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Should the old boys' network change: the M&A perspective

Master Thesis U.S.E[1]

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Abstract

The corporate environment can be described as an old boys' network. However, this does seem to be changing as the number of female CEOs and female board members has been increasing. In addition, there has been higher social and institutional pressure for change. Therefore, it is important to know what effect a higher share of women in top positions can have on corporate behavior. This study focuses on corporate behavior during the M&A process, as M&A is one of the biggest decisions a firm can make. Most existing literature on the M&A process focuses on the effects of firm and market characteristics. The goal of this study, however, is to add to the literature on the effects of gender characteristics, by investigating gender differences in risk taking during the M&A process. In addition, the role of board gender diversity is investigated. This study empirically analyzes a sample of 870 deals done by S&P 500 firms in the period 2015-2019. The results indicate that gender differences are apparent in the choice of payment (cash vs. stock) as well as for the choice of target type (private vs. public). In addition, this study investigates whether board gender diversity moderates these gender differences. The results are more unclear, as only for the choice of target type a significant moderating effect was found. The results of this study therefore strengthen existing evidence on gender differences in corporate behavior, especially during the M&A process and can therefore serve as arguments for more gender quotas. Moreover, it adds to the existing literature by investigating the moderating role of board gender diversity, on which literature is relatively scarce.

JEL codes: C31, G34, M14

Key words: board gender diversity, gender differences, M&A, risk

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Chapter 1: Introduction

The current corporate environment is still an old boys' network. The old boys' network is especially present on boards consisting of men with similar educational and social backgrounds. These boards will be inclined to appoint new board members, who are part of their existing network (Allemand et al., 2021). According to Perrault (2014) these networks tend to be homophilous, consisting of older white males (Siciliano, 1996). However, the number of female CEOs and female board members has been increasing. This increase is due to higher social and institutional pressures, for example Spain and Norway both require public firms to have at least a 40% share of women on their boards (Terjesen et al., 2009). Furthermore, the EU as a whole debated a union wide gender quota in 2012 (G. Chen et al., 2014). The rationale is that the gender diversity of boards underrepresents the share of women in the workforce (Gregorič et al., 2015). As the presence of female CEOs and female board members is becoming more common, it is important to understand the impact of gender characteristics on corporate decision making.

One of the biggest decisions a firm can make are mergers and acquisitions (M&A), as M&A is an important growth and survival strategy (Hamood Al-Sabri et al., 2020). Moreover, M&A is one of the riskiest corporate investments. First, M&A is one of the largest investment decisions a firm can make (Leung et al., 2019). Second, most studies find that M&A destroys rather than creates value for the acquirer's shareholders (see e.g. Meckl, R., & Röhrle, F., 2016 and Moeller et al., 2004). Previous literature mostly focuses on firm, industry or market characteristics which influence the M&A process. For example, Hamood Al-Sabri et al. (2020) find that firm size, sales growth, leverage and cash holdings affect M&A likelihood. Nazarova and Koshelev (2020) show that return on equity and Tobin's Q affect the synergistic effect of acquisitions.

Recently however, there has been an increase in studies looking at the M&A process from a behavioral corporate finance perspective. For example Bertrand and Schoar (2003) find that age and educational level of CEOs are significantly related to risky M&A strategies. Additionally, Elnahas and Kim (2017) find that republican CEOs are less likely to engage in M&A, as well as being more risk averse. Gender characteristics also seem to affect the M&A process, with most literature focusing on the likelihood of M&A or post-M&A performance. For example it is argued that male board members and CEOs are more likely to make acquisitions, see e.g. Levi et al. (2014) and Huang and Kisgen (2012). Furthermore, Levi et al. (2008) find that female CEOs engaging in M&A will have CARs close to zero.

However, literature on gender characteristics affecting risk in the M&A process is limited, even though it has been argued that both male CEOs and male board members tend to take more risk than women during corporate decision making (see e.g. Faccio et al., 2016 & Tang et al., 2020). Trinh et al. (2020) state that female CEOs are more likely to use cash to fund M&A investments, as they are more risk-averse than their male counterparts. Furthermore, Bazel-Shoham et al. (2020) show how the share of female board members reduces risky cross-border acquisitions. This research contributes by investigating other risk measures in M&A, such as payment type, target type and deal type, as well as

by investigating the moderating role of board gender diversity. J. Chen et al. (2019) found that the presence of female board members decreases risk taking of male CEOs. However, their study focuses on the likelihood of holding deep-in-the-money options. Therefore, to our knowledge this interaction effect has not been researched for M&A decision making. This paper therefore extends the existing literature by examining the effect of CEO gender and board gender diversity on risk taking in M&A decisions. Consequently, this paper aims to answer the following question:

Do male CEOs take more risk than female CEOs during the M&A process and does board gender diversity moderate the gender differences in risk taking?

This question will be researched by investigating a sample of 870 M&A deals done by S&P 500 firms within the period 2015-2019. The dependent variable risk will be measured in different ways: payment method, deal type and target type, following Elnahas and Kim (2017). The empirical analysis shows that gender differences exist both for payment and target type. However, the moderating role of board gender diversity is less obvious as a significant effect is only found for the choice of target type.

The results of this research add to the literature by providing more evidence of the existence of gender differences in risk taking in general, as found by both psychology, economic and corporate literature (see e.g. Arch, 1993; Barber and Odean, 2001; Tang et al., 2020). This research also contributes to the extensive literature on corporate financial decision making, and specifically to literature on personal characteristics affecting risk taking in M&A activities. Previous studies have tried to explain M&A performance and risk taking by CEO age, education and more recently gender, see e.g. Bertrand and Schoar (2003) and Levi et al. (2014). Even though the literature on gender affecting M&A is increasing, most focus on firm performance, or the likelihood of acquiring. Additionally, most studies use gender as a control variable only, with no attention paid to the effects (see e.g. Plaksina et al., 2019). Therefore, this study provides more insights on the effects of gender on risk taking in the M&A process. Moreover, the results of this study add to the literature by providing evidence in favor of gender differences in corporate behavior, whereas other studies argue that these gender differences do not exist in the corporate world (see e.g. Farag and Mallin, 2016; Iqbal et al., 2006). Additionally, this research tries to fill a gap in the existing literature by looking not only at gender effects for CEOs but also the moderating role of board gender diversity, which until now has not been investigated much. Researching how gender differences can lead to differences in risk taking, could help advocating in favor of gender quotas.

The rest of this paper is structured as follows. In chapter 2, previous literature on M&A, gender differences in risk taking and different risk measures in M&A will be discussed. Furthermore chapter 2 will form the hypotheses. Chapter 3 will then explain both the methods and data used to test the hypotheses. Chapter 4 will present the results of the empirical analysis. Finally, chapter 5 will close with a discussion of the results, implications and future research directions.

Chapter 2: Literature review and theoretical framework

This chapter provides an overview of the existing literature as well as explaining some of the concepts mentioned. Furthermore, this chapter will form hypotheses based on the existing arguments and findings in the literature.

2.1 Mergers and acquisitions

M&A is one of the biggest decisions a firm can make. Firms use M&A as a growth strategy, by either acquiring certain assets or even acquiring competitors (Brueller et al., 2016). The main goal of a CEO and the board should be to maximize shareholder value and therefore the ultimate aim of M&A should also be to enhance shareholder value. However, previous studies have shown that M&A is more likely to destroy shareholder value than create it (see e.g. Meckl & Röhrle, 2016 and Moeller et al., 2004). Therefore there has been an increase in studies trying to explain why firms still engage in M&A.

Currently, four theories in the literature try to explain why mergers still happen (Leung et al., 2019). The first is empire building, which argues that managers will acquire firms to build an 'empire,' thereby increasing their own wealth and pursuing their own goals. This closely relates to agency theory, in which agents pursue their own goals instead of those of their principal (Jensen, 1986). The second theory focuses on synergies. This theory argues that combining assets of two firms will lead toward higher value (Bradley et al., 1988). Thirdly, there has been extensive research on manager hubris and/or overconfidence. The research argues that overconfidence leads to CEOs believing their opinion or valuation is the best (Malmendier & Tate, 2008). In addition, it could also mean that CEOs believe they can manage a firm better than others (Roll, 1986).

The last theory is based on personal characteristics. This research will also focus on this newer strand of literature. These studies argue that top management's characteristics influence the M&A process, like the likelihood of acquiring, cumulative abnormal returns (CARs), method of payments etc. For example, Bertrand and Schoar (2003) find that including manager effects like age and education add explanation to the number of acquisitions taken by a firm. Elnahas and Kim (2017) find that republican CEOs take less risky decisions during M&A. This study will extend the strand of literature on gender affecting M&A risk taking.

2.2 Gender differences in risk taking

Risk taking behavior has been a hot topic in many scientific fields, as 'risk taking' applies to a wide range of behaviors and therefore is a big part of daily life (Byrnes et al., 1999). The psychology field has done a lot of research on gender differences in risk taking behavior. Most of these studies have done experiments, where participants indicate the amount of risk they would take in hypothetical situations or report on risk they have taken in the past (Byrnes et al., 1999). The overall conclusion is that men take more risk than women.

More importantly, studies have tried to explain these differences in risk taking. Niederle and Vesterlund (2007) investigate the overconfidence of men and women in problem solving and find that

men are more overconfident. Overconfidence will lead to the belief that their opinions are right and therefore they are more willing to take risks. Arch (1993) argues that there are gender differences in the perception of risk. Males will see a risky situation as a challenge, while women see it as a threat. This is further explained by Croson and Gneezy (2009) who argue that women are more nervous in anticipation of negative outcomes. This indicates that women will try to reduce the chance of a negative outcome by being more risk averse.

Some economic literature has also focused on gender differences in risk taking behavior. Barber and Odean (2001) find that men tend to be more overconfident and therefore trade stocks more excessively than women. Hinz et al. (1997) find that women invest their pensions more conservatively, using data on participants in the Thrift Savings Plan. They find that many female participants invest their pensions in the minimum risk portfolio. Bernasek and Shwiff (2001) find the same results using a survey of universities' faculty.

2.3 Male vs. female CEOs

As the literature discussed suggests that women are more risk-averse than men, this difference is also expected for male and female CEOs. There has been quite some research focusing on differences in corporate risk-taking between male and female CEOs. However, the findings in the literature are varied. For example, Ho et al. (2014) find that female CEOs tend to be more conservative in financial reporting than male CEOs and argue that this is due to women's risk aversion. This conservatism was also found for female CEOs in China, whose firms tend to have higher cash holdings than their male counterparts (Zeng & Wang, 2015). The 2019 study of Hoang et al. examines the differences in risk preference between male and female CEOs in Vietnam. They find that female-managed firms are less likely to operate in industries with elevated levels of risk, suggesting that female CEOs prefer less risky industries. In addition, Khan and Vieito (2013) argue that firm risk level is lower when the CEO is a woman. This is supported by Faccio et al. (2016) who find that transitions from male to female CEOs reduces corporate risk taking. Moreover, their study shows that firms with female CEOs have lower leverage and volatility in earnings, as well as higher chances of survival. The lower leverage and earnings volatility for firms with female CEOs was also found in a case study by Tang et al. (2020).

There have also been some studies focusing on gender differences in risk taking during M&A specifically, however this strand of literature is limited. Some studies find that female CEOs are less acquisitive, see e.g. Huang & Kisgen (2012) & Levi et al. (2010). Furthermore, Huang and Kisgen (2012) find that male CEOs have a higher probability of making value-destroying M&A. Moreover, Levi et al. (2008) find that female CEOs are less likely to overpay, as bid premiums are 70% lower when the CEO is a woman.

Nevertheless, there are also arguments that gender differences in risk taking between CEOs do not exist. For example, Farag and Mallin (2016) investigated the effects of CEO demographic characteristics on corporate risk-taking in China. They found that female CEOs are not more risk averse

than male CEOs. In addition, Johnson and Powell (1994) compare risk taking for males and females with managerial and nonmanagerial characteristics. They find that in the managerial subsample, risk taking behavior is similar between men and women. Iqbal et al. (2006) investigate differences in stock selling behavior of female and male executives. They argue that if female executives were more risk-averse they would sell shares of their firm when receiving new stock options to diversify their portfolio. However, they find the opposite in that male executives tend to be more risk averse than their female counterparts.

Although the literature argues both against and in favor of gender differences in corporate risk taking, Khan and Vieito (2013) find that the difference in risk taking between men and women tends to increase in situations involving ambiguity and uncertainty. Lenney (1977) also argues that gender differences in risk taking persist in tasks with unclear feedback. Since M&A involves a lot of uncertainty and leads to mixed results, we assume that gender differences in corporate risk taking exist in the M&A context (Zollo, 2009).

2.4 Risk in M&A

Psychological literature defines risk taking as the act of implementing a goal, when the behavior could lead to both positive and negative outcomes (Byrnes et al., 1999). Risk taking in M&A can therefore take various forms, as many decisions in the M&A process fall under this definition. Following Elnahas and Kim (2017), we measure risk in three different ways, payment method (cash vs. stock), target type (public vs. private) and deal type (focus increasing vs. diversification).

2.4.1 Payment method

M&A deals are usually financed with cash or stock. Overall, the corporate finance literature agrees that paying with stock is riskier than paying with cash. Firstly, the literature has investigated the effects of payment method on post-merger performance. The findings show that post-merger cumulative abnormal returns are negative for stock deals, while cash deals have zero to positive returns, see e.g. Chi et al. (2011), Mateev (2017) and Servaes (1991). In addition, Rao-Nicholson et al. (2016) find that in ASEAN countries, firms using stock as payment have lower operating performance in the long-term than firms using cash. This indicates that stock deals are riskier due to the chances of negative outcomes. As women tend to be more nervous than men in anticipation of negative outcomes, we expect women to be less likely to pay with stock (Croson and Gneezy, 2009).

Secondly, literature argues that stock financed deals are likely to been seen as unfavorable by investors. Sehgal et al. (2012) argue that acquisitions paid with cash reduce the agency costs of free cash flows. Moreover, they argue that a stock offer is a signal that the stock of the acquirer is overvalued, which is also argued by Chi et al. (2011). If target firms are aware of this, they will not naively accept a stock offer (Eckbo et al., 2018). In relation, deals involving cash will be accepted more quickly by the target firm, as cash value is certain while stock value is not (Chi et al., 2011). The quicker acceptance

can lead to lower risk of having to pay a high premium, due to the reduced chances of competitive bids, which will be preferred by investors (Fishman, 1989).

Thirdly, shareholders of the acquirer might not be happy with a stock financed deal. The issuance of new stock could dilute the earnings of the current shareholders (Rani et al., 2015). The shareholders could oppose the deal or convince the board to do so.

Again, women tend to be more risk averse in situations of uncertain or negative outcomes, while men will see this as a challenge (Arch, 1993; Croson and Gneezy, 2009). Hence, due to the higher risks of negative performance, overpayment, a rejected offer, the possibility of displeased shareholders and the risk averseness of women, our first hypothesis is:

H_1: Male CEOs are more likely to pay with stock than female CEOs

2.4.2 Type of target

Firms can acquire both public and private firms, however they need to consider the differences. Public firms are listed on stock exchanges, requiring them to provide financial results and information. Private firms do not have this obligation, which means there is a lot less information available. In addition, Yuce and Ng (2009) argue that private companies are riskier investments as they are usually smaller companies with more volatile cash flows and difficulties in raising capital.

The lack of available information can lead to issues involving information asymmetry. The target firm knows the value of their assets, while the acquirer will struggle with valuation (Capron and Shen, 2007; Elnahas and Kim, 2017; Yuce and Ng, 2009). This can lead to overpayment, which has been proven to increase chances of deal failure (Mallikarjunappa & Nayak, 2007). Therefore, acquiring private firms is riskier than acquiring public firms as there is a higher chance of deal failure. In addition, deal failure can easily be anticipated beforehand in deals involving a public target (Craninckx and Huyghebaert, 2010). However, this is not the case for deals involving private targets due to information asymmetry. Hence, chances of deal failure are not only higher with private targets, but also less predictable and therefore acquiring a private target is riskier than acquiring a public target. According to Niederle and Vesterlund (2007) men are more likely to be overconfident and will therefore believe that they are right in valuing a company and assessing the chances of failure, while women will be more risk averse. Therefore our second hypothesis is:

H_2: Male CEOs are more likely to buy private firms than female CEOs

2.4.3 Deal type

When firms engage in M&A, they can choose to diversify or not. Diversification means that the target firm's operations are in a different industry than the acquirer's operations. Therefore, M&A might be a good strategy for a firm wanting to enter a new industry (Martin & Sayrak, 2003). Although diversification is said to reduce stock portfolio risk (Sharpe, 1995), it is not expected to reduce risk for firms. In fact, diversifying M&A has been proven to destroy shareholder value by selling at a 'diversification discount'. For example, Berger and Ofek (1995) find that there is a 13-15% average firm value loss due to diversification. Furthermore, Stulz (1994) finds that diversified firms are

consistently lower valued than undiversified firms. These results indicate that engaging in diversifying M&A involves the risk of destroying rather than creating shareholder value.

Furthermore, Wu and Chiang (2019) research the impact of diversified M&A on corporate risk. They argue that diversification leads to information asymmetry as well as information overload. These situations of information overload create possibilities for opportunistic behavior of lower-level management, which could result in higher monitoring costs. Increased monitoring could lead to decreased effort by employees, and therefore could lead to lower performance. In addition, Custodio (2012) also argues that diversification is a risky strategy, as it can lead to inefficiencies, for example inefficient internal capital markets and higher agency costs.

Wu and Chiang (2019) further comment on the high chance of differing corporate cultures between acquirer and target firm. Indeed, Gordon (1991) argues that corporate culture is influenced by the industry of the firm. Therefore, firms in a diversifying deal are likely to have different corporate cultures. This could lead to issues in the negotiation and integration phase of the M&A process. Moreover, it has been found that deals are more likely to fail if corporate culture differs (Perry and Herd, 2004). Therefore, diversifying deals have a higher chance of failure and hence are riskier than a focus increasing deal.

Lastly, it should be noted that firms have two options when they want to diversify. Diversification can be done internally or externally with a deal. Overall, internal diversification is argued to be less risky, as management has more time for the planning and integration, as well as limited issues with differing cultures (Hornstein and Nguyen, 2014). So, even if firms have no choice but to engage in diversification, we expect female CEOs to choose internal diversification as it is less risky than external diversification.

In conclusion, diversifying deals seem to be riskier than focus increasing deals due to lower firm value, negative performance, and higher chances of failure. Again, women are expected to avoid these negative outcomes, which is why we expect them not to engage in diversifying mergers. Meanwhile, men, especially overconfident men, will see the risks associated with diversification as a challenge. Therefore, our third hypothesis is:

H_3: Male CEOs are more likely to engage in diversifying M&A than female CEOs

2.5 Moderating role of board gender diversity

As discussed above, we expect male CEOs to take more risk than female CEOs. In addition, we suspect that a higher share of female board members will also lead to less risk. Again, existing research comes to contradicting conclusions. Most studies focusing on firm performance and outcomes find non-significant effects of board gender diversity. For example, Parrotta & Smith (2013) find that board gender diversity does not significantly impact volatility in firm performance. However, the literature on board gender diversity affecting the M&A process does find significant effects. For example, Levi et al. (2011) find that bid premiums decrease with board gender diversity, measured as the share of female

board members. In addition, Trinh et al. (2020) find that in the UK from 2006-2016, a higher share of female board members led to higher dividend payouts leading to less cash left for M&A. Based on the previous literature, we expect a higher share of female board members to be negatively related to risk taking during the M&A process.

The next step is to investigate whether board gender diversity plays a moderating role in the gender differences in risk taking. Do female board members have enough influence to lower risk taking by male CEOs? J. Chen et al. (2019) found that as the share of female board members increases male CEOs tend to hold less deep-in-the-money stock options indicating less risk. It is important to also investigate this for M&A as boards are usually involved in the M&A process. The arguments for this moderating effect include peer pressure, differing values and opinions, and monitoring.

2.5.1 Peer pressure

M&A involves big investments and will most likely be discussed within the board. CEOs can be influenced by the opinions of board members. Psychology literature has heavily investigated the differences between men and women with regards to peer pressure and/or influence. Mears et al. (1998) argue that males are more influenceable than females. Although their study focuses on delinquency, other studies and experiments in other areas find similar results. For example, Wallach et al. (1962) found that males are more likely to increase risk when in groups. It has to be noted that most research focuses on adolescents as adolescents have more opportunity for risk taking than adults (Gardner and Steinberg, 2005). However, in their 2007 research, Steinberg and Monahan find that males are less resistant to peer influence than females regardless of their age. According to the evidence in psychology we expect that male CEOs are more prone to peer pressure than female CEOs. First, this could mean that male CEOs take more risk than they would individually because they are pressured by risk loving male board members and an increasing share of female board members reduces this peer pressure. It could also mean that a higher share of female board members peer pressures the male CEO into taking more risk-averse decisions.

The 2008 study by Singh et al. closely relates to this train of thought. They argue that women in top positions tend to be more educated than men in top positions, exemplifying the idea that women in top positions have to work twice as hard as men. This can be explained by status characteristics theory, which argues that minority groups', in this case women's, abilities are judged under a double standard (Muller-Kahle & Schiehll, 2013). Singh et al. (2008) further argue that higher education leads to the ability of independent thinking. Therefore, a male CEO might lack this ability and will easily agree with the board members. Hence, a high share of females on the board could persuade a male CEO to take less risky decisions.

2.5.2 Old boys' network

It is known that the corporate world is an old boys' network. Although the workforce has become more female, women are still heavily underrepresented in top positions. The old boys' network in the corporate world consists of older white men, with similar values and opinions (Siciliano, 1996). In

addition, men tend to be overconfident in their abilities and firms' prospects (J. Chen et al., 2019). The overconfidence combined with similarity between CEO and board members leads to excessive risk taking. Obviously, women are still a minority in board rooms, however Hillman et al. (2002) argue that women are salient and therefore are perceived as more influential. Women are likely to bring in different opinions, new ideas and better communication (Singh et al., 2008). Multiple studies further argue that board diversity will lead to more conflict which in turn leads to more efficient decision making (see e.g. G. Chen et al., 2005; Miller & del Carmen Triana, 2009). Additionally, board gender diversity leads to less rapid agreements as it increases the competitiveness of board interactions (G. Chen et al., 2014). Overall, this would suggest that female board members could decrease the risk taking by male CEOs by bringing in different opinions and reducing overconfidence.

2.5.3 Monitoring

Not only do female board members bring different values and opinions to board meetings, but there is also evidence that they increase monitoring of the CEO (see e.g. Adams et al., 2010; Srinidhi et al., 2011). Adams and Ferreira (2009) show that in their sample of US firms, female board members attend board meetings more frequently than men. This indicates that women have more influence as their opinions and ideas are actually heard. Additionally, they find that male board members lessen their attendance issues when there are more female board members. These findings indicate that board gender diversity increases the effort of the board to monitor the CEO. G. Chen et al. (2014) also argue that board gender diversity will lead to more comprehensive evaluations and oversight of the CEO. As a CEO is monitored more heavily and held accountable, they might decrease their risk taking (Adam & Ferreira, 2009). However, this effect is not expected for female CEOs as they are already risk averse.

Therefore, our fourth and last hypothesis is:

H_4: Board gender diversity plays a moderating role in the relationship between gender and risk taking during the M&A process

These hypotheses form the following conceptual model:

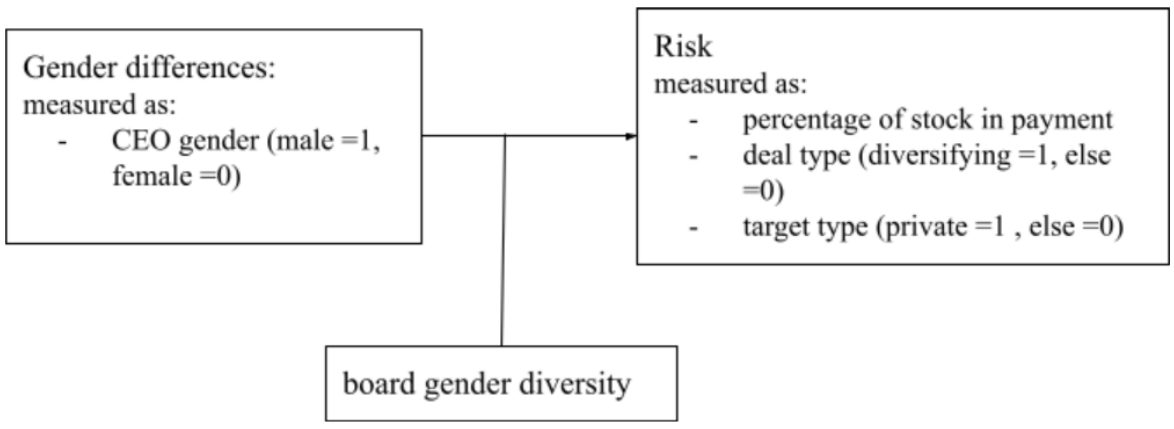

Figure 1: Conceptual model

Chapter 3: Methodology and empirical strategy

This section will explain the methodology and empirical strategy of this research. First the sample selection and data gathering is explained. A description of all variables used follows, including independent, dependent and control variables. Lastly, this section will elaborate on the empirical models used and provide some measurement assessments.

3.1 Sample

As women in top positions is only a recent phenomenon, it is best to use recent data. Therefore, our sample includes deals from the 1st of January 2015 until the 31st of December 2019. We do not include any deals past 2019 as we do not want the covid crisis to interfere with our results. We further choose to include only the firms which were part of the S&P 500 within our time period, as these are more likely to be included in the databases.

For all firms part of the S&P 500 between January 1st, 2015, and December 31st , 2019, we gathered CEO information from Compustat Execucomp, keeping only the observations that involve the CEO. Some firms have the same CEO in those five years, while others change CEOs. Furthermore, as some firms have gone private or bankrupt within our time period, not all firms have observations for 5 years. Data on firm financials comes from Compustat North America Fundamental Annuals. However, firm financials for firms with only financial services were not available and therefore we exclude them from this research. Specific board data, like board gender diversity and board size is gathered from Thomas Reuters' Eikon. These databases are merged together based on ticker symbol and year, giving us 2123 observations.

To retrieve data on M&A deals within this time period Thomas Reuters' Eikon is used. Furthermore, we gather M&A data for deals where the nation of the acquirer is the United States and the acquirer acquired more than 50% of the target firm. Moreover, we got rid of any deals that had a deal size below $1 million, as board members and CEOs will most likely only be involved with larger acquisitions (Alexandridis et al., 2020; Elnahas & Kim, 2017). This gives us 11,453 total deals within our time period. However, this includes all deals, not just the ones where the acquirer is part of our sample of firms. Merging the data together based on ticker symbol and year and getting rid of any observations that lack needed data, we are left with 870 deals from 298 firms who were part of the S&P 500 within our sample period. Some firms might have multiple deals within one year, or none. The most frequent acquirers are Cisco Systems and the Boston Scientific Corporation with 17 and 16 deals between January 1st, 2015, and December 31st, 2019, respectively. Further characteristics of the sample can be found in table 1. Interesting to note is that in this final sample, 96.1% of the CEOs is male, while in the full sample of S&P 500 companies, 95% of the CEOs was male. This could indicate that men are slightly more likely to undertake M&A, as the percentage of female CEOs undertaking deals is lower than the percentage of females in the initial sample.

Table 1: Data characteristics (n = 870)

Characteristic	Frequency in sample	Percentage of sample
CEO age		
< 40	5	0.57
40-44	12	1.38
45-49	68	7.82
50-54	199	22.87
55-59	259	29.77
60-64	245	28.16
65-69	54	6.21
>70	28	3.22
CEO gender		
Male	836	96.1
Female	34	3.9
Year		
2015	202	23.22
2016	171	19.66
2017	190	21.84
2018	173	19.89
2019	134	15.40
Board size		
<6	9	1.03
6-10	389	44.71
11-12	313	35.98
13-14	121	13.91
>15	38	4.37
Board gender diversity (% of females)		
0	16	1.84
1-9	41	4.71
10-19	228	26.21
20-29	383	44.02
30-39	167	19.20
40-49	31	3.56
>=50	4	0.46
Total revenue (in millions of dollars)		
<5000	264	30.34
5,000-14,999	283	32.53
15,000-24,999	91	10.46
25,000-34,999	40	4.60
35,000-44,999	41	4.71
45,000-54,999	48	5.52
>55,000	103	11.84
Target type		
Joint Venture	15	1.72
Private	301	34.60
Public	184	21.15
Subsidiary	370	42.53
Deal type		
Diversifying	428	49.20
Focus increasing	442	50.80

3.2 Measures

3.2.1 Dependent variables

As discussed in chapter 2, risk taking in the M&A process can happen during the choice of payment method, choice of deal type and choice of target type. The first dependent variable is therefore a measure

of payment method. The variable stock represents the percentage of stock used in the total payment. The second dependent variable is a measure for the type of target acquired. It will be a dummy variable equal to one if the target acquired was a private firm. Therefore, the dependent variable represents the likelihood of acquiring a private target. The third dependent variable is a measure of deal type, firms either use M&A to increase their focus on current operations or they choose to diversify into different operations. This dependent variable will be a dummy equal to one if the two firms are in different industries, indicating diversification. This dummy will be created by looking at the Standard Industrial Classification (SIC) codes of the acquirer and target firm. When the target has a different major SIC group than the acquirer, the deal is classified as diversification. For an overview of the possible major SIC groups see Appendix A.

3.2.2 Independent variables

This research uses two independent variables, which also combine into an interaction term to test hypothesis 4. The first independent variable is *male*, which we will use to test hypotheses 1, 2 and 3. This will be a dummy variable equal to one when the CEO is male, and zero otherwise. This measures the difference in probability of paying with stock, diversifying and/or acquiring a private firm between male and female CEOs and is expected to be positive.

The second independent variable is *board gender diversity*, measured as the percentage of female board members on the board. We take board gender diversity from the previous fiscal year, as it takes some time for women to gain influence (Liu et al., 2014). The expectation is that if the share of female board members increases, risk taking decreases. However, as we expect this effect to be bigger when the CEO is male, we have a third independent variable which is the interaction term *male x boardgenderdiversity*. We include an interaction term, instead of separate regressions on male and female CEOs as J. Chen et al. (2019) have done, as with an interaction term we can test whether the difference between effects is significant (Stone & Hollenbeck, 1984). This measure will be used to test hypothesis four.

3.2.3 Control variables

We further include several CEO and firm characteristics that could possibly influence the risk level taken in the M&A process. First, we control for CEO age, as Bertrand and Schoar (2003) have found age to be negatively related to risk.

We also control for firm size, measured by total sales or revenue, as small firms are more likely to pay with cash and more likely to make diversifying acquisitions, while large firms are more likely to acquire public firms (Moeller et al., 2004). Furthermore, we control for cash holdings, measured as cash and short-term investments divided by total assets, following Faccio and Masulis (2005), as well as leverage. Obviously, firms with higher levels of cash are more likely to pay with cash. Furthermore, firms with low cash holdings might want to increase debt levels to be able to pay with cash. However, if these firms have high existing leverage (debt/equity), it will be harder for them to get additional loans (Alexandridis et al., 2020). Therefore, a positive relationship is expected between leverage and using

stock as payment. In addition, we expect both cash holdings and leverage to have an effect on the likelihood of diversification and the likelihood of buying a private firm, as there would be more expenditure on gathering information about potential targets (Capron & Shen, 2007). Higher cash holdings are therefore expected to have a positive effect on the likelihood of buying a private firm and choosing a diversifying deal, while a higher leverage will have a negative effect on both.

Lastly, we control for board size. Following Liu et al. (2014), we take board size of the previous year as the decisions on M&A take some time. Board size is a standard control variable in related literature. The idea is that larger boards have more collective knowledge and skill to challenge the CEO and are therefore more skilled at stopping the CEO of taking high risks (Defrancq et al., 2020).

For an overview of all variables, descriptions and databases used, see Appendix B.

3.3 Empirical model

An assumption for regression analysis is that the variables are normally distributed. To ensure that this is the case, all the distributions of numerical variables were checked, for an overview see Appendix C. After analyzing the distribution of all variables, we decided to use log transformed variables for stock, revenue and cash holdings to make them more normally distributed (Higgins et al., 2008). Altogether, all hypotheses will be tested with the following models:

Model 1 (H1 & H4):

$$\text{Log}\,(stock_i) = \beta_0 + \beta_1 male_i + \beta_2 boardgenderdiversity_i + \beta_3 malexboardgenderdiversity_i + \beta_4 CEOage_i + \beta_5 \log(revenue)_i + \beta_6 \log(cashholdings)_i + \beta_7 DE_i + \beta_8 boardsize_i + e_i$$

Model 2 (H2 & H4):

$$private_i = \beta_0 + \beta_1 male_i + \beta_2 boardgenderdiversity_i + \beta_3 malexboardgenderdiversity_i + \beta_4 CEOage_i + \beta_5 \log(revenue)_i + \beta_6 \log(cashholdings)_i + \beta_7 DE_i + \beta_8 boardsize_i + e_i$$

Model 3 (H3 & H4):

$$diversify_i = \beta_0 + \beta_1 male_i + \beta_2 boardgenderdiversity_i + \beta_3 malexboardgenderdiversity_i + \beta_4 CEOage_i + \beta_5 \log(revenue)_i + \beta_6 \log(cashholdings)_i + \beta_7 DE_i + \beta_8 boardsize_i + e_i$$

The regressions will take the form of hierarchical regressions, where we first test the control variables and then add the independent variables in the second step and the interaction term in the third step.

For models 2 and 3 the dependent variables are dummy variables, meaning they can take on either the value of 0 or 1, therefore the regressions will be linear probability models (LPM). This means that a change in the dependent variable will always be in percentage points, and we should always correct for heteroskedasticity. A disadvantage of LPM is that the predicted values could fall outside of the 0-1 range. A logit or probit model would solve this issue, however Chatla and Shmueli (2013) find that both

models estimate similar marginal effects as LPM. Therefore, for this research LPM will be used for models 2 and 3.

3.4 Measurement assessment

Summary statistics and correlations between variables can be found in tables 2 and 3 respectively. Some insights from table 2 tell us that at least 75% of the sample uses no stock in their payment. Whereas the other dependent variables diversify and private seem to be more equally divided. Furthermore, 96.1% of the sample consist of male CEOs, this means that observations are not equally divided. However, it has been found that only 4% of all Fortune 500 CEOs in 2013 were women and therefore this is an expected division (Pillemer et al., 2014).

Table 2: Summary statistics (n=870)

	Min	1st quantile	Median	3rd quantile	Max	Mean	Standard deviation
Stock	0	0	0	0	100	7.472	22.44
Diversify	0	0	0	1	1	0.492	0.50
Private	0	0	0	1	1	0.346	0.48
Male	0	1	1	1	1	0.961	0.19
CEO age	35	53	57	61	80	57.37	6.28
Board gender diversity	0	15.38	20.52	27.27	56.25	21.13	8.90
Total sales (in millions)	519.4	4278.1	9654.4	26259.0	511729.0	28881.7	56709.1
Cash holdings (%)	0.01	2.79	7.43	15.76	68.35	11.87	12.92
Debt-to-equity	-776.6	0.45	0.69	1.22	167.6	-0.56	37.95
Board size	5	9	11	12	19	10.78	2.10

3.4.1 Multicollinearity

For the regression results to be interpretable, there should be no or at least low multicollinearity. Multicollinearity means that the correlations among variables are high enough to inflate standard errors and therefore to bias the results (Iacobucci et al., 2015). Correlations shown in table 3 do not show any highly positive or negative correlations. The highest correlation is 0.420 between log(revenue) and board size. This means that when revenue moves, board size tends to move in the same direction and vice versa. None of the other significant correlations are very high, indicating that there are no issues of multicollinearity. In addition, variation inflation factors were tested on all empirical models. VIFs for the variables included in the interaction term were unusually larger than 1, which indicates problems of multicollinearity (Mansfield & Helms, 1982). According to Iacobucci et al. (2015), a solution would be to mean center these variables before computing the interaction term. Therefore, we have subtracted the mean values from all observations for the variables *male* and *board gender diversity* making their means zero. The new VIFs are all between 1 and 2, so issues of multicollinearity have been solved.

Table 3: Correlations between variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Log (stock%)	-									
2. CEO age	-0.05	-								
3. BGDlast	-0.09***	-0.06*	-							
4. Log (total sales)	-0.02	0.08**	0.28***	-						
5. Log (cash holdings)	-0.04	0.02	0.02	0.17***	-					
6. Debt-to-equity	-0.12***	-0.03	0.13***	0.02	0.10***	-				
7. Board size	-0.04	0.02	0.26***	0.42***	0.04	0.03	-			
8. Male	0.04	-0.03	-0.14***	-0.07*	0.03	-0.01	-0.10***	-		
9. Private	-0.09***	-0.02	0.07**	-0.03	0.12***	0.02	-0.01	0.11	-	
10. Diversify	-0.17***	0.01	0.01	-0.03	-0.04	0.05	-0.05	-0.01	0.02	-

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

Note: Correlations between continuous variables are Pearson correlation (1-7) Correlations between continuous and binary variables are point bi-serial correlations (1-7 with 8-10). Correlations between binary variables are tetrachoric correlations, for which there is no available p-value (8-10). Tetrachoric correlation coefficients are useful for correlations between two binary variables (Divgi, 1979). A tetrachoric correlation coefficient close to 1 indicates that the variables are in agreement (Glen, 2020).

3.4.2 Heteroskedasticity

Another assumption needed to be addressed is heteroskedasticity. For multiple regression analysis to have unbiased standard errors, homoskedasticity must hold. This means that the error term should have the same variance for any value of the explanatory variables (Wooldridge, 2013). If heteroskedasticity is found, we need to correct for it with robust standard errors. For the models involving diversification and private as dependent variables, heteroskedasticity must be controlled for as these are linear probability models. However, for model 1, we need to check whether heteroskedasticity is an issue, and if so, control for it. To test for heteroskedasticity, we can run a Breusch-Pagan test. The Breusch-Pagan test regresses the squared residuals from the model on the variables. We then calculate the p-value using the R-squared from this regression, if the p-value is small, we reject the null hypothesis of homoskedasticity and we need to use robust standard errors (Wooldridge, 2013). For the first model, the Breusch-Pagan test gives us a p-value of 0.12. As this is not lower than 0.05 (the significance level), we fail to reject the null hypothesis. Therefore, there is no need to correct for heteroskedasticity, as it is not present in the model.

Chapter 4: Results

In this chapter, the results of our empirical models will be shown and explained. This will lead to conclusions on the hypotheses. Furthermore, this chapter will provide robustness tests where necessary to check for validity of the results.

4.1 Hypothesis testing

4.1.1 Model 1

The results of the first empirical model can be found in table 4. The first step shows the effects of the control variables on the percentage of stock used in the total payment. This model explains about 2% of the variation in the percentage of stock used, as shown by the r squared. However, only the debt-to-equity ratio has a significant effect on the percentage of stock used in payments (β=-0.004, $p<0.01$). So, when the debt-to-equity ratio increases with 1, the percentage of stock used in the total payment approximately decreases with 0.4%, ceteris paribus. This is not the sign expected as we expected firms with higher leverage to be more likely to pay with stock. All other variables except board size have the hypothesized sign, however they are not statistically significant.

Table 4: Effect of CEO gender on stock payments (model 1)

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	-0.011	-0.012*	-0.013*
	(0.007)	(0.007)	(0.007)
Log (revenue)	0.006	0.025	0.026
	(0.038)	(0.039)	(0.039)
Log (cash holdings)	-0.034	-0.039	-0.039
	(0.047)	(0.047)	(0.047)
DE	-0.004***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)
Board size	0.024	-0.014	-0.013
	(0.023)	(0.024)	(0.024)
Main effects			
Male		0.198	0.409
		(0.233)	(0.286)
Board gender diversity		-0.012**	-0.012**
		(0.005)	(0.005)
Interaction term			-0.035
			(0.027)
R^2	0.019	0.027	0.028
F-statistic	3.515***	3.39***	3.172***
R^2 change		0.008	0.001
F-change statistic		3.038**	2.80

n=870. *** $p\leq.01$, ** $p\leq.05$. * $p\leq.10$. (2-tailed)

In the second step we add the independent variables *male* and *board gender diversity*. This model is significantly more explanatory than the first (F-change: 3.038), it adds 0.8% to the explanation of variation in the percentage of stock used in the total payment. Debt-to-equity maintains significant as in step 1, however CEO age and board gender diversity are now also statistically significant. Everything else equal, a one-year older CEO will pay with 1.2% less stock. Furthermore, an increase of one

percentage point in board gender diversity results in a 1.2% decrease in the percentage of stock used in the total payment, ceteris paribus. This is in line with the expectations, an older CEO takes less risk and more female board members decrease risk. However, the results do not support hypothesis 1. We hypothesized that having a male CEO would increase the percentage of stock used in the payment. Yet, the results show that our independent variable male has no significant effect on the percentage of stock used (β=0.198, n.s). Therefore, there seems to be no difference in payment choice between male and female CEOs.

Step 3 adds the interaction term to the model, however this model is not significantly better than step 2 (F-change is not significant). This is logical as the interaction term is not significant and all other coefficients stay similar to their values in step 2. From these results, we conclude that the effect of board gender diversity on the percentage of stock used does not differ between male and female CEOs. The results therefore do not support hypothesis 4.

4.1.2 Model 2

Our second hypothesis expects male CEOs to be more likely to acquire private firms than female CEOs. The simplest way to check for any differences is looking at the relative numbers in our sample. While 34% (292/836) of male CEOs chose to acquire a private target, only 26% (9/34) of female CEOs decided to do so. This indicates that there is some difference, and it has to be tested with our empirical model.

The results for the second empirical model can be found in table 5. In the first step, we only test the effect of the control variables on the probability of acquiring a private target. Overall, the model explains 1.7% of the variation in the probability of acquiring a private target. Only cash holdings and age have the expected signs, although the effects of leverage and board size are practically zero. Moreover, only cash holdings seem to have a significant effect on the probability of acquiring a private target (β=0.064, p-value<0.01). Holding everything else constant, a 1% increase in cash holdings, will result in a 0.064 percentage points higher probability of acquiring a private target. Although this effect is statistically significant, it is very small and therefore lacks economic relevance.

The second step adds the independent variables *male* and *board gender diversity*, while the third step adds the interaction term. The model in the third step has all our variables and has the highest R-squared (2.9%), therefore we can test both hypothesis 2 and hypothesis 4 with the model in step 3. First, we see that firms with higher revenues have a lower probability of acquiring a private target (β=-0.025, p-value<0.10), while firms with high levels of cash are more likely to acquire a private target (β=0.065, p-value<0.01). All the other control variables are not statistically significant.

All our independent variables, including the interaction term are significant. We can interpret the coefficients as follows. First, if board gender diversity is 0%, a male CEO is 20.2 percentage points more likely to buy a private target than female CEOs, everything else equal. Therefore, these results support hypothesis 2. Second, a one percentage point increase in board gender diversity increases the likelihood of acquiring a private target by 0.5 percentage points if the CEO is female, ceteris paribus. If the CEO is male, a one percentage point increase in board gender diversity results in (0.005-0.018) a 1.3

percentage point decrease in the likelihood of acquiring a private target, ceteris paribus. As the effect of board gender diversity differs per gender and in addition board gender diversity decreases the risk taking by male CEOs, these results support hypothesis 4.

Table 5: Effect of CEO gender on target type (Model 2)

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	-0.001	-0.0004	-0.0006
	(0.003)	(0.003)	(0.003)
Log(revenue)	-0.018	-0.025*	-0.025*
	(0.014)	(0.015)	(0.015)
Log (cash holdings)	0.064***	0.065***	0.065***
	(0.017)	(0.017)	(0.017)
DE	0.0002	0.000	0.000
	(0.0001)	(0.0001)	(0.0001)
Board size	0.0002	-0.0025	-0.002
	(0.008)	(0.008)	(0.008)
Independent variable			
Male		0.094	0.202**
		(0.075)	(0.080)
Board gender diversity		0.005**	0.005**
		(0.002)	(0.002)
Interaction term			-0.018**
			(0.0078)
R^2	0.018	0.026	0.029
F-statistic	3.11***	3.283***	3.287***
R^2 change		0.008	0.003
F-change statistic		3.663**	3.256**

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

4.1.3 Model 3

As for hypothesis 2, the easiest way to see differences between male and female CEOs, is by looking at the relative numbers. Defining diversification as acquiring a target with a different major SIC than the acquirer, we see that 50% of female CEOs diversify, and 49.2% of male CEOs diversify. This would indicate that there are no gender differences in risk taking measured as diversifying. The results in table 6 hint at the same conclusion. In the first step only the control variables are tested. Not only are all effects small, and most statistically insignificant, but the entire model is insignificant (F=1.656, n.s). This means we cannot infer any results from this model. In step 2, we add the independent variables to test our hypothesis. However, again this model in its entirety is insignificant. Adding the interaction term in step 3 does not help and the model is still insignificant. Therefore, we cannot conclude anything from this model, except that these variables together do not explain the probability of a diversifying deal.

Table 6: Effect of CEO gender on deal type (model 3)

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	0.001	0.001	0.001
	(0.003)	(0.003)	(0.003)
Log(revenue)	-0.019	-0.019	-0.020
	(0.015)	(0.015)	(0.015)
Log (cash holdings)	-0.023	-0.023	-0.023
	(0.018)	(0.018)	(0.018)
DE	0.001***	0.001***	0.001***
	(0.0001)	(0.0001)	(0.0001)
Board size	0.016*	0.016*	0.016*
	(0.009)	(0.009)	(0.009)
Independent variable			
Male		0.007	-0.022
		(0.088)	(0.104)
Board gender diversity		0.0001	0.0001
		(0.002)	(0.002)
Interaction term			0.005
			(0.011)
R^2	0.009	0.009	0.0092
F-statistic	1.565	1.116	1.003
R^2 change		0.00	0.0002
F-change statistic		0.005	0.216

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

4.2 Robustness checks

4.2.1: Cash instead of stock

Although our original model shows no support for hypothesis 1, the relative numbers in the sample tell a different story: male CEOs do seem to pay with stock more than female CEOs. Only 2 out of 34 (5.8%) female CEOs paid some percentage of stock, while 108 out of 836 (13%) male CEOs paid with at least some percentage of stock. This would indicate that in fact male CEOs are more likely to pay with stock than female CEOs. The issue with our sample could be that there are some observations where it is stated that the consideration was cash and stock, however the stock percentage given is 0%. It could also be that data is missing and therefore the percentage of stock payment has been listed under 'other' or 'unknown'. Hence, it might be good to also test the same model with a different dependent variable, for example by the percentage of cash used in the total payment. This variable has much more non-zero observations. Stock percentage has 110 non-zero observations, while cash percentage has 464 non-zero observations. If it is the case that cash is less risky than stock payments and male CEOs take more risk, then male CEOs should pay with less cash than female CEOs. If the results from our initial model are valid, the results from this model should be similar, although have opposite signs. The results of this model can be found in table 7. Note that this is the percentage of cash in level-form, so the interpretation slightly differs from table 4.

From table 7, we can see that the control variables explain 2% of the variation in the percentage of cash in deal payments. In this model CEO age, total sales (revenue) and cash holdings have significant

effects. As expected, firms with higher levels of cash pay with a higher percentage of cash (β=4.26, p<0.05). However, in contrast to our expectations, bigger firms (measured as total sales) pay with a higher percentage of cash (β=2.642, p<0.10) and older CEOs tend to pay less with cash (β=-0.606, p<0.05).

Table 7: Effect of CEO gender on cash payment

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	-0.606**	-0.625**	-0.610**
	(0.252)	(0.253)	(0.251)
Log (revenue)	2.642*	2.622*	2.596*
	(1.361)	(1.389)	(1.360)
Log (cash holdings)	4.260**	4.400***	4.384***
	(1.676)	(0.042)	(1.623)
DE	-0.009	-0.009	-0.010
	(0.042)	(0.042)	(0.021)
Board size	-1.015	-1.147	-1.185
	(0.828)	(0.838)	(0.836)
Main effects			
Male		-20.04**	-28.11***
		(8.239)	(8.407)
Board gender diversity		-0.050	-0.049
		(0.191)	(0.191)
Interaction term			1.322
			(0.901)
R^2	0.020	0.0263	0.0284
F-statistic	3.454***	3.323***	3.146***
R^2 change		0.0063	0.0021
F-change statistic		2.96*	1.88

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)
Note: Breusch-Pagan tests were performed and no indication of heteroskedasticity was found in steps 1 and 2. The standard errors in model 3 are robust, as heteroskedasticity was found.

Step 2 does significantly add explanation to the variation in the percentage of cash used (F-change = 2.96, p-value<0.1). Furthermore, the independent variable *male* is significant with a coefficient of -20.04. This indicates that male CEOs pay for M&A deals with 20.04 percentage points less cash than female CEOs, ceteris paribus. Adding the interaction term in step 3, does not make the model statistically better than the model in step 2. Although even in step 3, there is a significant difference between male and female CEOs (β=-28.11, p<0.05). So, although we find no evidence for our first hypothesis using our initial model, we do find a significant difference in paying with cash. This could be due to incorrect data on stock payments measured as unknown or other in our sample. The relative numbers also show that male CEOs tend to use more stock than female CEOs. Switching the hypothesis around by testing whether male CEOs pay with less cash than female CEOs, instead of more stock, results in a significant difference. Therefore, the conclusion is that male CEOs do tend to take more risk, as they pay with a lower portion of cash than female CEOs and hence the results support hypothesis 1.

As the interaction term in step 3 is insignificant, we can conclude that the results do not support hypothesis 4, just as our original model in table 4. Therefore, the conclusion is that board gender

diversity does not play a moderating role in gender differences in risk taking, at least when risk is measured as the percentage of stock in the total payment (or vice versa the non-cash part of the total payment).

4.2.2 Public vs. Private

We found that both hypotheses 2 and 4 are supported by our results for the likelihood of acquiring a private target. However, the full data sample also includes firms acquiring joint ventures and/or subsidiaries. As these options are even less risky than acquiring a public target, it might be interesting to see if these results hold when running our model with observations only on public or private targets.

The results can be seen in table 8. Immediately, it stands out that the r-squared is higher than for our original results, which indicates that these variables explain more variation in public vs. private than variation in private vs. other. However, the other results do not change much. Cash holdings do not have a significant effect on the choice between private or public target. More importantly, the results found in our original model hold with this subsample. Holding everything else constant, if board gender diversity is 0%, male CEOs are 38.6 percentage points more likely to acquire a private target than a female CEO. Therefore, these results also support hypothesis 2.

Table 8: Effects on target type (Public vs. Private)

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	-0.001	-0.002	0.001
	(0.003)	(0.003)	(0.003)
Log(revenue)	-0.059***	-0.064***	-0.064***
	(0.018)	(0.019)	(0.019)
Log (cash holdings)	0.022	0.022	0.024
	(0.022)	(0.022)	(0.22)
DE	0.0006***	0.000**	0.0005**
	(0.0002)	(0.0002)	(0.0002)
Board size	0.015	0.013	-0.014
	(0.012)	(0.012)	(0.012)
Independent variable			
Male		0.245**	0.386***
		(0.099)	(0.102)
Board gender diversity		0.007***	0.007***
		(0.003)	(0.003)
Interaction term			-0.025***
			(0.007)
R^2	0.024	0.048	0.058
F-statistic	2.363**	3.436***	3.639***
R^2 change		0.024	0.010
F-change statistic		5.99***	4.863**

n=485. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

In addition, a one percentage point increase in board gender diversity increases the likelihood of a female CEO acquiring a private target by 0.7 percentage points, everything else equal. While a one percentage point increase in board gender diversity decreases the likelihood of a male CEO acquiring a private target by 1.8 percentage points, ceteris paribus. So, this regression on the subsample shows that

the results from our original model hold in these conditions as well. Therefore, we conclude that male CEOs are more likely to acquire a private target than female CEOs and that board gender diversity moderates this difference, as it decreases the probability for male CEOs and increases it for female CEOs.

4.2.3 Different measure for diversification

As the model for diversification was insignificant, we could not interpret any results from it. A solution to this, would be to measure diversification in a different way. Instead of focusing on the major SIC group, we could focus on Thomas Reuters' own classification of macro industries. So, to test the hypothesis, the dependent variable will be a dummy equal to one if the macro industry of the acquirer and target differ. The macro industry is less specific than the major SIC. This can be seen from the relative numbers as well. Before around 50% of deals were diversifying, however under this new definition only 43% are seen as diversifying. In addition, 26% of female CEOs choose to diversify and 32% of male CEOs tend to diversify. So under this definition there is a small difference.

Table 9: Effect of CEO gender on deal type (different dummy for diversification)

Independent variables	Steps		
	1	2	3
Control variables			
CEO age	0.006**	0.006**	0.006
	(0.003)	(0.003)	(0.003)
Log(revenue)	-0.013	-0.013	-0.013
	(0.014)	(0.014)	(0.014)
Log (cash holdings)	-0.025	-0.025	-0.025
	(0.016)	(0.016)	(0.016)
DE	0.001***	0.001***	0.001
	(0.0001)	(0.0001)	(0.0001)
Board size	0.011	0.011	0.011
	(0.009)	(0.009)	(0.009)
Independent variable			
Male		0.070	0.031
		(0.079)	(0.102)
Board gender diversity		0.0001	0.0001
		(0.002)	(0.002)
Interaction term			0.006
			(0.011)
R^2	0.012	0.013	0.014
F-statistic	2.173*	1.653	1.5
R^2 change		0.001	0.001
F-change statistic		0.359	0.439

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

The results to this regression can be found in table 9. This model gives similar coefficients as the previous model, and although it has a low r-squared, it is statistically significant and therefore we can interpret the results. Again, step 1 tests the control variables and we see that age and leverage are statistically significant. Holding everything else constant, a one-year older CEO is 0.6 percentage points more likely to acquire a target in a different industry. Everything else equal, if a firm's leverage increases by one, the likelihood to acquire a target in a different industry increases with 0.1 percentage points.

Step 2 again gives similar coefficients as in the previous model. Although step 2 does have a higher r squared, the difference between the two models is insignificant. This is logical, as the added variables are both insignificant. Adding the interaction term also does not make a significant difference. In addition, the variables in models 2 and 3 are not jointly significant (F-statistic: 1.653 and 1.5 respectively). Therefore, we can conclude that these results do not support hypothesis 3 or 4, as the models are non-significant as well as the coefficients of the variables themselves. Hence, it seems that these variables do not explain the variation in the choice to diversify or not.

4.2.4 At least 5 female board members

As only the results from model 2, where risk is measured as the probability of buying a private target, support hypothesis 4, there could be an underlying issue with our measurement of board gender diversity. The non-significant results in the other models could be affected because women only gain influence when there are more of them. Therefore, following Gul et al. (2011), we create a dummy variable which is equal to one if there are 5 or more females on the board. The results with this new measure can be found in Appendix D.1. The results are very similar to our original results. We also ran the model from table 7 as we base our conclusion for hypothesis 1 on that model. Again, the results (unreported) are very similar. We can therefore conclude that the results were not guided by this issue, and that they are valid. Thus, it seems that board gender diversity only has a moderating role for the choice of target type.

4.2.5 Logit/Probit vs. LPM

As mentioned in chapter 3, some researchers prefer using a probit or logit model for dichotomous dependent variables. However, Chatla and Shmueli (2013) argue that the three models should have similar results. To make sure that our results from the linear probability models are reliable, we run both a logit and probit regression for models 2 and 3. The results can be seen in Appendix D.2. Interpreting the coefficients is much more difficult, however we can check whether the sign and significance are similar to our LPM results. For our second model focusing on target type, both the probit and logit regression models give the same results as the LPM. The variables of interest are significant and have the same signs as in model 2. For our third model on diversification, probit and logit also show similar results, in that none are significant except board size. Therefore, we can conclude that the results from our LPMs are also correct under logit and probit models. Hence our results from the linear probability model are valid.

Chapter 5: Discussion and conclusion

As more and more women are moving into top positions in the corporate world, it becomes increasingly important to discover what effects this could have on corporate behavior and more specifically risk taking. Previous literature argues that gender differences in risk taking exist in financial reporting, choice of industry and leverage (Ho et al., 2014; Hoang et al., 2019; Tang et al., 2020). However, the literature focusing on gender differences in risk taking during the M&A process is limited. Therefore, the objective of this research is to investigate if gender differences in risk taking exist in the form of payment type, target type and deal type. The empirical analysis showed that there are gender differences in risk taking behavior during the M&A process. Firstly, male CEOs are more likely to acquire private targets, which is riskier as private companies are more volatile and there is information asymmetry (Yuce and Ng, 2009). Secondly, male CEOs use less cash in their payments for deals than female CEOs. Therefore, this also indicates that they take more risk as paying with cash would lead to higher returns, higher performance, and quicker deal acceptance (Chi et al., 2011; Rao-Nicholsown et al., 2016). In addition, this research looks further than just gender differences, by also exploring the moderating role of board gender diversity in this process. The empirical analysis shows that a moderating role exists when choosing to acquire a private target or not but shows no significant effects for our other risk measures. Overall, the results of this research have implications for the existing literature, firms and/or managers and provides opportunities for future research.

5.1 Theoretical implications

This research makes three contributions to the existing literature. First, it adds more evidence of gender differences in risk taking to the general literature. Both psychology, economic and corporate literature argue that gender differences in risk taking exist (see e.g., Faccio et al., 2016; Hinz et al., 2007; Niederle and Vesterlund, 2007). Our study also finds gender differences in risk taking to exist in the M&A process. The results show that male CEOs tend to take more risk than female CEOs, as they pay with a lower percentage of cash and are more likely to acquire a private target. This indicates that indeed women are more risk-averse than men. Second, it adds evidence in favor of gender differences in corporate behavior in the discussion on whether gender differences exist in the corporate world. Some studies argue that gender differences in risk taking do not exist, while other scholars argue that these differences do exist. For example, Farag and Mallin (2016) argue that female CEOs are not more risk-averse than male CEOs. Moreover, Iqbal et al. (2006) find that male executives are more risk-averse than female executives. However, our results show that men tend to take more risk, and as such fit into the literature that argues in favor of the existence of gender differences in risk taking in the corporate world. Third, it helps fill a gap in the literature, by investigating the moderating role of board gender diversity. To our knowledge, this has not been investigated yet within an M&A context. J. Chen et al. (2019) do investigate the moderating effect of board gender diversity in the context of holding deep-in-the-money stock options and suggest that this moderating role could also exist in the M&A context. Our

results show that this moderating role does exist in risk taking measured as the probability to acquire a private target. However, the results show no significant effects for the other risk measures. Therefore, this would require some more research with additional risk measures.

5.2 Managerial implications

The results of this research also provide some useful insights for firms. First, the results show that gender differences in risk taking do exist in the corporate world, at least in the M&A decision making process. It should be noted that our results do not mean that female CEOs are better than male CEOs, as some firms might be risk-loving while others are risk averse. However, the results do indicate that there is a significant difference in risk taking and therefore this should be considered when for example appointing a new CEO. Furthermore, the results of this research indicate that for at least one of the risk measures, target type, board gender diversity has a moderating role in the relationship between gender and risk. This shows that the board has a significant influence on decision making. Board gender diversity adds different opinions and values to meetings, which can lead to more discussion and more efficient decision making and as our results show lower risk-taking (Singh et al., 2008). Therefore, the results of this research can be used in favor of gender quotas. Moreover, this research found no gender differences in risk taking based on deal type. This could indicate that risk-taking behavior of male and female CEOs is equal, but as the results show significant gender differences in risk taking for our other two risk measures, this seems unlikely. However, it is possible that the choice between a focus increasing, or diversifying deal is not as risky as hypothesized. The risk might lie in the choice between internal or external diversification. If a firm chooses to engage in M&A, it is likely to have already decided on whether this will be a diversifying or focus increasing deal. Hence, if a firm is looking to appoint a new CEO to increase diversification, they need to consider that female CEOs tend to be more risk averse, as argued by the literature as well as our results, and therefore could be more likely to choose internal diversification (Hornstein and Nguyen, 2014). In addition, this research has found some significant control variables. Although these variables are not the focus of this study, firms should take note of these effects as they do influence risk taking in the M&A process.

5.3 Limitations and future research directions

This research has some limitations which need to be addressed. First, the distribution of gender is very skewed, as only 3.9% of our sample included deals with a female CEO. However, this seems to reflect reality, as from 2015-2019 only 5% of S&P 500 firms had female CEOs and in addition, Pillemer et al. (2014) found that only 4% of all Fortune 500 firms in 2013 had female CEOs. Second, the distribution of stock percentage used in total payments was as also quite skewed, as a large part of the deals had a stock percentage used of 0%. However, some of these deals were listed as 'Stock and cash consideration' while others were listed under unknown or other. Hence, in the robustness tests we changed the dependent variable to cash percentage used in the total payment as this had much more non-zero observations. The results from this model were much closer to our expectations. Third, although the

goal of this study was not to find high explanation of variation in our dependent variables, it should be noted that the R-squared of each model is very low. Hence, the results of this study might change when we add in variables that explain the variation in risk better than those included in our model. Fourth, this research excluded firms that only operate within the financial services industry due to a lack of financial data. However, it is possible that risk preferences and/or behavior are different in this industry. Therefore, future research could repeat this research including the financial services industry, although some control variables might need to be changed.

There are many other opportunities for future research. As stated before, no significant gender differences were found in the choice of deal type. Therefore, we argued that the risk might lie in choosing between internal vs. external diversification. Hence, future research could investigate whether these gender differences and the moderating role of board gender diversity exist in the choice of external or internal diversification. Moreover, our sample consists only of deals where the acquirer is from the United States, while corporate behavior might differ per country or region. For example, Jung (2010) finds that wealth creation post-M&A in Korea differs from that in the US. Jung (2010) argues that this is due to the different characteristics of the market of corporate control. These differences could also influence the results of this study. Therefore, repeating this research in other countries or regions might provide interesting further insights.

In addition, future research could look at other risk factors in the M&A process, for example the choice to make a cross-border acquisition or not. Furthermore, future research could investigate gender differences in risk taking in areas outside of M&A. It could also be interesting to repeat this research in the future to see whether these results hold over time, as it could be the case that women currently in top positions fit into the old boys' network, while gender quotas will bring more differing opinions and values. Hence, this could change the size and/or significance of the moderating role of board gender diversity. In relation to board gender diversity, it could be interesting to research board diversity in general. Our results have shown that board gender diversity has a moderating role for at least one risk measure, indicating that board gender diversity has led to more discussion. It would be interesting to see whether board diversity in general, for example based on nationality or culture, has a similar effect. The findings could encourage more diversity in the corporate world and bring an end to the old boys' network.

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Appendix A: Major SIC groups

Division A: Agriculture, Forestry, and Fishing	
Major Group 01	Agricultural Production Crops
Major Group 02	Agriculture Production Livestock and Animal Specialties
Major Group 07	Agricultural Services
Major Group 08	Forestry
Major Group 09	Fishing, Hunting and Trapping
Division B: Mining	
Major Group 10	Metal Mining
Major Group 12	Coal Mining
Major Group 13	Oil and Gas Extraction
Major Group 14	Mining and Quarrying of Nonmetallic Minerals, Except Fuels
Division C: Construction	
Major Group 15	Building Construction General Contractors and Operative Builders
Major Group 16	Heavy Construction Other Than Building Construction Contractors
Major Group 17	Construction Special Trade Contractors
Division D: Manufacturing	
Major Group 20	Food and Kindred Products
Major Group 21	Tobacco Products
Major Group 22	Textile Mill Products
Major Group 23	Apparel and Other Finished Products Made from Fabrics and Similar Materials
Major Group 24	Lumber and Wood Products, except Furniture
Major Group 25	Furniture and Fixtures
Major Group 26	Paper and Allied Products
Major Group 27	Printing, Publishing, and Allied Instruments
Major Group 28	Chemicals and Allied Products
Major Group 29	Petroleum Refining and Related Industries
Major Group 30	Rubber and Miscellaneous Plastics products
Major Group 31	Leather and Leather products
Major Group 32	Stone, Clay, Glass, and Concrete products
Major Group 33	Primary Metal Industries
Major Group 34	Fabricated Metal Products, except Machinery and Transportation Equipment
Major Group 35	Industrial and Commercial Machinery and Computer Equipment
Major Group 36	Electronic and Other Electrical Equipment and Components, except Computer Equipment
Major Group 37	Transportation Equipment

Major Group 38	Measuring, Analyzing, and Controlling Instruments; Photographic; Medical and Optical Goods; Watches and Clocks
Major Group 39	Miscellaneous Manufacturing Industries

Division E: Transportation, Communication, Electric, Gas, and Sanitary Services

Major Group 40	Railroad Transportation
Major Group 41	Local and Suburban Transit and Interurban Highway Passenger Transportation
Major Group 42	Motor Freight Transportation and Warehousing
Major Group 43	United States Postal Service
Major Group 44	Water Transportation
Major Group 45	Transportation by Air
Major Group 46	Pipelines, except Natural Gas
Major Group 47	Transportation Services
Major Group 48	Communications
Major Group 49	Electric, Gas, and Sanitary Services

Division F: Wholesale Trade

Major Group 50	Wholesale Trade-durable Goods
Major Group 51	Wholesale Trade-non-durable Goods

Division G: Retail trade

Major Group 52	Building Materials, Hardware, Garden Supply, and Mobile Home Dealers
Major Group 53	General Merchandise Stores
Major Group 54	Food Stores
Major Group 55	Automotive Dealers and Gasoline Service Stations
Major Group 56	Apparel and Accessory Stores
Major Group 57	Home Furniture, Furnishings, and Equipment Stores
Major Group 58	Eating and Drinking Places
Major Group 59	Miscellaneous Retail

Division H: Finance, Insurance, and Real Estate

Major Group 60	Depository Institutions
Major Group 61	Non-Depository Credit Institutions
Major Group 62	Security and Commodity Brokers, Dealers, Exchanges, and Services
Major Group 63	Insurance Carriers
Major Group 64	Insurance Agents, Brokers, and Service
Major Group 65	Real Estate
Major Group 67	Holding and Other Investment Offices

Division I: Services

Major Group 70	Hotels, Rooming Houses, Camps, and Other Lodging Places

Major Group 72	Personal Services
Major Group 73	Business Services
Major Group 75	Automotive Repair, Services, and Parking
Major Group 76	Miscellaneous Repair Services
Major Group 78	Motion Pictures
Major Group 79	Amusement and Recreation Services
Major Group 89	Health Services
Major Group 81	Legal Services
Major Group 82	Educational Services
Major Group 83	Social Services
Major Group 84	Museums, Art Galleries, and Botanical and Zoological Gardens
Major Group 86	Membership Organizations
Major Group 87	Engineering, Accounting, Research, Management, and Related Services
Major Group 88	Private Households
Major Group 89	Miscellaneous Services

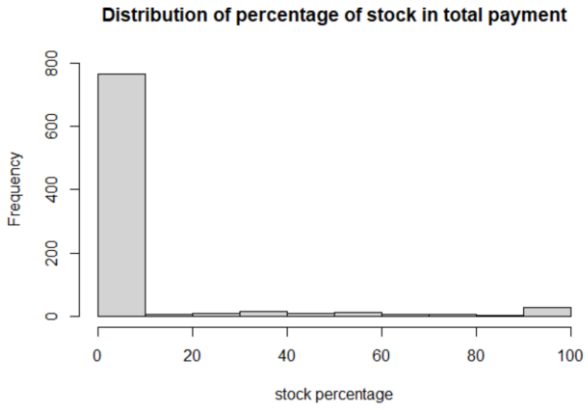
Division J: Public Administration

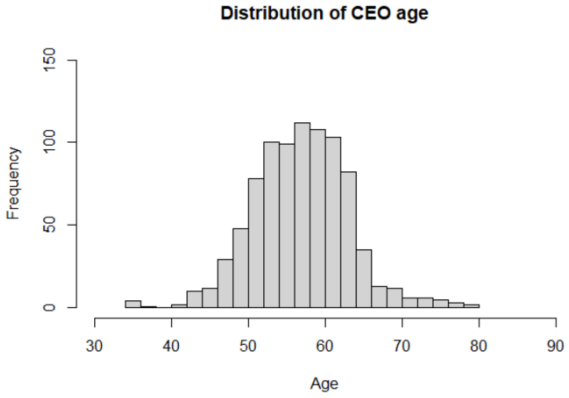
Major Group 91	Executive, Legislative, and General Government, except Finance
Major Group 92	Justice, Public Order, and Safety
Major Group 93	Public Finance, Taxation, and Monetary Policy
Major Group 94	Administration of Human Resource Programs
Major Group 95	Administration of Environmental Quality and Housing Programs
Major Group 96	Administration of Economic Programs
Major Group 97	National Security and International Affairs
Major Group 99	Non-classifiable Establishments

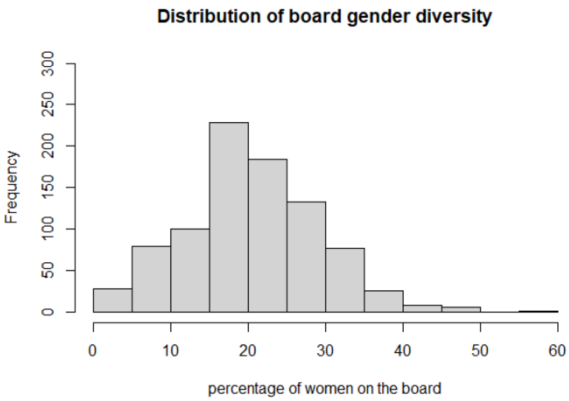
Appendix B: Description of variables used

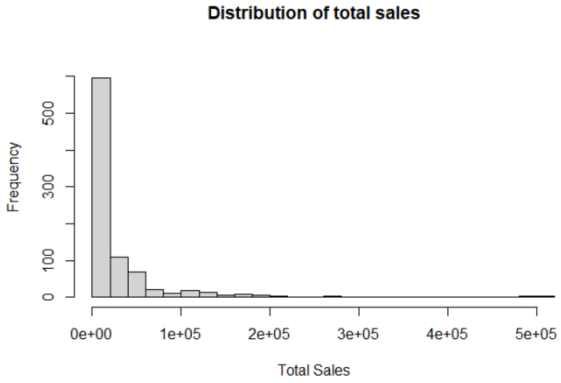
Variable name	Description	Collected from
Male	Dummy variable, where if the CEO in that year was a male, the dummy is equal to one, and zero otherwise	Compustat Execucomp - using WRDS
totalrevenue	Taken as a proxy for firm size, it is the total revenue of the firm in that specific year	Compustat - North America - Fundamental Annuals - using WRDS
cashholdings	Cash and short-term investments divided by total assets	Compustat - North America - Fundamental Annuals - using WRDS
debtequity	Total debt divided by total equity	Compustat - North America - Fundamental Annuals - using WRDS
CEOage	Age of the CEO per year	Compustat Execucomp - using WRDS
BGDlast	Board gender diversity, measured as the percentage of females on the board in the previous year	Thomas Reuters' Eikon
boardsize (last)	Board size, measured as total number of board members in the previous year	Thomas Reuters' Eikon
stock	The percentage of stock used in the total payment	Thomas Reuters' Eikon
private	Dummy equal to 1, if the target firm was listed as private, equal to zero if otherwise	Thomas Reuters' Eikon
diversify	Dummy equal to 1, if the target firm and acquiring firm have the same major SIC group	Thomas Reuters' Eikon
cash	The percentage of cash used in the total payment	Thomas Reuters' Eikon

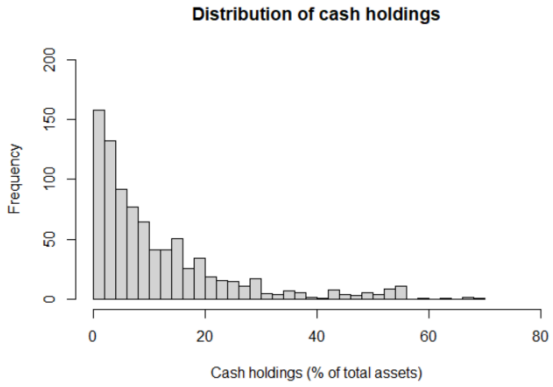
Appendix C: Distribution of variables

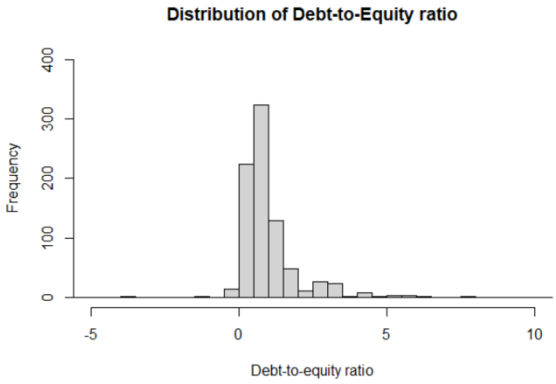


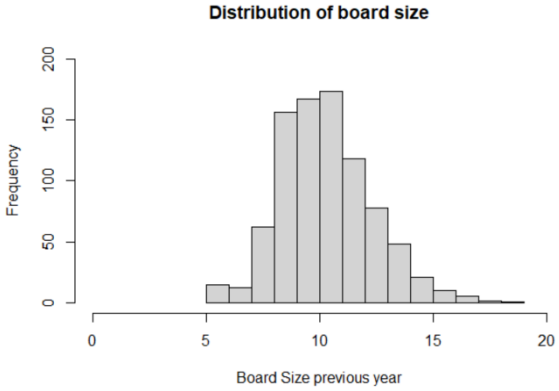












Appendix D: Results from robustness checks

D.1 Board gender diversity as dummy (female board members >=5)

Independent variables	Models		
	1	2	3
Control variables			
CEO age	-0.011	-0.001	0.001
	(0.007)	(0.003)	(0.003)
Log (revenue)	0.010	-0.017	-0.021
	(0.038)	(0.014)	(0.015)
Log (cash holdings)	-0.032	0.062***	-0.024
	(0.047)	(0.017)	(0.018)
DE	-0.004***	0.000	0.001***
	(0.001)	(0.000)	(0.000)
Board size	-0.040	-0.001	0.024**
	(0.026)	(0.009)	(0.009)
Main effects			
Male	0.321	0.169***	-0.034
	(0.250)	(0.064)	(0.091)
Board gender diversity	0.317*	-0.022	-0.015**
	(0.193)	(0.069)	(0.071)
Interaction term	-0.104	-0.576***	0.117
	(0.543)	(0.185)	(0.209)
R^2	0.025	0.029	0.015
F-statistic	2.74***	3.163***	1.626

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)

D.2: Probit and logit results

	Models			
	Logit		Probit	
Independent variables	Private	Diversify	Private	Diversify
Control variables				
CEO age	-0.003	0.006	-0.001	0.003
	(0.012)	(0.011)	(0.007)	(0.007)
Log (revenue)	-0.111	-0.079	-0.067	-0.049
	(0.068)	(0.061)	(0.039)	(0.038)
Log (cash holdings)	0.295***	-0.090	0.177***	-0.056
	(0.080)	(0.072)	(0.047)	(0.045)
DE	0.001	0.005	0.0005	0.003*
	(0.001)	(0.004)	(0.002)	(0.002)
Board size	-0.009	0.062*	-0.005	0.039*
	(0.038)	(0.036)	(0.023)	(0.022)
Main effects				
Male	1.19*	-0.091	0.681*	-0.057
	(0.660)	(0.422)	(0.344)	(0.498)
Board gender diversity	0.023***	0.0004	0.014**	0.0003
	(0.009)	(0.008)	(0.005)	(0.005)
Interaction term	-0.096*	0.020	-0.056*	0.012
	(0.050)	(0.045)	(0.03)	(0.028)

n=870. *** $p \leq .01$, ** $p \leq .05$. * $p \leq .10$. (2-tailed)