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Mergers and Acquisitions: The Effect of Gender Diversity in the Boardroom

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BIBLIOGRAPHIC NOTE

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ABSTRACT

Previous literature reveals that men and women have different behavioural patterns that influence their decision-making process. Indeed, the majority of academics found that women have certain characteristics that are usually associated with better corporate governance, such as risk aversion and low overconfidence.

Being the board of directors responsible for strategic decisions such as mergers and acquisitions, it could be expected that having more women on the boardroom will have some impact on the acquisition behavior of the company – especially since overconfidence is usually pointed as a main reason for failure of M&A deals.

The purpose of this dissertation is the study of the impact of gender diversity on the board of directors of bidding companies on mergers and acquisitions, namely, on the size of the premium and on the relative size of the target.

After gathering data of 167 American deals with announcement dates from 2018 to 2021, it was found no significant association between the proportion of female directors on the bidder and the size of the bid premium or the relative size of the target company. Also, this study couldn't observe any significant impact of having a female CEO on the premium and on the deal size.

However, it was possible to prove that the presence of female directors has a negative effect on the size of the bid premium on a 1% level of significance. More precisely, having at least one woman in the board of the bidder will reduce the premium offered in 26,58%.

RESUMO

A literatura revela que homens e mulheres têm padrões comportamentais diferentes que influenciam seu processo de tomada de decisão. De facto, existe uma panóplia de estudos que comprova que as mulheres têm determinadas características que geralmente estão associadas um melhor governo da empresa, como aversão ao risco e baixos níveis de excesso de confiança.

Sendo o conselho de administração o órgão responsável por tomar decisões estratégicas como fusões e aquisições, faz sentido pensar que ter mais mulheres no conselho de administração tenha algum impacto no comportamento de aquisição da empresa – especialmente uma vez que o excesso de confiança costuma ser apontado como um dos principais motivos da falha de aquisições.

O objetivo desta dissertação é o estudo do impacto da diversidade de género no conselho de administração das empresas compradoras em fusões e aquisições, nomeadamente, na dimensão do prémio oferecido e na dimensão relativa da empresa-alvo.

Após a recolha de dados de 167 aquisições americanas com datas de anúncio entre 2018 e 2021, não foi encontrada nenhuma relação significativa entre a proporção de mulheres no conselho de administração e o tamanho do prémio ou o tamanho relativo da empresa-alvo. Além disso, não se observou nenhum impacto significativo em ter uma CEO mulher no prémio e no tamanho relativo da empresa-alvo.

No entanto, foi possível comprovar que a presença de mulheres no conselho de administração tem um efeito negativo sobre o tamanho do prémio da oferta, a um nível de significância de 1%. Mais precisamente, ter pelo menos uma mulher como membro do conselho de administração na empresa compradora reduzirá o prémio oferecido em 26,58%.

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1. INTRODUCTION

In 2020, the World Economic Forum stated in its annual Global Gender Gap Report that it would take 100 years to achieve gender equality. In 2021, the period necessary to close the gender gap increased to 135.6 years.

The numbers are clear. Gender inequalities still persist in the labour market, either in the form of pay gaps, labour market segregation, employment gaps, working conditions and job quality (Cabrita et al., 2020). According to the European Commission, women still earn 14.1% less per hour than men, on average, that is, women earn 86 cents for every 1 euro that men earn.

This may be associated with the problem of labour segregation, which takes the form of sectoral segregation and occupational segregation. On one hand, sectoral segregation is the idea that women and men are not equally distributed through the different sectors of economic activity. Indeed, according to the International Labour Organization, in industrialised countries, 75% of women are working in historically low-paying service sectors. On the other hand, the concept of occupational segregation is the idea that women and men are not equally distributed through the several occupations or positions. It's not a surprise that, despite the progress that feminist movements have made, misogyny still exists, and society still favours men at the expense of women for leading positions. When people think of a successful leader, they associate it with a man - which means that, most times, women are overlooked for functions that demand these "masculine" characteristics. Thereby, women themselves end up not feeling suitable for this type of positions. In the European Union, in 2019, only 34% of managers, 28% of board members and 18% of senior executives were women. Naturally, leading positions are the best paid ones, and the fact that there are not many women in these positions can be part of the explanation for the gender wage gap.

Former literature has appointed some possible explanatory factors for segregation such as "comparative biological advantages, under-investment in human capital (schooling or training), differential income roles, preferences and prejudices, socialization and stereotypes, entry barriers and organizational practices" (Bettio et al., 2009). However, the recent feminist actions and legislation had helped women overcoming most of these issues with important advances namely, wider accessibility to education and the change of mentalities and family structures where, previously, the role of the woman was to stay home to raise the children

and manage the household (Bettio et al., 2009), which contributed to positive developments on this matter.

Undoubtedly, these issues have gained an increasing relevance in the business world, namely regarding the gender diversity in the boardroom. Companies are now, more than ever, committed in achieving gender diverse teams, also because it is being shown that having more women in the board can be very beneficial for the company, in general. According to several studies, more gender diverse boards are associated with better firm performance, which has to do with behavioral differences of women regarding to men (Adler, 2001; Carter, 2003; Terjesen et al., 2015). This dissertation will contribute to the enrichment of that field of research.

Previous literature reveals that men and women have different behavioural patterns that influence their decision-making process. Indeed, the majority of academics found that women have certain characteristics that are usually associated with better corporate governance, such as risk aversion (Levin et al., 1988; Barsky et al., 1997; Jianakoplos and Bernasek, 1998; Dohmen et al., 2011) and low overconfidence (Estes and Hosseini, 1988; Barber and Odean, 2001; Barsky et al., 1997). Being the board of directors responsible for strategic decisions such as mergers and acquisitions, it could be expected that having more women on the boardroom will have some impact on the acquisition behavior of the company – especially since overconfidence is usually pointed as a main reason for failure of M&A deals (Roll, 1986). That's precisely the point that this dissertation will attempt to study – the impact of gender diverse boards in acquisitions.

This dissertation is structured in 7 chapters: Introduction, Literature Review, Research Questions, Sample and Methodology, Results, Additional Analysis and Conclusion.

Chapter 2 summarizes the most relevant findings of previous works done in the field of gender diversity and mergers and acquisitions.

Chapter 3 explains in detail the hypotheses that will be tested.

Chapter 4 describes the sample and the models used to perform the investigation, as well as the variables included.

Chapter 5 presents the interpretation of the results of the study.

Chapter 6 consists in an additional investigation, beyond the original hypothesis proposed in chapter 3.

Lastly, chapter 7 highlights the main findings of the study, explains some limitations it had and gives directions for future research.

2. LITERATURE REVIEW

2.1. Corporate Governance

After centuries of lack of importance, corporate governance has become a central topic in finance, especially after the stream of bankruptcies in the US and UK, results of poor governances. These scandals brought awareness on the importance of having an adequate corporate governance and increased the demand of greater transparency of corporations since they play an important role in our economy.

There are a lot of proposed definitions of corporate governance. The Organisation for Economic Co-operation and Development (1999) defines corporate governance as “the system by which business corporations are directed and controlled”.

Accordingly, John and Senbet (1998) argue that “corporate governance deals with mechanisms by which stakeholders of a corporation exercise control over corporate insiders and management such that their interests are protected”. These mechanisms ensure that the company is being managed efficiently according to the interests of the providers of finance and reduce possible bad resource management decisions by managers.

This goes in line with the agency theory which states that the separation of ownership and control can result in conflict of interests. This way, agency costs occur when the interests of managers diverge from the interests of shareholders (Jensen, 1986). Shareholders may want managers to run the company in a way that maximizes shareholder value but managers may want to manage the company in a way that benefits their personal wealth and prestige, which can create a conflict between these two parties. Hence, corporate governance arises as a solution to control agency conflicts, realigning the interests of managers and stakeholders (Farinha, 2003).

It's important to note that, usually, when talking about corporate governance, the focus lays in how shareholders control the managers of the company, but the rest of stakeholders has to be taken into account as well. A good corporate governance should be able to create a balance between economic goals – maximization of shareholders' wealth – and social goals – for instance, protection of the environment, concerns with the community welfare (Cadbury, 2003). Indeed, since the XXI century, the role of the company as a social entity has

been gaining relevance. The goal of a company should not be just to generate profit, but also to generate benefits for the whole community (Tricker, 2012).

2.2. Board of Directors

The organ responsible for the governance of a company is the board of directors, which is composed by directors appointed by the shareholders. The board is in charge of directing the company, making sure that it is being ran in the right direction.

Even though that the board doesn't directly manage the corporate business, it has four vital functions. The main function of the board of directors is to monitor and supervise the activities of executive management, in order to guarantee that the interests of the shareholders are being pursued, reducing agency costs (Eisenberg, 1997). Besides, the board has the strategy formulation function, meaning that it works together with the top management to build a long-term strategy for the business. Directors are also in charge of designing policies that need to be aligned with the strategy of the company (Tricker, 2012). Lastly, the board has the function of accountability since it has to be accountable to the shareholders – “the shareholders as owners of the company elect the directors to run the business on their behalf and hold them accountable for its progress” (Cadbury, 1992).

Indeed, the board can be seen as the primary defense mechanism against inefficient management, protecting shareholder interests (Fama & Jensen, 1983). This way, as the main purpose of the board of directors is to reduce agency problems, the effectiveness of its work is crucial for the well-function and performance of the company.

Literature suggests that board composition may be determinant to an efficient functioning of the board and, ultimately, can influence firm performance (Nguyen and Faff, 2007).

Horváth and Spirollari (2012) were able to find interesting associations between some board characteristics and firm performance. Using data from large US firms between the period of 2005 and 2009, they found that the fraction of insider ownership is positively associated with firm performance, since it minimizes agency conflicts. There is vast research that proves that director ownership results in aligning the interests of owners and the management. In fact, it's easy to understand that by giving managers stock, they will start to take more into account shareholders' interests because themselves will have a stake in the company and will be directly affected by their decisions regarding the firm (Jensen and Meckling, 1976).

In addition, the work of Horváth and Spirollari (2012) suggests that the age of directors also influences the performance of a company – “younger members are probably willing to bear more risk and to undertake major structural changes to improve firm’s future prospects”. Similarly, a previous study by Wiersema and Bantel (1992) had already reached the same conclusions as the authors found a negative link between the average age of the directors and the propensity to make changes in corporate strategy due to a lower receptivity to change and a lower willingness to take risk. They argue that it’s crucial for the corporate strategy to be updated so the company can be continuously aligned with the firm’s environment.

Lastly, Horváth and Spirollari (2012) also found that independent directors are interestingly associated with worse firm performance, once they “prefer overly conservative business strategies in order to protect shareholders, but this goes at the cost of lower firm’s performance”. However, on general, academics has been suggesting that independent directors are associated with the protection of shareholders’ interest (Fama and Jensen, 1983). In fact, Rosenstein and Wyatt (1990) documented positive share-price reactions surrounding the appointment of an additional independent director, which is in accordance with the hypothesis of outside members as mechanisms to reduce agency conflicts.

Yermark (1996) studied the effect of board size on firm performance, using data from large US industrial companies between 1984 and 1991. According to the author, small boards of directors seem to be more efficient since he found an inverse relation between Tobin’s Q (used as a proxy for market valuation) and the size of the board. His results are in line with a previous study by Jensen (1993), where the author argued that larger boards end up suffering problems of communication and decision-making.

2.3 Diversity on the workplace

Although board composition has always been a main topic of study, more recently, a certain characteristic has been subject of a growing literature – diversity in the board of directors. Diversity can be defined as the existence of different characteristics in the composition of a group and it covers issues like gender, age, race, ethnicity, knowledge, education, values or personality (Oxford Economics, 2011).

Undoubtedly, the world is now more global than ever. Corporations have globalized its

operations, there are 60 000 multinational companies in the world¹, around 16% of companies are fully remote², and the labour force is increasingly more diverse. In fact, a lot of countries have seen their demographic landscape change with increased heterogeneity in the workforce in terms of gender, age, nationality, ethnicity and skills. Given that, governments have started to legislate on diversity matters, in order to protect the rights of all workers, ensuring that no employee – especially the ones belonging to a social minority group – suffers from discrimination (Oxford Economics, 2011).

On general, it has been reported that having more diversity on teams enriches the discussions and the decision-making process, since there is a greater range of perspectives to consider, leading to better and more creative solutions (Milliken and Martins, 1996). As explained by Nemeth (1986), the quality of reasoning in an opinion improves when it is counter-argued by a minority group. In fact, research suggests that diversity in terms of observable attributes such as ethnicity and nationality brings cognitive benefits, by increasing the number of options considered, improving the quality of ideas and strengthening the degree of cooperation. In the same way, skill-based diversity such as education, occupation background or previous work experience has been proved to also enhance the cognitive outcomes (Milliken and Martins, 1996).

Besides, diverse corporations are believed to understand better the market – as the marketplace is also becoming more heterogenous and diverse, a company with more diversity among its executives will be better at understanding and responding to the needs of customers and suppliers (Carter, 2003).

According to a study by McKinsey³, companies in the top quartile for gender, racial and ethnic diversity have financial returns above their national industry medians. Although it may be difficult to claim that this is a causal relation (that is, having more diverse teams will be directly translated into better financial results), it can be argued that companies with more diversity are better at win top talent, improve their customer orientation and have higher

¹ World Atlas of Global Issues (2018). Multinational Corporations. Retrieved from [Multinational Corporations - World Atlas of Global Issues \(sciencespo.fr\)](#) (Accessed August 1, 2022).

² Steward, J. (2020). The Ultimate List Of Remote Work Statistics for 2022. Retrieved from [The Ultimate List Of Remote Work Statistics for 2022 \(findstack.com\)](#) (Accessed August 1, 2022).

³ Hunt, V., Prince S. (2015). Why diversity matters. Retrieved from [Why diversity matters | McKinsey](#) (Accessed August 1, 2022).

employee satisfaction... which ultimately will result in better returns.

In the same way, Erhardt et al. (2003), using data from 127 large US companies, reported that board diversity (measured as ethnic and gender representation on boards) is positively associated with increased financial performance. The authors believe that these results reveal that a more diverse board may be able to be more effective in its oversight function, since a broader range of opinions is available.

2.4 Gender diversity on the board of directors

Particularly, gender diversity has been catching a lot of the attention of researchers. Many academics and corporate managers suggested a possible link between gender diversity and firm value. However, the conclusions of the studies around this topic are mixed and sometimes even inconclusive.

On one hand, there is an extensive list of studies that witness a positive impact of gender diversity. Adler (2001) found this positive impact of female representation on the boardroom. Using data from 215 Fortune 500 firms, from 1980 to 1998, the author reported that Fortune 500 firms with a high number of female executives outperformed their industry median firms. In particular, the 25 Fortune 500 firms with the best record of promoting women to high positions are around 18 and 69 percent more profitable than the median Fortune 500 firms in their industries.

In the same way, Carter (2003) reported a statistical significant positive relation between women or minority representation on the board and firm value (measured by Tobin's Q) of Fortune 1000 firms.

Campbell & Mínguez-Vera (2008), using data from firms listed in Spain between 1995 and 2000, had very interesting results. The authors found that having more women on the board of directors is not associated with a higher firm value. Instead, they found that the diversity of the board, that is, the balance between men and women, can lead to a higher firm value.

An investigation conducted by Campbell and Vera (2010) using data from 1989 to 2001, from Spanish companies, concluded that the stock market has a positive reaction in the short term to the announcement of female board appointments, registering positive abnormal returns around the announcement dates. Moreover, the authors found that that this effect is not only

observable in the short term, but also on the long term, once female board appointments have a positive and significant effect on firm value over a sustained period. These results suggest that shareholders are aware of the benefits of adding women to the board.

Terjesen, Couto and Francisco (2015) also suggested a positive impact of female representation on the board of directors. Using data from public firms of 47 countries in 2010, the authors found that companies with more women in the board have higher firm performance by market measures (Tobin's Q) and accounting measures (return on assets).

On the other hand, there are studies that can't find such a direct connection between gender diversity and firm performance or studies that even report a negative link between these variables. Farrell and Hersch (2005) witnessed a positive association between firm performance and the likelihood of adding a woman to the board. However, the authors explain this relation by arguing that women tend to self-select better performing firms or better performing firms are more able to focus on diversity matters. Furthermore, they found insignificant abnormal returns around the date of announcement of a female board appointment, meaning that adding more women to the board does not create nor destruct value. According to the authors, their results suggest that companies tend to add women to the board, not because they believe that it may contribute to a better firm performance, but as a response to external pressures for board diversity or internal preferences for diversity.

A study conducted by Adams and Ferreira (2009) found that gender diversity on the board is positively associated with measures of board effectiveness. However, their results suggest that gender diversity in the boardroom only has a positive impact on firm performance in companies with poor governance, while in companies with good governance, it can even decrease shareholder value. Thus, the authors end up concluding that "the average effect of gender diversity on firm performance is negative".

Chapple & Humphrey (2014), using data between 2004 and 2011 from Australian companies, did not find a significant impact of gender diversity on performance. Moreover, the authors recognized "some weak evidence of a negative correlation between having multiple women on the board and performance" but evidence that "in some industries diversity is positively correlated with performance".

2.5. Gender behavioral differences

Although the empirical findings regarding the effect on firm performance of gender diversity don't reach a clear consensus, there is a lot of literature that demonstrate that women have behavioral traits that can be extremely beneficial for corporations, in general. According to Vähämaa (2017), corporate governance practices directly influence the firm profitability, and women present certain characteristics that are usually linked with better governance.

2.5.1. Overconfidence

Huang and Kisgen (2013) went through a series of tests and concluded that men are more overconfident compared to women. They found that male executives make more acquisitions than female executives and interestingly, acquisitions made by firms with male executives have announcement returns around 2% lower than those made by female executive firms. Moreover, the authors reported that earnings forecasts made by firms with male executives have significantly narrower bands than those with female executives. Their study also found that male executives, especially CFOs, are more likely to be replaced – and they argue that overconfident executives should be more likely to be replaced because they take decisions that don't contribute to the increase in shareholder value. In addition, they suggested that male executives are less likely to exercise deep-in-the-money options early because they have stronger beliefs that the value of the company will continue to increase and increase – and this is clearly an indicator of overconfidence. All these results that the authors obtained lead them to conclude that men are more overconfident compared to women.

Likewise, a study conducted by Estes and Hosseini (1988) revealed that women are less overconfident than men in investment tasks. In fact, the authors studied several variables (such as years of business experience, education, years of education, experience in stock transactions and age) and concluded that gender was the most important characteristic for explaining investment decision confidence. On one hand, the authors state that having a low confidence level may be prejudicial, given that a more conservative attitude may lead to a loss of potential successful opportunities. On the other hand, they recognize that overly high confidence can also lead to excessive risk taking and avoidable costs. This way, the authors explain that their results do not necessarily indicate that women are worse investment decision makers than man.

Barber and Odean (2001) found that male investors trade 45% more than female investors,

which is clearly a sign of overconfidence. The authors explain that rational investors only trade if their expected gains are higher than the transaction costs. Contrarily, overconfident investors will overestimate their expected gains and end up trading even when the true expected net gains are, in fact, negative. This way, they conclude that men trade more than women and as a result, even though both men and women reduce their net returns by trading too much, men reduce their net returns by 2.65 percentage points per year while women reduce them only by 1.72 percentage points.

Lenney (1977) had very curious findings regarding the self-confidence of women. The author reported that, actually, women do not have lower self-confidence than men in all situations. Yet, he found that this difference in confidence is dependent on three factors. First, it depends on the nature of the task. This goes in line with a study conducted by Beyer and Bowden (1997) which revealed that women are less self-confident when performing “masculine tasks”, that is, tasks where both women and men agree that men are better at. Secondly, it depends on the availability of clear performance feedback – when there the feedback is ambiguous or vague, women underestimate their abilities. Thirdly, it depends on the presence of certain social comparison or evaluation – when women work alone or when they don’t expect their performance to be compared to anyone’s, women seem to be as self-confident as men.

2.5.2. Risk aversion

There’s a lot of literature that confirms the widely perceived notion that women are less risk averse than men. For instance, Barsky et al. (1997) found, in their survey, that female participants seemed to have a lower risk tolerance toward financial risks than males.

Levin et al. (1988) concluded that women are more risk-averse than men in gambling. Jianakoplos and Bernasek (1998) also came to that conclusion, after analyzing the allocation of total household wealth. Indeed, the authors reported that single women hold smaller proportions of their wealth in risky assets relatively to single men.

Byrnes et al. (1999) also reported a significant difference in risk propensity by gender. The authors found that, on average, men are more likely of taking risks than women but this gender difference tends to vary according to the context and age.

In the same way, Schubert et al. (1999) studied the gender effect on different contexts, namely

in abstract situations (gambling) and contextual situations – investment and insurance decisions, in this case. The authors reported that the gender difference in risk aversion only arises in abstract gambles – men are more risk-prone than women towards gains and women are more risk-prone towards losses – leading to the conclusion that women are more risk averse than men. In contextual situations, the results suggested that women do not make less risky financial decisions than men, since the level of risk propensity of women do not differ from men.

Olsen and Cox (2001) witnessed a gender difference for the perception and response to risk in professional investors. Their study concluded that female professional investors assign greater weight on downside or loss potential than their male colleagues in an investment setting and are more sensitive to ambiguity or uncertainty. As a consequence, women emphasize risk reduction in portfolio allocation. Moreover, the authors explored in their work a very interesting argument related with biological differences between men and women. They argue that “women’s unique role as child bearers and mothers and greater physical vulnerability to violence has led to physiological adaptations making women less sensation seeking and more averse to ambiguous situations”.

Similarly, Dohmen et al. (2011) conducted an investigation using a representative survey in order to understand the determinants of individual risk attitudes. When studying these determinants in specific contexts, the authors found that female participants showed more risk aversion in all of the domains (car driving, sports/leisure, financial matters, career and health). Interestingly, the domain of financial matters was one of the domains where the gender effect was more pronounced. Also, although their results suggest that age reduces risk tolerance in all the contexts, the domain of financial decisions reports a small impact of age.

Martin et al. (2009), using data from 70 announcements of female CEO appointments, between 1992 and 2007, and a matched sample of 70 male CEO appointments found that following a female CEO appointment, all capital market risk measures (that is, total risk, market risk, and firm-specific risk) decrease more when compared to male CEO appointments.

More recently, Parrotta and Smith (2013) thought that, given the vast amount of literature that suggests that women are more risk averse decision makers than men, it would be

reasonable to assume that female-led firms had less volatility in their economic outcomes. This way, their study reported that female-led companies tend to have a more stable performance, experiencing less volatile over time with respect to investments, return on equity, profits and sales, when compared to male-led companies. More specifically, having a female CEO is associated with lower variability in economic outcomes. However, interestingly, the share of women in the board and the gender of the chairperson is much less correlated with the volatility of these firm outcome variables. Overall, these findings are consistent with the idea that women are more risk averse in their decision making than men.

2.5.3. Ethicality

Peterson et al. (2010), using survey responses from around 6300 business students attending 120 colleges and universities in 36 countries, wanted to study the effects of gender, among other factors, in business-related ethicality. The authors concluded that, “on average, female survey participants had a significantly higher ethicality score mean than did male survey participants”.

This conclusion supports earlier studies. Roxas and Stoneback (2004) presented an ethical dilemma to around 750 accounting students from 8 countries and after analyzing their responses, the authors concluded that men were significantly less ethical than women.

Also, Borkowski and Ugras (1998) had already arrived at the same conclusion, reporting that “females (males) exhibited more (less) ethical attitudes/behavior than their counterparts”.

2.5.4. Others

Adams and Ferreira (2009) found that “female directors have better attendance records than male directors” and that “male directors have fewer attendance problems the more gender-diverse the board”. Additionally, the authors reported that female directors seem to be “tougher monitors” than their male colleagues.

Also, according to the same authors, Adams and Ferreira (2004), another source of value of gender diverse boards may be the diversity in perspectives, experiences and opinions – “Increasing board gender diversity (...) enhance decision making, as a wider variety of perspectives and issues are considered and a broader range of outcomes is assessed”. This makes sense since the more people with different characteristics, backgrounds and views, the more

enriched the discussions will be, which can contribute to more effective problem-solving and better decisions.

Besides, Tate and Yang (2012) found that companies with women in top positions have a smaller wage gap between genders. Thus, the authors conclude that having women in top positions help cultivate a more female-friendly environment since having women achieving leadership positions has a positive impact on other women, by expanding the opportunities of women lower in the organization hierarchy.

2.6. Mergers and Acquisitions

Mergers and acquisitions (M&A) are basically corporate operations in which two companies combine themselves. The primary motivation often pointed for M&A deals is the creation of synergies, that is, the incremental value that is created by combining the companies either as a result of higher revenues or lower costs due to economies of scale, economies of scope, or even complementary technical assets and skills (DePamphilis, 2019).

In fact, due to the increasing competitiveness, globalization and technologic advances, M&A have become highly popular processes that corporations seem to be relying in order to grow. Last year, in 2021, M&A activity accounted for \$5.1 trillion worth of approximately 62 000 transactions⁴.

Nevertheless, as appealing as these operations sound, they don't appear to be giving the results that probably shareholders expect. Although the joint effect of mergers on acquiror and target value is positive, empirical evidence suggests that on average, mergers and acquisitions fail to deliver positive returns to the bidding company and acquiring shareholders end up losing a lot of money. This way, mergers and acquisitions turn out to be value-destroying operations for the shareholders of acquiring firms (Andrade et al., 2001). According to a study by the Harvard Business Review⁵, between 70% to 90% of mergers fail.

Agrawal and Jaffe (2000), after an intensive examination on the literature existent until date regarding long-run abnormal returns following mergers, concluded that almost every study

⁴ PwC (2022). Global M&A Industry Trends: 2022 Mid-Year Update. Retrieved from [Global M&A Industry Trends : PwC](#). (Accessed September 1, 2022).

⁵ Christensen C., Alton R., Rising C., Waldeck A. (2011). The Big Idea: The new M&A playbook. Retrieved from [The Big Idea: The New M&A Playbook \(hbr.org\)](#). (Accessed September 1, 2022).

witnessed evidence of under-performance.

Moeller, Schlingemann, and Stulz (2004), using a robust sample of 12 023 acquisitions, from 1980 to 2001, found that bidding firm shareholders end up losing \$25.2 million on average upon announcement.

2.7. Overconfidence and M&A failure

Among the years, research has been pointing some possible reasons for the overall M&A failure. One of them is related with the price paid in M&A deals. Many managers seem to be caught up in deal fever and end up paying a lot more for a company than the actual value of the expected synergies.

Roll (1986) was the first to link M&A failure with managers' overconfidence. The author utilizes the concept of hubris – a Greek word for expressing excessive pride and self-confidence. According to the hubris hypothesis developed by the author, the acquiring-company board often miscalculate target firms which leads to a bid premium that goes far beyond the estimated synergies. In this sense, managers usually overestimate the benefits of a merger and thereby, end up overpaying for targets due to overoptimism or overconfidence.

Hayward & Hambrick (1997) conducted a study that concluded that, on average, acquiring-firm shareholders' experience wealth losses after a merger. More precisely, the authors state that the higher the CEO's degree of self-confidence, and the larger the acquisition premium, the higher this loss will be.

Malmendier and Tate (2008) using a sample of 396 U.S. companies, from 1980 to 1994, investigated the impact of CEO overconfidence in merger decisions. According to the authors, overconfident CEOs feel that they have superior ability to generate returns for the company and therefore, overestimate the potential synergies of a merger, entering often in value-destroying deals. Hence, on one hand, this will lead to an overpayment for target companies. On the other hand, the authors state that overconfident managers believe that outside investors undervalue their company and thus, will be more reluctant in conducting mergers when they need to raise external financing. This way, the authors conclude that the effect of overconfidence frequency is ambiguous – overconfident CEOs will conduct more mergers but only if they have enough internal resources. Nevertheless, in general, this investigation found that overconfident CEOs perform more acquisitions relatively to “rational” CEOs

and these CEOs end up destroying value for their shareholders.

Doukas and Petmezas (2007) introduced the self-attribution bias in this discussion. The self-attribution bias has to do with the way individuals access their reality. It's the idea that people tend to attribute a successful event (for instance, when a project is accomplished) entirely with their own merit, while blaming failure in bad luck, rather than on their own mistakes. Thus, it may lead individuals to believe (erroneously) that they are very talented. According to these authors, this bias can be the root of overconfidence in M&A activity. That is, managers who undertake one first successful merger tend to credit this positive outcome to their own skills and as a result, become overconfident and engage in more deals. This study concluded that managers "engaged in multiple acquisitions in a short-time interval fail to generate superior abnormal returns relative to non-acquisitive managers". Additionally, the authors found that overconfident managers have lower announcement returns when compared with "rational" managers and display poor long-term performance.

2.8. Impact of gender diversity on M&A activity

As above mentioned, empirical evidence has been revealed significant gender behavioral differences that seem to have an impact on firms. In the same way, some authors witnessed an impact of gender diversity on M&A activity.

As mentioned above, Huang and Kisgen (2013) studied the effect of executives' gender on corporate decision making, namely decisions regarding M&A. The authors found that firms with more male executives undertake more acquisitions and that acquisitions made these companies have announcement returns approximately 2% lower when compared with those made by firms with more female executives. Furthermore, they concluded that firms with more male executives present earnings forecasts with narrower bands and male executives are more likely to be replaced – which is all consistent with the idea of men being more overconfident relatively to women.

The study of this dissertation will be related with the effect of gender diversity in the board of the bidding company. This discussion already caught the attention of some researchers, although not many until the moment.

Levi et al. (2014) had very important findings in this field. The authors wanted to study the impact of having a more gender diverse board on the frequency of acquisition attempts and

on the bid premium paid for target companies. According to them, this question caught their eye mainly for three reasons. Firstly, mergers and acquisitions present high failure rates and it's crucial to figure out why so many deals fail. Secondly, as mergers are complex operations, immediate feedback is often not available and the authors thought it could be even more interesting to see how women – who are associated with lower overconfidence levels – react in this type of situations. Thirdly, M&A are situations where the psychological characteristics of individuals are more visible since they require intense board-level discussion.

Using data from 1997 to 2009, from 20 000 U.S. companies, the authors found that having more female representation on the board is negatively and significantly associated with the number of acquisition bids – more specifically, each 10% of female directors on the board (which represents approximately one female director) reduces the number of acquisition attempts in 7.6%. Additionally, the authors reported that having more women on the board of the bidding company is also negatively and significantly associated with the size of the bid premium - each 10% of female directors on the board reduces the size of the premium in 15.4%. The results were similar for the effect of having a female CEO - the bid premium is smaller when the CEO of the bidding company is a woman.

The researchers believe that this effect is consistent with the vast empirical evidence that suggests that women are less overconfident compared with their male peers. Moreover, other possible explanations are raised. It has been proved that women are more effective monitors than men (Adams and Ferreira, 2009), which can result in women being associated with fewer but better deals. Similarly, the authors recognize that diverse boards have more discussions and take more time to reach a consensus, which may also lead to fewer deals of superior quality.

Chen et al. (2016) had identical conclusions when studying the influence of gender diverse boards of the bidding company on the number of acquisition bids and the size of the acquisition – “greater female representation on a firm’s board will be negatively associated with both the number of acquisitions the firm engages in and (...) acquisition size”.

The authors developed a theory that argues that more gender diverse teams have more thorough discussions, a more active oversight and a more comprehensive decision-making process, which will make them analyze meticulously every deal opportunity and enter in only the best ones. Otherwise, all-male boards have more homogenous opinions and, thereby,

discussions will be probably poorer. Besides, they suggest that larger deals are indicators of hubris and as women are less overconfident than men, boards with more female representation are associated with smaller deals.

3. RESEARCH QUESTIONS/HYPOTHESES

The core idea of this dissertation is the study of the impact of gender diversity on the board of directors of bidding companies on M&A deals, namely, on the size of the premium and the size of the target.

As stated in the previous section, discussions at board level are enriched whenever there is more diversity in the group. Indeed, literature has suggested that heterogenous teams will naturally have a wider range of perspectives available, consequently will spend more time discussing ideas and, as a result, the final decisions will be more robust. In that sense, these gender differences in behaviour and the effect of diversity will impact the decision-making process of a company, which will ultimately influence the firm's merger and acquisition activity.

It's reasonable to assume that literature has reached to a consensus, concluding that women are less overconfident than men and less risk-averse, on general. In that sense, women will see the same acquisitions as less attractive relatively to their male peers since female directors will be less overconfident about the potential synergies created in the merger. As stated by Levi et. al (2014), women will apply a higher discount rate to future cash flows resulting from the acquisition and expect these cash flows to be lower. Thereby, it's predicted that more gender diverse boards – measured as boards with more percentage of women – will be associated with lower premiums.

Hypothesis 1: The proportion of women on the board of directors is negatively associated with the size of the bid premium.

For the same reasons stated above, it's also expected that having a female CEO will be associated with lower premiums.

Hypothesis 2: Having a female CEO has a negative impact on the size of the bid premium.

In the same way, the perceived lower overconfidence of female directors will impact the type of deals they will see as more attractive. Indeed, smaller deals are seen as less risky operations and are even considered to have a higher rate of success when compared to larger ones (Moeller et al., 2004). Hence, and in line with the study of Chen et al. (2016), it can be

expected that boards with more percentage of women will be associated with acquisitions of relatively smaller targets.

Hypothesis 3: The proportion of women on the board of directors is negatively associated with the relative size of the target company.

In the same way, it's predicted that that having a female CEO will be associated with smaller deals.

Hypothesis 4: Having a female CEO has a negative impact on the relative size of the target company.

4. SAMPLE AND METHODOLOGY

4.1. Sample construction

This dissertation intends to investigate the impact of gender diverse boards on the size of the bid premium on M&A deals. In that sense, it was decided that the sample would only contain deals of American bidding companies due to the larger volume of deals in the U.S. and in order to ensure that all companies are under the similar laws regarding diversity matters such as quotas. In fact, until 2022, there were no national quotas in place for women on boards in the United States, that is, there was not any minimum percentage or number of places in the boardroom allocated to women established by national law. However, some states have been coming with their own measures in order to promote more diverse teams, namely California (since 2018, public companies with up to four board members must have one female director, with five board members must have two female directors and with six or more board members must have three female directors), Illinois (since 2019, companies need to report the gender, race, and ethnicity demographics of their boards to the Illinois Secretary of State's Office), New York (since 2020, companies need to disclose the percentage of women in their boards), Maryland (since 2019, same measure as New York) and Washington (since 2020, public corporations must have at least 25% of female directors in their boards).⁶

Regarding the time period of the study, the sample includes deals announced from 2018 until 2022, covering a 4 year period, in order to capture a more recent insight on this issue.

The database used to export the data was the Zephyr database, since it provides financial information regarding both the acquiring and target company and about the deal itself. The additional required information about the composition of the board of the acquiror companies was found in the proxy statements of each firm of the year immediately before the merge/acquisition. Hence, for each company, it was identified the number of board members, the number of independent directors, the percentage of female directors in the board, the gender of the CEO and whether the CEO was also the chairman or not.

⁶ Deloitte (2022). Progress at a snail's pace – Women in the boardroom: A global perspective. <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/gx-women-in-the-boardroom-seventh-edition.pdf> (Accessed June 1, 2022)

As mentioned before, it was selected all deals with announced date between 01/01/2018 and 31/12/2021 with the following criteria: (i) the deal type is merger or acquisition, (ii) the deal is completed, (iii) the acquiror firm is American, (iv) the acquiror firm is listed and the target firm is listed or delisted and (v) the value of the bid premium is known. This way, the original sample contained 244 deals. However, 77 observations end up being left out of the sample. Observations with missing values were eliminated of the sample. Moreover, consistent with Farrell and Hersch (2005), financial institutions, insurance companies and real estate firms were also excluded because they may be subject to different regulatory rules regarding the composition of the board. Thus, the final sample includes a total of 167 deals.

4.2. Model specification

4.2.1. Dependent variables

The aim of this study is to investigate the impact of having a higher percentage of female directors on the size of the bid premium and size of the deal.

In that sense, the first dependent variable is, precisely, the size of the bid premium (BIDPREMIUM). The bid premium is the additional amount the bidder company offers for the target company above its pre-acquisition market value. The data regarding this variable was retrieved from the Zephyr database, which calculates the bid premium against the closing share price for the day before the offer is announced.

$$\begin{aligned} \text{Bid premium (in percentage)} \\ &= (\text{Offer price} - \text{Closing price on the day before the announcement}) \\ &\times 100 \end{aligned}$$

Furthermore, the second dependent variable is the relative size of the target company, that is, the ratio between the total assets of the target company and the total assets of the bidding company (TARGETSIZE) – both of them measured at the fiscal year end prior to the bid announcement.

$$\text{Target size} = \frac{\text{total assets target}}{\text{total assets bidder}}$$

4.2.2 Independent variables

Following the logic mentioned above, the independent variables of this study are the proportion of female directors which represents the ratio of women directors to the total board

members (PROPFEM), and a dummy variable which takes the value of zero if the CEO is male and one if the CEO is female (CEOFEM).

4.2.3 Control variables

Naturally, there are other factors influencing the bid premium besides the gender diversity of the board. Hence, in order to control for other influences on the dependent variables, some control variables were considered in this study – board control variables and financial control variables.

For board control, it was used the variable board size which measures the number of directors in the board of the bidding company at the time of the announcement of the deal (BOARDSIZEBID), the proportion of independent directors which is ratio of independent directors to the total board members (PROPINDBID) and a dummy variable which takes the value of one if the CEO was also the chairman and zero if not (CEOISCHBID).

The financial control variables are divided in variables concerning the bidder company, variables concerning the target company and variables concerning the deal in particular. For the study concerning the first and second hypotheses, the financial control variables included all three types of variables since the characteristics of the bidder, the target and the deal itself affect the amount of premium offered by the bidder. With respect to the third and fourth hypotheses, only financial control variables from the bidder company are considered relevant.

The financial control variables used from the bidding company were the return on assets (ROABID) which is the ratio between net income and total assets, and the ratio between operating cash flows and total assets (OPCFBID), representing measures of firm performance; the natural logarithm of total assets (ASSETSBID) and the natural logarithm market capitalization (MARKETCAPBID), which are measures of firm size; the ratio between cash and cash equivalents and total assets (CASHBID); the ratio between total debt and total assets (DEBTBID).

The financial control variables regarding the deal were the toehold (TOEHOLD), that is, the stake of the target company owned by the bidder prior to the bid; a dummy variable that takes the value 1 if the bidder is seeking for majority control, that is, 50% of the shares of the target company and 0 otherwise (CONTROL).

As for the financial control variables of the target company, it was used the ratio between EBIT (earnings before interest and taxes) and total assets, which measures the profitability of the company (PROFTARGET); the ratio between equity and total assets (EQASSETSTARGET) which is an indirect measure of the leverage of the company since, in general, the higher this ratio, the lower the indebtedness of the firm and the less risky it is.

The majority of the control variables considered in this study are based on the past work by Levi et al. (2014) and Chen et al. (2016).

4.3 Regression Models

Since both dependent variables used in this dissertation are cross-sectional variables, the chosen method to understand the relationship between gender diversity and the bid premium/target size is the Ordinary Least Squares (OLS) regression. Besides, this method was used in previous studies in this field, namely by Chen et al. (2016) and Levi et al. (2014).

Thereby, the following models will be used to estimate the possible link between gender diversity in the boardroom and the size of the bid premium (hypothesis 1 and 2) and the possible link between gender diversity in the boardroom and the size of the target company (hypothesis 3 and 4):

$$BIDPREMIUM_i$$

$$\begin{aligned}
&= \beta_0 + \beta_1 PROP FEM_i + \beta_2 CEO FEM_i + \beta_3 BOARD SIZE BID_i \\
&+ \beta_4 PROP IN DBID_i + \beta_5 CEO ISCH BID_i + \beta_6 ROA BID_i + \beta_7 OPC FBID_i \\
&+ \beta_8 MARKET CAP BID_i + \beta_9 ASSETS BID_i + \beta_{10} CASH BID_i \\
&+ \beta_{11} DEBT BID_i + \beta_{12} TOE HOLD_i + \beta_{13} CONTROL_i + \beta_{14} PROFTARGET_i \\
&+ \beta_{15} EQASSETSTARGET_i + u_i
\end{aligned}$$

$$\begin{aligned}
TARGETSIZE_i &= \beta_0 + \beta_1 PROP FEM_i + \beta_2 CEO FEM_i + \beta_3 BOARD SIZE BID_i \\
&+ \beta_4 PROP IN DBID_i + \beta_5 CEO ISCH BID_i + \beta_6 ROA BID_i + \beta_7 OPC FBID_i \\
&+ \beta_8 MARKET CAP BID_i + \beta_9 ASSETS BID_i + \beta_{10} CASH BID_i \\
&+ \beta_{11} DEBT BID_i + u_i
\end{aligned}$$

4.4 Descriptive Statistics

Table 1 presents the descriptive statistics of the two dependent variables used in this study.

In the sample of 167 deals, the average bid premium is 29.76% meaning that, on average, the bidding company offered a premium of 29.76% above the market price of the target. Regarding the target size, according to the data, on average, bidding companies buy targets with a size of 40.18% of their own companies.

Table 1. Descriptive statistics: Dependent Variables

	Mean	Median	Std Deviation	Min	Max
Bid premium	0.2976	0.2230	0.3423	-0.3410	2.75
Target size	0.4018	0.1611	0.6807	0.0002	4.4934

The information concerning the dependent variables are shown in table 2 and table 3. From table 2 it's possible to observe that the average percentage of female directors is 21.84% and the median is 22,22%. It's important to note that the standard deviation is only 11.35%, which suggests that the values are close to the mean. Moreover, according to table 3, only 4.79% of the acquirer companies had a female CEO.

Table 2. Descriptive statistics: Independent Variables – Percentage of female directors

	Mean	Median	Std Deviation	Min	Max
Proportion of female directors	0.2184	0.2222	0.1135	0	0.5714

Table 3. Descriptive statistics: Independent Variables – female CEO

Gender of CEO	%
Female	0.0479
Male	0.9521

The summary statistics concerning the control variables are represented in table 4. Looking at board control variables, the average board size is 10 elements, the average proportion of independent directors is 82.16% and in 47.91% of the bidding companies there is CEO duality (the CEO is also the chairman of the board).

Table 4. Descriptive statistics: Control variables

	Mean	Median	Std Deviation	Min	Max
Board size	9.6047	10	2.35	4	17
Proportion of	0.82156	0.875	0.1281	0.3333	1

independent directors					
CEO is Chairman	0.4791	0	0.5012	0	1
ROA bidder	-0.0032	0.0469	0.2975	-2.9930	0.4210
Operating cash flow bidder	0.0803	0.0895	0.1166	-0.9804	0.2845
Market capitalization bidder	48 454 908	8 333 243	167 802 089	11 608	2 040 303 500
Total assets bidder	26 981 867	7 587 600	48 295 357	10 617	333 779 000
Cash bidder	0.1513	0.1049	0.1669	0	0.7533
Debt bidder	0.3423	0.3137	0.3141	0	2.9083
Toehold	0.0485	0	0.1692	0	0.9481
Control	0.9461	1	0.2265	0	1
Profitability target	-0.0492	0.0240	0.3752	-1.7243	3.3152
Equity to assets target	0.4533	0.4293	0.3852	-1.3068	3.3152

4.5. Expected Results

The aim of this study is to find the impact of the proportion of female directors on the size of bid premium and the deal size and to understand if the gender of the CEO has any impact on the size of the premium and on the deal size. For this reason, these variables don't have expected results since they are the variables being investigated.

Regarding the expected impact of board size on the dependent variables, although it brings advantages to have more people from diverse backgrounds and a wider scope of opinions inside the board, research suggests that the more directors the board has, the less effective they tend to be, mainly due to problems of coordination and communication (Jensen, 1993). Indeed, there are empirical evidence supporting the idea that larger boards are associated with poorer corporate performance (Yermack, 1996; Eisenberg et al., 1998). Thus, it's reasonable to expect that in a larger board, as ideas won't flow so efficiently, the decisions may not be the most optimal. Hence, the expected sign of this variable can be either positive or negative.

In a different way, the proportion of independent directors can affect the decision-making process in the board. Typically, each stock exchange has its own definition and requirements for a director to be considered independent. According to the New York Stock Exchange and the Nasdaq Stock Market, basically, independent directors are directors with no

materiality relationship with the firm and no other relationship that would prevent them of providing an independent judgment in their decisions. Recalling the agency theory, managers and shareholders have contradictory interests and thus, even though managers are expected to act in shareholders' best interests, they may use the resources of the company to pursue their own goals (Jensen, 1986). Having this in mind, independent directors may decrease agency problems, as they will protect the interests of shareholders. Confirming this hypothesis, a study by Brickley and James (1987) found that outside directors help to reduce managerial consumption of perquisites. Additionally, Byrd and Hickman (1992) concluded that in the case of tender offers, bidding companies with boards dominated by independent outside directors present higher announcement-date abnormal returns than other bidders. Thereby, the sign of this variable is expected to be negative, for the size of the bid premium and uncertain for the deal size. Note that if it's believed that larger deals are a sign of hubris, the expected sign is also negative.

Concerning CEO/Chairman duality, as it entrenches the CEO at the top of the group, it makes more difficult for the board to execute its monitoring and oversight role (Finkelstein and D'Aveni, 1994). Taking into account that the responsibility of a CEO is to strategically manage the firm while the chairman has to evaluate the effectiveness of that strategy, and deal with the process of hiring, firing and compensate the CEO, it's easy to understand that adopting this duality will lead to a conflict of interests (Jensen, 1993). In fact, some studies have showed a negative effect of duality on firm performance (see Rechner and Dalton, 1991; Daily and Dalton, 1994). Moreover, Li and Tang (2010) argue that CEO duality strengthens the effect of hubris, leading CEOs to take greater than optimal risk. For these reasons, it's expected that CEO duality might be associated with higher bid premiums and larger deals.

Now addressing the impact of financial control variables, it's expected that companies with better firm performance are also able to make better deals and therefore, the expected sign of both measures of profitability (ROA and operating cash flows) on the size of the premium is negative and for the deal size it's uncertain. Again, if it's believed that larger deals are a sign of hubris, the sign is also negative for the deal size.

Further, there's evidence that larger companies pay higher premiums, which might be related to the fact that managers from bigger companies are more prone to suffer from managerial

hubris and overconfidence (Moeller, Schlingemann, and Stulz, 2004). This may also be a potential reason for larger companies enter in larger deals. Thus, the expected sign of the measures of firm size (total assets and market capitalization) on the size of the premium and the deal size is positive.

It also makes sense to expect companies with higher cash holdings to overpay and enter in deals of bigger targets, since they have more available resources. In fact, Harford (1999) and Opler et al. (1999) found similar evidence that firms with more cash spend more in acquisitions.

Moreover, regarding the effect of leverage on the bidding company, according to Uysal (2011), firms with higher debt levels pay lower premiums and engage in acquisitions of smaller targets once these companies will find more difficult to raise capital or issue further debt due to the risks associated with high leverage.

Concerning the financial control variables of the deal itself, it's expected that, as empirical evidence suggests, the toehold negatively affects the bid premium since bidders who already have a large ownership of target shares are less probable of facing competition and target resistance, therefore resulting in lower premiums (Betton and Eckbo, 2000).

It can also be expected that a bidder who is interested in acquiring a stake that will give it majority control over the company is willing to offer a higher premium (Walkling & Edmister, 1985).

Regarding financial control variables of the target, it can be expected that, because profitable targets are more attractive, bidders will be willing to offer a higher premium.

On the matter of the impact of target leverage on premium (that will be measured indirectly by the equity to assets ratio), the forecasted relationship is ambiguous. On the one hand, it makes sense to expect that high debt levels on the target may limit future growth due to potential financial distress, and therefore, expect a negative relationship between target leverage and the premium (Walkling & Edmister, 1985) which is equivalent to a positive relationship between the equity to assets ratio and the premium. However, on the other hand, low leverage may also mean unused debt capacity and possible tax shelters which can result in a higher premium being offered.

Table 5 summarises the expected results discussed above.

Table 5. Summary of the expected results

	Size of the bid premium	Relative size of the target
Proportion of female directors	?	?
Female CEO	?	?
Board size	+ or -	+ or -
Proportion of independent directors	-	+ or -
CEO duality	+	+
ROA bidder	-	+ or -
Operating cash flow bidder	-	+ or -
Market capitalization bidder	+	+
Total assets bidder	+	+
Cash bidder	+	+
Debt bidder	-	-
Toehold	-	n.a.
Control	+	n.a.
Profitability target	+	n.a.
Equity to assets target	+ or -	n.a.

5. RESULTS

5.1. Correlation

Firstly, it's crucial to check if any independent variable suffers from high correlation, which would lead to a problem of multicollinearity, that is, one explanatory variable could be linearly predicted from others. As a result of multicollinearity, standard errors would be much larger and statistical inference would be less reliable. The Pearson's correlation coefficient gives a measure of how related two variables are. A value of 1 or -1 indicates that the variables are perfectly correlated.

Table 6 presents the correlation matrix for all the variables. As it shows, toehold and control are highly negatively correlated, with a correlation coefficient of -0.9. Thereby, it was decided that the variable regarding the toehold will be dropped from the model because after generating two models, one including the variable of toehold and other including the variable of control, the goodness of fit measured by R-squared is higher for the last one. Moreover, total assets and market capitalization are positively correlated, exhibiting a correlation coefficient of 0.7. In that sense, the same procedure was repeated and after generating two models, one including the variable of total assets and other including the market capitalization, it was concluded that for the first and second hypotheses it's better to include market capitalization as a firm size measure while for the second hypotheses, it's preferable to use total assets.

Table 6: Pearson's Correlation Coefficients Matrix of the variables

	BIDPREMIUM	PROPFEM	CEOFEM	BOARDSIZE	PROPINDBID	CEOISCHBID	ROABID	OPCFBID	MARKETCAPBID	ASSETSIBID	CASHBID	DEBTBID	TOEHOLD	CONTROL	PROFTARGET	EQASSETSTARGET
BIDPREMIUM	1.000	-0.046	-0.010	-0.033	0.024	0.123	0.088	0.072	0.043	0.048	0.115	0.067	-0.143	0.178	-0.210	0.000
PROPFEM	-0.046	1.000	0.259	0.262	0.402	0.174	-0.020	0.128	0.211	0.229	0.012	-0.012	0.079	-0.024	0.021	0.017
CEOFEM	-0.010	0.259	1.000	0.014	0.117	0.066	0.068	0.087	-0.017	-0.002	-0.025	-0.012	-0.064	0.054	0.020	-0.065
BOARDSIZEBID	-0.033	0.262	0.014	1.000	0.304	0.197	0.185	0.166	0.241	0.380	-0.076	0.180	-0.052	0.050	0.278	0.151
PROPINDBID	0.024	0.402	0.117	0.304	1.000	0.042	0.190	0.193	0.149	0.149	-0.048	0.033	0.078	-0.037	0.031	0.196
CEOISCHBID	0.123	0.174	0.066	0.197	0.042	1.000	-0.027	-0.041	0.082	0.266	0.073	-0.014	-0.073	0.070	-0.133	-0.109
ROABID	0.088	-0.020	0.068	0.185	0.190	-0.027	1.000	0.457	0.107	0.119	-0.274	0.136	0.023	-0.006	0.116	0.115
OPCFBID	0.072	0.128	0.087	0.166	0.193	-0.041	0.457	1.000	0.171	0.151	-0.158	0.108	0.015	0.013	0.231	0.167
MARKETCAPBID	0.043	0.211	-0.017	0.241	0.149	0.082	0.107	0.171	1.000	0.722	-0.093	-0.008	-0.011	0.032	0.002	0.061
ASSETSIBID	0.048	0.229	-0.002	0.380	0.149	0.266	0.119	0.151	0.722	1.000	-0.212	-0.010	0.081	-0.068	-0.046	0.080
CASHBID	0.115	0.012	-0.025	-0.076	-0.048	0.073	-0.274	-0.158	-0.093	-0.212	1.000	-0.161	-0.137	0.117	-0.026	-0.020
DEBTBID	0.067	-0.012	-0.012	0.180	0.033	-0.014	0.136	0.108	-0.008	-0.010	-0.161	1.000	-0.043	0.057	0.043	0.036
TOEHOLD	-0.143	0.079	-0.064	-0.052	0.078	-0.073	0.023	0.015	-0.011	0.081	-0.137	-0.043	1.000	-0.908	0.026	-0.021
CONTROL	0.178	-0.024	0.054	0.050	-0.037	0.070	-0.006	0.013	0.032	-0.068	0.117	0.057	-0.908	1.000	-0.021	0.016
PROFTARGET	-0.210	0.021	0.020	0.278	0.031	-0.133	0.116	0.231	0.002	-0.046	-0.026	0.043	0.026	-0.021	1.000	0.430
EQASSETSTARGET	0.000	0.017	-0.065	0.151	0.196	-0.109	0.115	0.167	0.061	0.080	-0.020	0.036	-0.021	0.016	0.430	1.000

5.2. Heteroscedasticity

One of the most important assumptions for linear regression modelling is homoscedasticity, that is, the variance of the error term is constant. If this assumption is not verified, the model suffers from heteroscedasticity and, as a consequence, statistical inference won't be valid.

In order to test for heteroscedasticity, it was performed the White's test, in which the null hypothesis states that the variances for the errors are equal and thereby, a p-value lower than the level of significance implies that there's a problem of heteroscedasticity. In the case of the two models used in this study, the p-values were 0.3742 and 0.7229, meaning that the null hypothesis is not rejected for a level of significance of 1% and there is no presence of heteroscedasticity.

5.3. Regression Analysis

Recalling hypothesis 1, it was expected that the proportion of women on the board of directors would be negatively associated with the size of the bid premium. Table 7 presents the regression results of the relationship between the size of the bid premium and the independent variables. It's possible to observe that, as expected, the variable for the proportion of female directors has a negative effect on the size of the premium. This is in accordance with the conclusions of Levi et al. (2014), who were able to find this negative link between the same variables and it's in line with the wide literature suggesting that women are less overconfidence than men (Huang and Kisgen, 2013; Estes and Hosseini, 1988; Barber and Odean, 2001), which will make them push the premium downwards. Nevertheless, this variable is not statistically significant and thereby, hypothesis 1 cannot be accepted. The negative effect of having a female CEO on the dependent variable is also in accordance with the expectations, but also not statistically significant, and for this reason it's not possible to accept hypothesis 2. Despite the fact that the independent variables are not statistically significant, the regression is globally significant on a level of significance of 5%, meaning that the model provides a better fit to the data than a model with no independent variables. Moreover, the explanatory power of the model is 13,4% measured by the R-squared, which means that 13,4% of the variability observed in the dependent variable is explained by the independent variables collectively.

Concerning the board control variables, the board size of the bidding company presents a

negative effect on premium, which is in line with the theory of Jensen (1993), which states that having a board comprised by too many elements can generate problems of communication that lead to less optimal decisions. However, the effect is not statistically significant. The proportion of independent directors seems to have a positive impact on the size of the bidding premium, contradicting the previous expectations supported by the research of Brickley and James (1987) which concluded that outside directors help to reduce managerial consumption – but the variable is also not significant. Lastly, the variable for CEO duality has a positive sign, which is in conformity with the expectations, as literature suggests that a CEO who is also chairman of the board is more likely to suffer from hubris (Li and Tang, 2010).

The results for financial control variables matched the predictions, on general. Both measures of profitability of the bidding company, that is, return on assets and operating cash flow have a positive effect on the size of the premium, which goes against the argument that a more profitable company could be more prone to make more optimal decisions but supports the idea that a more profitable company may have more money available to spend. However, both variables are not statistically significant. As for the variable measuring firm size, that is market capitalization, the results match previous literature that claims that premiums increase as the size of the bidding company increases due to hubris (Moeller et al., 2004). Nevertheless, the effect is not statistically significant. Further, according to the results, cash has a statistically significant positive impact on the size of the bidding premium on a level of significance of 10%, implying that companies with higher amounts of cash will offer higher premiums, as literature suggests (Harford, 1999; Opler et al, 1999). On the contrary, the effect of debt is the opposite of the anticipated, as debt has a positive sign on the size of the premium and it was expected that more leveraged companies wouldn't be so predisposed to offer higher premiums (Uysal, 2011). Nevertheless, the variable is not statistically significant.

Regarding the profitability of the target, although it is a statistically significant variable, is not in line with the predicted results since it seems to have a negative effect on the premium and it was expected that companies would offer higher premiums for targets with higher profits. As for the variable for the equity to assets ratio, it has a statistically significant positive impact on the size of the premium on a level of significance of 1% and this is in accordance with previous expectations and literature, since a target company with a higher equity to assets ratio has a lower level of debt and therefore, it's more attractive for bidders (Walkling &

Edmister, 1985).

Lastly, the dummy variable for control has positive and statistically significant effect on the size of the bid premium, on a level of significance of 10%. This means that a bidding company who is interested in obtaining a majority stake in a target will be willing to pay a higher premium – which is in line with the expectations and previous research by Walkling & Edmister (1985).

Table 7. Regression Results for the hypothesis 1 and 2

	BIDPREMIUM
PROPFEM	-0.211 (-0.788)
CEOFEM	-0.009 (-0.070)
BOARDSIZEBID	-0.007 (-0.458)
PROPINDBID	0.032 (0.133)
CEOISCHBID	0.062 (1.069)
ROABID	0.101 (0.963)
OPCFBID	0.247 (0.875)
MARKETCAPBID	0.008 (0.401)
CASHBID	0.292* (1.768)
DEBTBID	0.075 (0.883)
CONTROL	0.217* (1.876)
PROFTARGET	-0.233*** (-2.856)
EQASSETSTARGET	0.082 (1.064)

For the OLS estimates, t-values are in parentheses. *, **, *** are respectively significance level of 10%, 5%, 1%.

Hypotheses 3 and 4 suggest that the proportion of women on the boardroom and having a female CEO could be negatively associated with the deal size. As table 8 shows, it's not possible to prove that there is an association between these variables, since the variable for the proportion of female directors and the variable for having a female CEO are not statistically significant, and thereby hypotheses 3 and 4 have to be rejected. These results differ from the ones obtained by Chen et al. (2016) who were able to find a negative relationship between female representation at board level and the acquisition size.

As it happened with the regression model for hypothesis 1 and 2, although the independent variables are not statistically significant, the model is globally significant on a level of significance of 1%, meaning that the model provides a better fit to the data than a model with no independent variables. Furthermore, the explanatory power of the model is 17% measured by the R-squared, which means that 17% of the variability observed in the dependent variable is explained by the independent variables collectively.

In this case, the effects of the control variables don't seem to match previous expectations so well. For board control variables, the sign for board size is positive but not statistically significant. As for the proportion of independent directors, the impact on the relative size of the target company is negative but not statistically significant. Moreover, results indicate that, for a significance level of 5%, companies in which the CEO is also the chairman will tend to acquire relatively smaller targets – which contradicts the idea that CEO duality, as it contributes for the hubris phenomenon (Li and Tang, 2010), would make CEOs who are also chairmen more prone to engage in larger deals. Concerning financial control variables, the return on assets of the bidding company and the operating cash flows present a negative sign on the relative size of the target company, but not statistically significant. The variable for total assets has a negative effect on the dependent variable on a level of significance of 5%, meaning that, the more assets a company has, the smaller the target company it will acquire. This goes against the expectation that managers from larger companies, as would be more likely to suffer from overconfidence (Moeller et al., 2004), would enter in bigger deals. However, the variable is not statistically significant. As for cash, the sign is also negative, contradicting previous studies, namely by Harford (1999) and Opler et al. (1999), which concluded that companies with higher amounts of cash available are more likely to spend more in acquisitions. Nonetheless, the variable is also not statistically significant. Finally, the effect of debt of the bidding company on the deal size is in accordance with the forecasts and the

literature (Uysal, 2011), presenting a negative sign – but the variable is, again, not statistically significant.

Table 8. Regression Results for the hypothesis 3 and 4

	TARGETSIZE
PROPFEM	0.2616 (0.509)
CEOFEM	0.108 (0.444)
BOARDSIZEBID	0.012 (0.429)
PROPINDBID	-0.171 (-0.386)
CEOISCHBID	-0.231** (-2.129)
ROABID	-0.180 (-0.901)
OPCFBID	-0.804 (-1.561)
TOTALASSETS BID	-0.091** (-2.294)
CASHBID	-0.489 (-1.418)
DEBTBID	-0.034 (-0.208)

For the OLS estimates, t-values are in parentheses. *, **, *** are respectively significance level of 10%, 5%, 1%.

6. ADDITIONAL ANALYSIS

Given the not significance of the independent variables of the previous models, it was decided relevant to perform some additional analysis in order to understand if gender diversity is, indeed, not linked with the size of the bid premium and the size of deal.

This way, it was created a dummy variable to measure the level of gender diversity in the board which takes the value 0 if there are no female directors and the value of 1 if there is at least, one female director in the boardroom. All the control variables considered in the previous models were also included.

Table 9 presents the new regression results. As it's possible to observe, the presence of female directors has a negative effect on the size of the bid premium on a 1% level of significance. More precisely, having at least one woman in the board of the bidder will reduce the premium offered in 26,58%. These results are similar with the previous research on this field, namely by Levi et. al (2014) who found a negative association between the proportion of female directors and the premium. In the case of this dissertation, it was not possible to confirm that hypothesis, but it was possible to support the hypothesis that companies with all-male boards offer higher premiums than gender diverse boards. This is in line with the literature explored in previous sections, arguing that heterogenous teams can be very beneficial for corporations because more opinions and perspectives are being brought to be table and as a result, discussions will be richer and solutions will have a better quality (Nemeth, 1986; Milliken and Martins, 1996; Chen et al., 2016).

Table 9. Regression Results for additional analysis

	BIDPREMIUM
MOREONEFEM	-0.266*** (-0.230)
BOARDSIZEBID	0.002 (-2.534)
PROPINDBID	0.167 (0.151)
CEOISCHBID	0.051** (0.894)
ROABID	0.094 (0.931)

OPCFBID	0.279 (1.016)
MARKETCAPBID	0.004 (0.214)
CASHBID	0.346 (2.121)
DEBTBID	0.079 (0.961)
CONTROL	0.223* (1.973)
PROFTARGET	-0.239*** (-2.997)
EQASSETSTARGET	0.070 (0.938)

For the OLS estimates, t-values are in parentheses. *, **, *** are respectively significance level of 10%, 5%, 1%.

7. CONCLUSION

The conversation around diversity and inclusivity in corporations, especially at board level is an issue that has been finally gaining relevance. Nonetheless, the majority of boardrooms remain predominantly male, meaning that the debate is not over yet. Some governments already brought to the table this topic, implementing mandatory gender quotas, pushing for more female representation in boards. Alongside with regulatory measures, academic research can also contribute to the promotion of gender equality. In fact, there is an extensive body of literature focused on the influence of female directors on the different corporate decisions and overall performance, as an attempt to show companies that gender diversity can be a source of value (Adler, 2001; Carter, 2003; Campbell & Mínguez-Vera, 2008; Terjesen, Couto and Francisco, 2015).

This dissertation intends to study the impact of gender diverse boards in the particular case of acquisitions. Past research argues that M&A is ideally suited to investigate gender behavior since it amplifies gender differences in dealing with uncertainty along with overconfidence (Levi et al., 2014). Indeed, most academics agree that men are more overconfident than women, when facing uncertainty (Estes and Hosseini, 1988; Barber and Odean, 2001; Huang and Kisgen, 2013). Moreover, overconfidence is appointed by many authors as a possible cause for M&A failure (Roll, 1986; Hayward & Hambrick, 1997; Doukas and Petmezas, 2007; Malmendier and Tate, 2008). According to Roll (1986), managers usually overestimate the benefits of a merger and thereby, end up overpaying for targets due to overoptimism or overconfidence. In that sense, it could be expected that the presence of women in the boardroom of the bidding company could contribute to lower premiums and the acquisition of smaller targets.

After gathering data of 167 American deals with announcement dates from 2018 to 2021, it was found no significant association between the proportion of female directors on the bidder and the size of the bid premium or the relative size of the target company. Also, this study couldn't observe any significant impact of having a female CEO on the premium and on the deal size. These results go against the findings of Levi et. al (2014) who were able to report that having more women on the board of the bidding company is negatively and significantly associated with the size of the bid premium, as well as having a female CEO. The previous work by Chen et al. (2016) also contradicts the conclusions of this study, as the

author witnessed a negative association between the female representation on a company's board and the acquisition size.

However, due to the inconclusive results from the first models, instead of using the proportion of women as the gender diversity measure, it was created a dummy variable which had the value 0 if there were no female directors and the value of 1 if there was at least, one female director in the boardroom. After this additional analysis, it was possible to prove that the presence of female directors has a negative effect on the size of the bid premium on a 1% level of significance. More precisely, having at least one woman in the board of the bidder will reduce the premium offered in 26,58%.

It's important to note that this dissertation suffered from some limitations. Firstly, the sample size comprised by only 167 deals can be considered small, when compared to previous work done in this field. This results in a lower statistical power of the regressions, making it harder to generalize the results. Secondly, the chosen time interval of research encompasses the period of the COVID-19 pandemic, which slowed down M&A activity, decreasing the numbers of completed deals, according to the Institute for Mergers and Acquisitions.

For future research, it's recommended that a larger sample size is used in order to improve the power of the study. Moreover, it would be interesting to perform this work in a country with gender quotas, to understand the impact of that mechanism in strategic decisions such as mergers and acquisitions. It would be also relevant to investigate the impact of other minority groups in the decision-making process in the board and use other diversity measures, such as age, experience or nationality.

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