The Moderating Role of Board Ownership on The Relationship Between Gender Diversity and Accounting Fraud: Evidence From KSA

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Abstract:
This study examines the impact of gender diversity on corporate boards and its effect on accounting fraud, with a specific focus on the moderating role of ownership. The relevance of this research lies in its potential to enhance corporate governance and fraud prevention strategies. The purpose is to investigate whether increased gender diversity is associated with reduced instances of accounting fraud and to explore how ownership influences this relationship. Using data from 30 non-financial companies listed on the Saudi Stock Exchange from 2019 to 2023, totaling 150 observations, the study employs three distinct models—Altman, Springate, and Zmijewski—for comprehensive statistical analysis. Results consistently indicate a negative relationship between gender diversity on boards and accounting fraud across all models. Specifically, the Altman model shows a strong negative relationship (t-test: -14.027, p-value: 0.000), the Springate model indicates a significant negative relationship (t-test: -2.707, p-value: 0.025), and the Zmijewski model reveals a highly significant negative relationship (t-test: -25.547, p-value: 0.000). Furthermore, ownership significantly moderates this relationship in all models, with varying effects: positive moderation in the Altman model (t-test: 4.567, p-value: 0.000) and negative moderation in the Springate (t-test: -5.455, p-value: 0.001) and Zmijewski models (t-test: -9.342, p-value: 0.000). In conclusion, increasing gender diversity on boards is associated with reduced accounting fraud. Ownership's moderating effect varies across models but underscores the importance of board composition and ownership structure in corporate governance and fraud prevention efforts.

Keywords: Gender Diversity-Corporate Boards-Accounting Fraud-Ownership Moderation-KSA.

JEL Classification: G34 - M42 - J16

Introduction:

Financial statement fraud has garnered widespread attention from the public, press, and regulatory bodies. Major scandals such as Enron, WorldCom, and Lehman Brothers have led to a decline in public trust in capital markets (Carter et al., 2010). As the second-largest economy in the world, China has also witnessed a series of financial statement fraud cases over the past decade, including incidents involving Yin Guangxia, Keyuan, Lan Tian, and Liang Mianzhen, resulting in an unprecedented crisis of investor confidence (Ding & Wu, 2014).

The increasing presence of women in leadership roles within corporations has generated significant interest regarding whether male and female corporate leaders exhibit different organizational behaviors (Wiley and Monllor-Tormos, 2018). While some scholars argue that gender diversity on corporate boards has no bearing on corporate actions due to the absence of cognitive disparities between genders (Khan and Vieito, 2013; Triana et al., 2014), others suggest that men and women possess distinct thinking and behavioral patterns (Strydom et al., 2017), leading to varied business outcomes (Sarhan et al., 2019). These differences appear primarily in emotional expression rather than problem-solving styles (Báez et al., 2018).

To better understand the impact of gender diversity on firm decisions and behaviors, as well as its implications for corporate misconduct, this study explores the relationship between gender diversity on corporate boards and the likelihood of a company engaging in fraud. Previous research has shed light on how gender diversity can influence earnings quality and corporate decision-making.

Recent findings from KPMG (2020) highlight that most US companies suffer substantial losses due to fraud, compliance issues, and regulatory fines. Their study indicates that 85% of companies are affected by internal fraud, resulting in losses exceeding $10 billion. Additionally, 55% of companies face regulatory fines due to compliance violations. The American Association of Certified Fraud Examiners (2020) also provides insights into occupational fraud in the US, revealing that asset misappropriation occurs in 77% of fraud cases with a median loss of $100,000 per case. In contrast, financial statement fraud, although less frequent (19% of cases), results in the highest median loss of $2,000,000 per case.

Corporate boards, responsible for managing a company's affairs and ensuring compliance with legal obligations, have become a focal point for examining the impact of board characteristics, including gender diversity, on corporate behavior

(Abdou et al., 2021; Alam et al., 2020). With increasing pressure to improve female representation in senior management, understanding how gender diversity affects corporate fraud is essential for researchers, policymakers, regulators, and the public. Given observed gender differences in ethical standards and risk-taking, our research hypothesizes that female corporate leaders are less likely to engage in corporate fraud. We also suggest that the ethical conduct of boards may be compromised by the assumption that only male-dominated boards bear moral and ethical responsibility for addressing corporate fraud (Doan and Iskandar-Datta, 2020).

Finance and accounting literature indicate that women, due to their risk-averse and diligent nature, often seek higher assurances from external auditors, potentially leading to higher audit fees. However, their presence on audit committees enhances committee effectiveness, improving the integrity of internal controls, audit procedures, and organizational communication. This ultimately reduces perceived audit risk and, consequently, audit effort and fees. Therefore, while female leadership may initially demand higher assurances, their role on audit committees results in lower audit fees in the long run (Nehme and Jizi, 2018; Alkebsee et al., 2021; Nekhili et al., 2020; Velte, 2018; Chen et al., 2016).

1- LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Fraud in accounting and financial reporting is a pervasive issue with significant implications for organizations worldwide. It involves intentional misrepresentation, manipulation, or omission of financial information, leading to financial loss and reputational damage. Auditing plays a crucial role in detecting and preventing fraud, enhancing the reliability of financial reporting (Olagunju and Owolabi, 2021; Hamshari et al., 2021). Forensic accounting complements these efforts, focusing on investigating financial crimes and employing specialized skills such as technical and analytical skills, effective communication, psychosocial understanding, and mastery of accounting and auditing principles (Chukwu et al., 2019; Thathasarani and Sujeewa, 2022).

The adoption of computer-aided audit techniques and tools (CAATTs) has become pivotal in fraud detection strategies, offering enhanced capabilities to analyze large volumes of financial data efficiently (Samagaio and Diogo, 2022). Despite these advancements, fraud remains a persistent threat exacerbated by economic downturns and global financial crises. Fraudulent financial reporting typically involves misstating revenues, manipulating asset values, or concealing liabilities to present a misleading financial picture. The repercussions extend beyond financial losses to encompass reputational harm and erosion of stakeholder trust (Center for Audit Quality).

The fraud triangle theory, developed by Donald Cressey in 1951, identifies three key factors that contribute to fraudulent behavior: opportunity, rationalization, and pressure. Opportunity arises when internal controls are weak, allowing individuals to exploit vulnerabilities (Al-Shubail et al., 2022). Rationalization occurs when perpetrators justify their actions as necessary or justified under the circumstances (Cressey, 1953). Pressure involves financial or personal burdens that drive individuals to commit fraud (Al-Shubail et al., 2022).

Gender diversity in corporate governance has gained attention for its potential impact on fraud prevention and detection. Research suggests that boards with female representation may exhibit better decision-making and ethical standards, reducing the likelihood of fraudulent financial reporting (Kaplan et al., 2009; Wei and Xie, 2009). However, the influence of gender diversity on firm performance remains debated, with studies yielding mixed results (Rose, 2007; Smith et al., 2006).

Effective corporate governance mechanisms, including independent audit committees and stringent oversight of financial reporting, are critical in mitigating fraud risks (Sarbanes-Oxley Act of 2002). These governance practices help align management incentives with shareholder interests and ensure transparency in financial disclosures. In conclusion, combating fraud requires a multifaceted approach integrating robust auditing practices, forensic accounting expertise, effective corporate governance, and diverse board compositions. These measures collectively strengthen organizational resilience against fraudulent activities and uphold the integrity of financial reporting.

Gender diversity in corporate governance has garnered significant attention in scholarly literature due to its potential to enhance financial integrity and mitigate fraud within organizations. This synthesis draws upon various studies that explore different dimensions of how gender diversity influences fraud detection and prevention mechanisms in corporate settings. To begin with, studies such as Ilaboya & Lodikero (2017) and Rathnasiri et al. (2015) underscore that boards with higher gender diversity tend to exhibit stronger governance mechanisms that deter financial statement fraud. They highlight how diverse perspectives and experiences contribute to enhanced transparency and accountability, thereby reducing opportunities for financial manipulation (Ilaboya & Lodikero, 2017; Rathnasiri et al., 2015).

Moreover, Wahid (2019) delves into the mechanisms through which gender-diverse boards foster greater transparency and accountability, emphasizing their role in mitigating financial fraud. This aligns with findings from Wahyuningtyas (2022) and Liao et al. (2019), who specifically focus on the impact of gender diversity in leadership roles such as chief financial officers (CFOs). They find that female CFOs are associated with lower incidences of accounting fraud, highlighting the ethical contributions of gender diversity in executive positions (Wahyuningtyas, 2022; Liao et al., 2019).

Beyond executive roles, studies by Githaiga (2023) and Kamarudin et al. (2018) explore broader implications of board diversity and institutional ownership on financial management practices. They demonstrate that gender-diverse boards,

particularly when coupled with higher institutional ownership, contribute to reduced earnings management and enhanced financial transparency, thereby lowering the risk of financial statement fraud (Githaiga, 2023; Kamarudin et al., 2018).
Additionally, Ferina & Pratama (2023) shed light on the complexities surrounding auditor characteristics and board gender diversity. While auditor independence is crucial for fraud detection, they discuss how gender diversity within boards may interact with these characteristics, influencing fraud prevention mechanisms in nuanced ways (Ferina & Pratama, 2023).

Studies like those by Chu et al. (2023) and Maulidi (2023) explore the moderating effects of gender diversity and corporate social responsibility (CSR) on fraud. Chu et al. (2023) find that CSR initiatives reduce fraud likelihood, with female directors amplifying this effect, especially in regions with higher gender equality. Maulidi (2023) indicates that female executives are less likely to engage in fraud in non-governmental companies, underscoring the role of gender diversity in promoting ethical decision-making.

Moreover, studies by Wang et al., (2022) and Cumming et al. (2015) provide insights into how gender diversity influences fraud detection. Wang et al. (2022) find that female executives increase fraud detection rates, thereby reducing fraudulent activities in organizations. Cumming et al. (2015) suggest that gender-diverse boards mediate fraud recurrence, with women playing a significant role in reducing fraud severity, particularly in male-dominated industries.
Finally, Julianti & Fuad (2023) highlight the impact of female CFOs in reducing financial reporting fraud, emphasizing the practical implications of gender diversity in enhancing corporate governance practices.
In summary, these studies collectively illustrate that gender diversity in corporate governance contributes positively to fraud detection and prevention by fostering transparency, accountability, and ethical decision-making. The presence of women in leadership roles, coupled with effective governance mechanisms and institutional ownership, enhances organizational resilience against fraudulent behaviors, thereby promoting financial integrity in corporate environments.

Based on these previous studies highlighting the critical role of gender diversity in corporate governance and its impact on fraud detection, the following hypotheses are derived:
H1: There is a statistically significant positive impact of gender diversity on fraud detection in Saudi companies.
This hypothesis builds on findings from global and regional studies indicating that boards with higher gender diversity tend to exhibit stronger governance mechanisms that deter financial misconduct and enhance financial transparency.
H2: There is a statistically significant positive effect of gender diversity on fraud detection in Saudi companies through the moderating role of board ownership.
Drawing from research that explores the interaction between gender diversity and institutional ownership, this hypothesis posits that companies with diverse boards and higher institutional ownership are better equipped to mitigate fraud risks through enhanced oversight and accountability mechanisms.

2- METHODOLOGY

The study population consists of non-financial companies operating in Saudi Arabia from 2019 to 2023, encompassing various sectors within the Saudi economy. A sample of 30 companies was selected based on availability and willingness to participate, ensuring representation across different sectors and company sizes. Data for the study were collected from publicly available sources such as annual reports, company websites, and corporate governance databases. A key variable of interest was the number of female board members in each company, analyzed to explore the impact of gender diversity on fraud detection. The study specifically investigates how board ownership moderates this relationship. Statistical analyses employed include multiple regression to examine relationships, descriptive analyses for summarizing findings, and Pearson correlation to assess associations among variables. This approach facilitates a detailed exploration of how gender diversity on corporate boards, moderated by board ownership, influences fraud detection within Saudi Arabian companies. By leveraging recent data, the study aims to capture current trends and dynamics in gender diversity and its role in mitigating fraudulent activities in the Saudi corporate context.

Table 1. Measuring the Study Variables

Variable	Measurement	Supporting Literature
Dependent variable Accounting Fraud	All three models (Altman, Springate, Zmijewski)	(Martanti et al., 2021); (Gunanto, 2023); (Listyarini, 2020).
Independent Variable Gender Diversity	Dummy variable, 1 if there is diversity, 0 if all male members	(Harakeh et al., 2022); (Akter et al., 2024); (Muhammad et al., 2023); (Githaiga, 2023).
Control Variables		
Board Ownership	Percentage of ownership of members in the board of directors	Al Sharawi (2022)
Firm size	It is computed by taking the natural logarithm of the total assets at the end of the year.	Sharawi (2023a)
Return on Assets (ROA)	Ratio of net income to total assets	Sharawi (2022)
Liquidity	Liquidity is calculated by dividing cash and cash equivalents by total assets.	Sharawi (2023b)

Accounting fraud is a critical concern in corporate governance, often assessed using predictive models such as the Altman Z-Score, Springate Model, and Zmijewski Model. Developed by Edward I. Altman in 1968, the Altman Z-Score predicts bankruptcy based on ratios like Working Capital/Total Assets, with values below 1.1 indicating high risk. The Springate Model, introduced by Gordon L. V. Springate in 1978, also predicts bankruptcy using ratios such as Net Profit Before Taxes/Current Liabilities. The Zmijewski Model, established in 1984, assesses financial health using ratios including Return on Assets. In the context of investigating gender diversity and accounting fraud, these models incorporate gender diversity (Gender) as a primary independent variable alongside control variables such as company Size, Return on Assets (ROA), Ownership percentage, Liquidity ratios, and Board characteristics. Moreover, they include interaction terms like Gender*Ownership to explore how ownership structure moderates the relationship between gender diversity and accounting fraud. These analytical frameworks provide structured approaches to understanding the complex interplay between gender diversity, ownership dynamics, and the occurrence of accounting fraud in corporate settings. By integrating these models, researchers aim to enhance insights into the mechanisms through which gender diversity influences financial integrity and governance practices within companies.

Table 2. Research Models

The First Model
Altman Model=β0+β1 Gender +β2 Size + β3 ROA +β4 Ownership +β5 Liquidity+β6 Board+β7 Gender*Ownership
The Second Model
Springate Model=β0+β1 Gender +β2 Size + β3 ROA +β4 Ownership +β5 Liquidity+β6 Board+β7 Gender*Ownership
The Third Model
Zmijewski Model=β0+β1 Gender +β2 Size + β3 ROA +β4 Ownership +β5 Liquidity+β6 Board+β7 Gender*Ownership
β0- β7 = Regression coefficients
ε = Error term

3. RESULTS

Table (3) presents descriptive statistics for the variables analyzed in the study. The variables include three models used to assess accounting fraud: Altman, Springate, and Zmijewski. The Altman model shows a mean score of 1.013, with values ranging from 0.012 to 3.700. Similarly, the Springate model has a mean of 0.022, ranging from -0.073 to 2.230, while the Zmijewski model has a mean of 0.236, ranging from -0.238 to 2.560. Company Size, measured in billions, averages around 5.990, with a range from 0.765 to 13.250 billion. Return on Assets (ROA) averages 0.161, varying between -0.031 and 0.827. Ownership percentage of board members ranges from 34.8% to 99.8%, with an average of 60.8%. The Board variable, likely representing board diversity or structure, has a mean of 1.003, ranging from 0.270 to 2.253. Liquidity, reflected in the current ratio, averages 1.540, ranging from 0.487 to 2.900. Gender diversity on boards, represented as a dummy variable (0 for all-male and 1 for diverse boards), shows an average of 0.450, indicating that, on average, 45% of boards include female members. Standard deviations across variables illustrate variability around the means.

Table 3. Descriptive Statistics of Variables.

Variables	N	Min	Max	Mean	SD
Altman	120	0.012	3.700	1.013	0.103
Springate	120	-0.073	2.230	0.022	0.051
Zmijewski	120	-0.238	2.560	0.236	0.527
Size	120	0.765	13.250	5.990	0.764
ROA	120	-0.031	0.827	0.161	0.281
Ownership	120	0.348	0.998	0.608	0.215
Board	120	0.270	2.253	1.003	0.683
Liquidity	120	0.487	2.900	1.540	0.395
Gender	120	0.000	1.000	0.450	0.110

Table 4 displays the pairwise correlations among the study variables, indicating the strength and direction of their linear relationships. Company Size shows a positive and significant correlation with ROA (0.209) and Board (0.635), suggesting that larger companies tend to have higher returns on assets and more diverse boards. ROA is positively correlated with Liquidity (0.145) but negatively correlated with Board (-0.206) and Gender (-0.331), indicating that higher profitability is associated with better liquidity but lower board diversity and gender diversity. Ownership exhibits a negative correlation with ROA (-0.133), suggesting that higher board ownership is linked with lower returns on assets. Board is negatively correlated with Liquidity (-0.193) and Gender (-0.383), implying that more diverse boards are

associated with lower liquidity and gender diversity. Liquidity shows a positive correlation with Gender (0.202), indicating that firms with higher liquidity tend to have more gender-diverse boards. Lastly, Gender is highly negatively correlated with Size (-0.856), Board (-0.383), and Ownership (-0.013), suggesting that gender-diverse boards are less common in larger firms, those with higher board ownership, and less diverse boards. These correlations provide valuable insights into the relationships between firm characteristics, board composition, and financial performance.

Table 4. Pairwise correlations

Variables	Size	ROE	Ownership	Board	Liquidity	Gender
Size	1					
ROA	.209**	1				
	0.002					
Ownership	-0.008	-.133*	1			
	0.900	0.046				
Board	.635**	-.206**	-0.031	1		
	0.000	0.002	0.647			
Liquidity	-.269**	.145*	.179**	-.193**	1	
	0.000	0.030	0.007	0.004		
Gender	-.856**	-.331**	-0.013	-.383**	.202**	1
	0.000	0.000	0.844	0.000	0.002	

* representing $p < 0.05$ and ** representing $p < 0.01$, demonstrating the statistical significance of these correlations.

Altman Model: The Altman Model results indicate a significant relationship between most variables and accounting fraud. The constant is highly significant ($p < 0.001$), suggesting a baseline impact on the Altman score. The control variable Size is not significant ($p = 0.455$), indicating that company size does not have a notable effect in this model. However, ROA ($p < 0.001$) and Board ($p < 0.001$) are both significant, with negative t-values indicating a negative relationship with the Altman score. Liquidity also shows a significant negative relationship ($p < 0.001$). Gender diversity is significant ($p < 0.001$) with a strong negative t-value, suggesting that increased gender diversity is associated with lower Altman scores (indicative of lower risk of bankruptcy). The interaction term Gender*Ownership is positive and significant ($p < 0.001$), indicating that board ownership moderates the relationship between gender diversity and accounting fraud. The model explains 41.69% of the variance (Adj R2 = 41.69%).

Springate Model: In the Springate Model, the constant is marginally significant ($p = 0.050$). Size is highly significant with a negative t-value ($p < 0.001$), indicating that larger company size is associated with lower Springate scores. ROA is positively significant ($p < 0.001$), suggesting higher profitability increases the Springate score. Both Board ($p < 0.001$) and Liquidity ($p < 0.001$) are significant with positive t-values, indicating their positive relationships with the Springate score. Gender diversity is significant ($p = 0.025$) with a negative t-value, showing that higher gender diversity leads to lower Springate scores. The interaction term Gender*Ownership is significant with a negative t-value ($p = 0.001$), suggesting a moderating effect of board ownership on the relationship between gender diversity and accounting fraud. This model has the highest explanatory power among the three, with an adjusted R2 of 57.03%.

Zmijewski Model: The Zmijewski Model shows a highly significant constant ($p = 0.001$). Size is highly significant with a negative t-value ($p < 0.001$), indicating a negative relationship with the Zmijewski score. ROA ($p < 0.001$), Board ($p < 0.001$), and Liquidity ($p < 0.001$) are all significant with positive t-values, indicating positive relationships with the Zmijewski score. Gender diversity is highly significant with a negative t-value ($p < 0.001$), indicating that higher gender diversity is associated with lower Zmijewski scores. The interaction term Gender*Ownership is significant with a negative t-value ($p < 0.001$), suggesting that board ownership negatively moderates the relationship between gender diversity and accounting fraud. The model explains 52.69% of the variance (Adj R2 = 52.69%).
Overall, these results highlight the complex interplay between gender diversity, board ownership, and accounting fraud, with each model showing significant effects of these variables and their interactions on financial distress indicators.

Table 5. Moderating effects of Board ownership

Variables	Altman Model		Springate Model		Zmijewski Model	
	t test	P-value	t test	P-value	t test	P-value
(Constant)	29.617	0.000	-1.785	0.050	3.878	0.001
Control Variables						
Size	0.451	0.455	-4.304	0.000	-5.657	0.000
ROA	-3.643	0.000	16.233	0.000	9.120	0.000
Ownership	1.617	0.087	1.327	0.218	-0.930	0.543
Board	-9.322	0.000	-7.507	0.000	5.430	0.000
Liquidity	-9.554	0.000	8.218	0.000	10.240	0.000
Independent variable						

Gender diversity	-14.027	0.000	-2.707	0.025	-25.547	0.000
Moderating Variable						
Gender*Ownership	4.567	0.000	-5.455	0.001	-9.342	0.000
F. statistic	40.73		315.518		230.68	
Adj R2	**41.69%**		**57.03%**		**52.69%**	

* representing $p < 0.05$ and ** representing $p < 0.01$, demonstrating the statistical significance of these correlations.

Based on the results from the Altman, Springate, and Zmijewski Models, we can test the two hypotheses:

1. **First Hypothesis**: "There is a statistically significant positive impact of gender diversity on fraud detection in Saudi companies."
   - **Altman Model**: The t-value for gender diversity is -14.027 ($p < 0.001$), indicating a significant negative impact. Therefore, we reject the hypothesis.
   - **Springate Model**: The t-value for gender diversity is -2.707 ($p = 0.025$), also indicating a significant negative impact. Thus, we reject the hypothesis.
   - **Zmijewski Model**: The t-value for gender diversity is -25.547 ($p < 0.001$), showing a strong significant negative impact. Consequently, we reject the hypothesis.
2. **Second Hypothesis**: "There is a statistically significant positive effect of gender diversity on fraud detection in Saudi companies through the moderating role of board ownership."
   - **Altman Model**: The interaction term Gender*Ownership has a t-value of 4.567 ($p < 0.001$), indicating a significant positive moderating effect. Thus, we accept the hypothesis.
   - **Springate Model**: The interaction term Gender*Ownership has a t-value of -5.455 ($p = 0.001$), indicating a significant negative moderating effect. Hence, we reject the hypothesis.
   - **Zmijewski Model**: The interaction term Gender*Ownership has a t-value of -9.342 ($p < 0.001$), showing a significant negative moderating effect. Therefore, we reject the hypothesis.

The first hypothesis is rejected in all models due to the significant negative impact of gender diversity on fraud detection, while the second hypothesis is only accepted in the Altman Model where board ownership positively moderates the relationship, but it is rejected in the Springate and Zmijewski Models due to a negative moderating effect

The study reveals that gender diversity does not necessarily enhance corporate governance in non-financial companies in Saudi Arabia. The study rejects the first hypothesis, suggesting that inclusion of women on boards does not necessarily lead to better fraud detection. This could be due to cultural and structural factors specific to the Saudi corporate landscape. The negative impact of gender diversity could be attributed to a potential mismatch between theoretical benefits and practical realities. The study also suggests that board ownership can moderate the relationship between gender diversity and fraud detection. The Altman Model supports this, suggesting that board members with significant ownership stakes are more likely to leverage gender diversity to enhance fraud detection. However, the negative moderating effects in the Springate and Zmijewski Models indicate that this positive influence is not consistent across all conditions. The study also suggests that a more tailored approach to improving corporate governance is needed. Companies must ensure that diverse members are effectively integrated and that ownership structures align the interests of board members with those of the company. This suggests that policymakers and corporate leaders in Saudi Arabia need to consider broader strategies that include cultural change, structural adjustments, and supportive governance practices to harness the full potential of gender diversity in enhancing fraud detection and overall corporate governance.

4- DISCUSSION

The results of the current study present a nuanced perspective on the impact of gender diversity and board ownership on fraud detection in non-financial companies in Saudi Arabia. Contrary to previous research, which predominantly highlights the positive influence of gender diversity on corporate governance and fraud prevention, our findings indicate a significant negative impact of gender diversity on fraud detection across all three models (Altman, Springate, and Zmijewski). This divergence might stem from contextual differences, such as cultural and regulatory environments unique to Saudi Arabia. Similar studies, like those by Wahid (2019) and Githaiga (2023), emphasize the role of gender diversity in enhancing transparency and reducing fraud; however, our results challenge this view, suggesting that gender diversity alone may not suffice in improving fraud detection in this specific context. Furthermore, the moderating role of board ownership provides an additional layer of complexity. While our study finds a positive moderating effect of board ownership in the Altman Model, supporting the notion that ownership can enhance the beneficial effects of gender diversity on fraud detection, this effect is negative in the Springate and Zmijewski Models. This inconsistency aligns with Soboleva et al. (2024), who noted varied impacts of board characteristics on fraud probability. It indicates that the relationship between gender diversity, board ownership, and fraud detection is highly context-dependent and influenced by specific corporate governance frameworks. In comparison to earlier studies, our research underscores the importance of considering the interplay between various corporate governance elements rather than isolating gender diversity as a singular factor. The negative findings related to gender diversity might also reflect the nascent stage of integrating gender diversity into corporate boards in Saudi Arabia, where traditional norms and practices could dilute its potential impact. Moving forward, it is crucial for future research to delve deeper into understanding the

mechanisms through which board ownership moderates the relationship between gender diversity and fraud detection in different national and organizational contexts. Additionally, exploring alternative measures and strategies to enhance the effectiveness of gender diversity in improving corporate governance and fraud prevention remains a promising avenue for future investigation. By addressing these gaps, future studies can contribute to developing more comprehensive frameworks for corporate governance practices tailored to diverse global business environments.

CONCLUSION

The current study aimed to investigate the impact of gender diversity and board ownership on fraud detection within non-financial companies in Saudi Arabia, utilizing the Altman, Springate, and Zmijewski models for analysis. The findings reveal a significant negative relationship between gender diversity and fraud detection across all three models, contrasting with prevailing literature that often highlights a positive association. This discrepancy underscores the contextual complexities inherent in corporate governance dynamics specific to Saudi Arabia, influenced by cultural norms and regulatory frameworks. Moreover, while board ownership demonstrates a positive moderating effect in the Altman Model, indicating its potential to enhance the beneficial impact of gender diversity on fraud detection, this effect is reversed in the Springate and Zmijewski Models. These variations underscore the intricate nature of governance structures and their differential impacts on fraud prevention strategies. Therefore, the study suggests that efforts to improve corporate governance and mitigate fraud should consider not only gender diversity but also the nuanced interplay with board ownership and other governance factors. Future research should further explore these dynamics across diverse contexts to refine governance practices and enhance organizational resilience against fraudulent activities.

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