

Investigating the effect of the presence of females in management positions of companies on reducing fraudulent financial reporting: Evidence from Iran

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Abstract

Financial reporting is an important source of information and tools for making decisions by managers, investors, and other participants in the capital market. Thus, it is necessary to pay attention to the executive and influential factors in the accuracy, correctness, and trustworthiness of accounting information systems. The high rate of financial frauds and related failures has reduced public trust in capital markets. Also, in recent years, females' participation in economic activities and their presence in senior management positions have increased significantly. In this study, the data of 174 companies listed on the stock exchange were used. To analyze the data, logistic regression was used due to the duality of the dependent variable (likelihood of fraudulent financial reporting). Results suggest that the presence of a female member in the board and the audit committee has a negative and significant effect on fraudulent financial reporting of companies.

Keywords: Gender Diversity, Audit Committee, Fraudulent Reporting, Financial Abuse, Female Financial Officer.

Introduction

Financial statements are the most important sources of information for users and shareholders of companies (Aktaş et al., 2013). Investors reconsider their analysis and make decisions by obtaining information through financial statements. Thus, trust in accuracy of information is a key element in capital markets (Tashdidi et al., 2019). Fraud and fraudulent financial reporting is a deliberate distortion in financial statements that misleads users (Awang et al., 2017). Also, fraudulent financial reporting is a mechanism used by managers to deceive shareholders by showing the good result of the company and not the real result that may be worse (Beasley et al., 2000). Also, fraudulent financial reporting can include errors and mistakes in financial statements (Kamarudin et al., 2018).

Research has shown that there is a gender difference in moral sensitivity and risk aversion. Women have more moral sensitivities and are less risk-averse than men (Cumming et al., 2015).

In addition, research has shown that gender diversity in the board of directors, their supervisory committees, and chief financial officers is effective in reducing the likelihood of financial statement fraud (Cumming et al., 2015) (Wahid, 2019) (Kamarudin et al., 2018) (Marzuki et al., 2019) (Liao et al., 2019). The present study

aims to answer the following main questions: Does the presence of at least one female representative in the board or audit committee and a female chief financial officer reduce the likelihood of fraudulent financial reporting? It is also examined to know whether the presence of females in corporate governance has a significant effect on reducing fraudulent financial reporting. It is expected that the presence of females in the management of companies to have a direct and significant effect on reducing fraudulent reporting. The results of present study can provide a new perspective on females' membership in the management of companies. Then, the theoretical and experimental fundamentals of the research, research hypotheses, and methodology and research results are presented.

Theoretical and experimental foundations of research

Fraudulent financial reporting and conditions to its occurrence in companies

Fraud is an illegal act that is intentionally done for a specific purpose or to give false reports to other related groups (Achmad & Pamungkas, 2018). In this case, the other party is directly or indirectly harmed.

Fraud is defined as misconduct done by an employee leading to the employee's personal gain at the expense of the employer (Kieso et al., 2019). Professional frauds are classified into three categories: financial corruption, misuse of assets, and fraud in financial statements. Fraud in financial statements is the most harmful type of fraud in organizations and companies (Tashdidi et al., 2019). That is why the financial manager is so important in companies. The Chief Financial Officer (CFO) has the task of reviewing and approving the reporting decisions of other CFOs and is the depository of the financial reports, thus having a significant impact on the company's financial performance (Feng et al., 2011) (Suh et al., 2020).

The main goal of financial reporting according to the theoretical framework of accounting is to provide information that will be useful in the decision-making process to users of financial statements to make useful decisions. Transparent and comparable financial information is one of the main elements of accountability of executive managers and one of the basic needs of economic decision-making. If these criteria are met in all financial information, users can confidently use financial statements (Yendrawati et al., 2019), but frauds in these reports in recent decades have caused doubt among investors (Martins & Júnior, 2020). Unfortunately, the results of studies indicate that financial report manipulation has increased from one year to another year (Achmad & Pamungkas, 2018). Some companies manipulate the financial statements provided to users to make the company look good to attract investors to invest in the company. It means that the company does not describe the real situation and commits fraudulent financial reporting (Nanda et al., 2019).

It should be noticed that there are two types of distortions in financial statements: 1- Error and 2- Fraud.

Error (unintentionally) is a mistake in financial statements that occurs naturally and accidentally, while fraud is an intentional mistake in financial statements (Maulidiana & Triandi, 2020).

There are several methods for fraudulent financial reporting.

One method is to change accounting practices, change management estimates, and misidentify revenues and expenses (Spathis, 2002). Also, misidentification of revenues and over-presentation of assets are the most common methods of fraud (Beasley et al., 2000). Also, the companies involved in fraudulent activities have a high level of profit management (Hasnan et al., 2013).

Also some studies indicate that companies commit fraudulent financial reporting by manipulating production costs (Hasnan Rashidah Abdul Rahman & Mahenthiran, 2014) (Marzuki et al., 2019). Weak corporate governance is one of the factors in fraudulent activities in companies (Hasnan Rashidah Abdul Rahman & Mahenthiran, 2014). As a result, more attention is paid to the issue of fraudulent financial reporting, as the most harmful type of fraud in organizations and companies has great importance. Also, fraudsters act very innovatively, smartly, and fast nowadays, and despite strict rules, financial statement fraud is increasing (Sadgali et al., 2019).

The importance of the presence of females in the management positions of companies

In the last decade, researchers, investors, policymakers, and even governments have paid special attention to the role of females and their influence in organizations and companies (Mensi-Klarbach, 2014). Studies have also shown the widespread presence of females in social and economic activities around the world (Rose, 2007), as a result of the enactment of rules and regulations regarding the employment of females in various areas (Campbell & Mínguez-Vera, 2008) (Adams & Ferreira, 2009); (Gull et al., 2018). In this regard, proponents of the presence of females in the social arena also argue that the existence of gender diversity promotes performance and creativity in groups (Wullum Nielsen & Börjeson, 2019).

Along with changes in females' participation in the world, the number of females in senior management positions has increased significantly in recent years (Khlif & Achek, 2017). Results of studies conducted in this area in recent years also indicate the active presence of females in the board, committees, and management positions and their vital role in the management of the company (Daily et al., 2000). The increasing presence of females in the management positions of organizations has attracted the attention of researchers in the relationship between male and female managers and different behaviors of the organization (Gupta et al., 2020). Previous studies have shown that there are fundamental differences in the way males and females think and act (Eagly & Carli, 2003), so that the outcomes of the company vary depending on the gender of the decision-maker (Faccio et al., 2016).

When females are a member of boards and subcommittees, their performance leads to better results (Boulouta, 2013). For example, gender diversity in the management positions of companies can play a major role in improving the transparency of companies' performance (Khlif & Achek, 2017). Also, the presence of females in the board and its committees is effective in decision-making due to differences and multiplicity of opinions and creation of creativity (Isidro & Sobral, 2015).

Female managers usually exhibit gender-specific characteristics such as lack of self-confidence and generosity and conservatism (Zhou et al., 2018) (Adams et al., 2015). Gender diversity of audit committees may also increase management's ability to identify the diverse interests of stakeholders (Harjoto et al., 2015). Also, females are less aggressive than males and are more conservative financially and responsible morally

compared to males (Siboni et al., 2016). The presence of females in the management of companies is also debatable from two social and economic perspectives. Socially, females have the same equal opportunity as males in management positions, and economically, the organization should seek to select the most competent people for positions, regardless of gender. Gender discrimination will prevent the organization from making good use of human resources. Also, the presence of females increases accountability and improves the relationship between the board and shareholders (Marzuki et al., 2019).

In general, based on previous studies, the presence of females in the management positions of companies increases creativity and effectiveness of decisions (Smith et al., 2006), improves company financial results (Croson & Gneezy, 2009), increases company productivity and profitability (Kamarudin et al., 2018), reducing profit manipulation (Peni & Vähämaa, 2010), increasing the relationship between board and shareholders (Marzuki et al., 2019), increases accounting conservatism (B. Francis et al., 2015), improves performance and creativity (Wullum Nielsen & Börjeson, 2019), improves profit quality (Khlif & Achek, 2017), reduces management opportunism (Tirvadi and Huang, 2011: 485), and improves company governance mechanisms (Bernardi et al., 2002). However, prejudgments against females still affect minds. The mentality of others is often influenced by the idea that females are more problematic because of conditions such as maternity leave and family responsibilities. Hiring females means more costs because companies need to provide more infrastructure and more flexible work policies to support females' working conditions (Marzuki et al., 2019).

The effect of the presence of females in preventing fraudulent behavior of companies

Most of the cases studied suggest that chief executive officers (CEOs), board members, and CFOs play a greater role in fraud because managers are more aware of their business than others. Also, the risk of business failure and financial crises in recent years has increased the risk of financial statement manipulation (Krishnan & Wang, 2015). Board and its subsidiaries (management positions) are backbones of the company. For this reason, one of the factors that may play a role in financial fraud is the characteristics of the management positions of companies (Kamarudin et al., 2018). These characteristics have been examined to find out how they relate to company performance (Karamanou, & Vafeas, 2005) or fraudulent activities (Uzun et al., 2004).

One of these characteristics that can affect financial fraud is the gender diversity of the board (Kamarudin et al., 2018), the presence of a female representative in the audit committees (Marzuki et al., 2019), and the gender of the chief financial officers (Liao et al., 2019). In this regard, some studies have indicated that gender differences in morality and risk-taking as well as other psychological, social, and biological characteristics such as idealism (Kennedy et al., 2017) or a sense of competition (Swab & Johnson, 2019), affect the willingness of males and females to participate in financial behavior (Gupta et al., 2020). Thus, due to the increasing presence of females in the management of organizations (Adams, 2016), studying and understanding how gender affects company financial reporting can be helpful for researchers, policymakers, regulators, and investors (Gupta et al., 2020).

Female managers on the board of companies can be more trustworthy than male managers, so it is less likely to manipulate company financial statements and other important information disclosures. Also, gender diversity in audit committees and the presence of female senior chief financial officers are effective in reducing potential abuses (García-Sánchez et al., 2019). Females show less opportunistic behaviors when making organizational decisions and less concerned with personal interests (Krishnan & Parsons, 2008). Also, they are more risk-averse than males (Barber & Odean, 2001). Females are more cautious than males in various decision-making areas and are less likely take risks, especially in financial decision-making situations (Gull et al., 2018). These studies suggest that a person who is risk-averse is less likely to commit fraud (Lenard et al., 2017).

Studies have shown that the presence of females in the boards, audit committees, or as senior managers of organizations and chief financial officers leads to more conservative reporting, and as a result the quality of reporting in companies with female managers is reduced compared to companies with male managers and financial misuse decreases (Khlif & Achek, 2017). For example, the presence of females in corporate governance reduces fraudulent financial reporting (Cumming et al., 2015). Also, there is less sensitivity to fraud in companies that use females in various company jobs.

Accounting conservatism has also increased in companies that have employed women as CEOs, and due to the risk aversion and ethical sensitivity of females in key accounting issues, strong opposition to fraudulent financial reporting was observed (Ho et al., 2015).

Also, in examining the impact of the presence of female managers on the number of legal claims of companies due to fraud in financial statements, it has been found that there is a negative and significant effect between the presence of women in corporate governance and the number of company lawsuits (Adhikari et al., 2016). Studies have shown that female managers increased the quality of financial statements and reduced financial fraud in the companies under their leadership due to more supervision of the accounting process compared to their male counterparts (García Lara et al., 2017). Companies with gender diversity make fewer mistakes in financial reporting and the rate of fraud is significantly lower than companies without gender diversity (Wahid, 2019). Also the most of the fraud in the financial statements has occurred in companies which boards did not use females (Kamarudin et al., 2018). It has also been shown that the presence of at least one female representative on the board of directors and the audit committee has a negative effect on the tendency to commit fraud in financial statements (Marzuki et al., 2019). There is a negative relationship between gender diversity in the board of directors and female CFO in companies and fraud in financial statements and the companies that have used women as CFOs as well as on the board are significantly less likely to be involved in financial statement fraud (Liao et al., 2019).

Also Companies with a female CFO are less likely to commit serious frauds than their male CFO counterparts (Luo et al., 2020).

Research hypotheses

Based on theoretical and empirical foundations of the study and with emphasis on

gender theory, it is expected that gender diversity in the management positions of companies such as board, audit committee and chief financial officer to reduce the occurrence of fraudulent financial reporting by using various opinions. Hence, the present study was conducted to investigate the effect of gender diversity on reducing fraudulent financial reporting in companies listed on the Tehran Stock Exchange. Accordingly, the research hypotheses are formulated as follows:

- 1- The presence of a female member in the board reduces fraudulent financial reporting in companies.
- 2- The presence of a female member in the audit committee reduces fraudulent financial reporting in companies.
- 3- Female chief financial officer reduces fraudulent reporting in companies.

Research methodology

To test the research hypotheses, logistic regression analysis with panel data and Eviews10 software were used. For this purpose, the required data were collected from companies listed in the Tehran Stock Exchange based on the systematic elimination sampling method:

- A) Listed on the Tehran Stock Exchange before 2013
- B) Formed the audit committee in accordance with the charter of the audit committee of the Exchange Organization (2012)
- C) The financial year of the companies did not change during the research period
- D) The company has not changed its activities during the study period;
- E) They should not be a part of financial services, insurance, investment companies, banks, leasing and holding companies.

Also, the study period was between 2015 and 2019. Accordingly, 174 companies with 870 firm-year observations were selected as sample companies for the study.

Test models of research hypotheses according to the model of Liao (Liao et al., 2019) (Marzuki et al., 2019)(Kamarudin et al., 2018)(Wang et al., 2017) are estimated as follows:

FRAUD = Model (1):

$$\beta_0 + \beta_1B_GD + \beta_2ROA + \beta_3SIZE + \beta_4LEV + \beta_5ROE + \beta_6MB + \beta_7LSHARE + \beta_8INST + \beta_9B_INDEP + \beta_{10}AGE + \beta_{11}BIG + \beta_{12}AC_SIZE + \beta_{13}AC_INDEP + \beta_{14}AC_EXPERT + \beta_{15}SEASON$$

FRAUD = Model (2):

$$\beta_0 + \beta_1AC_GD + \beta_2ROA + \beta_3SIZE + \beta_4LEV + \beta_5ROE + \beta_6MB + \beta_7LSHARE + \beta_8INST + \beta_9B_INDEP + \beta_{10}AGE + \beta_{11}BIG + \beta_{12}AC_SIZE + \beta_{13}AC_INDEP + \beta_{14}AC_EXPERT + \beta_{15}SEASON$$

FRAUD = Model (3):

$$\beta_0 + \beta_1FEMALE_CFO + \beta_2ROA + \beta_3SIZE + \beta_4LEV + \beta_5ROE + \beta_6MB + \beta_7LSHARE + \beta_8INST + \beta_9B_INDEP + \beta_{10}AGE + \beta_{11}BIG + \beta_{12}AC_SIZE + \beta_{13}AC_INDEP + \beta_{14}AC_EXPASON + 15$$

Research variables

Hypotheses are tested based on the probabilistic relationship between the variables. The variables used in the research and the way of measuring them are described.

5.1. Dependent variable

In the present study, fraudulent financial reporting was measured and calculated according to Equation 1, following Razali and Arshad (Razali & Arshad, 2014) and using the modified model of profit manipulation (Beneish, 1999) and then localized. Equation (1):

$$Adj-Mscore=0.002+0.665(TATA)+0.257(LVGI)+0.024(SGAI)-0.641(DEPI)+0.19(SGI)+0.004(AQI)-0.032(GMI)+0.061(DSRI)$$

In this equation, Adj-Mscore, based on Beneish model (Beneish, 1999) is the score of profit manipulation. In Equation 1, the operational definition of each variable is as follows:

DSRI: index of sales in accounts receivable measured by Equation 2. In this regard, REC is accounts receivable and SALES is sales.

Equation (2):

$$DSRI = \frac{REC_t/SALES_t}{REC_{t-1}/SALES_{t-1}}$$

GMI: Gross margin index measured through Equation 3. In this regard, SALES annual sales and COG are the cost of goods sold.

Equation (3):

$$GMI = \frac{[SALES_{t-1} - COG_{t-1}]/SALES_{t-1}}{[SALES_t - COG_t]/SALES_t}$$

AQI: Asset quality index measured through Equation 4. In this equation, CA is the sum of current assets, PPE of properties, plants, and equipment, and ASSETS the sum of assets.

Equation (4):

$$AQI = \frac{1 - [(CA_t + PPE_t)/ASSETS_t]}{1 - [(CA_{t-1} + PPE_{t-1})/ASSETS_{t-1}]}$$

SGI: Sales growth index measured through Equation 5.

Equation (5):

$$SGI = \frac{SALES_t}{SALES_{t-1}}$$

DEPI: Depreciation cost index measured by Equation 6. In this regard, DEP is the

cost of depreciation of tangible fixed assets and PPE is gross properties, plants and equipment.

Equation (6):

$$DEPI = \frac{DEP_{t-1}/PPE_{t-1}}{DEP_t/PPE_t}$$

SGAI: sales, general, and administrative expenditures index measured by Equation 7. In this equation, SGA.EXP is the sales, general, and administrative expenditures and SALES are annual sales.

Equation (7):

$$SGAI = \frac{SGA.EXP_t/SALES_t}{SGA.EXP_{t-1}/SALES_{t-1}}$$

TATA: Index of total accruals to total assets measured using Equation 8. In this regard, ACC is accruals (the difference between operating profit and operating cash flow) and ASSETS is the sum of assets.

Equation (8):

$$TATA = \frac{ACC_t}{ASSETS_t}$$

LVGI: Financial leverage index measured through Equation 9. In this regard, LTD is the sum of long-term liabilities, CL is the sum of current liabilities and ASSETS is the sum of assets.

Equation (9):

$$LVGI = \frac{(LTD_t + CL_t)/ASSETS_t}{(LTD_{t-1} + CL_{t-1})/ASSETS_{t-1}}$$

Finally, according to (Razali & Arshad, 2014), companies are divided into two groups to determine the status of companies in the statistical population of the research in terms of fraudulent financial reporting.

1-Companies that their Adj-M-Score value is less or equal to 0.5 will indicate that the company financial statements have not been manipulated and it is assumed that they do not have fraudulent financial reporting and will receive the value of 0.

2-Companies that their Adj-M-Score value is more than 0.5 will indicate that the company financial statements have been manipulated and it is assumed that they have fraudulent financial reporting and will receive the value of 1.

Independent variables

Independent variables of this study include gender diversity (presence of at least one female member) in the board, gender diversity (presence of at least one female member) in the audit committee, and female chief financial officer. The independent

variables are measured in this way:

A) Gender diversity of board (B_GD): It is a two-dimensional variable and if there is at least one female member in the board, it will be 1, otherwise, it will be zero (Kamarudin et al., 2018).

B) Gender diversity of the audit committee (AC_GD): It is a two-dimensional variable and if there is at least one female member in the audit committee, it will be 1; otherwise, it will be zero (Appuhami & Tashakor, 2017).

C) Female chief financial officer (*FEMALE_CFO*): It is a two-dimensional variable that will be 1 if there is a female chief financial officer; otherwise, it will be zero (Liao et al., 2019).

Control variables

In the present study, 14 control variables were selected as follows and used in regression analysis:

Return on assets (ROA), Company Size (SIZE), Financial Leverage (LEV), Return on equity (ROE), The ratio of market value to book value of stocks (MB), Percentage of ownership of the largest shareholder (LSHARE), Percentage of ownership of institutional owners (INST), Board independence (B_INDEP), Company age (AGE), Audit firm size (BIG), Audit committee size (AC_SIZE), Audit Committee independence (AC_INDEP), Audit committee members financial expertise (AC_EXPERT), Control of the effect of end of fiscal year (SEASON).

Research results

Descriptive results

In 870 observations of this study, the mean and median of return on assets were 0.0913 and 0.0768, respectively, indicating a slight Skewness of this variable. Also, the maximum and minimum values of this variable were 0.3401 and -0.1459. The lowest negative sign means that companies have experienced losses in some observations. The mean of company size is 14.4652. This variable is obtained from the natural logarithm of the company total assets. The maximum value of the financial leverage variable is 0.9967 and the lowest value is 0.2139. The average variable of financial leverage is equal to 0.5836.

Mean and median of return on equity respectively are 0.2334 and 0.2086. Since the mean value of a variable is closer to median, the distribution of that variable is closer to the normal distribution, so according to the results obtained, the distribution of this variable is normal. The mean of ratio of market value to book value of stocks is 2.3462. Also, mean percentage of ownership of the largest shareholder is approximately 66%, the maximum percentage of ownership is 92% and the minimum percentage of ownership is 45%. The maximum percentage of ownership of institutional owners is 48% and the minimum is zero, indicating that there is no institutional ownership in some companies. The maximum value of the variable of audit committee independence board independence is 1, which indicates that in some companies, all members of the audit committee and the board are independent.

The mean age of companies, obtained from the natural logarithm of the number of years of activity of the company in the stock exchange, is equal to 3.1401 and its

maximum value is 3.9890 and its minimum is 2.3979. The maximum and minimum value of audit committee size variable is 5 and 3, respectively. On average, more than 92.86% of the members of the audit committee had financial expertise. The maximum value of the audit committee financial expertise is 1, which indicates that in some companies, all members of the audit committee have financial expertise. Also, one of the dispersion parameters is the standard deviation of the variable, which shows the dispersion of the data. According to the values obtained for this statistic, it can be seen that the variables of market value to book value of stocks with a value of 1.6238 and company size with a value of 1.2376 have more dispersion around the mean than other variables.

Table 2 also shows the descriptive statistics of qualitative variables (two-dimensional variables with two values of zero and one). In short, in 163 observations, the likelihood of fraudulent financial reporting was seen (18.74%), in 164 observations, female member in board (18.85%) was seen, in 135 observations, female representative in the audit committee (15.52%) was seen, in 79 observations, female chief financial officer was seen (9.08%). Descriptive statistics of quantitative and qualitative variables of the research are presented in Tables 1 and 2.

Variable	Symbol	Mean	Median	Max	Min	SD	Number of observations
Return on assets	ROA	0.0912	0.768	0.3401	-0.1459	0.1213	870
Company size	SIZE	14.4652	14.3830	17.2988	12.2945	1.2376	870
Financial Leverage	LEV	0.5847	0.5863	1.0126	0.2139	0.2121	870
Return on equity	ROE	0.2334	0.2086	0.6640	-0.2166	0.2331	870
The ratio of market value to the book value of stocks	MB	2.3398	1.9874	6.3622	-0.0613	1.6329	870
Percentage of ownership of the largest shareholder	LSHARE	0.6625	0.6512	0.9233	0.4548	0.1435	870
Percentage of ownership of institutional owners	INST	0.0573	0.0000	0.4849	0.0000	0.1248	870
Board independence	B_INDEP	0.6646	0.6000	0.1000	0.0000	0.2050	870
Company age	AGE	3.1401	3.0445	3.9890	2.3979	0.4998	870
audit committee size	AC_SIZE	3.3103	3.0000	6.0000	3.0000	0.8782	870
Audit Committee independence	AC_INDEP	0.7010	0.6667	0.1000	0.0000	0.1707	870
Financial expertise of members of audit committee	AC_EXPERT	0.9286	1.0000	1.0000	0.6000	0.1369	870

Table 1: Descriptive statistics of research quantitative variables

Variable	Symbol	Existence		Non-existence		Total	
		N	%	N	%	N	%
Fraudulent financial reporting	FRAUD	163	18.74	707	81.26	870	100
Gender diversity in board	B_GD	164	18.85	706	81.15	870	100

Gender diversity in audit committee	AC_GD	135	15.52	735	84.48	870	100
Female chief financial officer	FEMALE_CFO	79	9.08	791	90.92	870	100
Type of auditing firm	BIG	171	19.66	699	80.34	870	100

Table 2: Descriptive statistics of qualitative variables of study

Inferential results

Testing stationarity of research variables

In the present study, Hadri (Hadri, 2000) test was used to investigate the significance of the variables. In this test, the null hypothesis is based on non-stationary and the opposite hypothesis is stationary. The results of this test are presented in Table 3. Since the likelihood related to the statistics of this test is significant at the level of 5% error, the null hypothesis is rejected and the opposite hypothesis (significance of all research variables) is confirmed.

Variable	Symbol	statistic Z	Significance level
Fraudulent financial reporting	FRAUD	10.3861	0.0010
Gender diversity in the board	B_GD	7.6430	0.0021
Gender diversity in the audit committee	AC_GD	8.9405	0.0052
Female chief financial officer	FEMALE_CFO	9.6227	0.0068
Return on assets	ROA	18.1608	0.0081
Company size	SIZE	24.1725	0.0092
Financial Leverage	LEV	17.6134	0.0000
Return on equity	ROE	20.7201	0.0000
The ratio of market value to the book value of stocks	MB	19.6768	0.0054
Percentage of ownership of the largest shareholder	LSHARE	18.6044	0.0000
Percentage of ownership of institutional owners	INST	12.3228	0.0029
Board independence	B_INDEP	19.0062	0.0021
Company age	AGE	27.8523	0.0000
audit committee size	AC_SIZE	21.0344	0.0000
Audit committee independence	AC_INDEP	6.6266	0.0036
Financial expertise of members of the audit committee	AC_EXPERT	6.8466	0.0000
Type of auditing firm	BIG	5.8969	0.0086

Table 3: Results of stationary test of research variables

Testing research hypotheses

The effect of presence of females in board on fraudulent financial reporting

To investigate the effect of presence of females in the board on fraudulent financial reporting of the company, model (1) has been estimated, the results of which are presented in Table 4.

$$FRAUD = \beta_0 + \beta_1 B_GD + \beta_2 ROA + \beta_3 SIZE + \beta_4 LEV + \beta_5 ROE + \beta_6 MB + \beta_7 LSHARE + \beta_8 INST + \beta_9 B_INDEP + \beta_{10} AGE + \beta_{11} BIG + \beta_{12} AC_SIZE + \beta_{13} AC_INDEP + \beta_{14} AC_EXPERT + \beta_{15} SEASON + \varepsilon$$

Variable	Symbol	Coefficient	Statistic Z	Significance level
Gender diversity in the board	B_GD	-0.8346	-2.9466	0.0032
Return on assets	ROA	1.2867	0.7188	0.4723
Company size	SIZE	0.3420	3.4397	0.0006
Financial Leverage	LEV	1.9681	2.3917	0.0168
Return on equity	ROE	-0.6083	-0.9974	0.3186
ratio of market value to the book value of stocks	MB	0.0048	0.0789	0.9371
Percentage of ownership of the largest shareholder	LSHARE	-0.1676	-0.2549	0.7988
Percentage of ownership of institutional owners	INST	-0.7599	-0.9029	0.3666
Board independence	B_INDEP	0.3167	0.7120	0.4764
Company age	AGE	0.7108	3.9717	0.0001
audit committee size	AC_SIZE	0.2437	1.9632	0.0496
Audit committee independence	AC_INDEP	-1.5580	-2.6689	0.0076
Financial expertise of the members of the audit committee	AC_EXPERT	0.5227	0.5585	0.5765
Type of auditing firm	BIG	-0.6345	-2.4038	0.0162
Constant	C	-9.9311	-5.0214	0.0000
McFadden's coefficient of determination	0.2713	LR	68.2059	Probability of LR statistics
				0.0000

Table 4: The effect of presence of females in boards on fraudulent financial reporting

In logistic regression, LR statistic is used to evaluate the significance of the whole model. According to the information in Table 4, the likelihood value of LR statistic is 0.0000 which is less than the accepted error level (0.05), indicating that not all regression coefficients are zero simultaneously and the whole model is significant at 95% confidence level. The value of McFadden's coefficient of determination is equal to 0.1733. This coefficient shows that about 16% of the changes in the dependent variable of the research are explained by explanatory variables. The aim of this hypothesis is to examine the effect of the presence of a female member in the board in companies on fraudulent financial reporting. Therefore, the estimated coefficient and likelihood of the Z statistic of the gender diversity variable are considered in the board. According to the results of Table 4, the estimated value of the coefficient related to the gender diversity variable in the board is -0.8346. The negative sign of this number means that there is an inverse relationship between the dependent variable (fraudulent financial reporting) and the independent variable (gender diversity of board). Also, the value of this coefficient indicates the intensity of the effect of gender diversity on the board in reducing the likelihood of fraudulent financial reporting. Also, the likelihood of Z statistic related to it is 0.0032. Therefore, since its value is less than 0.05, it indicates a significant relationship between the independent and dependent variables, and as a result, the H0 is rejected and H1 is confirmed.

In other words, the results suggest a significant inverse relationship between gender diversity on board and the likelihood of fraudulent financial reporting. It means that the presence of a female member on board reduces the likelihood of fraudulent financial reporting. This result confirms the first hypothesis of the research. Results of

the first hypothesis of the research on the relationship between dependent variable and control variables show that there is a direct and significant relationship between the likelihood of fraudulent financial reporting and variables of company size, financial leverage, company age, and size of the audit committee. The variables of audit committee independence and type of auditing firm are inversely and significantly related.

The effect of presence of females in the audit committee on fraudulent financial reporting

To investigate the effect of presence of females in the audit committee on fraudulent financial reporting of the company, model (2) was estimated, the results of which are presented in Table 5.

Variable	Symbol	Coefficient	The standard deviation	statistic Z	Significance level
Gender diversity in the audit committee	AC_GD	-0.8003	0.3247	-2.4644	0.0137
Return on assets	ROA	0.7665	1.8407	0.4218	0.6731
Company size	SIZE	0.3331	0.0978	3.4059	0.0007
Financial Leverage	LEV	1.7333	0.8298	2.0889	0.0367
Return on equity	ROE	-0.5960	0.6332	-0.9413	0.3466
The ratio of market value to book value of stocks	MB	0.0103	0.0624	0.1644	0.8694
Percentage of ownership of the largest shareholder	LSHARE	-0.1128	0.6669	-0.1691	0.8657
Percentage of ownership of institutional owners	INST	-0.8255	0.8428	-0.9795	0.3273
Board independence	B_INDEP	0.2524	0.4500	0.5608	0.5749
Company age	AGE	0.7605	0.1767	4.3036	0.0000
audit committee size	AC_SIZE	0.2882	0.1207	2.3877	0.0172
Audit Committee independence	AC_INDEP	-1.5571	0.5503	-2.8298	0.0047
Financial expertise of the members of the audit committee	AC_EXPERT	0.4667	0.9121	0.5117	0.6088
Type of auditing firm	BIG	-0.7217	0.2622	-2.7527	0.0059
Constant	C	-9.8830	1.9744	-5.0056	0.0000
McFadden's coefficient of determination	0.2192	LR	66.5094	Probability of LR statistics	0.0000

Table 5: The effect of presence of females in audit committee of companies on fraudulent financial reporting

Based on data in Table 5, the likelihood of LR statistic is 0.0000, which is less than the accepted error level (0.05) and indicates that all regression coefficients are not zero simultaneously and the whole model is significant at 95% confidence level. The value of McFadden's coefficient of determination is equal to 0.2192. This coefficient shows that about 22% of the changes in the dependent variable of research are explained by independent and control variables. The aim of this hypothesis is to investigate the effect of the presence of a female member in the audit committee of companies on fraudulent financial reporting. Therefore, the estimated coefficient and likelihood of the Z statistic of gender diversity are examined in the audit committee. Based on the results of Table 5, the estimated value of the coefficient related to the gender diversity variable in the audit committee is -0.8003. The negative sign of this number means that there is an inverse relationship between the dependent variable (fraudulent financial reporting) and the independent variable (gender diversity of the audit committee).

The value of this coefficient also indicates intensity of the effect of gender diversity in the audit committee on reducing the likelihood of fraudulent financial reporting. Also, the likelihood of the related Z statistic is 0.0137.

Thus, since its value is less than 0.05, it indicates a significant relationship between the gender diversity in the audit committee and the likelihood of fraudulent financial reporting. As a result, the null hypothesis is rejected and H1 is confirmed. In other words, the results suggest a significant inverse relationship between gender diversity in the audit committee and the likelihood of fraudulent financial reporting. It means that the presence of a female member on the audit committee reduces the likelihood of fraudulent financial reporting. This result confirms the second hypothesis of the study.

The effect of female chief financial officer on fraudulent financial reporting

To investigate the effect of female chief financial officer on fraudulent financial reporting of the company, model (3) is estimated, the results of which are presented in Table 6.

Variable	Symbol	Coefficient	The standard deviation	Statistic Z	Significance level
Female Chief financial officer	FEMALE_CFO	-0.5444	0.3706	-1.4687	0.1419
Return on assets	ROA	0.9852	1.8278	0.5390	0.5899
Company size	SIZE	0.3319	0.0976	3.3995	0.0007
Financial Leverage	LEV	1.9289	0.8279	2.3299	0.0198
Return on equity	ROE	-0.6265	0.6306	-0.9934	0.3205
The ratio of market value to the book value of stocks	MB	0.0042	0.0622	0.0672	0.9464
Percentage of ownership of the largest shareholder	LSHARE	-0.1573	0.6645	-0.2367	0.8129
Percentage of ownership of institutional owners	INST	-0.7996	0.8529	-0.9375	0.3485
Board independence	B_INDEP	0.2954	0.4514	0.6544	0.5129
Company age	AGE	0.7932	0.1771	4.4780	0.0000
audit committee size	AC_SIZE	0.2533	0.1208	2.0979	0.0359
Audit committee independence	AC_INDEP	-1.5154	0.5471	-2.7698	0.0056
Financial expertise of the members of the audit committee	AC_EXPERT	0.4851	0.9142	0.5306	0.5957
Type of auditing firm	BIG	-0.6781	0.2642	-2.5669	0.0103
Constant	C	-10.0804	1.9705	-5.1156	0.0000
McFadden's coefficient of determination	0.1733	LR	61.4951	Probability of LR statistics	0.0000

Table 6: The effect of female chief financial officer on fraudulent financial reporting
 Based on data in Table 6, the likelihood of LR statistic is 0.0000, which is less than the accepted error level (0.05) and indicates that all regression coefficients are not zero simultaneously and the whole model is significant at 95% confidence level. The value of McFadden's coefficient of determination is equal to 0.1733. This coefficient shows that about 17% of the changes in the dependent variable of research are explained by independent and control variables. The aim of this hypothesis is to investigate the effect of the presence of a female chief financial officer on fraudulent financial reporting. Therefore, the estimated coefficient and likelihood of the Z statistic of

female chief financial officer are examined in the audit committee. Based on the results of Table 6, the estimated value of the coefficient related to chief financial officer variable in the audit committee is -0.5444. The negative sign of this number means that there is an inverse relationship between the dependent variable (fraudulent financial reporting) and the independent variable (female chief financial officer). However, the likelihood of related Z statistic is 0.1419. Therefore, since its value is more than 0.05, it indicates that the relationship between the female chief financial officer variable and the likelihood of fraudulent financial reporting is non-significant. As a result, the null hypothesis is confirmed and H0 is rejected. In other words, the results indicate that there is no significant relationship between female chief financial officer and the likelihood of fraudulent financial reporting. This result indicates that the third hypothesis of the research is not confirmed

Hosmer-Lemeshow and Andrews tests

After estimating the Logit model, the goodness of the fit can be measured. Accordingly, Hosmer-Lemeshow and Andrews tests are used. Table 7 presents the values obtained from the above tests.

Hypothesis	Test	Test statistic value	Significance level
Hypothesis 1	Hosmer-Lemeshow	9.8053	0.2790
	Andrews	12.3563	0.2619
Hypothesis 2	Hosmer-Lemeshow	12.8479	0.1172
	Andrews	15.7905	0.1058
Hypothesis 3	Hosmer-Lemeshow	9.1312	0.3314
	Andrews	10.8132	0.3723

Table 7- Results of Hosmer-Lemeshow and Andrews tests

In Hypothesis 1 of the research, the value of Hosmer-Lemeshow test statistic was 9.8053 and its significance was 0.2790 and Andrews test statistic is 12.3563 and its significance is 0.2619. In Hypothesis 2 of the research, Hosmer-Lemeshow test statistic was equal to 12.8479 and the level of significance was 0.1172 and Andrews test statistic was equal to 15.7905 and its significance was 0.1058. Also, in Hypothesis 3 of the research, the value of Hosmer-Lemeshow test statistic is equal to 9.1312 and its significance is 0.3314 and Andrews test statistic is 10.8132 and its significance value is 0.3723. Since the significance level of the tests in all three hypotheses was higher than 0.05, all three models have a high explanatory power.

Conclusions and Recommendations

Due to financial crises in the world in recent years, fraud in financial statements has increased significantly, which has negative effects on the capital market and investor confidence, and many companies have suffered consequences of fraud. Studies have shown that the most important factor in the occurrence of fraudulent financial

reporting is manpower and various people who have committed financial reporting frauds. Most of these studies indicate that CEO, board members, subcommittees and chief financial officers have played a greater role in creating fraud. Also, the employment of females in the management and senior positions of organizations and companies has nowadays increased significantly.

The results of testing the first hypothesis of the study showed that the presence of females in the board of companies reduces financial fraud. In other words, there is a negative and significant relationship between the presence of a female member in the board and the likelihood of fraudulent financial reporting. These results are consistent with results of the studies conducted by (Marzuki et al., 2019), (Wahid, 2019), (Kamarudin et al., 2018), (Lenard et al., 2017), (Capezio & Mavisakalyan, 2016), (Adhikari et al., 2016), (Cumming et al., 2015) and is in contrast to results of the studies conducted by (Yang et al., 2018), (Abdullah & Ismail, 2016), and (Ye et al., 2010). In interpreting the results of the first hypothesis of this research, it can be stated that females are less aggressive and are more financially conservative and morally responsible than males. This issue can affect accounting conservatism, management opportunism, and risk aversion or risk-taking of senior managers. Other psychological, social, and biological characteristics, such as idealism, or a sense of competition, also reduce willingness of females to participate in financial fault and misuse. Previous studies have also indicated that females are less likely to be opportunistic when making organizational decisions and less concerned with personal interests. Also, females have higher performance standards than males to achieve executive positions over time and have many motivations to prevent management violations. Females are more cautious in making decisions and are generally more conservative than males. Gender diversity makes meetings more dynamic and increases the board ability to supervise and monitor the disclosure of company information and reports. Improving these supervisions influences accounting decisions, which can reduce the likelihood of accounting fraud. The results of testing the second hypothesis of research revealed that the presence of females in the audit committee of companies reduces financial fraud. In other words, there is a significant negative relationship between the presence of a female member in the audit committee and likelihood of fraudulent financial reporting. These results are consistent with results of the studies conducted by (Marzuki et al., 2019), (Yang et al., 2018), (García Lara et al., 2017), (Adhikari et al., 2016), (Cumming et al., 2015), (Thiruvadi & Huang, 2011) and are in contrast to results of the studies conducted by (Ye et al., 2010). In interpreting the results of testing the second hypothesis of the research, it can be stated that the presence of females has influenced the audit methods by affecting the quality of audit, audit efficiency (delay in publishing audit report), audit fee and auditor attitude towards risks.

Since there are behavioral differences between males and females in terms of planning, risk tolerance, and overconfidence, gender may affect auditors' planning, risk aversion, and overconfidence, leading to more doubt among female auditors when performing audit tasks. It may directly affect the cost of audit, the delay in the audit report, and the audit comment, since they are a function of audit risk (internal and inherent control risks). From a management perspective, differences in risk preferences (risk aversion or risk-taking) between females and males may affect

management behavior. Thus, the presence of females in audit committees will be more conservative in assessing company risks, identifying potential problems of internal control, and critically evaluating the internal control systems. Moreover, female members of the audit committee increase the quality and transparency of financial statements and reduce financial fraud in companies due to higher supervision of the accounting process compared to their male counterparts. The results of testing the third hypothesis of the study revealed no significant relationship between female chief financial officers and reducing the likelihood of fraudulent financial reporting. These results are in line with results of studies conducted by (Yang et al., 2018), (Ye et al., 2010) and are inconsistent with results of the studies conducted by (Luo et al., 2020), (Liao et al., 2019), (Sun et al., 2017), (Lenard et al., 2017), (García Lara et al., 2017), (Liu et al., 2016), and (B. B. Francis et al., 2014).

In interpreting the results of the third hypothesis test, it can be stated that the number of female chief financial officers in the studied companies was very small and it can affect the results. However, in the theoretical foundations of the research, it was mentioned that among all senior managers, chief financial officers have the most influence on a company financial reporting decisions. Also, legislators and regulatory organizations consider chief financial officers accountable for financial reports of companies, since chief financial officer has an important responsibility for providing fair company financial statements. However, small number of female chief financial officers compared to males had a significant effect on rejection of the third hypothesis. The results of the present study can be used by stock managers, shareholders, investors and all stakeholders and activists of the Iranian Stock Exchange. Thus, it is recommended to implement control policies on the reporting units of company by the internal audit committee and stock exchange organization, especially the managers of audit units to reduce the likelihood of fraudulent financial reporting. Also, it is recommended to consider the establishment of efficient accounting and auditing systems and internal control, including an audit committee composed of females and using female chief financial officers and employment of females in company boards, which can increase investor confidence in companies. It is also recommended that future research provide a comprehensive and reliable model for identifying and assessing the likelihood of financial misconduct and controlling financial statements. The most important limitation of this study is the low number of females in the management positions of companies, especially female chief financial officers, which can affect the results.

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