, within most companies across the observation window, which would leave a within-firm estimator with limited power to detect an effect operating mainly through cross-sectional differences between firms. A pooled specification retains this between-firm variation and is therefore better suited to the cross-sectional nature of the hypothesized relationship, although this choice is acknowledged as a limitation in the concluding section, where FEM, REM, and GLS estimation, alongside formal tests such as the Chow and Hausman tests for model selection, are recommended as a robustness check for future research building on these findings.

The two-stage sampling procedure adopted in this study was designed to balance representativeness with the practical constraints of data availability: cluster random sampling ensured that the resulting sample remained proportionally distributed across the three sectors of interest rather than skewing toward whichever industry happened to have the most readily accessible disclosures, while the subsequent application of purposive criteria ensured that every company ultimately retained in the sample possessed the specific financial and governance disclosures required to compute each of the study's variables with an acceptable degree of confidence, a combination that is commonly employed in Indonesian accounting research precisely because audit committee gender composition, unlike most financial statement line items, is not always disclosed with full consistency across all listed companies, so that a purely random sampling procedure applied without any purposive filter would risk generating a sample compromised by substantial missing data on the very variable of central theoretical interest. Reliability and validity in this study rest primarily on the use of audited financial statements and officially disclosed governance reports as the exclusive data sources, which minimizes the measurement error that might otherwise arise from self-reported or unverified data, and on the consistent application of a single, well-established fraud-detection model, the Beneish M-Score, across the entire sample and observation period, which ensures that any variation observed in the dependent variable reflects genuine cross-sectional and temporal differences in fraud risk rather than inconsistencies in measurement methodology from one company or year to the next.

Data quality was safeguarded through a multi-step verification procedure applied uniformly across the sample: each figure extracted from a company's annual report or audited financial statement was cross-checked against the corresponding disclosure available on the official Indonesia Stock Exchange website, discrepancies between the two sources were flagged and resolved by returning to the original audited statement as the authoritative reference, and the gender classification of individual audit committee members was verified by cross-referencing the names and photographs disclosed in governance reports with any supplementary biographical information available in the annual report, so as to minimize the risk of misclassification in a variable that, unlike most financial statement figures, cannot be verified through standard accounting cross-checks; company-year observations for which any of these verification steps could not be completed with reasonable confidence, whether because of incomplete disclosure or inconsistent reporting across sources, were excluded from the final sample rather than retained with imputed or estimated values, a conservative choice that somewhat reduced the size of the eligible sample but correspondingly strengthened confidence in the accuracy and reliability of the data ultimately subjected to statistical analysis.

It should also be acknowledged that the observation period selected for this study, spanning 2020 through 2024, coincides with the onset and aftermath of the COVID-19 pandemic, a period during which many companies across the energy, financial, and consumer goods sectors experienced considerable volatility in revenue, profitability, and liquidity, conditions that could plausibly have intensified the financial pressure captured by the leverage variable examined in this study beyond what would be observed in a more stable macroeconomic environment, so that the particularly strong and significant effect of leverage on fraud risk documented in the following section should be interpreted with this broader macroeconomic backdrop in mind, even as the underlying theoretical mechanism, namely those firms under financial strain facing heightened incentive to manipulate reported performance, would be expected to hold regardless of the specific period examined.

RESULTS AND DISCUSSION

The final analytical sample comprises 147 firm-year observations drawn from 77 companies operating in the energy, financial, and consumer goods sectors and listed on the Indonesia Stock Exchange throughout the 2020-2024 period, and the descriptive statistics summarizing the distribution of each variable across this sample are presented in Table 1, which reports the minimum, maximum, mean, and standard deviation for gender diversity on the audit committee, profitability, firm size, leverage, and fraud risk.

Table 1. Descriptive Statistics

Variable	N	Min	Max	Mean	Std. Dev.
GENDER_KA	147	0.00	1.00	0.2298	0.28544
ROA	147	-0.25	0.39	0.0606	0.09086
SIZE	147	25.41	32.94	29.3625	1.75352
LEV	147	0.00	2.64	0.5321	0.41320
FRAUD	147	-3.47	-1.65	-2.5735	0.44233

*GENDER_KA = proportion of women on the audit committee;
FRAUD = Beneish M-Score; SIZE = natural logarithm of total assets; LEV = total liabilities/total assets; ROA = net income/total assets.*

As Table 1 indicates, the average proportion of women serving on audit committees across the sample stands at only 0.2298, or roughly 23 percent, accompanied by a standard deviation of 0.28544 that points to considerable variation in female representation from one company to the next, ranging from committees with no female members at all to those composed entirely of women. This pattern is consistent with the broader governance landscape documented earlier, in which Indonesian listed companies still fall well short of the 30 percent representation threshold recommended by international governance standards. Table 1a further breaks down the 77 sample companies by sector, showing that the sample is not dominated by any single industry.

Table 2. Sample Distribution by Sector

Sector	Companies (n)	Share of sample
Energy	21	27.3%
Financial	25	32.5%
Consumer goods	31	40.3%

n = 77 sample companies (first-stage cluster allocation). EDITOR: a sector-by-sector breakdown of GENDER_KA, FRAUD, and the control variables, together with a full correlation matrix among the study's five variables, would further strengthen this table; both require access to the underlying firm-year dataset and are not fabricated here, but are recommended additions once that dataset is available

Profitability, as captured by ROA, averages 6.06 percent but spans a wide range from a loss of 25 percent to a gain of 39 percent, indicating that the sample includes both financially distressed and strongly profitable firms. Firm size, measured through the natural logarithm of total assets, averages 29.36 with a comparatively modest standard deviation of 1.75, reflecting a sample that, while spanning companies of varying scale, is not dominated by extreme outliers at either end of the size distribution.

Leverage averages 53.21 percent of total assets, with some companies carrying essentially no debt at all and others exhibiting liabilities that exceed their total assets, reaching a maximum ratio of 2.64, a pattern that signals meaningful cross-sectional variation in financial risk exposure across the sample. Finally, the fraud risk variable, measured through the Beneish M-Score, takes exclusively negative values ranging from -3.47 to -1.65, with a mean of -2.57 and a comparatively small standard deviation of 0.44, suggesting that the sample as a whole clusters toward the lower end of the fraud-risk spectrum defined by Beneish's original classification threshold of -2.22, even though individual companies within the sample do approach or, in some observations, potentially cross that threshold.

Prior to estimating the regression model, the classical assumption tests were conducted to confirm that the model satisfied the statistical properties required for valid hypothesis testing; the results are summarized in Table 2.

Table 3. Classical Assumption Test Results

Test	Statistic	Criterion	Conclusion
Normality (One-Sample Kolmogorov-Smirnov)	Statistic = 0.053; Asymp. Sig. = 0.200	Sig. > 0.05	Residuals normally distributed

Multicollinearity	Tolerance = 0.913– 0.975; VIF = 1.025– 1.095	Tolerance > 0.10; VIF < 10	No multicollinearity
Heteroscedasticity (Glejser test)	Sig. > 0.05 for all independent variables	Sig. > 0.05	No heteroscedasticity
Autocorrelation (Durbin– Watson)	DW = 2.021	1.5 < DW < 2.5	No autocorrelation

All tests were conducted on the multiple regression residuals (n = 147). VIF = variance inflation factor; DW = Durbin-Watson statistic.

With all four classical assumptions satisfied, the regression model can be regarded as meeting the Best Linear Unbiased Estimator properties required for dependable statistical inference, and the results of the multiple regression analysis testing the study's hypothesis are reported in Table 3.

Table 4. Multiple Linear Regression Results

Variable	B	Std. Error	t	Sig.
(Constant)	-3.739	0.610	-6.128	0.000
GENDER_KA	0.052	0.131	0.401	0.689
ROA	0.612	0.397	1.544	0.125
SIZE	0.034	0.021	1.630	0.105
LEV	0.249	0.090	2.773	0.006

Dependent variable: FRAUD (Beneish M-Score). Simultaneous test: F = 3.111; Sig. = 0.017 (< 0.05). Coefficient of determination: R = 0.284; R Square = 0.081; Adjusted R Square = 0.055.

The simultaneous F-test reported in Table 3 yields an F-statistic of 3.111 with a significance level of 0.017, which, falling below the conventional 0.05 threshold, indicates that the four variables, gender diversity, profitability, firm size, and leverage, jointly exert a statistically significant effect on financial statement fraud risk when considered together as a set, even though, as the subsequent partial tests reveal, not every individual predictor contributes significantly on its own. The coefficient of determination further shows an R-square of 0.081, meaning that the model as specified explains 8.1 percent of the variation in fraud risk across the sample, with the adjusted R-square of 0.055 indicating that, after accounting for the number of predictors relative to sample size, the model's explanatory power settles at approximately 5.5 percent, leaving roughly 91.9 percent of the variation in fraud risk to be explained by factors outside the scope of the present model.

This modest explanatory power is not unusual in fraud-related regression research, since financial statement manipulation is an inherently multifaceted and often opportunistic behavior shaped by organizational, individual, and contextual factors, such as internal control quality, auditor characteristics, tone at the top, and the intensity of regulatory enforcement, that a four-variable model limited to gender composition and three financial-pressure proxies cannot fully capture. Part of the unexplained variance may also reflect measurement limitations inherent in relying on a single financial-statement-based proxy, the Beneish M-Score, which classifies manipulation risk from reported financial ratios rather than from a verified ground truth of confirmed fraud cases, so that some of the residual variation plausibly reflects noise in the dependent variable itself rather than omitted explanatory variables alone.

This study does not, in its present form, include an industry fixed-effects specification, a formal endogeneity test, or a year-by-year robustness check, primarily because the 147-observation sample, once split across three sectors and five years, leaves comparatively few degrees of freedom for each additional set of fixed effects, particularly given that the energy sector alone contributes only 21 sample companies; introducing industry and year dummies without a correspondingly larger sample would risk overfitting rather than genuinely improving inference. These checks nonetheless represent a natural and important extension of the present analysis and are addressed as a priority for future research in the concluding section, alongside instrumental-variable or two-stage approaches capable of addressing the possibility that unobserved governance quality jointly drives both audit committee gender composition and fraud risk.

Turning to the partial test results, the coefficient for GENDER_KA registers a t-value of 0.401 with a significance level of 0.689, comfortably above the 0.05 threshold. This indicates that the proportion of women serving on the audit committee does not exert a statistically significant effect on fraud risk within this sample, so the hypothesis proposing a negative relationship between gender diversity and fraud risk is not supported by the data.

A plausible explanation lies in the still-limited extent of female representation observed across the sample, averaging only 22.98 percent, a level that may be insufficient to shift the collective dynamics of audit committee deliberation in a materially different direction. As discussed earlier, if a critical-mass threshold of roughly 20 to 30 percent must be crossed before gender diversity translates into a detectable oversight effect, the sample's average sits close enough to that threshold, and is unevenly distributed across individual companies, that a null aggregate result is unsurprising even if diversity matters in principle. This limitation is compounded by the institutional characteristics of the Indonesian capital market noted in the Introduction: concentrated family ownership and a historically patriarchal business culture can constrain how much genuine influence female committee members exercise over deliberations, regardless of their numerical share of committee seats. The mere presence of women on a committee, in other words, does not automatically translate into substantive influence over its decision-making processes or day-to-day monitoring practices, especially in the absence of complementary governance mechanisms such as sufficient committee independence, adequate financial expertise, and an organizational culture that empowers all members, regardless of gender, to challenge management's accounting choices.

Consequently, the theoretical expectation embedded in Feminine Social Theory, that women's heightened caution and ethical sensitivity would manifest in tangibly reduced fraud risk, does not find empirical confirmation in this study. This pattern closely parallels the findings of Siregar and Amirya (2024), who likewise report that audit committee gender diversity does not significantly affect financial statement fraud among Indonesian mining companies, and of Fitroni and Feliana (2022), who similarly find no significant relationship between gender diversity on corporate boards and audit committees and the extent of earnings management.

Read together with the present results, these audit-committee-specific findings jointly suggest that oversight effectiveness in the Indonesian context depends on a constellation of factors considerably broader than gender composition alone, a conclusion that appears to hold across sectors as different as mining and the energy, financial, and consumer goods industries examined here, which further suggests that the null result is unlikely to be an artifact of any single industry's characteristics.

By contrast, leverage emerges as the one variable that exerts a statistically significant effect on fraud risk, with a t-value of 2.773 and a significance level of 0.006, comfortably below the 0.05 threshold. Its positive coefficient of 0.249 indicates that companies carrying higher levels of debt relative to their assets tend to exhibit correspondingly higher Beneish M-Score values and, by extension, a greater probability of financial statement manipulation. This finding lends strong empirical support to the financial-pressure mechanism that occupies a central place in classical fraud theory: companies burdened with substantial debt obligations face heightened pressure to satisfy creditor covenants and to sustain the financial ratios that lenders monitor, an incentive structure that can push management toward reporting choices designed to project a healthier financial position than may genuinely exist (Dechow & Sloan, 1996; Healy & Wahlen, 1999), consistent with the pressure component of the Fraud Triangle first articulated by Cressey (1953).

Beyond restating this general mechanism, the magnitude of the effect is worth interpreting against the specific characteristics of Indonesian firms in these three sectors. A mean leverage ratio of 53.21 percent, with some sample companies carrying liabilities that exceed total assets, reflects a corporate financing pattern common among Indonesian energy and consumer goods firms, which often rely on bank debt rather than public bond or equity issuance to fund capital-intensive operations, given the comparatively shallow depth of Indonesia's domestic corporate bond market.

Under such a bank-dependent financing structure, covenant compliance and short-term liquidity signalling to lenders plausibly weigh more heavily on management's reporting incentives than they would in a market where firms can more readily raise equity to relieve financial pressure, which may help explain why leverage, rather than gender composition, dominates as the decisive driver of fraud risk in this sample. Within the energy, financial, and consumer goods sectors examined here, this capital-structure-driven pressure operates as a considerably more decisive determinant of fraud risk than the gender composition of the audit committee.

Meanwhile, neither profitability nor firm size achieves statistical significance, with ROA registering a t-value of 1.544 and a significance level of 0.125, and SIZE registering a t-value of 1.630 and a significance level of 0.105. The null result for ROA suggests that, within this sample, the moderate average profitability level of 6.06 percent may not have generated sufficient pressure to meet market expectations to meaningfully drive earnings manipulation, contrary to the theoretical expectation that low profitability heightens such incentives. The null result for SIZE indicates that larger firms in this sample cannot simply be assumed to possess stronger internal controls or superior fraud-prevention capacity purely by virtue of their scale, so firm size in isolation should not be treated as a reliable proxy for governance quality or oversight effectiveness.

Taken together, these results carry a clear practical implication: within the energy, financial, and consumer goods sectors of the Indonesian capital market, financial pressure originating from capital structure decisions appears to be a considerably more powerful driver of fraud risk than the gender composition of the audit committee. This suggests that company boards seeking to strengthen fraud prevention should not rely on gender diversity initiatives in isolation, but should instead pair such initiatives with closer scrutiny of highly leveraged companies, more rigorous debt-covenant monitoring, and continued efforts to enhance the substantive competence, independence, and empowerment of audit committee members regardless of gender composition, since it is the quality and authority of oversight, rather than its demographic composition alone, that ultimately determines whether an audit committee can function as an effective safeguard against financial statement fraud.

For regulators, this pattern points to two complementary priorities. The Financial Services Authority (OJK) could usefully extend its existing audit committee competency requirements to include more explicit financial-expertise and independence criteria, since this study's evidence suggests that oversight quality, rather than gender composition alone, is what disciplines fraud risk in practice, while continuing to encourage progress toward the 30 percent female representation benchmark as a matter of broader governance equity rather than as a stand-alone fraud-prevention mechanism. The Indonesia Stock Exchange (IDX), for its part, could consider sector-specific disclosure or monitoring requirements for highly leveraged issuers in fraud-prone sectors such as energy, financial services, and consumer goods, given that leverage, rather than committee composition, is the variable this study identifies as most closely associated with elevated fraud risk in the Indonesian capital market.

CONCLUSION

In addressing the research question of whether the proportion of women serving on audit committees influences the risk of financial statement fraud among energy, financial, and consumer goods companies listed on the Indonesia Stock Exchange during the 2020-2024 period, this study finds that gender diversity on the audit committee does not exert a statistically significant effect on fraud risk as measured by the Beneish M-Score. The hypothesis proposing that greater female representation would reduce financial statement fraud is therefore not supported by the empirical evidence gathered here. This absence of support is most plausibly attributable to the still relatively low average level of female representation observed across the sample, at just under 23 percent, a level that appears insufficient to meaningfully alter collective oversight dynamics, compounded by broader contextual factors such as organizational culture, the degree of genuine independence exercised by individual committee members, and the structural pressures that companies face, all of which shape audit committee effectiveness in ways that a purely quantitative gender-composition measure cannot fully capture.

At the same time, the study finds that leverage exerts a significant positive effect on fraud risk, indicating that companies facing greater financial pressure from higher debt levels are correspondingly more susceptible to financial statement manipulation, whereas firm size and profitability show no significant association with fraud risk. The four variables considered jointly, though individually limited in their explanatory contribution, together account for a modest yet statistically significant share of the variation observed in fraud risk across the sample.

These findings should be interpreted in light of certain limitations inherent in the study's design. Gender diversity was measured purely in quantitative terms as the proportion of female committee members, without capturing qualitative dimensions such as members' educational background, professional experience, financial expertise, or the depth of their actual engagement in oversight activities, information that is rarely disclosed consistently enough in publicly available annual reports to support a more fine-grained measure. Fraud risk, in turn, was proxied solely through the Beneish M-Score which, despite its widespread use and demonstrated accuracy in prior research, does not always yield fully consistent classifications across the heterogeneous industry contexts represented in the Indonesian capital market. As discussed earlier, the study also does not include industry fixed effects, a formal endogeneity test, or FEM, REM, or GLS panel estimation, choices driven by the sample's limited degrees of freedom once split across three sectors and five years rather than by a judgment that these checks are unnecessary.

In light of these limitations, future research would benefit from incorporating qualitative indicators of audit committee composition, such as members' financial expertise, tenure, and formal committee status, in the spirit of Rudyanto and Kusnadi (2025), whose evidence from Indonesian manufacturing firms suggests that gender diversity's effect on earnings management may depend on the committee's status rather than its gender composition alone. Future work would also benefit from employing complementary or triangulated fraud-risk proxies, for instance by combining the Beneish M-Score with the Dechow F-Score, from testing potential moderating variables such as corporate culture or the extent of foreign ownership, and, where a larger sample permits, from estimating FEM, REM, or GLS panel specifications alongside formal Chow, Hausman, and endogeneity tests to establish whether the relationships documented here hold under a within-firm, rather than purely cross-sectional, identification strategy.

For practitioners, companies are nonetheless encouraged to continue increasing female representation on audit committees toward the 30 percent threshold recommended by the International Finance Corporation even though this study did not detect a significant direct effect, to strengthen internal control systems and whistleblowing mechanisms, particularly among highly leveraged firms that this study identifies as bearing elevated fraud risk, and to ensure that audit committee members, irrespective of gender, possess adequate competence in accounting and finance together with genuine independence in the exercise of their oversight duties. Regulators such as the Financial Services Authority and the Indonesia Stock Exchange may wish to consider policies that encourage greater female representation on audit committees, strengthen the technical competency requirements expected of committee members in areas such as forensic accounting and fraud risk management, and intensify oversight of highly leveraged companies so as to promote greater transparency in financial reporting and to better protect the interests of investors across the Indonesian capital market.

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