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Females and fraud

Effect of female corporate leaders and gender combinations of leadership and auditor on the occurrence and detection of fraud.

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Abstract

In the past years awareness of female leadership and females in high executive positions has grown. In this thesis I research the effect of female corporate leaders on the likelihood of fraud litigation and the effect of gender combination between leadership and audit engagement partner on the detection of fraud. The dataset consists of US firms between 2017 and 2021 of which 136 are involved in fraud litigations and a control sample of 136 non-fraud firms. With the use of logistic regressions, I conclude that when the CEO is female the likelihood of fraud litigation is significantly lower. I find no significant change when focusing on the board of directors. The gender combination between auditor and leadership shows a positive significant effect on likelihood of fraud litigation on board of director level, while there is no significant effect on CEO level.

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1 Introduction

In the past years there has been a consistent focus on increasing the share of women working and especially on increasing the share of women working in higher level functions. This is certainly also the case within the accounting profession. However, recent research by the IBM Institute for Business Value (2021) finds that things have changed, but not necessarily for the better. There is plenty of awareness, but only one out of four organizations have made the step to make the advancement of females a priority. What is especially concerning, is that currently there are less women on the track of an executive role than three years ago. There is enough reasoning for the awareness. Females are found to be more empathic, more compassionate, more risk-averse and have better intuition according to Powell & Ansic (1997), Byrnes et al. (1999), Costa Jr. et al. (2001) and Zalata et al. (2019). This leads to more innovative and effective teams. Firms with female leadership seem to be well-balanced and it seems to favor the results of the organizations (Frangos, 2021). All these benefits might also have an impact on the work for an auditor. Female auditors, specifically audit engagement partners, have the same characteristics as other female leaders and are found to have a higher level of moral awareness (Carrera & Van der Kolk, 2021) and are better compared to men in decision making when it is a complex task (Chung & Monroe, 2001). Off course female leaders also experience disadvantages. Male leaders are found to be more open towards ideas and more assertive, which provides other opportunities for them (Costa Jr. et al., 2001).

This awareness for female leadership and the difference in characteristics lead to the research objective. Since females are more emphatic and are more risk-averse they are expected to commit less fraud. Since commitment of fraud cannot necessarily be measured, I look at the likelihood of fraud litigation. The first part of this thesis is hence about whether the likelihood of fraud litigation is influenced by the gender of the corporate leaders of the firm. This is done both on the full board of directors and on the CEOs. The second part focuses on the gender combination of auditors and leadership. Here the question to answer is, whether equal genders understand each other better than if the gender differs between auditor and leadership. This also is done on both the full board of directors and on the CEOs specifically.

This thesis is academically relevant. It adds to the existing knowledge by researching the effect of gender combinations between auditor and leadership. Up until now papers have either looked into female leadership or looked into the role of female auditors within audits. Prior research exists on female leadership and occurrence of fraud, but this thesis focuses on the US market and updates on the most current years. Since the awareness for female leadership has been growing, it is interesting to see the results in more current years. The second part on the gender combinations is a test that has not been performed yet. It is therefore an underdeveloped area and interesting to look into. Moreover, it adds to the existing research of how allocation of auditors based on characteristics influences the audit like Chung & Monroe (2001).

The social relevance of this thesis is that the results might add to the discussion of female leadership at companies. Even though the awareness currently is high, there is still a long way to go. As a company, being involved in fraud litigation is certainly not beneficial for your results and this might be an incentive for firms to rethink their leadership and change. Moreover, within the audit, knowing how the gender combinations play out can be interesting with regards to quality of audit.

This paper continues as follows: the first section provides some background information on fraud and the detection of fraud. Furthermore, this section contains a description of the differences found between genders and concludes with a literature review on female leadership and occurrence of fraud and female auditors and detection of fraud. The next section presents the hypotheses that are tested in this paper. Section 4 explains the methodology. Section 5 describes the data used to form the sample and its sources, including descriptive statistics. Section 6 presents the analysis of the results. Finally, the conclusion summarises the results and discusses the implication of the findings, the limitations of this research and suggestions for future research.

2 Background and literature review

This chapter provides some background information and reviews existing relevant literature for this thesis. It starts with explaining fraud and who discovers fraud. Thereafter, it discusses the characteristic differences between female and male in general. Following this, prior research is discussed about female leadership and occurrence of fraud and about female auditors and detection of fraud.

2.1 Fraud

Fraud is done through either misappropriation of assets, corruption or fraudulent financial reporting. When engaging in the first types of fraud as listed above, it leads to financial reporting fraud, as a fraudster will need to hide the fraudulent actions. The latter is the intentional act that causes a misstatement with the intention to deceive others. This involves three parts. First, deception, which means that manipulation, falsification or alterations are done to accounting records or supporting documents. Secondly, the misrepresentation or the intentional omission of significant information, for example events and transactions. Lastly, it also involves the intentional misapplication of accounting principles. (Jordaan, 2022)

According to Cressey (1950) there is the need that three criteria are present for fraud to be committed. As seen in Figure 1, these three criteria are perceived pressure, opportunity and rationalization. This is called the fraud triangle. Perceived pressure means that there is a non-shareable financial problem, such as pressure to meet financial numbers or gambling problems. Opportunity means that there is a possibility to violate a position of trust and that there is knowledge on how the firm works. Lastly, rationalization means the ability to adjust your perception so that you do not constitute this as criminal behavior. Examples of this behaviour are thinking that you are entitled since you are underpaid or that you are simply doing what the predecessor did.



Figure 1: Fraud triangle (source: Jordaan, 2022)

2.2 Detection of fraud

The Standards on Auditing (SAs) states that management and the governing body of a firm are the responsible primaries for prevention and detection of fraud. (Taxmann, 2021) The most common way fraudsters get caught is through tips of employees (65.4%). Other ways are through accidental discovery (23.1%) and external audit (11.5%). A few examples of parties that play a role in these ways are external and internal auditors, financial press, employees, suppliers (Lindquist CPA, 2022).

The focus of the thesis is on the role that external auditors play. The task of an external auditor is to obtain reasonable assurance that the financial statements as a whole are free from material misstatements. These misstatements can be either caused by error or fraud. This is thus the role that the auditors play in detection of fraud; they check solely on material misstatements. We therefore cannot expect them to find fraud cases which take place within immaterial amounts. Moreover, the people that commit fraud will do their best to cover it up and this is even easier when the fraud is committed by management. All of this complexifies detection of fraud even further (Jordaan, 2022).

2.3 Differences of gender

There are multiple aspects which prior researchers look into regarding differences of gender. A paper that focuses on personality traits is by Costa Jr. et al. (2001). With data analysis from the *Revised NEO Personality Inventory* of 26 cultures, they find that gender differences are relatively small compared to variation within genders. An additional observation is that across cultures, gender differences vary in a manner that is consistent with gender stereotypes. Females perceive themselves highly in Neuroticism, Agreeableness, Warmth and Openness to Feelings. Males report themselves higher in Assertiveness and Openness of Ideas. The results indicate that women lean towards being higher in negative affect, submissiveness and nurturance and, as stated above, are more focused on feelings while men are more focused on ideas.

Byrnes et al. (1999) perform a meta-analysis on 150 studies in which the risk-taking choices are compared between males and females. They obtain results that point towards male participants taking more risks than the female participants. They look into 16 types of risk taking and for 14 out of the total the average effects are significantly larger than 0. For 48% of the effects, the effect size was even larger than .20 (cutoff for small effects). Effects are the outcomes of all 150 studies separated per task/content, if possible, within a study. When looking into more detail of the results, it brings forward that risk taking does not evolve simply or constantly across ages or contexts but differs by the way risk is taken.

A research that is more in the context of financial decision-making is by Powell & Ansic (1997). They examine with an experimental analysis whether gender differences in risk propensity and strategy choices are general traits or that they arise through contextual factors. They have similar results as Byrnes et al. (1999), whereby females are less risk seeking than males and this is not influenced by familiarity and framing, costs or ambiguity. With regards to the strategy choices, they also find that different strategies are picked between males and females but that this does not have an effect on their ability to perform.

Zalata et al. (2019) look specifically to the chief executive officer (CEO) and if their gender influences earnings management. They use a multivariate analysis method using a regression to investigate the classification shifting within US firms over the period of 1992 till 2014. Before the *Sarbanes-Oxley (SOX) Act* both female and male CEOs showed high levels of classification shifting. After the *SOX Act* introduction, classification shifting is now punished.

It came forward that classification shifting by female CEOs declined significantly while it stayed omnipresent in firms with male CEOs. These results thus show that females changed their behaviour towards earnings management when a strong legal environment got introduced, which subsequently can be explained by female CEOs being more risk-averse.

Other papers that find similar results to Byrnes et al. (1999), Powell & Ansic (1997) and Zalata et al. (2019) are Baffour et al. (2019), Emami (2017), Croson & Gneezy (2009) and Dwyer et al. (2002).

2.4 Prior research on female leadership and occurrence of fraud

From 2.3 it is clear that research shows that females are less risk taking. As we know fraudsters need to feel like they can conceal their fraud, this pertains taking some kind of risk and could mean that the presence of female leadership results in less fraud. This paragraph contains the review of prior research on this topic.

Lenard et al. (2017) investigates litigations of financial reporting fraud issued from 2007 till 2013, taken from the *Stanford Securities Class Action Clearinghouse* database. They examine the likelihood of fraud when at least one woman is present in the board of directors or has an executive position. The results show that the presence of females makes the firm commit fraud less frequently. They conclude that this might be due to the tendency of woman to be more risk averse. When focusing more on ethics policies they state that the female gender acts like a moderator on risk-taking with the effect of reducing the likelihood of fraud. They find similar results when looking into the female presence in the audit committee.

A second paper on board gender diversity and corporate fraud is by Capezio & Mavisakalyan (2015). They perform an empirical analysis on data consisting of 128 publicly listed companies in Australia. They find that an increase in female representation on company boards is associated with a lower probability of fraud. A current paper with similar conclusions is by Wang et al. (2022). They analyse the role of gender in fraud commissions and the occurrence of fraud for Chinese listed companies during the years 2007-2018. They find that companies with more female corporate leaders are less likely to be involved in financial statement fraud. According to them this is a result of female leaders being associated with a higher likelihood of detecting fraud which makes the propensity to engage in fraud lower. Moreover, they state, similar to Lenard et al. (2017), that women are risk averse and more focused on ethical practices than men in similar positions.

2.5 Prior research on female auditors and detection of fraud

When the focus changes towards female auditors and detection of fraud, I first discuss the papers by Carrera & Van Der Kolk (2021) and Chung & Monroe (2001). These papers do not research specifically the detection of fraud but does provide some interesting insights about female auditors.

Carrera & Van Der Kolk (2021) examine the relation between experience and gender on the auditor's moral awareness. With survey data of 191 auditors working at a 'Big 4' firm in the Netherlands, they find that the more experience an auditor has, the higher levels of moral awareness they show. Moreover, they find that, on average, female auditors have a higher level of moral awareness than male auditors. They conclude that increasing the percentage of women in senior positions might have a positive effect on the ethical decision-making in audit firms.

Chung & Monroe (2001) examine the effects of gender and task complexity on how accurate audits are performed. They find that females perform more accurate decision making in complex decision tasks. The hypothesis states that there will be a significant interaction between the gender variable and accuracy of decision making. With a 2 x 2 full factorial experiment (males vs females by high- vs low-task complexity) they find results supporting the hypothesis. Less complex tasks are done more accurately by males compared to females but when the task becomes more complex, females are more accurate. Fraud detection is certainly not the easiest task for an auditor. The fraudster tries to obscure it and perform their utmost to ensure that it is not detected, so the outcome of the paper by Chung & Monroe could provide the background information for explaining why female auditors detect more fraud than male auditors.

However, no previous research finds this result. Idawati (2018) tests how gender, professional skepticism and time budget pressure influences the capability of the auditor to detect fraud. Her sample consists of public accounting firms registered in *IAPF* based in Jakarta. After performing a linear regression, she finds a joint significance of gender on ability to detect fraud. This means that it does not matter which gender you are in detecting fraud.

Owhoso (2002) finds a similar result. He states that auditors need to be able to assess ethical issues during an audit, otherwise they will fail to consider the ethical information of the clients when making an audit judgment. Prior literature discusses whether women are more sensitive towards ethical issues. He examines specifically whether the presence of ethical information weakens the heightened ethical sensitivity of females in the context of fraud detection. The results bring forward that there is different sensitiveness of auditors towards ethical information due to more years of experience. However, no effect is found between gender and their sensitivity towards ethical issues or towards fraud detection. The conclusion is that females might lose this superior sensitivity in ethical dilemmas and hence do not necessarily detect more fraud.

Suryandari & Yuesti (2017) look into the effect of workload and characteristics of auditors on professional skepticism and fraud detection ability. With questionnaire results from 37 auditors registered in Bali, Indonesia, they find, among other things, that gender does not have an effect on professional skepticism or the likelihood of the auditor to detect fraud.

The conclusion is hence that gender does not influence the likelihood of detection of fraud.

3 Research hypotheses

This chapter provides the hypotheses based on prior theories used in this thesis to figure out the role of female leadership and female auditors in the occurrence and detection of fraud.

From section 2.2, we determine that there is extensive research leading to the conclusion that females are more risk averse compared to their male counterpart. This occurs in different settings, from experiments (Powell & Ansic, 1997) to specific research in the context of CEOs (Zalata et al., 2019). As stated previously, to act fraudulent it is necessary to take risk. The results on differences of characteristics between males and females and the findings that females are more risk averse (based additionally on the papers by Byrnes et al. (1999), Baffour et al. (2019), Emami (2017), Croson & Gneezy (2009) and Dwyer et al. (2002)), all seem to indicate that females will commit less fraud compared to males. In the prior research as discussed in Section 2.3, Lenard et al. (2017), Capezio & Mavisakalyan (2015) and Wang et al. (2022) arrive with similar conclusions stating that more female representation in the board has the outcome of a reduced likelihood to be involved in financial statement fraud litigation. In this thesis the focus will be on the most recent data of the last 5 years. Based on this, the first hypothesis is formulated as:

H1: Firms with female corporate leadership are subjected less to fraud litigation compared to firms with male corporate leadership.

When redirecting the attention from the female leadership within a company towards female auditors, we see that females might have certain abilities which can help with detecting fraud. A higher moral awareness and a more accurate decision making within complex tasks could be necessary as part of the foundation to suspect and find fraud as an auditor. However, prior research does not find these results. Idawati (2018), Owhoso (2002) and Suryandari & Yuesti (2017) found no effect between gender and ability or sensitivity to detect fraud. Still, it is interesting to look whether the similarity or dissimilarity of the genders of the auditors and the corporate leaders has an influence on the likelihood of fraud litigation for a firm. The question that I want to answer with the second part is whether female auditors are better in seeing through the deception created by female leaders or by male leaders. The same query holds for male auditors. Do you recognize a certain behavior easier when you have the same gender?

The hypothesis for the second part of this research is formulated as:

H2: Firms with corporate leadership that have auditors with the same gender are subjected less to fraud litigation compared to firms with corporate leadership that have auditors with a different gender.

4 Method

This section describes the methodology used in this thesis to test the hypotheses as stated in chapter three. After this, it provides the definitions of all variables used.

4.1 Methodology

The first part of this thesis focuses on whether female leadership influences the likelihood of a firm being subjected to fraud litigation. This is done by using a logistic regression model. First, on a dataset looking at the whole board of directors and thereafter on a dataset focusing on the CEO.

The regression models used are as follows:

$$\begin{aligned} \text{Fraud}_{it} = & \beta_0 + \beta_1 \text{Female_Dir}_{it-1} + \beta_2 \text{Dir_Age}_{it-1} + \beta_3 \text{Years_As_Direc}_{it-1} + \\ & \beta_4 \text{For_Emp}_{it-1} + \beta_5 \text{Fin_Exp}_{it-1} + \beta_6 \text{Boa_Size}_{it-1} + \beta_7 \text{SIZE}_{it-1} + \beta_8 \text{ROA}_{it-1} + \\ & \beta_9 \text{LEV}_{it-1} + \beta_{10} \text{GP}_{it-1} + \beta_{11} \text{GRO}_{it-1} + \varepsilon_i \end{aligned} \quad (1)$$

$$\begin{aligned} \text{Fraud}_{it} = & \beta_0 + \beta_1 \text{Female_CEO}_{it-1} + \beta_2 \text{CEO_Age}_{it-1} + \beta_3 \text{Years_As_Direc_CEO}_{it-1} + \\ & \beta_4 \text{For_Emp_CEO}_{it-1} + \beta_5 \text{Fin_Exp_CEO}_{it-1} + \beta_6 \text{Boa_Size}_{it-1} + \beta_7 \text{SIZE}_{it-1} + \\ & \beta_8 \text{ROA}_{it-1} + \beta_9 \text{LEV}_{it-1} + \beta_{10} \text{GP}_{it-1} + \beta_{11} \text{GRO}_{it-1} + \varepsilon_i \end{aligned} \quad (2)$$

where fraud is the dependent variable and represents a dummy variable that takes value 1 if the firm is subjected to fraud litigation and takes value 0 if not. The fraud litigation occurs in year t. Each β_i is a parameter value for the corresponding explanatory variable, β_0 specific is the constant coefficient in the regression model. *Female_Dir* is the independent variable of interest and represents the percentage of female members in the board of directors. The control variables are explained in Section 4.2 and are of year t-1, since the assumption is made that although the litigation is filed in a certain year that the fraud is committed before that year and that the situation of the firm in year t-1 influences the fraud litigation. Therefore, I take the control variables all of year t-1. Lastly, ε refers to the error term.

To confirm the first hypothesis as stated in chapter three, β_1 needs to show a significant effect in both models. Analysis is conducted in the statistical software STATA, and a significance threshold of 5% is used to determine whether to reject the null hypothesis or conclude that there is insufficient evidence to do so. In other words, if the p-value is smaller than 0.05, this means that that variable is statistically significant.

The control variables *SIZE* and *ROA* are firm characteristics that are taken into consideration to control for the size and profitability ratio of the firms. I then add control variables which could play a role in the likelihood of fraud. First, I add the variable for leverage. When a company is more leveraged, it has more debts. From prior research by Christie (1990), we know that there is a positive correlation between leverage and income-enhancing accounting policies to try avoiding violating debt covenants. This combined with results from Persons (2005) show that this situation has the consequence of managers stating assets and liabilities differently to portray another truth. In other words, fraud. Gross profit is controlled for in the

regression, since management might feel that they need to portray a profit instead of a loss and therefore use more aggressive reporting practices (Persons, 1995). The last firm characteristic control variable is one for growth. When firms grow exponentially, they might be something called 'one-hit-wonders' (Erhardt, 2021). However, stakeholders like to see growth and thus a consequence might be that management creates fictitious sales to portray that the growth that they experienced continues in the years after (Persons, 1995). Next, I add board of directors (members) characteristics. First, the age of the directors. Horváth and Spirollari (2012) finds that younger board of directors' members are riskier, and since taking risk is a subsequent part of committing fraud the variable *Dir_Age* is added to control for this. Moreover, how many years on average they are part of the board might indicate for example having more expertise and therefore taking more risk because one believes one knows better how to hide the fraudulent behavior. This is supported by Tejerina-Gaite and Fernández-Temprano (2021) finding that there is a significant association between longer tenure and the performance levels of the firm. It could also be the other way around, if one has become director at the company recently, then one does not have a sense of responsibility yet and committing fraud is easier. Therefore, I include the variable *Years_As_Dir*. The same reasoning holds for if the director is a former employee. Houston, Lee and Shan (2016) find that when directors are former employees, they have more understanding of the company. A downside however is that they do not function properly as effective monitors. They find an association between former employee directors and litigation risk. For that reason, I control for *For_Emp*. Knowledge also plays a role for the next control variable for financial expertise, *Fin_Exp*. Minton, Taillard & Williamson (2014) find that when directors have financial expertise there is a support towards increased risk. Additionally, financial experts have more influence due to their knowledge within a board (Güner, Malmendier & Tate, 2008). If you know how firms work financially it might feel less risky to commit fraudulent behavior. Finally, board size is added to the regression. Beasley (1996) finds when testing for the relation between fraud and composition of board of directors that as board size increases that there is an increase in the likelihood of financial statement fraud.

The second part of the thesis focuses on whether gender of auditor and the gender composition of the board of directors is correlated to likelihood of fraud litigation. Does a person understand their own gender better or do they understand the opposite gender better? To research this, the dummy variables *EQ_BOD* and *EQ_CEO* are added. The former represents whether the gender of the auditor and the main gender representation in the board of directors are equal. The latter represents whether the gender of the auditor and the gender of the CEO are equal. The benchmark is thus that leadership and auditor are of different genders. To indicate whether the board of directors is led by female leadership the choice is made to take a guideline of 30% for the percentage of female members in the board of directors. This results in 64 firms with female leadership in board of directors, which is comparable to the 84 firms that have female CEOs. In all other cases the board of directors is led by males.

I perform similar logistic regression models as Equation (1) and (2) but add on the dummy variable. See Equation (3) and (4) for the logistic regression models for hypothesis two. The regressions are performed in STATA and the significance threshold is used of 5% to determine whether to reject the null hypothesis or conclude that there is insufficient evidence to do so. This means the variable is statistically significant when the p-value is smaller than 0.05.

$$Fraud_{it} = \beta_0 + \beta_1 Female_Dir_{it-1} + \beta_2 Dir_Age_{it-1} + \beta_3 Years_As_Direc_{it-1} + \beta_4 For_Emp_{it-1} + \beta_5 Fin_Exp_{it-1} + \beta_6 Boa_Size_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ROA_{it-1} + \beta_9 LEV_{it-1} + \beta_{10} GP_{it-1} + \beta_{11} GRO_{it-1} + \beta_{12} EG_BOD_{it-1} + \varepsilon_i \quad (3)$$

$$Fraud_{it} = \beta_0 + \beta_1 Female_CEO_{it-1} + \beta_2 CEO_Age_{it-1} + \beta_3 Years_As_Direc_CEO_{it-1} + \beta_4 For_Emp_CEO_{it-1} + \beta_5 Fin_Exp_CEO_{it-1} + \beta_6 Boa_Size_{it-1} + \beta_7 SIZE_{it-1} + \beta_8 ROA_{it-1} + \beta_9 LEV_{it-1} + \beta_{10} GP_{it-1} + \beta_{11} GRO_{it-1} + \beta_{12} EG_CEO_{it-1} + \varepsilon_i \quad (4)$$

To confirm hypothesis two, I look at the β_{12} . If that shows a significant effect this means that there is an interaction between gender of leadership and gender of auditor. In other words, this then tells us whether similar genders for leadership and auditor has a positive or negative effect on the likelihood of fraud litigation. Thus, that a person understand their own gender better.

4.2 Definitions of variables used

The following variables are used in the data analysis:

Fraud litigation ($Fraud_{it}$)

Fraud is a dummy variable that takes value 1 if the firm is subjected to fraud litigation in year t and takes value 0 if not.

Female board of directors' member ($Female_Dir_{it-1}$)

Represents the percentage of female members in the board of directors in year t-1.

$$Female_Dir = \frac{\sum \text{female members in board of directors}}{Boa_Size} \quad (5)$$

Female CEO ($Female_CEO_{it-1}$)

Consists of a dummy variable that takes value 1 if the CEO is female and takes value 0 if male in year t-1.

Board of directors' size (Boa_Size_{it-1})

Consists of the number of members of the board of directors in year t-1.

Average age of board of directors' members (Dir_Age_{it-1})

Consists of the average age of the board of directors members in year t-1. (WRDS, 2022a)

$$Dir_Age = \frac{\sum \text{age of members in board of directors}}{Boa_Size} \quad (6)$$

Age of board of directors' member ($Dir_Age_Indv_{it-1}$)

Consists of the age of the board of directors member in year t-1 (WRDS, 2022a). For CEO specific the variable is called *CEO_Age*.

Individual years as board of directors' member ($Years_As_Dir_Indv_{it-1}$)

Consists of the individual years that members are part of the board in year t-1.

$$Years_As_Direc_Indv = Year - Dir_Since \quad (7)$$

Where *Year* is the data year, *Dir_Since* is the year in which service began (WRDS, 2022a). For CEO specific the variable is called *Years_as_Dir_CEO*.

Average years as board of directors' member ($Years_As_Dir_{it-1}$)

Consists of the average years the members are part of the board of directors in year t-1.

$$Years_As_Direc = \frac{\sum Years_As_Direc_Indv}{Boa_Size} \quad (8)$$

Former employee ($For_Emp_Indv_{it-1}$)

Consists of a dummy variable that takes value 1 if board of directors' member was a former employee and takes value 0 if not in year t-1 (WRDS, 2022a). For CEO specific the variable is called *For_Emp_CEO*.

Percentage of members of board of directors that were former employees (For_Emp_{it-1})

Consists of the number of members of board of directors that were former employees in year t-1.

$$For_Emp = \frac{\sum For_Emp_Indv}{Boa_Size} \quad (9)$$

Financial expertise ($Fin_Exp_Indv_{it-1}$)

Consists of a dummy variable that takes value 1 if board of directors' member has financial expertise and takes value 0 if not in year t-1. This variable is taken directly from the Institutional Shareholder Services database and there is no further explanation what exactly is needed for the board of directors' member to have financial expertise (WRDS, 2022a). For CEO specific the variable is called *Fin_Exp_CEO*.

Percentage of members of board of directors that have financial expertise (Fin_Exp_{it-1})

Consists of the number of members of board of directors that have financial expertise in year t-1.

$$Fin_Exp = \frac{\sum Fin_Exp_Indv}{Boa_Size} \quad (10)$$

Size of firm ($SIZE_{it-1}$)

$$SIZE = \log(TA) \quad (11)$$

Where TA represents the total value of assets reported on the balance sheet in year t-1. (WRDS, 2022b)

Return on assets (ROA_{it-1})

$$ROA = \frac{NI}{TA} \quad (12)$$

Where NI represents the income (loss) reported by the firm after expenses and losses are subtracted from all revenues and gains including extraordinary items and discontinued operations after tax expenses and TA is total value of assets reported on the balance sheet in year t-1. (WRDS, 2022b/2022c)

Leverage (LEV_{it-1})

$$LEV = \frac{TL}{SE} \quad (13)$$

Where TL represents the total value of all items reported in the liabilities section and SE is total stockholders' equity in year t-1.

Gross profit (GP_{it-1})

$$GP = SALE - COGS \quad (14)$$

Where $SALE$ is net sales and $COGS$ is cost of goods sold in year t-1. (WRDS, 2022e)

Growth (GRO_{it-1})

Growth is the change in sales, which is calculated by the percentage change between net sales of previous year and net sales of the current year.

$$GROWTH_{t-1} = \frac{SALE_{t-1} - SALE_{t-2}}{SALE_{t-2}} \quad (15)$$

Where $SALE_{t-1}$ is net sales in year t-1 and $SALE_{t-2}$ is net sales in year t-2.

Equal gender leadership and auditor - board of directors (EG_BOD_{it-1})

Consists of a dummy variable that takes value 1 if the main gender in board of directors and the gender of the auditor is equal in the year prior to the fraud litigation and takes value 0 if the main gender in board of directors and the gender of the auditor is different in year t-1.

Equal gender leadership and auditor - CEO (EG_CEO_{it-1})

Consists of a dummy variable that takes value 1 if the gender of the CEO and the gender of the auditor is equal in the year prior to the fraud litigation and takes value 0 if the gender of the CEO and the gender of the auditor is different in year t-1.

5 Data

In this part, I discuss the dataset used for this study. First, a description of the data source is given. Followed by the explanation of the sample selection. Lastly, descriptive statistics of the data are provided.

5.1 Data sources

In this thesis the data comes from separate databases. The first one is the Stanford Securities Class Action Clearinghouse database. They provide detailed information on prosecution, defense and settlement of federal class action securities fraud litigation. They hold a database on 6,202 securities class action lawsuits filed since 1995. Per case details can be found, but this thesis uses the overview which contains filing name, filing date, district court, exchange and the ticker of the firm (SCAC, 2022). Information about the board of directors is taken from the Institutional Shareholder Services database through Wharton Research Data Services (WRDS), specifically the Directors Data section. It includes a range of variables related to individual board directors and contains information since 1996 (WRDS, 2022f). For the control variables on firm characteristics the data is taken from Compustat, also provided through WRDS. It provides standardized financial statement and market data for more than 300 North American publicly held companies since 1950 (WRDS, 2022g). Lastly, the data on the auditors is from the AuditorSearch set up by PCAOB for educators and researchers. It provides the names of engagement partner and other accounting firms who played a role in audits of U.S. public companies. (PCAOB, 2022)

5.2 Sample selection

5.2.1 Full sample

I collect my sample data for the years 2017-2021 from companies listed on the Stanford Securities Class Action Clearinghouse database as being involved in fraud litigation and having the status of case ongoing, case settled, or case remanded. I choose these years since auditor data only goes back till the filing year 2017. This results in a sample set of 654 litigation cases. However, a few of these cases are of firms that do not have a ticker which is used to collect the data from the other databases. Therefore, I decide to eliminate these litigation cases from the sample and end up with 626 litigation cases.

The next step is searching for the board of directors' data for these 626 litigation cases using Institutional Shareholder Services database. The information from this database contains data year, ticker, full name of director, age of director, year service began, gender, which executive position, whether they were a former employee and if they have financial expertise of all board of directors' members for that firm. The board of directors consists of the board of the year prior to the litigation. *Years_As_Direc* is calculated by subtracting year service began from year prior to the litigation case filing year. Since this data is not known for all firms, the sample reduces to 165 litigation cases and results to information on 1,612 members of board of directors.

Following this I search data about the firms through Compustat. The variables that I want are total assets, net income, total liabilities, gross profit and net sales of current year and previous year. All variables contain information of the year prior to the litigation due to it taking some time before a fraud litigation case is filed and hence the assumption is made that the year prior has more influence. This again reduces the sample since information is either not available at all for the firm or not specifically for the year needed. The sample is brought down to 140 litigation cases.

The final step is collecting data on the audit engagement partner that filed a form AP in the year the litigation case was filed. This means that they were the auditor of the firm in the year prior to the litigation year. A form AP means the auditor reporting of certain audit participants and is the way that the PCAOB holds record on the engagement partners and accounting firms that engage in any audits of the public accounting firm that issues this form (PCAOB, 2021). Name and firm of the audit engagement partner is taken and based on the name gender is determined. If questionable, the partner is searched through LinkedIn. In the end the dataset consists of 136 litigation cases and therefore 136 auditors.

5.2.2 Matched sample

In this thesis, I make the comparison between fraud litigation and non-fraud litigation firms. Therefore, it is needed to create a control sample consisting of firms that are similar to the fraud litigation firms but that have not been involved in any fraud litigation. The assumption I make here is that on the time of retrieving data about these firms, it is not known that they are involved in any fraudulent behavior. To make this control group I develop a prognostic score matching sample. With a prognostic score, also known as disease risk score, groups are matched on their baseline risk for the outcome, which is also called their prognosis. In this sample that is the likelihood of fraud litigation. Furthermore, in this case firms are matched based on their size, log of assets, and their Standard Industry Classification (SIC) code in STATA following the method of Lenard et al. (2017). A problem that occurs normally in comparative effectiveness research is that there is a lack of comparability, however prognostic score matching reduces bias by ensuring the compared groups are as similar as possible. Additionally, Stuart et al. (2013) finds that researchers find more reliable estimates with this method. Nguyen & Debray (2019) arrive at similar conclusions and also state that a advantage of prognostic score analyses is that it does not need the positivity assumption as in the case of propensity score matching. The fraud litigation firms are matched to a weighted non-fraud litigation firm, which means these firms are in the same industry and have similar size. This results in a final matched sample of 136 fraud litigation and 136 non-fraud litigation firms.

5.3 Descriptive statistics

To get a first indication of the data, Tables 1 and 2 provide descriptive statistics. Column (1) contains the names of the variables. Column (2) contains the mean of the variables, column (3) the standard deviation of the mean, column (4) the media, column (5) the minimum and column (6) the maximum. Tables 1 and 2 show that there are quite some similarities

between the fraud litigation firms and the non-fraud litigation firms. Significant differences are in the variables return on assets, growth and female CEOs. Non-fraud litigation firms have a higher mean of return on assets compared to fraud litigation firms. Moreover, growth is significantly higher for fraud litigation firms. This can be explained, as stated in 4.1, by the fact that firms commit fraud to keep showing growth. Lastly, there are more female CEOs for the non-fraud litigation firms.

Table 1 – Descriptive statistics for fraud litigation firms

Variable	Mean	Std. Dev.	Median	Min	Max
Size	4.087	0.892	3.998	2.181	6.429
ROA	0.021	0.120	0.025	-0.817	0.241
Leverage	4.877	24.920	1.652	-17.537	285.242
Gross profit	9,935.486	22,670.45	2,096.256	-370.054	147,770
Growth	0.106	0.214	0.064	-0.350	1.116
Boa_Size	9.882	2.419	10	5	16
Female_Dir	0.217	0.141	0.181	0	0.800
Dir_Age	59.017	9.907	61.494	26.910	88.455
Years_as_Dir	7.794	3.767	7.186	0	17.500
For_Emp	0.018	0.046	0	0	0.250
Fin_Exp	0.274	0.154	0.250	0	0.625
Female_CEO	0.118	0.323	0	0	1
CEO_Age	58.559	6.953	58	35	85
Years_as_Dir_CEO	8.985	8.296	6.500	0	39
For_Emp_CEO	0.022	0.147	0	0	1
Fin_Exp_CEO	0.103	0.305	0	0	1
EQ_BOD	0.772	0.421	1	0	1
EQ_CEO	0.772	0.421	1	0	1

Notes: Number of observations is 136. Consists of the firms that have 1 for the variable FRAUD.

Table 2 – Descriptive statistics for non-fraud litigation firms

Variable	Mean	Std. Dev.	Median	Min	Max
Size	3.973	0.807	3.907	2.419	6.340
ROA	0.348	2.423	0.050	-0.227	27.426
Leverage	2.345	5.854	1.408	-24.431	31.523
Gross profit	7,080.194	13,949.870	1,557.273	-279	83,410
Growth	0.027	0.140	0.022	-0.424	0.741
Boa_Size	9.934	1.963	10	5	15
Female_Dir	0.207	0.144	0.200	0	0.636
Dir_Age	59.946	7.650	61.191	30.818	76
Years_as_Dir	8.043	3.787	7.318	1.455	26.182
For_Emp	0.015	0.039	0	0	0.182
Fin_Exp	0.227	0.116	0.200	0	0.500
Female_CEO	0.500	0.502	0.500	0	1
CEO_Age	58.213	6.161	59	43	78
Years_as_Dir_CEO	8.169	9.224	5	0	52
For_Emp_CEO	0.015	0.121	0	0	1
Fin_Exp_CEO	0.125	0.332	0	0	1
EQ_BOD	0.684	0.498	1	0	1
EQ_CEO	0.463	0.500	0	0	1

Notes: Number of observations is 136. Consists of the firms that have 0 for the variable FRAUD.

6 Results

This chapter discusses the results obtained from the logistics regressions carried out to test the hypotheses as described in chapter three. The analysis is conducted in STATA and a significance threshold of 5% is used to determine whether the null hypothesis is rejected or not. The first part shows tables 3 and 4, which both present and review the regression results. The last part discusses the checks with regards to the validity of the results.

6.1 Statistical tests hypothesis 1 and 2

Tables 3 and 4 show the results of the logistic regressions for both hypothesis 1 and 2.

The second column of both tables 3 and 4 are of interest for testing the first hypothesis. This hypothesis states that firms with female corporate leadership are subjected less to fraud litigation compared to firms with male corporate leadership. The variables of interest are Female directors and Female CEO. To accept hypothesis 1, these variables need to show a significant negative coefficient. This does occur when looking at the CEOs of the company. There, the variable Female CEO is significant and has the value -2.073. This implies that when the CEO of a company is female, the firms are subjected to less fraud litigation compared to firms where the CEO is a male. This, however, is not found when looking into the percentage of females on the board of directors. Here the variable of interest is not significant, which means there is not enough evidence to reject the null hypothesis. A main reason for why we see this could be, is that CEOs have the most power relative to other directors in the board of directors. Prior research show that CEOs are the main leaders in the board of directors and play a major role in, for example, choosing the directors and forming the board. Moreover, decisions made by the board are significantly influenced by the CEO (Zajac & Westphal, 1996; Lorsch & MacIver, 1989; Westphal & Zajac, 1995). This would mean that even though the percentage females is relatively high in the board of the director, if the CEO is male, this is the main driver for the likelihood of being subjected to fraud litigation. These results could be the explanation for why I only find a significant coefficient when the gender of leadership is determined by the CEO.

Most control variables do not show significance, except return on assets, gross profit and growth, which are significant in both focus groups. Specifically for the board of directors, financial expertise is significant and for CEOs leverage is significant. The more people with financial expertise in the board of directors, the higher the chance that the firm is subjected to fraud litigation. This follows what is expected in section 4.1. Since the members have more financial knowledge, they are more prone to financial risk. Return on assets is an indicator for profitability and shows that if a firm is more profitable, the subsection to fraud litigation reduces. Gross profit is significant, however has a coefficient value close to 0. This might be due to the variable containing relatively high values. Growth has, as expected, a positive influence on fraud litigation. As described in section 4.1, the expectation is that firms with high growth are these 'one-hit wonders' and to stay of interest for stakeholders, they commit

fraud to portray multiple years of growth. Then lastly, covering leverage, this agrees with prior literature which finds that more leveraged companies use income-enhancing accounting policies that inevitably state assets and liability differently.

The third column of tables 3 and 4 show the results of the models used for hypothesis two. This hypothesis states that firms with corporate leadership that have auditors with the same gender are subjected less to fraud litigation compared to firms with corporate leadership that have auditors with a different gender. The variables of interest are now the equal gender variables. To accept hypothesis two, these variables need to show a significant negative coefficient. I actually find the opposite. In the board of directors focus, I do find a positive significant coefficient with the value 0.739. For the CEO focus, the coefficient is not significant. The former means, that when looking on board of directors' level, if the auditor and the main gender representation of the board of directors is equal that the likelihood of fraud litigation increases. The main gender representation is female when at least 30% of the board of directors' members are female and male in all other cases. On CEO level, there is not enough evidence to make this conclusion. The former results could be an indicator that women understand men better, or in the case of fraud see through the deception easier. The same holds the other way around from men towards women. Of the 198 equal gender combination cases, only 15 are female-female and 183 are male-male. Since former results show that when female leadership is present the likelihood of subjection to fraud litigation decreases, the main presence of male-male combinations explains why I find a positive coefficient. This means that even though the coefficient itself does not predict what was expected in the second hypothesis, that it is still consistent with the theory described before.

6.2 Quality of the regression model

To check the quality of the regression model, a few tests and checks are performed. First, I use a pairwise correlation test to see if there is collinearity between the independent variables. Tables 5 and 6 in appendix A present the results. The assumption made in the regressions is that the independent variables are not correlated strongly with each other. Multicollinearity exists when this assumption does not hold, which then means that the conclusion based on the regression needs to be taken with precaution. According to Bex (2021), when the correlation coefficient is higher than 0.7 there is said to be strong correlation between the independent variables. In tables 5 and 6 it is clear that none of the independent variables are highly correlated, therefore the models can be used as is.

Next, I consider the pseudo R-squared. When performing a logistic regression STATA provides the pseudo R-squared. The pseudo R-squared is a statistical measure representing how much of the variance of the dependent variables is explained by the independent variables. The last row in tables 3 and 4 show the pseudo R-squared for all models. The rule of thumb by Falk and Miller (1992) is that the pseudo R-squared should be equal or greater than 0.10. This is

the case in all four models. As a result, the variance explained by the independent variables suffices in this thesis.

Lastly, I cover the Hosmer-Lemeshow test. This tests the goodness of fit for logistic regression models. The problem it hence addresses is how well the data fits the model. It first divides the data into segmented groups based on having similar predicted probabilities and then examines whether observed and predicted probability are similar using a Pearson chi square test. Small values with large p-values indicate good fitting of the data. Table 7 in appendix B presents the results. For all four models the p-values are large, above the threshold of 0.05, and the values are small. This shows that the goodness of fit is sufficient and thus that the aforementioned results can be interpreted as is.

Table 3 – Logistic regressions on board of directors’ members

Variable	Coefficient Model 1	Coefficient Model 3
Constant	0.455 (1.064)	0.330 (1.126)
Female_Dir	0.455 (1.064)	1.525 (1.196)
Dir_Age	-0.023 (0.019)	-0.021 (0.020)
Years_as_Dir	-0.016 (0.040)	-0.018 (0.040)
For_Emp	1.916 (2.935)	1.810 (2.939)
Fin_Exp	3.243*** (1.050)	3.213*** (1.072)
Boa_Size	-0.039 (0.095)	-0.063 (0.100)
Size	-0.009 (0.240)	-0.026 (0.242)
ROA	-5.819*** (1.672)	-6.040*** (1.644)
Leverage	0.008 (0.007)	0.007 (0.007)
Gross profit	0.000* (0)	0.000** (0)
Growth	3.460*** (1.017)	3.344*** (1.026)
EQ_BOD		0.739** (0.365)
Observations	272	272
Pseudo R ²	0.131	0.143

Notes: This table reports coefficients from the logistic regressions from model 1 and model 3, which is run on the dependent variable Fraud conducted on the sample of 272 firms. For model 1 (column 2), the variable Female director is the variable of interest and for model 3 (column 3), the variable Equal gender – board of directors is the variable of interest. The other variables are used as control variables. Standard errors are given in parentheses. Detailed description of the variables is described in section 4.2. Significance stars are used to indicate p-values; * p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

Table 4 – Logistic regressions on CEOs

Variable	Coefficient Model 2	Coefficient Model 4
Constant	0.791 (1.502)	0.500 (1.550)
Fem_CEO	-2.073*** (0.355)	-1.806*** (0.462)
CEO_AGE	0.004 (0.024)	0.004 (0.024)
Years_as_Dir_CEO	-0.014 (0.018)	-0.014 (0.018)
For_Emp_CEO	0.478 (1.105)	0.420 (1.106)
Fin_Exp_CEO	0.512 (0.577)	0.506 (0.577)
Boa_Size	-0.043 (0.082)	-0.048 (0.081)
Size	-0.018 (0.259)	-0.014 (0.256)
ROA	-4.156*** (1.622)	-4.155*** (1.608)
Leverage	0.012** (0.006)	0.012** (0.006)
Gross profit	0.000* (0)	0.000** (0)
Growth	2.418*** (1.502)	2.452** (1.024)
EQ_CEO		0.372 (0.404)
Observations	272	272
Pseudo R ²	0.210	0.212

Notes: This table reports coefficients from the logistic regressions from model 2 and model 4, which is run on the dependent variable Fraud conducted on the sample of 272 firms. For model 2 (column 2), the variable Female CEO is the variable of interest and for model 4 (column 3), the variable Equal gender – CEO is the variable of interest. The other variables are used as control variables. Standard errors are given in parentheses. Detailed description of the variables is described in section 4.2. Significance stars are used to indicate p-values;

* p-value < 0.1, ** p-value < 0.05, *** p-value < 0.01

7 Conclusions

This thesis aims to research the effect of female leadership and the effect of the gender combination of the auditor and leadership on the likelihood of fraud litigation. The following section summarises the results, formulates the key findings, discusses its limitations and provide future research suggestions.

7.1 Summary of results and key findings

With the use of logistic regressions an answer is found with regards to the research objective. Analysis is done with a dataset that contains data of 136 fraud litigation firms and 136 non-fraud litigation firms between the years 2017 until 2021. Two focuses are taken into account, first on the full board of directors and secondly on the CEOs. The dependent variable is a dummy variable, named Fraud, for whether the firm is subjected to fraud litigation. The independent variables consists of firm characteristics, board of directors' characteristics, CEO characteristics and auditor gender. These variables all contain information about the year prior to litigation year. For the control sample, the firms are matched to the fraudulent firms and like the latter firms I take the year prior to the matched year for the control firms.

For the first part of this thesis, focusing on the full board of directors the coefficient for Female directors, the percentage of females in the board of directors, is not significant on the likelihood of fraud litigation. However, when solely looking at the gender of the CEO I find that when the CEO is female the coefficient is significant and negative for fraud. This means that female CEOs reduces the likelihood of fraud litigation as is expected in hypothesis one. A reason for seeing it at CEO level but not full board of directors' level, might be because the CEO has the most power within a board. So even though there is relatively a high percentage females in the board, if the CEO is male this might overtake the female presence. The practical implication of this is that this adds to the discussion of more female representation in the work field in general and also in high executive positions.

For the second part there is a split in results too. For the full board of directors, the coefficient for the equal gender combination of auditor and leadership is positive and significant. For CEOs the coefficient for the equal gender combination is not significant. Therefore, if the main gender representation in board of directors is equal to the auditor, the chance of subjection to fraud litigation increases, while on CEO level there is not enough evidence to reject the null hypothesis for the second hypothesis. For this reason, for board of director level it seems like men understand women better and the other way around. While for CEO level this conclusion, or any conclusion, cannot be made. This does not align with what was expected in hypothesis two. However, due to mainly male-male combinations in equal gender combinations the outcome still follows the theory as described before. These results do not show that it should be better if audit firms puts a certain gender as auditor on certain clients to increase the chance of finding fraud. No clear arguments are provided to add to the possible discussion of certain gender combinations in the auditing field.

7.2 Limitations and future research suggestions

This thesis is subjected to multiple limitations which influences the validity of the aforementioned results. The first limitation regards the assumption made that the firm, leadership and auditor characteristics are taken from the year before the fraud litigation since it is expected that the potential fraud that is committed happened in the year prior and hence that the year prior will have the most influence on the likelihood of fraud litigation. It is possible that this is true for most firms, but not necessarily for all firms. Therefore, the validity might reduce for the results of this thesis. To counteract this limitation, it is necessary to find for each firm the year that the fraud is expected to have taken place, this is a suggestion for future research.

Another limitation also regards an assumption made in this thesis. It is assumed that the firms in the control sample are not involved in fraud litigation. However, there is the possibility that in the future they will be subjected to a fraud litigation or that they have committed fraud, but this is not detected. If this is the case, then the control sample consists not solely of non-fraud litigation firms and this reduces the validity of the results.

The last limitation is partly mentioned above, it is that fraud is not always detected. As explained in chapter two, fraudsters hide their fraudulent actions. Fraud is committed to deceive others; therefore, it can be relatively difficult to detect fraud. The fraud litigation firms thus only show maybe the tip of the iceberg and when the dataset truly consists of all firms that commit fraud, the results might change.

The first future research suggestion is mentioned above, but another potential avenue of interest is to test data based on other countries. The US is known for low female leadership and low female representation on executive positions. Results might hence differ in other countries. For example, eastern European countries score high in ranking of females in managerial positions. However, retrieving fraud litigation data in certain countries might be difficult.

Lastly, similar to having the focus on board of directors and CEOs, another research idea is to have a focus on audit engagement partner and the full audit team. The former is performed in this thesis, but the latter is still an underdeveloped area of research. The main area of issue is that internal information is needed from accountancy firms which might be difficult to gather.

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Appendix A – Pairwise correlation test

Table 5: Pairwise correlation of independent variables – Board of directors’ members

Variable	Fem_Dir	Age_Dir	Years_ as_Dir	For_Emp	Fin_Exp	Boa_Size	Size	ROA	Leverage	Gross profit	Growth	EQ_ BOD
Fem_Dir	1.000											
Age_Dir	0.215	1.000										
Years_ as_Dir	-0.173	0.342	1.000									
For_Emp	-0.032	0.059	0.102	1.000								
Fin_Exp	0.010	0.191	0.120	0.013	1.000							
Boa_Size	0.372	0.548	0.183	0.118	0.087	1.000						
Size	0.287	0.266	0.027	0.081	0.163	0.561	1.000					
ROA	-0.126	-0.030	-0.018	0.021	-0.050	-0.083	-0.113	1.000				
Leverage	0.038	0.036	0.057	-0.004	0.095	0.096	0.123	-0.021	1.000			
Gross profit	0.144	0.048	-0.015	-0.010	0.150	0.190	0.521	0.253	0.052	1.000		
Growth	-0.028	0.019	0.101	0.061	0.046	-0.037	-0.099	-0.024	0.021	-0.011	1.000	
EQ_BOD	-0.422	-0.088	0.128	0.037	0.007	-0.082	-0.142	0.0200	0.028	-0.209	0.064	1.000

Table 6: Pairwise correlation of independent variables – CEO

Variable	Fem_ CEO	Age_ CEO	Years_as _CEO	For_Emp_ CEO	Fin_Exp _CEO	Boa_Size	Size	ROA	Leverage	Gross profit	Growth	EQ_ CEO
Fem_CEO	1.000											
Age_CEO	-0.114	1.000										
Years_ as_CEO	-0.263	0.450	1.000									
For_Emp _CEO	-0.092	0.046	-0.015	1.000								
Fin_Exp_ CEO	0.211	0.012	-0.110	0.037	1.000							
Boa_Size	0.108	0.086	-0.111	-0.019	0.063	1.000						
Size	0.032	0.019	-0.142	-0.011	0.175	0.561	1.000					
ROA	-0.041	-0.020	0.045	0.094	0.002	-0.083	-0.113	1.000				
Leverage	0.083	-0.004	-0.045	-0.021	0.169	0.096	0.123	-0.021	1.000			
Gross profit	-0.030	-0.039	-0.033	0.030	0.120	0.190	0.521	0.253	0.052	1.000		
Growth	-0.186	-0.049	0.066	0.024	-0.070	-0.037	-0.099	-0.024	0.021	-0.011	1.000	
EQ_CEO	-0.686	0.072	0.189	0.051	-0.123	-0.054	-0.038	0.024	-0.065	-0.045	0.096	1.000

Appendix B – Hosmer-Lemeshow test

Table 7: Goodness of fit test using Hosmer-Lemeshow test

	Value	P-value
Model 1	7.260	0.509
Model 2	1.470	0.993
Model 3	8.99	0.343
Model 4	4.490	0.810