Radboud University

The impact of female board representation on corporate acquisitiveness in Europe

Master's Thesis in Economics

Faculty: Nijmegen School of Management

Study program: Master Economics, specialization Corporate Finance and Control

Supervisor: Dr. K. Burzynska

Student: Dion van Merwijk (s4594150)

Date: October 31, 2020

Abstract:

This study investigates whether women in boardrooms influence the acquisitiveness of European firms. Using a sample of 45,932 firm-year observations from 2,821 publicly listed companies during the period 1999 – 2019, it is found that board gender diversity does not significantly influence a firm's acquisitiveness. This result is robust to two alternative measures of corporate acquisitiveness as well as to various sub-samples and does not support the claim that women tend to be less overconfident and more risk-averse than men. However, when low value deals are excluded, it is found that a 10% increase in the proportion of female directors significantly decreases the number of acquisition deals by 5.45%. It is also demonstrated that a 10% increase in the tenure of female relative to male directors significantly decreases the number of acquisition deals by 2.87%. No significant difference in corporate acquisitiveness is found between firms with and without at least 30% or 3 female directors. Hence, no support is found for the critical mass theory in either relative or absolute terms for women on corporate boards. Finally, it is demonstrated that firms with at least one female director are associated with 4.53% less acquisition deals.

Keywords: mergers and acquisitions, corporate acquisitiveness, board gender diversity, female directors, overconfidence, risk-aversion, critical mass theory, social identity theory

Table of contents

1. Introduction

Stimulated by the 2012 proposal of the European Commission (EC) on improving gender balances among non-executive directors of listed companies, national governments of European countries are pursuing gender equality on the board of directors (hereinafter referred to as the board) and trying to close the gender gap by e.g. introducing quotas. This resulted in a significant increase in the number and proportion of women on corporate boards amongst firms in the European Union (EU). Where at the end of 2009 the average percentage of women on boards was 10.9% for the largest publicly listed companies[1] in the current European Union, so excluding the United Kingdom, this percentage increased to 28.4% at the end of 2019 (EIGE, 2020). Despite the significant progress in female presence on corporate boards over the last decade, they continue to be dominated by men. Also, between European countries there is still a lot of difference. Whereas the largest publicly listed firms in Iceland, France and Norway currently have over 40% of female directors on their boards, for firms located in Malta, Cyprus and Estonia this proportion is below 10%. In contrast to the well-documented developments of female directors in European boardrooms, much less is yet known about its consequences on corporate matters.

Just like in society, the attention for female executives, directors and managers is growing in the economics and finance literature as well. Motivated by the psychological findings that there are significant gender differences with respect to risk preference and thus decision making, academic literature studying the effects and predictors of women on corporate boards has increased substantially during recent years. Men are found to be more competitive, more (over)confident and less risk-averse than women (see Croson & Gneezy (2009) for an extensive literature review on gender differences in economic experiments). This has led to papers investigating the effects of gender differences in corporate leadership on decision making, policies, activities and outcomes of firms. Papers such as Carter, Simkins and Simpson (2003), Erhardt, Werbel and Shrader (2003), Adams and Ferreira (2009) and Krishnan and Parsons (2008) for example find that female directors are positively associated with a firm's value measured by Tobin's Q, higher firm performance in terms of ROA and ROI, better monitoring and earnings quality, respectively.

One of the most prominent and impactful corporate activities carried out by firms are considered to be mergers and acquisitions (hereinafter referred to as M&As). Most M&A-related literature points to the fact that M&As are risky activities with a high chance of failure (Bazel-Shoham, Lee, Rivera & Shoham, 2017), meaning that they do not increase shareholder value. Since prior research has shown that gender influences risk attitudes and corporate decision making, there might be gender differences with respect to M&As as well. In other words, the characteristics of male

[1] Here, the largest publicly listed companies means the largest companies that are constituents of the primary blue-chip index of a national stock exchange. These companies are usually the largest in terms of market capitalization and/or volume of market trades. For each EU member state, the largest publicly listed companies are taken into account with a maximum of 50 (EC DG JUST, 2019).

and female directors and consequently the composition of boards might influences the corporate acquisitiveness of firms. Corporate acquisitiveness or corporate acquisition intensity indicates the frequency a firm engages in M&As. To my knowledge, the relationship between female board representation and the number of corporate acquisitions of firms has been the main study in four papers prior to this thesis[2]. However, none of these papers have studied this relationship for a sample of firms from purely European countries. Therefore, this thesis investigates the relationship between women on the board and corporate acquisition intensity for firms within Europe. This leads to the following central research question: *"What impact do female directors have on the acquisitiveness of publicly listed firms within Europe?"*.

Using a sample of 45,932 firm-year observations from 2,821 publicly listed companies in Europe during the period 1999 – 2019, this study has five main findings. (1) It is demonstrated that women on corporate boards do not significantly influence a firm's acquisitiveness, as measured by the number of acquisition deals. This result is robust to two alternative measures of corporate acquisitiveness as well as to various sub-samples and does not support the claim that women tend to be less overconfident and more risk-averse than men. (2) However, when low value deals are excluded, it is found that a 10% increase in the proportion of female directors decreases the number of acquisition deals by 5.45%, which is found to be a significant effect. (3) Also, it is demonstrated that a 10% increase in the tenure of female relative to male directors decreases the number of acquisition deals by 2.87%. Again, this is found to be a significant effect. (4) No significant difference in corporate acquisitiveness is found between firms with and without at least 30% or 3 female directors. Hence, no support is found for the critical mass theory in either relative or absolute terms for women on corporate boards. (5) Finally, it is demonstrated that firms with at least one female director are associated with 4.53% less acquisition deals. This finding supports the social identity theory. These results are found using random effects negative binomial models and controlling for board and financial characteristics of firms as well as for year, industry and country fixed effects.

This thesis contributes to the literature on gender diversity on corporate boards and M&A activity in two distinctive ways. First, as mentioned before, it is the first to study the relationship between female board representation and acquisitiveness for firms in Europe. Therefore, this thesis fills up a research gap in the existing literature by adopting a sample of merely European firms. Filling this research gap is academically relevant since differences in for example institutional quality (e.g. Hyun & Kim, 2010), corporate governance regime (e.g. Rossi & Volpin, 2004) or the type of financial system (e.g. Di Giovanni, 2005) between European countries and e.g. the US might cause the relationship between board gender diversity and corporate acquisitiveness to be different as well. According to Hyun and Kim (2010) a country's institutional quality, assessed by the strength of the

[2] These four papers are: Bazel-Shoham et al. (2017), Chen, Crossland and Huang (2016), Dowling and Aribi (2013) and Levi, Li and Zhang (2014). Each of these papers will be discussed in the literature review (section 2.3).

legal system and observance of the law, has a positive impact on M&A activity. Rossi and Volpin (2004) state that M&A activity is higher in countries with better accounting standards and stronger shareholder protection as a corporate governance regime. Di Giovanni (2005) finds that the development of financial markets, measured by the stock market capitalization to GDP ratio, has a positive effect on cross-border M&A activity. This effect is more pronounced in countries with a market-based financial system, such as the US and the UK, compared to bank-based financial systems, which most European countries have. All three studies report their findings using a global sample. Thus, there is reason to believe that there are differences in M&A activity between European and non-European firms and as Moschieri and Campa (2009) states: "this raises questions about the generalizability of current research on North American M&As to the European context" (p. 71). As a consequence, the findings of related studies might be limited in their external validity (generalizability), which this thesis aims to extent by studying European firms.

The second contribution of this thesis is that it, next to the main results, tests whether the relationship between female board representation and corporate acquisitiveness differs between firms from European countries with binding, non-binding and no board gender quotas. These additional results contribute to the existing literature regarding the impact of board gender quotas on M&A activity, which to my knowledge has only been studied twice in a relatively limited context: by Ahern and Dittmar (2012) and by Matsa and Miller (2013). Ahern and Dittmar (2012) study the difference in M&A activity before and after the introduction of the board gender quota in Norway. They find that the quota led to significantly more acquisitions and the effect being the strongest for firms which were most affected by the quota. Matsa and Miller (2013) study the difference in M&A activity between Norwegian firms, which are bound to a board gender quota since 2006, and firms in Denmark, Sweden and Finland. Even though M&A activity by Norwegian firms modestly increased after the quota, the authors do not find a significant difference in M&A activity between Norwegian firms and firms from these other Nordic countries, which are not bound to such board gender quotas. Thus, since the existing literature on the impact of board gender quotas on M&A activity is relatively limited, this thesis wishes to extent this research area.

With respect to practical relevance, the findings of this thesis have practical implications for all parties involved in the market of corporate control (M&As). These parties are predominantly companies, both acquirers and potential targets, but also legislators such as national governments. For example, an implication for companies is that they might want to alter their M&A activities/policy and can do so by changing the (tenure-weighted) female representation on their boards. Reasoning the other way around, companies wanting to, or having to due to a quota, change the number of female directors might automatically and unintentionally affect their acquisitiveness. Likewise, this thesis has implications for national governments and other policymakers since an increasing amount of European countries is introducing board gender quotas, both binding and non-binding. This thesis shows the possible effects of such quotas, and consequently the (forced) increase of women on

corporate boards, on M&A activity in Europe. In addition, it is indicated how this effect differs between countries with different board gender quota legislation.

The remainder of the thesis is organized as follows. The next section reviews the relevant prior literature which leads to the development of hypotheses. Section 3 discusses the methodology, including the data, sample, variables and econometric model of this thesis. Section 4 presents the empirical results and several robustness checks. The thesis ends with a concluding remark and discussion.

2. Literature review and hypotheses development

This chapter gives an overview of the relevant literature related to the research topic of this thesis. The literature review begins by elaborating on two prominent gender differences: overconfidence and risk-aversion. Then, two theories and three other potential effects regarding group diversity, such as gender diversity on corporate boards, are reviewed. Both the gender differences and diversity theories will be discussed in the context of corporate boards, corporate decision making and M&As. Thereafter, the findings of prior studies about the relationship between female board representation and M&A activity are analyzed. Finally, hypotheses are developed based on what has been discussed in this chapter.

2.1 Gender differences and corporate decision making

Two prominent behavioral differences between men and women that affect the (corporate) decision making process are overconfidence and risk-aversion. Both these gender differences will be discussed and linked to corporate boards, directors and M&As[3].

2.1.1 Overconfidence

The existing literature suggests that, in general, men are more overconfident than women (e.g. Johnson et al., 2006; Barber & Odean, 2001), increasing the likelihood of taking excessive risks and making worse financial decisions (Doukas & Petmezas, 2007). Overconfidence expresses itself in two forms. The first form is about the perceived accuracy of beliefs regarding the future, which means that overconfident investors overestimate the precision of their knowledge concerning uncertain future events. Research has shown that men tend to estimate their future predictions as more accurate compared to women. See for example the paper by Barber and Odean (2001), who show that men overestimate the precision of their own information more than women and hence are more overconfident, because they trade common stocks more frequently and consequently reduce the returns on their investments. The second form of overconfidence is about the level of expectations regarding the future, which indicates that overconfident investors overestimate the success of future outcomes. Malmendier and Tate (2005) e.g. show that overconfident CEOs overestimate the returns on their investment projects. Generally speaking, men tend to see the future in a more favorable way compared to women (Levi, Li & Zhang, 2014).

The fact that men tend to be more overconfident than women is partly because men are more sensitive to the self-attribution bias than women (Lundeberg, Fox, & Punćcohaŕ, 1994). The self-attribution bias, originally uncovered by Heider (1958), is the tendency of individuals to attribute successful decision outcomes to their own abilities and actions, while attributing unsuccessful decision outcomes to external factors or persons. The self-attribution bias has also been examined in

[3] However, just like Levi et al. (2014), this thesis is unable to disentangle the effects of overconfidence and risk-aversion on corporate acquisitiveness. The reason is that neither overconfidence nor risk-aversion are measured directly.

the context of M&As by for example Billett and Qian (2008) and Doukas and Petmezas (2007). Both papers conclude that managerial overconfidence stems from the self-attribution bias.

Since both forms of overconfidence are stronger for men than for women, men are associated with more risk taking in corporate decision making relative to women. In the case of M&As, male directors commonly overestimate their expectations and the precision of their estimates concerning for example the valuation of a target company, the stock returns of the acquirer or the synergies of an acquisition. Due to this, male directors are more likely to engage in acquisitions than female directors and hence firms with a greater proportion of women on their boards are expected to be less acquisitive.

2.1.2 Risk-aversion

Related to, but different from, overconfidence is risk-aversion. Risk-aversion is the tendency for people to prefer outcomes that are certain over outcomes that are uncertain or unknown, even when the expected pay-off may be lower (Kahneman & Tversky, 1979). The opposite of risk-aversion is risk-seeking. Earlier studies have conclusively shown that, in general, women are relatively more risk-averse than men (Croson & Gneezy, 2009; Eckel & Grossman, 2008)[4]. Croson and Gneezy (2009) provides three potential explanations for this: (1) women experience heavier emotional reactions of outcomes, (2) women are less (over)confident than men in uncertain situations and (3) women are more likely to interpret risky situations as threats that cause avoidance while men are more likely to see it as challenges that stimulate participation.

Two alternative explanations for why women exhibit more risk aversion than men can be found in the socio-biological and the neuro-biological domain. The socio-biological explanation is that women adapt towards more risk-averse behavior due to their greater responsibility in reproduction and child rearing (Witt, 1994). The neuro-biological explanation is that men have higher levels of testosterone than women and are therefore less risk-averse (Sapienza, Zingales, & Maestripieri, 2009). Testosterone is a hormone that drives dominance seeking behavior by men in competitive situations (Levi, Li & Zhang, 2010). This explanation has also been examined in the domain of corporate boards, executives and M&As. Levi et al. (2010) and Yim (2013), for example, show that CEO age is negatively and significantly related to corporate acquisitiveness. Hence, they suggest that the testosterone effect is especially pronounced for young male directors and executives.

Since research has shown that that, in general, women are relatively more risk-averse than men and M&As are risky activities with a high chance of failure (Bazel-Shoham et al., 2017), it is hypothesized that women are less likely to engage in such activities. Hence, one would expect that firms with a greater proportion of female directors are associated with a lower acquisition intensity.

[4] See Croson and Gneezy (2009) and Eckel and Grossman (2008) for extensive reviews of the recent literature on gender differences with respect to preferences in economic experiments and risk behavior, respectively.

2.2 Board diversity and corporate decision making

According to Chen et al. (2016) it is problematic to generalize findings related to gender differences in terms of cognitions, personality traits and preferences, such as overconfidence and risk-aversion, to a population of senior managers for two reasons. First, research has claimed that gender differences in risk-taking significantly depend on the type of activity being examined and the context in which the risk-taking is being evaluated (see e.g. Holt & Laury, 2002; Schubert, Brown, Gysler & Brachinger, 1999). Secondly, there is only limited support for the claim that female directors are significantly more risk-averse than male directors, because of the small amount of survey-based literature in the field (Adams & Funk, 2012; Graham, Harvey & Puri, 2013). For these two reasons, this thesis does not just discuss the potential effects of gender differences in overconfidence and risk-aversion on corporate decision making and consequently M&A activity, but also theories about group diversity.

Two prominent theories about the effects of diversity in groups are the critical mass theory and the social identity theory. These two theories explain how group diversity influences the interaction among its members, (corporate) decision making and its processes. Both theories will be discussed in the light of gender diversity on corporate boards and M&As.

2.2.1 The critical mass theory

The critical mass theory, originally developed by Kanter (1977a, b), distinguishes groups in four different categories based on their composition: uniform groups, skewed groups, tilted groups and balanced groups.

Uniform groups are groups in which all members share the same salient external master status. A master status is the primary identifying characteristic of an individual, for example gender, and determines his or her social position and identity (Kanter, 1977a). An example of a uniform group is a corporate board with solely male or female directors.

Skewed groups are groups in which members of the dominant sub-group control the members of the minority sub-group and consequently also control the group as a whole. Members of the minority group are considered “tokens”, which are treated as representatives of their category rather than as individuals. Tokenism means that firms appoint members from minority groups, such as often women on corporate boards, just to window-dress (gender) diversity. According to Kanter (1977a), groups are skewed when members of the minority category consist of up to a maximum of 20% of the entire group. An example of a skewed group is a corporate board which consists of 9 male directors and 1 female director.

Tilted groups are groups in which members of the minority category take up to between 20% and 40% of the group. As opposed to skewed groups, minority members in tilted groups are seen as both representatives of their own category as well as individuals with each different skills and abilities. By cooperating, minority members in tilted groups are able to influence the culture of the group (Kanter, 1977a). An example of a tilted group is a corporate board which consists of 7 male

directors and 3 female directors.

Balanced groups are groups in which there are no majority and minority categories anymore, and thus no more sub-groups. As a result, the focus shifts from collective categories, such as gender, to an individual's abilities and skills. In a balanced group, each sub-group is more or less equally distributed as they take up 40% to 60% of the entire group (Kanter, 1977a). An example of a balanced group is a corporate board which consists of 5 male directors and 5 female directors.

Whereas in skewed groups minority members are often seen as tokens, subject to stereotyping or even disregarded by members of the majority group, in tilted groups they are more likely to be seen as individuals with each different skills, abilities, experiences, knowledge, opinions and perspectives (Farrell & Hersch, 2005; Burgess & Tharenou, 2002). "While in a skewed group, these new perspectives may either not be adequately expressed by the female tokens or not spotted by the dominant males, in tilted or balanced groups, the combination of female and male attributes will more likely allow for productive discussions and will hence positively affect group performance" (Joecks, Pull & Vetter, 2013, p. 64). When applying the critical mass theory to corporate boards, it is therefore suggested that when a certain threshold or "critical mass" of women on a corporate board is reached, they have an influence on the board. In other words, a critical mass has to be reached in order for female directors to add value to the board and to realize the advantages of a more diverse board.

Research suggest that the critical mass for women to have an impact on corporate boards is 30% (Joecks et al., 2013). Therefore, it is hypothesized that firms with at least 30% women on their board are less likely to engage in acquisitions than companies that do not have this critical mass of female directors. That is because a critical mass has to be reached first before female directors become influential in the decision making process and their lower overconfidence and higher risk-aversion come into play. Additionally, research has found that a critical mass can be reached in absolute terms instead of a percentage as well. Papers such as Joecks et al. (2013), Konrad and Kramer (2006), Konrad, Kramer and Erkut (2008) and Torchia, Calabrò and Huse (2011) show that there is also a critical mass when there are at least three female directors on the board.

2.2.2 The social identity theory

Another theory about how (gender) diversity influences the interaction and decision making processes in groups is the social identity theory. The social identity theory (Tajfel, 1978; Tajfel & Turner, 1979; Turner, 1975) covers various socio-cognitive sub-theories about how the behavior and interactions of individual people is steered by the social groups they belong to (Hogg, 2006; Hogg & Terry, 2000). The underlying notion of this theory is that collective processes, such as for example corporate boards, should be explained by both differences between individuals and their personal characteristics and by interactions between different social identity groups (Turner, 1996). According to the social identity theory, individuals are categorized into such social identity groups by either others or themselves. Categorization is based on an individual's characteristics, traits, norms, values, attitudes,

beliefs and all kinds of other personal aspects. The result is so-called in-groups and out-groups. In-groups are categories to which individuals themselves feel they belong to, while out-groups are categories to which individuals feel they themselves do not belong to but others do. Identification with a particular identity group is strongest when it is based on prominent and important personal aspects that are valued, central and frequently employed (Ashforth & Mael, 1989; Yzerbyt & Demoulin, 2010). Such characteristics cause inter-group differences and intra-group similarities to become most clear (Hogg & Terry, 2000). One of the most prominent and important characteristics and thus category is gender, which has been of great interest to the social identity theory since the beginning (Ely, 1995; Tajfel & Turner, 1985).

In groups where individuals of multiple categories come together, also known as superordinate groups, the inter-category differences between individuals may be perceived even more (Hogg, 2006). An example of such a superordinate group is a board of directors, which could consist of all kinds of sub-groups including men and women. According to Yzerbyt and Demoulin (2010), there are two explanations why such superordinate groups can lead less cooperative and more competitive interaction between individuals. First, superordinate groups consist of both in- and out-groups, wherein individuals respond differently to members of the opposite group. Individuals tend to favour in-group members, allocate more resources to them and cooperate more easily with them. At the same time, individuals tend to agree less easily with out-group members, disregard them or even avoid them (Hewstone, Rubin & Willis, 2002). In other words, individuals are more attracted to the similar in-groups than to the dissimilar out-groups (Tajfel, 1982). The result is an enlarged separation between the two groups and out-group members trying to protect their social identity (Branscombe, Schmitt & Harvey, 1999). This decreases the cooperativeness and increases the competiveness of members of the out-group when interacting with in-group members (Hogg, 2006). This effect is even strengthened when the out-group is a marginalized or minority category, which is often the case for women in boardrooms.

The second reason why superordinate groups can lead to individuals interacting less cooperatively and more competitively is due to the so-called "interindividual-intergroup discontinuity effect" (Wildschut & Insko, 2007). This effect implies that interactions between groups (inter-group) are more hostile than interactions between individuals (inter-individual). Since directors may perceive their board to consist of groups of e.g. men and women rather than individuals, this effect can lead to more competitive and less cooperative behavior.

For these two reasons, boards with solely male or female directors, and hence with one single category/group, will interact differently from boards with both male and female directors. The reason is that board diversity changes the social interactions and psychological processes amongst directors and consequently affects corporate decision making. The consequence is that "because the presence of multiple salient categories within a board will be associated with more competitive interactions (Hogg, 2006), decision-making processes are likely to be more contentious, thorough, and

comprehensive, and less likely to be characterized by acquiescence, rapid consensus, or groupthink (Hogg & Terry, 2000)" (Chen et al., 2016, p. 305). Hence, it is assumed that the addition of female directors to a board decreases the likelihood of a corporate acquisition.

In contrast to the critical mass theory, the social identity theory claims that the presence of one single female director on a board already affects the decision making process. Even boards with just one female director will interact differently from boards with only male directors. Hence, the proportion of female directors does not necessarily have to be a critical mass to be influential. This reasoning is based on the notion that individuals from minority groups are able to influence the decision making process as well (Westphal & Milton, 2000), because their underrepresented and divergent views make members from majority groups think differently (see e.g. Peterson & Nemeth, 1996). Nonetheless, the influence of female directors increases when their proportion increases.

2.2.3 Other explanations

The literature suggests three other explanations about how female directors and board (gender) diversity potentially affect the decision making process. All of these possible explanations eventually lead to more comprehensive board discussions and therefore may be associated with less corporate acquisition deals. First, prior studies have found that male and female directors have different experiences (see e.g. Huse, 2008) and consequently different views on strategic corporate decisions. Also, there is evidence that female directors are less likely to have financial and M&A-related expertise (see Kim & Starks, 2016). This may result in more comprehensive and more complicated board discussions. Secondly, Adams and Ferreira (2009) find that female directors are tougher monitors than male directors and that the attendance behavior of male directors improves when the board is more gender-diverse. Again, fostering the comprehensiveness of board discussions. Thirdly, research has suggested that heterogeneity in groups leads to the willingness to challenge taken-for-granted norms, the use of more diverse information sources and the consideration of broader perspectives (see e.g. Jackson, 1992; Wiersema & Bantel, 1992). Thus, diverse boards usually have more elaborate discussions and take longer to make decisions (Erhardt et al., 2003; Milliken & Martins, 1996). On the one hand this may lead to less M&A, but on the other hand the deals may be of better quality.

2.3 Female board representation and M&A activity

To my knowledge, there are four papers that have studied a similar relationship as this thesis: Chen et al. (2016), Levi et al. (2014), Dowling and Aribi (2013) and Bazel-Shoham et al. (2017). Using a sample of US firms listed on the Standard & Poor's (S&P) 1500 during the period 1998-2010, Chen et al. (2016) shows that a greater female board representation is negatively associated with the number of acquisition deals a company makes. Based on the social identity theory, Chen et al. (2016) reasons that "higher levels of female board representation will affect intra-board social psychological

dynamics such that deliberations become more thorough and comprehensive, resulting in more exhaustive evaluations and active oversight of proposed strategic actions" (p. 303-304). As a result, such boards are less likely to be characterized by corporate acquisitiveness as these proposed strategic actions are for example M&As. Levi et al. (2014) also uses a sample of S&P 1500 companies, but instead uses acquisition bids over a 13 year period from 1997 to 2009. They document a negative and significant relationship between the proportion of women on corporate boards and the number of M&A deals initiated. It is stated that female directors appear to be less motivated by empire-building are therefore less likely to engage in acquisitions. As a consequence, companies with more male directors are more acquisitive compared to companies with more female directors. More precisely, they find that a 10% increase in the number of women on a board leads to 7.6% less acquisition bids issued. The authors argue that this is due to female directors being less overconfident than their male counterparts and therefore less overestimating M&A gains. Nevertheless, empire-building differs from overconfidence in the sense that overconfident directors may believe that they are acting in the shareholders' interest by acquiring companies, while empire-building directors know that the acquisition of a firm is not in the shareholders' interest but in their own interest instead. Hence, with empire-building there is an agency problem while with overconfidence there is not (Jensen, 1986, 1988). The paper by Dowling and Aribi (2013) finds that the presence and proportion of female directors is significantly negatively related to the acquisition intensity of UK FTSE 100 companies over the period 2000-2011. Lastly, using a global sample of firms from 1998 to 2014, Bazel-Shoham et al. (2017) reports that cross-border M&A activity decreases as the fraction of women on boards of multinational companies (MNC) increases. M&A activity is measured by the percentage of equity ownership in the target company that is bought by the acquirer. Using an instrumental variable approach, they show that their findings are unlikely to be driven by endogeneity issues and thus that the influence of female directors is rather causal than merely associative.

In summary, all four papers find a negative and significant relationship between board gender diversity and corporate acquisitiveness. These findings are based on, and thus robust to, different samples, variables and methods. In addition, each of the four papers offer different explanations for their findings including overconfidence, risk-aversion, the critical mass theory and the social identity theory. The only thing these four papers have in common is their main independent variable, female board representation, which is measured by the percentage of female directors on the board.

2.4 Formulation of hypotheses

As opposed to daily business operations, M&As are major risky corporate activities which usually involve extensive discussion, analyses, evaluation and monitoring by the board. Also, they usually require final approval. This makes M&As useful events to test the aforementioned theories and other explanations regarding the effect of gender differences and group diversity on the decision making processes of corporate boards (Levi et al., 2014).

Since research has claimed that women are less overconfident and more risk-averse than men, it is less likely that female directors are willing to undertake risky corporate activities such as M&As compared to their male counterparts. Moreover, the social identity theory argues that (gender) diversity in groups increases the competiveness and decreases the cooperativeness amongst its members. As a result, board discussions become more comprehensive, making it less likely for firms to engage in M&As. For these reasons, it is expected that a larger fraction of female directors on a corporate board, and thus higher board gender diversity, decreases the likelihood of an acquisition. Furthermore, comparable studies have repeatedly shown a negative and significant relationship between female board representation and the acquisition intensity of firms (see section 2.3). Based upon these arguments, the following hypothesis is formulated:

H1: Firms with greater female board representation are associated with fewer corporate acquisitions.

In other words, the first hypothesis expects that the proportion of female directors on a corporate board is negatively associated with the number of acquisitions a firm engages in.

The critical mass theory however claims that female directors are merely able to have an impact on boards when they represent a critical mass. Research has suggested that this critical mass for women on corporate boards is 30%. As a consequence, it is assumed that a critical mass of at least 30% is required before female directors are able to influence the decision making process of firms and their lower overconfidence and higher risk-aversion come into play. Therefore, it is hypothesized that firms with at least 30% women on their board are less likely to engage in acquisitions than companies that do not have this critical mass of female directors:

H2: Firms with a female board representation of at least 30% are associated with lower corporate acquisitiveness.

As opposed to the critical mass theory, the social identity theory claims that the presence of one single female director on a board already affects the decision making process. Even boards with just one female director will interact differently from boards with solely male directors, because it is assumed that female directors change the way of thinking by male directors. Hence, the proportion of female directors does not necessarily have to be a critical mass to be influential. To test whether this is the case, the following hypothesis is formulated:

H3: Firms with at least one female director on the board are associated with lower corporate acquisitiveness.

3. Methodology

This chapter discusses the data collection, sample determination, variable operationalization and model specification.

3.1 Data and sample

This thesis adopts a panel/longitudinal dataset which involves measurements over time for the same units of observation. The units of observation are publicly listed companies in Europe during the years 1999 until 2019. This particular time period is analyzed due to the availability of data. Data prior to 1999 as well as data after 2019 is not (consistently) available through the employed databases. Panel data is used over cross-sectional or time-series data because of three reasons. First, panel data is considered the best kind of non-experimental data for making causal inferences between two variables (Allison, 2005). This is important since the aim of the thesis is to study the causal relationship between board gender diversity and corporate acquisitiveness. Secondly, panel data is better able to control for omitted, either unobserved or incorrectly measured, variables compared to cross-sectional or time-series data. Such omitted variables are correlated with both the dependent and independent variables and would lead to biased results. Thirdly, panel data contains a higher number of observations compared to cross-sectional or time-series data which increases the degrees of freedom and reduces multicollinearity amongst the explanatory variables. As a result, the efficiency of the econometric models improves and its parameters are more accurately estimated (Hsiao, 2014).

The data is retrieved from four different databases: BoardEx, Eikon by Thomson Reuters and Zephyr and Orbis, both by Bureau van Dijk. These databases are used because they are freely accessible to Radboud University students and contain virtually all required data for the variables of this thesis. Orbis is used to identify the initial sample. BoardEx is used to obtain board information of firms. Eikon is used to obtain financial information of publicly listed companies and is used over Orbis because it has less missing data and the data is available for a longer time period[5]. Lastly, Zephyr is used to obtain data concerning acquisition deals. To mitigate the amount of missing data, Orbis and Eikon are consulted regarding financial and board information, respectively. The data from these different databases is merged into one dataset based on ISIN (International Securities Identification Number) codes, which is an identifier for each unique firm. All four databases have this firm identifier in common and is therefore used as a matching variable.

Orbis database identifies a total of 114,882,865 European firms that have been active at one point from the 1st of January 1999 until the 31st of December 2019. This is used as the initial sample and does not solely include firms that are currently still active, but also firms that used to be operational during the 21-year research period and have now ceased to exist due to for example bankruptcy or a M&A. As a consequence, some firms in the sample might not have an observation for

[5] Data in Eikon goes back to 1999, while Orbis only goes back to 2010.

each year (missing data). These firms are nevertheless included to avoid selection bias.

Starting with the initial sample, six steps are taken in order to construct the final sample. The first three steps are called: stock exchange listing, consolidated accounts and industry exclusion. The last three steps can be classified as database matching. Each step will be explained and substantiated individually. Additionally, after each step is indicated how many firms remain in the sample.

The first step is called stock exchange listing and means that non-publicly listed companies are excluded from the sample. In contrast to publicly listed companies, unlisted/private companies usually do not publicly disclose information about their M&A activities, board information and financials since they are not obligated to do so through mandatory disclosure regulations. As a result, the data of such companies required for the analysis of this thesis is not consistently available. Furthermore, Eikon only contains information of publicly listed companies and therefore only currently listed and formerly listed companies (which are now delisted) are included. The latter firms are taken into account to avoid selection bias. After this step 40,016 firms remain in the sample.

Secondly, the sample excludes companies without consolidated accounts, also called consolidated financial statements. Orbis allows for this exclusion by filtering based on the consolidation codes C1 and C2, which leaves a sample including only parent companies with consolidated accounts that do not have an unconsolidated companion (consolidation code C1 in Orbis) and those that do have an unconsolidated companion (consolidation code C2 in Orbis). This exclusion is made because otherwise the sample includes both parent/holding companies as well its subsidiaries and thus certain subsidiaries would be taken into account more than once. Such subsidiaries are considered duplicates and therefore excluded from the sample. Also by making this exclusion, the effects of corporate groups, also known as concerns, can be studied instead of individual firms. After this step 14,163 firms remain in the sample.

As a third step, companies active in the finance, insurance and real estate industry are excluded from the sample. These firms have SIC (Standard Industry Classification) codes ranging from 6000 until 6999. This exclusion of financial firms has also been made by related papers such as Dowling and Aribi (2013), Huang and Kisgen (2013) and Plaksina, Gallagher and Dowling (2019). According to Doukas and Petmezas (2007) financial companies are more likely to engage in M&As due to the nature of their business than due to any behavioral motives of their directors. However, this thesis is interested in the latter rather than the former effect, since it studies how such behavioral motives of male and female directors and consequently how gender diversity on corporate boards potentially affects M&A activity. For this reason, financial firms are excluded from the sample which reduces the sample size to a total of 10,614 firms.

The final three steps are called database matching and means that firms, of which data is unavailable in one of the three databases (BoardEx, Eikon and Zephyr), are excluded from the sample. Matching the sample defined in Orbis with the data available in BoardEx results in 3,717 firms remaining in the sample. Matching the rest of the firms with the data available in Eikon and Zephyr

leads to a total of 3,479 and 2,821 firms remaining in the sample, respectively.

Eventually, the final sample covers 45,932 firm-year observations of 2,821 publicly listed companies in Europe, active at one point from the 1st of January 1999 until the 31st of December 2019. This includes only parent companies of which the data is available in all four databases and excluding those active in the finance, insurance and real estate industry. Table 7.1 in the appendix shows the European countries of which firms are incorporated in the sample. It also indicates the number of firms per country and its (cumulative) percentage of the total. Besides, the dataset is an unbalanced panel since not every firm is observed each year[6]. This is not problematic for the analyses since observations are automatically dropped from the regressions when they have missing data on the involved variables. Hence it is possible that for different regression analyses involving different variables, the number of firms and observations included are also different.

3.2 Variables

This subchapter discusses all variables involved in the thesis including the dependent, independent and control variables. This also includes variables that are used as robustness checks. Each variable will be clarified, substantiated and operationalized individually.

3.2.1 Dependent variable

The dependent variable of this thesis is corporate acquisition intensity, also known as acquisitiveness, and is measured by the number of announced, completed, pending and postponed acquisition deals a company makes within one year. The year in which a deal takes place is determined by the announced date of the deal. This discrete count variable has also been used by Dowling and Aribi (2013), who study a similar relationship as this thesis. Other papers that study corporate acquisitiveness use different measures such as the acquisition expenditures as a fraction of total assets (Ahern & Dittmar, 2012) or net plant, property, and equipment (Huang & Kisgen, 2013), the percentage of equity ownership bought (Bazel-Shoham et al., 2017), the number of completed acquisition deals (Chen et al., 2016; Netter, Stegemoller & Wintoki, 2011) and a dummy variable that equals 1 if a firm made any acquisitions that year or 0 otherwise (Graham et al., 2013; Kolasinski & Li, 2013). Next to the actually completed acquisition deals, this thesis also includes deals that are already announced but not completed yet. The reason is that both type of deals are approved by the board. As a result, the effect of interest can be studied, which is the relationship between corporate acquisition intensity and female board representation. This way of operationalizing corporate acquisitiveness is used over other (previously mentioned) measures because they do not include uncompleted acquisition deals.

A shortcoming of this measure is that it only includes ‘accepted’ acquisition bids and, as opposed to the paper by Levi et al. (2014), rejected bids are not taken into account. That is because this data is not available through Zephyr and because rejected acquisition bids are commonly not

[6] The actual number of firm-year observations is smaller than the total amount of (21 years times 2,821 firms =) 59,241 firm-year observations in a balanced panel.

made public. Due to this shortcoming the effect of interest is imperfectly measured, since accepted acquisition bids do not just depend on the acquirer's (board) characteristics, but often also on that of the target company. For instance when a firm completes relatively less acquisition deals, that could be due to a higher percentage of women on their board or due to e.g. target companies rejecting more offers. The former is the effect of interest of this thesis, while the latter is a confounding bias which leads to both effects becoming indistinguishable.

Furthermore, no exclusions are made with regard to the location of target companies. This means that they can be located all around the world and thus also outside of Europe, in contrast to the acquiring companies. Also, no exclusions are made concerning the deal's method of payment such as cash, liabilities or stocks. Lastly, no exclusions are made regarding the value of deals and the percentage of shares/stake acquired, because typically all deals require final approval by the board (Levi et al., 2014) or are at least scrutinized (Dowling & Aribi, 2013).

To test the robustness of the results, two alternative measures of corporate acquisition intensity will be used. In the first robustness check deals with a value below 5% of the acquirer's end-of-year market capitalization, deals of which the acquirer's final stake is less than 50% of the target's shares and deals in which the acquirer already owned more than 50% of the target's shares prior to the acquisition are excluded. In other words, only deals of significant size which lead to an increase of the target's shares held by the acquirer from below 50% prior to the acquisition to above 50% after the acquisition are included. Acquisitions without a known deal value or known acquired stake are excluded as well. According to Morck, Shleifer and Vishny (1990), acquisition deals worth less than 5% of the acquirer's market capitalization might not require significant involvement of the board and thus do not capture the effect of interest. Also, when the acquirer does not obtain more than 50% of the target's shares it does not obtain a majority stake. In that case, the acquirer does not gain full control over the target and hence such deals cannot be classified as proper acquisitions. This also includes deals in which the acquirer already holds more than 50% of the target's shares before the acquisition (see e.g. Malmendier & Tate (2008) and Plaksina et al. (2019)).

In the second robustness check, corporate acquisition intensity will be measured by the net assets from acquisitions over the total assets of a firm. This operationalization is summarized in the following formula:

$$Corporate\ acquisition\ intensity\ (robustness\ check) = \frac{Net\ assets\ from\ acquisitions}{Total\ assets}$$

Formula 3.1: Dependent variable for robustness check, corporate acquisition intensity (NAFA)

This alternative measure is used as a robustness check for three reasons. First, it is a continuous variable instead of a count variable and therefore requires a different regression analysis. It is checked whether the results still hold using the random effects model instead of the negative binomial model.

Secondly, this is the only alternative measure available via the utilized databases. Thirdly, other M&A-related studies use a similar measure (see e.g. Ahern & Dittmar, 2012).

3.2.2 Independent variables

In order to test the three hypotheses of this thesis, six different independent variables are used of which three as a robustness check. The first hypothesis, regarding the effect of overconfidence and risk-aversion of female directors on corporate acquisitiveness, is tested by the variable female board representation. This independent variable is also known as board gender diversity and is measured by the percentage of women on the board of a firm. This is the most commonly used measure in studies related to board gender diversity, such as Adams and Ferreira (2009) or Ahern and Dittmar (2012), and is operationalized via the following formula:

$$Female\ board\ representation = \frac{Number\ of\ female\ directors}{Total\ number\ of\ directors}$$

Formula 3.2: Independent variable, female board representation (FBR)

To clarify, the number of female directors is the same as the number of female board members and the number of women on a corporate board, while the total number of directors is the same as the size of a corporate board. This variable is measured as a percentage rather than a discrete amount in order to make it comparable between companies with different board sizes.

As a robustness check for the first hypothesis, an alternative measure of female board representation is used. This alternative measure is called the tenure-weighted female board representation and is calculated by the sum of the tenure of female directors divided by the total tenure of all directors on the board. This can be shown in the following formula:

$$Tenure\text{-}weighted\ FBR = \frac{Total\ tenure\ of\ female\ directors}{Total\ tenure\ of\ all\ directors}$$

Formula 3.3: Independent variable for robustness check, tenure-weighted FBR (TW_FBR)

This alternative ratio is used because it might take some time before women on corporate boards have an actual impact on the decision making process (Coles, Daniel & Naveen, 2014). The tenure of directors is quantified by the number of years he or she has sat in the boardroom, regardless of their role. Similar to the standard FBR ratio, it is assumed that an increase in the tenure-weighted FBR ratio leads to a greater influence by female directors on the decision making of a firm (Bazel-Shoham et al., 2017).

The second hypothesis, regarding the critical mass theory, is tested by a dummy variable that equals one if the percentage of female directors is at least 30% and zero otherwise. This dummy variable is used because research suggests that the critical mass for women to have an impact on corporate boards is 30% (Joecks et al., 2013). Additionally, research has found that a critical mass can

be reached in absolute terms instead of a percentage. Papers such as Joecks et al. (2013), Konrad and Kramer (2006), Konrad et al. (2008) and Torchia et al. (2011) show that a critical mass is also reached when there are at least three women on the board. For that reason, as a robustness check, a dummy variable is used that equals one if there are three or more female directors and zero otherwise.

The third hypothesis, regarding the social identity theory, is tested by a dummy variable that equals one if there is at least one female director on the board and zero otherwise. As explained in the literature review (section 2.2.2), the social identity theory claims that the presence of one single female director already affects the interaction on a corporate board and consequently the decision making process. Hence, in contrast to the critical mass theory, the proportion of female directors does not necessarily have to be a critical mass to be influential.

To test the robustness of the third hypothesis, an alternative dummy variable is used that equals one if there are at least two female directors on the board and zero otherwise. This alternative dummy variable is used to check for potential window dressing and tokenism of gender diversity on corporate boards by companies (Konrad et al., 2008). Window dressing and tokenism imply that companies hire only one female director so that the gender diversity on their board appears more favorable (Bazel-Shoham et al., 2017). Also in the sample of this thesis, 68.33% and 25.26% of the observations have a maximum of one or only one female director on the board, respectively[7].

3.2.3 Control variables

This thesis includes a range of board-, financial-, year-, industry- and country-specific control variables since these are expected have an effect on the dependent variable, which is the number of accepted acquisition bids. These variables are taken into account and added to the regression models to control for potential endogeneity issues and omitted variable biases. Also, these controls are broadly adopted by similar studies which makes the findings of this thesis comparable (Dowling & Aribi, 2013).

The first set of control variables are related to board, director and CEO characteristics. Following Bazel-Shoham et al. (2017), Chen et al. (2016), Dowling and Aribi (2013) and Levi et al. (2010, 2014) these control variables include: board size, board independence, board age diversity and CEO duality. According to the papers mentioned above, these variables potentially have an influence on the corporate acquisition intensity of firms.

Board size is calculated by a count of the number of directors on a corporate board. Bigger boards have been shown to decrease the corporate acquisition intensity of firms (e.g. Cheng, 2008).

Board independence is defined by the percentage of directors on a corporate board who are independent. This is calculated by the following formula:

[7] In an unreported statistic, (21,961 / 32,141 = 0.68327 =) 68.33% of the observations in the sample have 0 or 1 female director on the board, while (8,119 / 32,141 = 0.25261 =) 25.26% of the observations have 1 female director on the board.

$$Board\ independence = \frac{Number\ of\ independent\ directors}{Total\ number\ of\ directors}$$

Formula 3.4: Control variable, board independence (BI)

A director is considered to be independent when he or she does not have any business relationship with the firm or a related person (Levi et al., 2014). Akbar, Kharabsheh, Poletti-Hughes and Shah (2017) for example suggests that a larger proportion of independent directors, also known as outside directors, significantly decreases corporate risk-taking. M&As are seen as such risky corporate activities.

Board age diversity is defined as the average age of the directors on a corporate board and is operationalized via the following formula:

$$Board\ age\ diversity = \frac{Total\ age\ of\ all\ directors}{Total\ number\ of\ directors}$$

Formula 3.5: Control variable, board age diversity (AGE)

According to e.g. Levi et al. (2010) firms with young male CEOs are associated with a 4% higher probability of making an acquisition bid, which might be due to dominance-seeking behavior.

The final board-related control variable is CEO duality and is defined as the situation in which the CEO of a company is also the chairman of the board (COB). This control is a dummy variable taking the value of one if the CEO is also the COB and zero otherwise. It is expected that this control potentially has an impact on a firm's acquisitiveness, although the paper of Levi et al. (2010) does not find this variable to significantly impact the likelihood of a bid initiation.

The second set of controls variables are related to the financial/accounting characteristics of firms. Again, following Chen et al. (2016), Dowling and Aribi (2013) and Levi et al. (2010, 2014), but also e.g. Billet and Qian (2008) and Kolasinski and Li (2013), these control variables include: return on assets, leverage ratio, firm size, free cash flow, cash holdings and Tobin's Q. As stated before, these variables potentially have an influence on the corporate acquisition intensity of a firm as well.

Return on assets (ROA) is a commonly used indicator for firm performance and is calculated by dividing the net income of a firm by the total value of its assets. This can be expressed into the following formula:

$$Return\ on\ assets = \frac{Net\ income}{Total\ assets}$$

Formula 3.6: Control variable, return on assets (ROA)

This control is included as firms with higher performance might have more possibilities to undertake acquisition (Shi, Hoskisson & Zhang, 2017). Where Levi et al. (2014) and Chen et al. (2016) both

find that the ROA has an insignificant effect on the acquisitiveness of firms, Levi et al. (2010) finds that this financial ratio has a strong (significant at 1% level) and positive influence.

The potential influence of a firm's capital structure (leverage) is taken into account by the leverage ratio. This ratio is calculated with the following formula:

$$Leverage\ ratio = \frac{Total\ liabilities}{Total\ assets}$$

Formula 3.7: Control variable, leverage ratio (LEV)

This ratio is included because it measures a firm's financial resources which can potentially be used for acquisitions (Duchin, 2010). Chen et al. (2016) reports that the leverage ratio has a positive impact of the number of acquisitions, while the study of Dowling and Aribi (2013) reports the opposite. However, both results are insignificant.

The size of a firm is measured by taking the natural logarithm of its total assets, denominated in thousands of euros. This calculation is displayed in the following formula:

$$Firm\ size = \ln(Total\ assets)$$

Formula 3.8: Control variable, firm size (SIZE)

This method of measuring firm size is widely accepted in the finance literature and is found to affect a firm's ability to undertake acquisitions (Haleblian, Devers, McNamara, Carpenter & Davison, 2009). It is for example used in Chen et al. (2016), Billet and Qian (2008) and Dowling and Aribi (2013) who study a similar relationship to this thesis. These first two papers find a strong (both significant at 1% level) and positive effect on corporate acquisitiveness, while the latter reports an insignificant effect. The total assets are measured by means of a natural logarithm instead of normal values for three reasons. First and most importantly, by taking the natural logarithm absolute changes in total assets over time are converted into relative/percentage changes. This makes it possible to compare companies with different total assets, regardless of their absolute values. Hence, companies of different sizes become comparable. The second reason is that by using a natural logarithm, the data of this variable is transformed towards a normal distribution which makes it a better fit to the regression model. The third reason is that by using a natural logarithm the impact of outliers is reduced for this variable.

Free cash flow is an indicator of firm profitability and is hence of potential influence to corporate acquisitiveness. There are many different ways of measuring the free cash flow, but in line with e.g. Yim (2013) this thesis quantifies it by dividing the earnings before interest, taxes, depreciation and amortization (EBITDA) by the total market capitalization of a firm. This calculation is summarized in the following formula:

$$Free\ cash\ flow = \frac{EBITDA}{Total\ market\ capitalization}$$

Formula 3.9: Control variable, free cash flow (FCF)

Just like other measures of firm performance, such as ROA, a higher value possibly increases the likelihood of an acquisition. This positive effect is e.g. observed in the studies of Billett and Qian (2008) and Chen et al. (2016), significant at the 5% and 1% level respectively.

The cash holdings of a firm are found to have a positive influence on the likelihood of an acquisition (Harford, 1999). In line with e.g. Levi et al. (2014), Plaksina et al. (2019) and Shi et al. (2017) the cash holdings of a firm are calculated as the ratio of cash and short-term investments over the book value of total assets. This calculation is presented in the following formula:

$$Cash\ holdings = \frac{Cash\ and\ short\text{-}term\ investments}{Book\ value\ of\ total\ assets}$$

Formula 3.10: Control variable, cash holdings (CASH)

The aforementioned papers reveal a mixed effect (depending on the model), a negative effect and an insignificant effect on corporate acquisitiveness, respectively.

The last financial control variable is Tobin's Q which measures the ratio of a firm's market value to its replacements costs of capital. This ratio is found to influence corporate acquisition behavior based on the Q-theory of mergers (Jovanovic & Rousseau, 2002). Tobin's Q is originally calculated by dividing the market value of total assets by the replacement value of total assets, which is the same as dividing the market value of liabilities plus equity by the replacement value of liabilities plus equity. However, since replacement values are often difficult to estimate and companies do not have marketable debt, it is assumed that both are equal to its book value. Book values are stated on the balance sheet of firms and therefore more easily accessible. This leads to a simplified Tobin's Q being calculated by the market value (of capital) plus the book value of total liabilities divided by the book value of total assets of a firm. This operationalization is shown in the following formula:

$$Tobin's\ Q = \frac{Market\ value + Book\ value\ of\ liabilities}{Book\ value\ of\ total\ assets}$$

Formula 3.11: Control variable, Tobin's Q (TOB)

Related papers such as Chen et al. (2016) and Dowling and Aribi (2013) both report a small positive effect of Tobin's Q on corporate acquisition intensity at a significance level of 10%, while Billett and Qian (2008) reports a strong positive effect at a significance level of 1%. Levi et al. (2014) reports mixed results depending on the regression model they use.

Finally, year, industry and country fixed effects are included as controls. Year fixed effects

are included because the acquisitiveness of firms might be influenced by M&A waves (see Harford, 2005) and macroeconomic variations such as business cycles or economic shocks. Industry fixed effects are included because the acquisitiveness of firms might be influenced by industry characteristic such as competition (concentration), growth, scale or by the fact that M&As often happen between companies operating within the same industry, also known as horizontal M&As (Bazel-Shoham et al., 2017). Firms are categorized into a certain industry based on the Fama and French (1997) 48-industry classifications, which on its turn is based on the four-digit SIC codes. These SIC codes are provided by Eikon. Country fixed effects are included because, as stated in the introduction, differences in for example the institutional quality (Hyun & Kim, 2010), corporate governance regime (Rossi & Volpin, 2004) or the type of financial system (Di Giovanni, 2005) between European countries might influence the corporate acquisitiveness of firms within Europe. Firms are categorized based on the country they are located in, except for the countries that have 5 or less firms in the sample of this thesis. These countries are categorized as "other" and include: Croatia, Czech Republic, Faroe Islands, Gibraltar, Hungary, Iceland, Malta, Monaco, Romania, Slovakia and Slovenia. See table 7.1 in the appendix. This technically decreases the number of countries from 35 to 25, with the remaining countries all having at least 12 firms in the sample[8]. The three fixed effects are included as controls by adding them to the regression models as dummy variables for each year, industry and country. Only the first year (1999), first industry category (agriculture) and first country (Austria) dummies are left out of the regressions because they serve as the reference categories.

3.2.4 Overview variables

Table 3.1 provides an overview of all variables included in the thesis and summarizes how each variable is operationalized, either in words or by a formula. All variables are calculated manually in either Excel or Stata except for the variables ROA and LEV, which are directly retrieved from Eikon. In the dataset all financial amounts are denominated in thousands of euros and all ratios are denominated in decimals[9]. Table 3.1 furthermore indicates from which database the data for each individual variable is retrieved. Additionally, every variable is given an abbreviation which is of importance for the regression models throughout the remainder of the thesis.

[8] In unreported regression analyses, these eleven countries are included normally (individually) instead of being categorized as "other". This makes the number of countries stay at 35, but it does not change the results.
[9] E.g. a total assets of €35,118,762.54 is recorded as 35118.76 and a ROA of 4% is recorded as 0.04.

Table 3.1: Overview of all variables including the abbreviation, operationalization and data source

Abbreviation	Variable	Operationalization	Database
Dependent variables			
CAI	Corporate acquisition intensity	The number of announced, completed, pending and postponed acquisition deals in one year	Zephyr
CAI_EXCL_DV	Corporate acquisition intensity (robustness check)	" but only including deals with a value above 5% of the acquirer's end-of-year market capitalization	Zephyr
CAI_EXCL_STAKE	"	" but only including deals that lead to an increase of the target's shares held by the acquirer from below 50% prior to the acquisition to above 50% after the acquisition	Zephyr
CAI_EXCL_BOTH	"	" but only including deals that meet both of the abovementioned criteria	Zephyr
NAFA	"	$\frac{Net\ assets\ from\ acquisitions}{Total\ assets}$	Eikon
Independent variables			
FBR	Female board representation	$\frac{Number\ of\ female\ directors}{Total\ number\ of\ directors}$	BoardEx
TW_FBR	Tenure-weighted FBR (robustness check)	$\frac{Total\ tenure\ of\ female\ directors}{Total\ tenure\ of\ all\ directors}$	BoardEx
FBR_30PLUS	Critical mass theory	Dummy variable that equals 1 if the percentage of female directors is at least 30% and 0 otherwise	BoardEx
FD_3PLUS	Critical mass theory (robustness check)	Dummy variable that equals 1 if there are at least three female directors on the board and 0 otherwise	BoardEx
FD_1PLUS	Social identity theory	Dummy variable that equals 1 if there is at least one female directors on the board and 0 otherwise	BoardEx

FD_2PLUS	Social identity theory (robustness check)	Dummy variable that equals 1 if there are at least two female directors on the board and 0 otherwise	BoardEx
Board control variables			
BOARD	Board size	The number of directors on a corporate board	BoardEx
BI	Board independence	$\frac{Number\ of\ independent\ directors}{Total\ number\ of\ directors}$	BoardEx
AGE	Board age diversity	$\frac{Total\ age\ of\ all\ directors}{Total\ number\ of\ directors}$	BoardEx
DUAL	CEO duality	Dummy variable that equals 1 if the CEO is also the chairman of the board and 0 otherwise	BoardEx
Financial control variables			
ROA	Return on assets	$\frac{Net\ income}{Total\ assets}$	Eikon
LEV	Leverage ratio	$\frac{Total\ liabilities}{Total\ assets}$	Eikon
SIZE	Firm size	$\ln(Total\ assets)$	Eikon
FCF	Free cash flow	$\frac{EBITDA}{Total\ market\ capitalization}$	Eikon
CASH	Cash holdings	$\frac{Cash\ and\ short\text{-}term\ investments}{Book\ value\ of\ total\ assets}$	Eikon
TOB	Tobin's Q	$\frac{Market\ value + Book\ value\ of\ liabilities}{Book\ value\ of\ total\ assets}$	Eikon
Fixed effects			
YEAR	Year fixed effects	Dummy variable for each year of the period 1999 - 2019	All databases
INDUSTRY	Industry fixed effects	Dummy variable for each of the 48 industry classifications defined by Fama and French	Eikon
COUNTRY	Country fixed effects	Dummy variable for each of the 25 countries	Eikon

3.3 Model

Before discussing the econometric model, the dataset of this thesis is checked for potential multicollinearity issues amongst the included variables. Multicollinearity means that there is significantly high correlation between two or more explanatory (independent and control) variables. As a consequence, such variables more or less explain the same effect and the econometric model is less capable of distinguishing the different effects of each individual explanatory variable. This leads to a distortion of the coefficient estimates and p-values (statistical significance). Hence, multicollinearity threatens the general validity of the results and when this is the case, one of the correlating variables will be left out of the regressions. To check whether multicollinearity plays a role in the dataset of this thesis a correlation matrix is used. A correlation matrix shows the bivariate correlation between two explanatory variables in which zero indicates no correlation at all and (minus) one indicates perfect (negative) correlation. The correlation matrix, displayed in table 3.2, reports relatively low correlation amongst all explanatory variables as none of correlation coefficients approach one[10]. The highest correlation is between the control variables SIZE and BOARD and is equal to 0.6679. To be sure that there is no multicollinearity issue between the size of firms and the size of its board, a variance inflation factor (VIF) test is conducted. In contrast to the correlation matrix, this test accounts for multivariate correlation amongst the explanatory variables. The VIF test, displayed in table 3.3, shows that there is no multicollinearity between the control variables SIZE and BOARD since its VIF value is 1.36 and multicollinearity only becomes a problem when the VIF value is higher than 5 (O'Brien, 2007).

Since this thesis uses panel data and is thus a panel study, adopting either a fixed effects model or random effects model seems most logical. These models fit best when the dependent variable is normally distributed and continuous. The latter means that the variable can take on any value. However, the dependent variable of this thesis is corporate acquisition intensity, which is calculated by the number of acquisition bids a company makes within one year, and thus a count variable. This variable takes on discrete values with a minimum of zero and a maximum of potentially infinite. Also, this variable is not normally distributed but instead follows a negative binomial distribution or a Poisson distribution. Therefore, the dependent variable does not adhere to two important properties of the fixed and random effects models and adopting such a model would result in a bad fit. This can be solved by taking the natural logarithm of the dependent variable which makes it continuous and transforms it towards a normal distribution. However, this procedure has its disadvantages such as the loss of data due to taking the logarithm of observations with a value of zero becoming undefined. Another disadvantage is that the model is still unable to cope with the dispersion of the data.

[10] The correlation between the independent variables FBR, TW_FBR, FBR_30PLUS, FD_3PLUS, FD_1PLUS and FD_2PLUS is ignored and hence not included in the matrix. That is because these variables are alternatives of one another and therefore never included in the same regression.

Thus, since the dependent variable of this thesis is negative-binomially or Poisson-distributed, a negative binomial or Poisson regression model is most suitable. These two regressions models are also used in other papers that study the impact of female board representation on corporate acquisitiveness, such as Chen et al. (2016) who use a Poisson regression, Levi et al. (2014) who use a negative binomial regression and Dowling and Aribi (2013) who use a normal Poisson as well as a zero-inflated Poisson regression. The Poisson regression model assumes that the dependent variable is Poisson-distributed and thus that its variance is equal to the mean. Hence, if the variance (squared standard deviation) of the dependent variable is close to its mean, a Poisson regression model is most appropriate (Cameron & Trivedi, 1998). By contrast, if its variance is significantly different from the mean, a negative binomial regression model suits best. The situation in which the variance of a variable is larger than its mean is called overdispersion, while the opposite situation is called underdispersion. The former is more common, since samples are often heterogeneous.

From the summary statistics of table 4.1 can be derived that the variance of CAI is 2.1086[11], which is significantly larger than its mean of 0.7071. This indicates that the dependent variable is overdispersed and a negative binomial regression model is the best fit. The Durbin-Wu-Hausman tests, shown in appendix 7.2 and 7.3, point out that a fixed effects model is most appropriate. This can be seen from the fact that the p-values of all different model specifications used in this thesis, including the robustness checks, are significant at 1%. This means that the coefficients between the random and fixed effects model are systematically different. As a consequence, the null hypothesis must be rejected while the alternative hypothesis must be accepted, which indicates that the fixed effects model is consistent. However, as this study controls for industry and country fixed effects, a random effects negative binomial model is used over a fixed effects model because it allows for these time-invariant variables[12]. As an example, to test H1 with the main variables, the random effects negative binomial model runs the following regression equation:

$$CAI_{it} = \alpha_0 + \beta_1 FBR_{it} + \beta_2 BOARD_{it} + \beta_3 BI_{it} + \beta_4 AGE_{it} + \beta_5 DUAL_{it} + \beta_6 ROA_{it} + \beta_7 LEV_{it} + \beta_8 SIZE_{it} + \beta_9 FCF_{it} + \beta_{10} CASH_{it} + \beta_{11} TOB_{it} + \epsilon_{it}$$

where i indicates the unit of observation (firm), t indicates the time of observation (year), epsilon (ϵ) is the error term, alpha (α) is the constant term and the betas (β) are the coefficients of the respective independent and control variables. To test the other two hypotheses and for the robustness checks, the dependent or independent variables will be different while the control variables stay the same. Since the negative binomial model does not allow for robust or clustered (by firm) standard errors, the

[11] The variance is equal to the squared standard deviation. Hence, for CAI: $1.4521^2 = 2.1086$.
[12] Additional analyses, displayed in table 7.7 in the appendix, briefly show the regression results when a fixed effects instead of a random effects negative binomial model is used. It is found that in seven specifications, of which one in the main study, the variable of interest has a different coefficient and significance level compared to the standard analyses.

regression outputs in this thesis report normal standard errors. This may be problematic as, in contrast to robust standard errors, normal standard errors are biased when the data is heteroscedastic.

Table 3.2: Correlation matrix of all explanatory variables, including those for the robustness checks

VARIABLES	BOARD	BI	AGE	DUAL	ROA	LEV	SIZE	FCF	CASH	TOB
FBR	0.0856	0.2468	0.0510	-0.0359	0.0809	0.0162	0.2150	0.0133	-0.0462	-0.0110
TW_FBR	0.0575	0.2049	0.0183	-0.0615	0.0601	0.0099	0.1703	0.0099	-0.0314	-0.0128
FBR_30PLUS	0.0061	0.1719	0.0254	-0.0292	0.0463	0.0134	0.1168	0.0008	-0.0271	-0.0070
FD_3PLUS	0.3390	0.1381	0.0781	0.0433	0.0735	0.0206	0.3230	0.0331	-0.0694	-0.0165
FD_1PLUS	0.2862	0.2113	0.0686	-0.0032	0.1092	0.0202	0.3408	0.0349	-0.0768	-0.0194
FD_2PLUS	0.3234	0.2057	0.0862	0.0118	0.0968	0.0246	0.3502	0.0308	-0.0846	-0.0194
BOARD	1.0000									
BI	-0.0683	1.0000								
AGE	0.1064	0.2199	1.0000							
DUAL	0.2078	-0.2288	0.0771	1.0000						
ROA	0.1396	0.0709	0.0331	0.0064	1.0000					
LEV	0.0342	0.0253	0.0156	0.0156	-0.1319	1.0000				
SIZE	0.6679	0.2302	0.2154	0.0907	0.3062	0.0428	1.0000			
FCF	0.1008	0.0013	0.0264	0.0378	0.2801	-0.0545	0.1428	1.0000		
CASH	-0.1604	-0.0350	-0.0199	-0.0097	-0.1926	-0.0801	-0.3076	-0.0739	1.0000	
TOB	-0.0508	0.0046	-0.0203	0.0186	-0.2360	0.3654	-0.1171	-0.0414	0.0973	1.0000

Table 3.3: Variance inflation factor with BOARD as dependent variable

VARIABLES	VIF	1/VIF
SIZE	1.36	0.734667
ROA	1.25	0.797367
BI	1.23	0.811514
TOB	1.22	0.817521
LEV	1.19	0.841293
CASH	1.14	0.878643
AGE	1.10	0.908060
FBR	1.10	0.910815
DUAL	1.10	0.912767
FCF	1.09	0.914123
Mean VIF	1.18	

4. Results

This chapter addresses the results of the thesis. First, the data is described, analyzed and compared to other reports by means of the summary statistics. Secondly, the outcomes of the main regression analyses are presented and discussed, also in light of the literature. Thirdly, several tests are conducted in order to check the robustness of the results.

4.1 Data analysis

Prior to the regression analyses, the data is discussed using the summary statistics displayed in table 4.1. This summary statistics includes the number of observations (N), the averages (Mean), the standard deviations (SD), the minimum (Min) and maximum (Max) values and the quartiles (Q_1, Q_2 & Q_3) of each variable in this thesis. The second quartile (Q_2) is also called the median.

The final sample of this thesis contains 45,932 firm-year observations of 2,821 publicly listed companies in Europe. However, the summary statistics indicates that the number of observations is lower than that for every variable. This is due to missing values and the fact that observations with missing values are automatically dropped from the regressions. As a result, different regressions involving different variables cause the number of observations and firms included to be different as well.

With respect to outliers, there is no need to drop/trim or winsorize the data as the summary statistics indicate that outliers have a minimal influence on the results[13]. This can be seen from the fact that for each continuous variable the mean is relatively close to the median. Also for the dummy and count (discrete) variables the mean, median, minimum and maximum values seem to be plausible. Besides, observations in the current dataset may not be altered or deleted as they are directly retrieved from the utilized databases and hence there is no reason to presume that this data is incorrect.

Table 4.2 and 7.4 show how the dependent and independent variables, excluding the dummy variables, develop over time. These tables indicate the total number of acquisition deals, the average number of acquisition deals, the average (tenure-weighted) percentage of female directors and the net assets from acquisitions over total assets ratio per year for the firms in the sample. As pointed out in the introduction, the average percentage of female directors on corporate boards of publicly listed companies in Europe has increased substantially, particularly in the last decade. Whereas in mid-2003 this percentage was 8.5%, it increased to 11% in mid-2009 and to 28.8% in mid-2019 for the largest publicly listed companies[14] in the European Union (EIGE, 2020). A similar progression is found in

[13] Additional analyses, displayed in table 7.7 in the appendix, briefly show the regression results when the relevant variables are winsorized. It is found that in four specifications, of which none in the main study, the variable of interest has a different coefficient and significance level compared to the standard analyses.

[14] Here, the largest publicly listed companies means the largest companies that are constituents of the primary blue-chip index of a national stock exchange. These companies are usually the largest in terms of market capitalization and/or volume of market trades. For each EU member state, the largest publicly listed companies are taken into account with a maximum of 50 (EC DG JUST, 2019).

the sample of this thesis, as the average percentage of female directors increased from 4.43% in 1999 to 6.35% in 2003 to 8.05% in 2009 and lastly to 24.53% in 2019. Nonetheless, these percentages are lower than those reported by the EIGE, which is likely because they only include the "largest" publicly listed companies while the sample of this thesis also incorporates smaller publicly listed companies. When comparing this progression in Europe to the U.S., for example with the paper of Chen, Gramlich and Houser (2019) that uses a sample of S&P firms, it is found that female board representation in the U.S. has always been higher and increased more gradually. For comparison, the percentage of female directors in the U.S. was 9.20% in 1999, 10.54% in 2003, 12.34% in 2009 and 26% in 2019 for S&P500 firms (Spencer Stuart, 2019).

The dependent variable of this thesis, corporate acquisition intensity, also increased gradually during the years 1999 – 2007. In 2008 and especially in 2009, both the total and average number of acquisition deals as well as the NAFA ratio decreased substantially. This is likely due to the global financial crisis of 2007-2008. When looking at the robustness checks of the dependent variable, in which certain deals are excluded, the decline in corporate acquisition intensity is found to be even stronger. In all three deal exclusions the number of acquisitions is more than halved in 2009 compared to 2007. Since 2010 M&A activity started increasing again. Noteworthy is that sometimes the total number acquisition deals increases while the average decreases. That is because the number of firms in the sample increases faster than the number of deals, relatively speaking. All of this can be seen in tables 4.2 and 7.4. Other M&A-related papers with a sample of European firms, such as Defrancq, Huyghebaert and Luypaert (2016) and Jensen-Vinstrup, Rigamonti and Wulff (2018), report similar findings for the periods 2005-2013 and 2002-2012, respectively.

Subsequently, it is analyzed what the average firm in the sample of this thesis looks like in terms of board and financial characteristics. In this analysis a comparison is made to a sample of UK FTSE 100 constituents during the years 2000-2011 (Dowling & Aribi, 2013), a sample of firms from continental Europe during the years 2005-2013 (Defrancq et al., 2016) and a sample of S&P1500 firms during the years 1997-2009 (Levi et al., 2014).

With respect to board characteristics, the average firm has 8.96 directors with an age of 55.88 on the board, of which 40.32% is independent. Also, in 40.08% of the firms the chairman of the boards is also the CEO. Dowling and Aribi (2013) report relatively similar statistics: a board size of 10.62, an average director age of 55.20 and an independent director ratio of 36%.

Regarding the financial characteristics, the average firm has a total assets (firm size) of 553,878.15 euro[15], of which 23.15% are liabilities (leverage ratio) and 14.66% are cash and short-term investments (cash holdings ratio). Relatively similar values are found by Defrancq et al. (2016) with an average total assets of 570,917.50 euro[16] and a cash ratio of 11.34%. Only their reported leverage ratio is with an average of 13.54% considerably lower. This might be due to the fact that they solely

[15] $e^{13.2247}$
[16] $e^{13.2550}$

take long-term debt into account when calculating the leverage ratio, while this thesis also incorporates short-term debt.

Finally, the average firm in this thesis' sample has a return on assets of 1.63%, a free cash flow ratio (EBITDA over market capitalization) of 9.52% and a Tobin's Q (market value of capital plus book value of liabilities over total assets) of 1.88. Even though Levi et al. (2014) finds an equivalent Tobin's Q of 1.891, their reported ROA of 4% is more than twice as big. Again, this might be explained by the global financial crisis of 2007-2008 and the fact that the research period of Levi et al. (2014) stops in 2009 while this thesis continues. As a result, this thesis captures the inferior firm performance following the financial crisis and thus is ROA on average lower.

Table 4.1: Summary statistics of all variables

VARIABLES	N	Mean	SD	Min	Q_1	Q_2	Q_3	Max
CAI	29079	0.7071	1.4521	0	0	0	1	45
CAI_EXCL_DV	22276	0.1721	0.4475	0	0	0	0	7
CAI_EXCL_STAKE	28341	0.5976	1.2907	0	0	0	1	39
CAI_EXCL_BOTH	21019	0.1633	0.4330	0	0	0	0	7
NAFA	27084	0.0214	0.0600	-1.4698	0	0	0.0139	1.2606
FBR	29079	0.1332	0.1469	0	0	0.1111	0.2222	1
TW_FBR	29072	0.0995	0.1336	0	0	0.0375	0.1643	1
FBR_30PLUS	29079	0.1519	0.3589	0	0	0	0	1
FD_3PLUS	29079	0.1724	0.3777	0	0	0	0	1
FD_1PLUS	29079	0.5907	0.4917	0	0	1	1	1
FD_2PLUS	29079	0.3307	0.4705	0	0	0	1	1
BOARD	29079	8.9644	4.2700	1	6	8	11	35
BI	29079	0.4032	0.2588	0	0.2143	0.4167	0.5833	1
AGE	29079	55.8817	4.7460	32.3182	53	56	58.9	82
DUAL	29079	0.4008	0.4900	0	0	0	1	1
ROA	29079	0.0163	0.2403	-12.2496	0.0107	0.0489	0.0866	5.3726
LEV	29079	0.2315	0.6122	0	0.068	0.2008	0.328	72.211
SIZE	29079	13.2247	2.3812	2.4849	11.5943	13.3170	14.9234	19.9788
FCF	29079	0.0952	0.7331	-46.6758	0.0627	0.1223	0.2052	14.8265
CASH	29079	0.1466	0.1531	0	0.0484	0.0983	0.1856	0.9991
TOB	29079	1.8815	6.4179	0.0052	1.0205	1.3165	1.8708	572.189

Table 4.2: Overview of the variables CAI, FBR, TW_FBR and NAFA per year

Year	Total number of acquisition deals	Average number of acquisition deals	Average percentage of female directors	Average tenure-weighted percentage of female directors	Average Net Assets From Acquisitions / Assets
1999	571	1.4948	4.4281%	3.6644%	0.0276
2000	776	1.4007	4.9570%	3.6597%	0.0399
2001	755	1.0604	5.1253%	3.9633%	0.0261
2002	760	0.9744	5.4314%	4.2842%	0.0172
2003	699	0.7810	6.3486%	4.9343%	0.0188
2004	876	0.8521	6.5339%	5.1600%	0.0203
2005	1,120	0.8939	7.0443%	5.6531%	0.0303
2006	1,250	0.8993	7.3800%	5.8553%	0.0336
2007	1,514	0.9687	7.7593%	6.2173%	0.0345
2008	1,267	0.7816	7.6054%	6.5609%	0.0300
2009	767	0.4821	8.0484%	7.0731%	0.0114
2010	992	0.6146	9.0201%	7.5175%	0.0165
2011	1,155	0.6623	10.3004%	7.9966%	0.0216
2012	1,076	0.6048	11.8242%	8.6502%	0.0162
2013	1,029	0.5632	13.3250%	9.6108%	0.0127
2014	1,201	0.6153	14.8530%	10.834%	0.0171
2015	1,312	0.6080	15.7794%	11.777%	0.0201
2016	1,221	0.5542	17.5058%	13.124%	0.0199
2017	1,354	0.5762	19.6413%	14.926%	0.0191
2018	1,263	0.5356	21.0443%	16.463%	0.0215
2019	996	0.4173	24.5311%	17.691%	0.0175
Total	**21,954**				

4.2 Regression analyses

This section presents the results of the main regression analyses. In order to test the three hypotheses, three different specifications of the random effects negative binomial model are conducted. The results of these three specifications are presented in table 4.3. Hypotheses 1, 2 and 3 are tested by specification 1, 2 and 3, respectively.

The first hypothesis predicts that firms with a greater fraction of women on their board are associated with fewer corporate acquisitions. In other words, a negative and significant relationship between female board representation and corporate acquisition intensity is expected. Column 1 in table 4.3 indicates that the coefficient of FBR is indeed negative, but statistically insignificant. In terms of economic significance, a ten percent increase in the proportion of female directors corresponds to a 0.96%[17] decrease in the number of acquisition deals, ceteris paribus. However, since FBR is insignificant H1 must be rejected. The insignificance of FBR might be due to a lack of within-firm variation in female board representation over time. The average year-to-year change in the percentage of female directors is 7.8022% and 44.23% of the firm-year observation have no change at all. This indicates little within-firm variation, which makes finding a statistically significant effect more difficult (Zhou, 2001).

This result does not support the social identity theory which states that (gender) diversity in groups increases the competiveness and decreases the cooperativeness amongst its members, leading to more comprehensive board discussions and eventually making it less likely for firms to engage in M&As. Additionally, this result does not support the claim that women tend to be less overconfident and more risk-averse than men, making it less likely for female directors to undertake risky corporate activities such as M&As compared to their male counterparts. Also, this finding is not in line with similar papers such as Chen et al. (2016), Levi et al. (2014) and Dowling and Aribi (2013) as they find both a negative and significant (at 1%) relationship using the same dependent and independent variable as this thesis. Using the Poisson regression model, but robust to the negative binomial model, Chen et al. (2016) reports a coefficient of -0.897 for female board representation. Using the negative binomial regression model Levi et al. (2014) reports a coefficient of -0.7901 for the fraction of female directors. Using the (zero-inflated) Poisson regression model Dowling and Aribi (2013) reports a coefficient of -4.7622 (-5.4454) for the percentage of women on the board. A potential explanation for the different result is that this thesis uses a sample of European firms while the other papers use a sample of S&P1500 firms from 1998 to 2010, a sample of S&P1500 firms from 1997-2009 and a sample of UK FTSE 100 constituents from 2000 to 2011, respectively. It could be that gender differences in overconfidence and risk-aversion are less present in these different samples and research periods.

The second hypothesis tests the critical mass theory and predicts that firms with a female

[17] $(1 - \exp(-0.0963 * 0.10)) * 100$

board representation of at least 30% are associated with fewer corporate acquisitions. Therefore, a negative and significant relationship between the independent dummy variable FBR_30PLUS and corporate acquisition intensity is expected. Column 2 of table 4.3 indicates that the coefficient of FBR_30PLUS is negative, but again insignificant. This means that a critical mass of 30% female directors does not significantly influence a firm's acquisitiveness and hence H2 must be rejected. In terms of economic significance, firms with at least 30% female directors are associated with 0.54%[18] less acquisition deals, ceteris paribus. This result is in contrast with the conclusions of Joecks et al. (2013), who find that a critical mass of women on corporate boards is required to influence the decision making process of firms and to realize the potential advantages of board diversity.

The third hypothesis tests the social identity theory and predicts that firms with at least one female director in the boardroom are associated with fewer corporate acquisitions. Hence, a negative and significant relationship between the independent dummy variable FD_1PLUS and corporate acquisition intensity is expected. This expectation is confirmed in column 3, as the coefficient of FD_1PLUS is both negative and significant at the 10% level, meaning that H3 must be accepted. In terms of economic significance, firms with at least one women on the board are associated with 4.53%[19] less acquisition deals, ceteris paribus. Using the same dummy variable, a similar result is found by Chen et al. (2016) and Bazel-Shoham et al. (2017). The latter paper uses a global sample of firms over the years 1998 to 2014.

With respect to the control variables, the main analyses show that all of them are significant at the 1% level except BOARD, BI and FCF. Moreover, the coefficient sign of every control variable is in a plausible direction based on related studies such as Chen et al. (2016), Dowling and Aribi (2013) and Levi et al. (2014).

[18] (1 – exp(-0.0054)) * 100
[19] (1 – exp(-0.0464)) * 100

Table 4.3: Main regression analyses

VARIABLES	(1) CAI	(2) CAI	(3) CAI
FBR	-0.0963		
	(0.1011)		
FBR_30PLUS		-0.0054	
		(0.0321)	
FD_1PLUS			-0.0464*
			(0.0256)
BOARD	0.0013	0.0012	0.0024
	(0.0045)	(0.0045)	(0.0045)
BI	-0.0117	-0.0169	-0.0093
	(0.0579)	(0.0576)	(0.0577)
AGE	-0.0105***	-0.0101***	-0.0105***
	(0.0029)	(0.0029)	(0.0029)
DUAL	-0.0836***	-0.0837***	-0.0834***
	(0.0280)	(0.0280)	(0.0280)
ROA	0.5542***	0.5526***	0.5538***
	(0.0777)	(0.0777)	(0.0776)
LEV	-0.3657***	-0.3644***	-0.3649***
	(0.0756)	(0.0756)	(0.0756)
SIZE	0.2297***	0.2286***	0.2303***
	(0.0106)	(0.0105)	(0.0105)
FCF	0.0039	0.0042	0.0038
	(0.0197)	(0.0197)	(0.0197)
CASH	-0.7867***	-0.7881***	-0.7847***
	(0.1025)	(0.1025)	(0.1024)
TOB	0.0052***	0.0052***	0.0052***
	(0.0014)	(0.0014)	(0.0014)
Constant	-1.4620***	-1.4595***	-1.4746***
	(0.2969)	(0.2970)	(0.2970)
Observations	29,079	29,079	29,079
Number of firms	2,735	2,735	2,735
Log-likelihood	-29179	-29179	-29177

Three specifications of the random effects negative binomial model including observations of publicly listed companies in Europe over the period 1999-2019. The dependent variable CAI is a count of the number of announced, completed, pending and postponed acquisition deals. The explanatory variables of interest are: (1) FBR which is the percentage of female directors on a corporate board (2) FBR_30PLUS which is a dummy variable that equals one if the proportion of female directors is at least 30% and (3) FD_1PLUS which is a dummy variable that equals one if there is at least one female director. All specifications include year, industry and country fixed effects. Normal standard errors are reported in parentheses. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

4.3 Robustness checks

In this section the robustness of the results is tested by conducting three different checks. The first set of robustness checks are four alternative measures of the dependent variable. The second set of robustness checks are alternative measures of the independent variables. The third and final set of robustness checks are sub-samples of firms from countries with binding, non-binding or no board gender quota. Additionally, sub-samples are made of firms from the countries France, Germany, the UK and all three countries together.

4.3.1 Alternative measures of corporate acquisition intensity

Table 4.4 shows the result of the four alternative measures of corporate acquisition intensity. These alternative measures are: (4) excluding deals with a value below 5% of the acquirer's end-of-year market capitalization, (5) excluding deals that do not lead to an increase of the target's shares held by the acquirer from below 50% prior to the acquisition to above 50% after the acquisition, (6) both exclusions together and (7) the net assets from acquisitions over total assets ratio.

As opposed to the main analysis, column 4 indicates that female board representation has both a negative and significant impact on the number of "high value" acquisition deals. High value acquisition deals are deals with a value above 5% of the acquirer's end-of-year market capitalization. In terms of economic significance, a ten percent increase in the proportion of female directors is associated with a 5.45%[20] decrease in the number of high value acquisition deals, ceteris paribus. The finding that the relationship between board gender diversity and corporate acquisitiveness is stronger when "low value" deals are excluded is also the case in Dowling and Aribi (2013). A possible explanation for this result is that acquisition deals worth less than 5% of the acquirer's market capitalization might not require significant involvement of the board (Morck, Shleifer & Vishny, 1990). By excluding such deals, it is assumed that the board and thus the directors are always involved in the decision whether or not to acquire a firm. As a result, gender differences in overconfidence and risk-aversion of directors can play a role and the effect of interest is captured.

When excluding deals that do not lead to an increase of the target's shares held by the acquirer from below 50% prior to the acquisition to above 50% after the acquisition, a negative and insignificant effect of FBR is found, just like in the main analysis. This can be seen in column 5 and strengthens the claim that H1 must be rejected. Also, the coefficient of FBR decreases from -0.0963 in column 1 to -0.0218 in column 5, making the effect even less strong and significant.

If both deal exclusions are applied, the coefficient of FBR remains negative and significant at 1% just like in the first deal exclusion. Nevertheless, its effect is slightly reduced in magnitude as the coefficient decreases from -0.5607 in column 4 to- 0.5533 in column 6. This again indicates that the stake exclusion makes the relationship less significant.

The final alternative measure of corporate acquisition intensity is the net assets from

[20] (1 – exp(-0.5607 * 0.10)) * 100

acquisitions over total assets ratio. Column 7 shows that the effect of FBR on NAFA is negative but insignificant. Again, strengthening the rejection of H1. This outcome is different from the papers Ahern and Dittmar (2012) and Huang and Kisgen (2013), who use an equivalent measure of M&A activity. Using an acquisition expenditures over assets ratio, the former finds a significant (at 1%) effect of an 1 to 4 percentage points increase of acquisitions when female board representation increases by 20%. The latter paper also finds a negative and significant (at 5%) relationship between board gender diversity and corporate acquisitiveness, which is measured by an acquisition expenditures over net plant, property and equipment ratio.

4.3.2 Alternative measures of the independent variables

Table 4.5 shows the results of the alternative measures of the three independent variables, which are female board representation, the critical mass theory and the social identity theory. These alternative measures are: (8) a tenure-weighted percentage of female directors, (9) a dummy variable that equals 1 if there are at least three female directors and (10) a dummy variable that equals 1 if there are at least two female directors on the board, respectively.

Column 8 indicates a negative and highly significant (at 1%) relationship between the tenure-weighted female director ratio and corporate acquisition intensity. In terms of economic significance, a ten percent increase in the proportion of female tenure corresponds to a 2.87%[21] decrease in the number of acquisition deals, ceteris paribus. This finding is different from the main analysis (column 1), which does not find a significant relationship using the standard female director ratio. A possible reason for this difference is that in recent years publicly listed companies in Europe have been appointing female directors at a relatively fast rate, also due to (non-)binding board gender quotas. However, these newly appointed female directors have a lower tenure in terms of number of years seated in the boardroom compared to the sitting and dominating male directors. As a result, the average proportion of female directors is increasing while the tenure-weighted average is lagging behind. This can be seen in table 4.2. Since it might take some time before newly appointed (female) directors have an actual impact on the decision making of firms (Coles et al., 2014), it might be that the relatively higher overconfidence and lower risk-aversion of the sitting male directors cause firms to be more acquisitive. This could explain why TW_FBR is found to be significant where FBR is not. Even though Bazel-Shoham et al. (2017) also report a negative and significant (at 1%) relationship between the tenure-weighted female director ratio and corporate acquisitiveness, the effect of their standard female director ratio is found to be stronger (coefficients: -0.309 versus -0.245).

As a robustness check of the critical mass theory, the dummy variable that equals 1 if the proportion of female directors is at least 30% is replaced by a dummy that equals 1 if there are at least three female directors on the board. That is because research has stated that a critical mass of women on corporate boards cannot only be reached in relative terms (30%), but also in absolute terms (3

[21] (1 – exp(-0.2913 * 0.10)) * 100

directors). The outcome of this robustness check is displayed in column 9 and shows that the coefficient of FD_3PLUS is negative, but insignificant. Therefore, this thesis does not find a critical mass of female directors in either relative or absolute terms to be influential on the acquisitiveness of firms. In other words, no significant difference in corporate acquisitiveness is found between firms with and without a critical mass of female directors. Hence, also based on this alternative measure H2 must be rejected. This outcome is not in line with papers such as Joecks et al. (2013) and Konrad et al. (2008), who both find that women on corporate boards influence the decision making of firms when a critical mass of either 30% or 3 female directors is reached.

Column 10 of table 4.5 shows the results when an alternative dummy variable is used to test the social identity theory. This dummy variable is equal to 1 if there are at least two female directors on the board instead of only one and is used to rule out potential window dressing and tokenism of board gender diversity by firms. In comparison to the main analysis (column 3), the variable of interest increases in significance from the 10% to the 5% level. In addition, the negative effect increases in size as FD_2PLUS has a coefficient of -0.0590, while FD_1PLUS has a coefficient of -0.0464. This strengthens the acceptance of H3. In terms of economic significance, firms with at least two women on the board are associated with 5.73%[22] fewer acquisition deals, ceteris paribus. This result is in line with Dowling and Aribi (2013) and Bazel-Shoham et al. (2017), who also both find a significant (at 5%) and negative relationship between the same dummy variable and corporate acquisition intensity. Besides, the former paper also uses the number of acquisition deals as the dependent variable and reports a coefficient of -0.4937.

4.3.3 Sub-samples

The first set of sub-samples are based on whether the country a firm is located in has a binding, non-binding or no board gender quota. These sub-samples are created to check whether the relationship between female board representation and corporate acquisition intensity differs between firms from countries with different board gender legislation. The reasoning behind this is that firms in countries with gender quotas are forced to assign a certain percentage of their board seats to women which may lead to tokenism. In the case of tokenism, female directors are not appointed by firms because of their knowledge and skills but rather to window-dress board gender diversity. As a consequence, such female directors might have less influence on the decision making of firms, including the decision to whether or not acquire another company. Additionally, a distinction is made between firms from countries with binding and non-binding board gender quotas. Binding (hard) quotas require firms to comply and if not face sanctions. Non-binding (soft) quotas do not lead to sanctions if they are not met and are used as a stimulation rather than an obligation. It is argued that token appointments of female directors are more likely in countries with binding board gender quotas than in countries with non-binding gender quotas, simply because they are forced to.

[22] (1 – exp(-0.0590)) * 100

Table 4.6 shows the results of the first set of sub-samples. In line with the expectations, the negative effect of female board representation on corporate acquisitiveness is stronger for firms in countries without a board gender quota than for firms in countries with such a quota. This can be seen by the fact that the coefficient of FBR is -0.1695 in column 14, which is more negative than the one in column 13 of -0.0636. However, in contrast to the expectations, this same negative effect is stronger for firms in countries with binding than for firms in countries with non-binding board gender quotas. This can be seen by the fact that FBR has a coefficient of -0.2934 in column 11 and of -0.0113 in column 12. Nevertheless, the effect of female board presentation on corporate acquisitiveness is negative and insignificant in each sub-sample. This result is similar to the main analyses (column 1) and thus strengthens the results.

As opposed to the first set of sub-samples, which was theory-based, the second set of sub-samples is data-based. As indicated by table 7.1 in the appendix, firms from France, Germany and the UK represent 11.70%, 10.03% and 34.35% of the total sample, respectively. Together firms from these countries form 56.08% of the sample. Both together and individually, firms from these countries form a significant proportion relative to the other countries in the sample and hence they may drive the results. To check whether this is the case, sub-samples are created of firms from the countries France, Germany, the UK and these three countries together. The results of these sub-samples are displayed in table 4.7 and indicate that in none of the sub-samples FBR is significant. Female board representation is even found to have a small positive effect (column 15: 0.0059) on the acquisitiveness of French firms. German firms are found to have the strongest negative effect (column 16: -0.4169). Overall, these results strengthen the rejection of H1.

Table 4.4: Robustness check with alternative measures of corporate acquisition intensity

VARIABLES	(4) CAI_EXCL_DV	(5) CAI_EXCL_STAKE	(6) CAI_EXCL_BOTH	(7) NAFA
FBR	-0.5607***	-0.0218	-0.5533***	-0.0060
	(0.1727)	(0.1079)	(0.1789)	(0.0038)
BOARD	0.0021	-0.0022	0.0013	-0.0007***
	(0.0075)	(0.0049)	(0.0081)	(0.0002)
BI	-0.0258	0.0532	0.0146	-0.0010
	(0.0926)	(0.0624)	(0.0963)	(0.0024)
AGE	-0.0277***	-0.0134***	-0.0285***	-0.0005***
	(0.0045)	(0.0032)	(0.0047)	(0.0001)
DUAL	-0.0760*	-0.0774**	-0.0880*	-0.0009
	(0.0447)	(0.0303)	(0.0468)	(0.0011)
ROA	0.0317	0.6121***	0.0759	0.0027
	(0.0976)	(0.0811)	(0.1001)	(0.0018)
LEV	-0.0066	-0.3948***	-0.0334	0.0021***
	(0.0601)	(0.0820)	(0.0803)	(0.0006)
SIZE	0.0201	0.2164***	0.0110	0.0039***
	(0.0145)	(0.0113)	(0.0150)	(0.0004)
FCF	0.0376	-0.0090	0.0401	-0.0004
	(0.0333)	(0.0202)	(0.0355)	(0.0005)
CASH	-0.9474***	-0.8233***	-0.9913***	-0.0515***
	(0.1469)	(0.1091)	(0.1526)	(0.0032)
TOB	-0.0099	0.0052***	-0.0075	-0.0000
	(0.0080)	(0.0014)	(0.0070)	(0.0001)
Constant	2.2365***	-1.2303***	2.2114***	0.0165
	(0.4705)	(0.3186)	(0.5218)	(0.0125)
Observations	22,276	28,341	21,019	27,084
Number of firms	1,923	2,649	1,820	2,721
Log-likelihood	-10529	-26137	-9563	N/A

Specification 4 to 6 are random effects negative binomial models, while specification 7 is a standard random effects model. The observations are from publicly listed companies in Europe over the period 1999-2019. Each specification has an alternative dependent variable relative to the main analysis, depending on the robustness check conducted. The explanatory variable of interest is FBR in each specification. All specifications include year, industry and country fixed effects. Normal standard errors are reported in parentheses. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4.5: Robustness check with alternative measures of the independent variables

VARIABLES	(8) CAI	(9) CAI	(10) CAI
TW_FBR	-0.2913***		
	(0.1023)		
FD_3PLUS		-0.0321	
		(0.0302)	
FD_2PLUS			-0.0590**
			(0.0266)
BOARD	0.0011	0.0020	0.0029
	(0.0045)	(0.0045)	(0.0045)
BI	-0.0055	-0.0136	-0.0067
	(0.0577)	(0.0577)	(0.0578)
AGE	-0.0110***	-0.0104***	-0.0108***
	(0.0029)	(0.0029)	(0.0029)
DUAL	-0.0862***	-0.0834***	-0.0832***
	(0.0280)	(0.0280)	(0.0280)
ROA	0.5563***	0.5532***	0.5548***
	(0.0778)	(0.0777)	(0.0777)
LEV	-0.3725***	-0.3658***	-0.3678***
	(0.0757)	(0.0757)	(0.0756)
SIZE	0.2316***	0.2294***	0.2310***
	(0.0105)	(0.0105)	(0.0106)
FCF	0.0036	0.0040	0.0036
	(0.0198)	(0.0198)	(0.0197)
CASH	-0.7803***	-0.7868***	-0.7863***
	(0.1024)	(0.1025)	(0.1024)
TOB	0.0052***	0.0052***	0.0052***
	(0.0014)	(0.0014)	(0.0014)
Constant	-1.4635***	-1.4731***	-1.4819***
	(0.2969)	(0.2971)	(0.2970)
Observations	29,072	29,079	29,079
Number of firms	2,734	2,735	2,735
Log-likelihood	-29164	-29178	-29177

Three specifications of the random effects negative binomial model including observations of publicly listed companies in Europe over the period 1999-2019. Each specification has an alternative independent variable relative to the main analysis, depending on the robustness check conducted. All specifications include year, industry and country fixed effects. Normal standard errors are reported in parentheses. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4.6: Robustness check with sub-samples of binding, non-binding and no board gender quota countries

VARIABLES	(11) CAI	(12) CAI	(13) CAI	(14) CAI
FBR	-0.2934	-0.0113	-0.0636	-0.1695
	(0.2457)	(0.1735)	(0.1385)	(0.1746)
BOARD	-0.0071	-0.0160*	-0.0077	0.0056
	(0.0093)	(0.0096)	(0.0071)	(0.0060)
BI	0.0970	0.0300	0.0758	0.0294
	(0.1341)	(0.1217)	(0.0912)	(0.0806)
AGE	-0.0057	-0.0128**	-0.0111**	-0.0124***
	(0.0066)	(0.0056)	(0.0043)	(0.0043)
DUAL	0.0576	-0.0299	0.0064	-0.1080***
	(0.0701)	(0.0586)	(0.0459)	(0.0381)
ROA	1.1612***	0.3020**	0.4665***	0.4712***
	(0.2285)	(0.1255)	(0.1102)	(0.1203)
LEV	-0.2345	-0.2387*	-0.3174***	-0.3630***
	(0.1892)	(0.1393)	(0.1178)	(0.1030)
SIZE	0.3262***	0.2419***	0.2564***	0.2216***
	(0.0238)	(0.0195)	(0.0154)	(0.0144)
FCF	-0.0516*	0.0357	0.0057	0.0163
	(0.0302)	(0.0408)	(0.0275)	(0.0306)
CASH	-0.6188**	-1.0884***	-0.9432***	-0.7086***
	(0.2647)	(0.1904)	(0.1563)	(0.1401)
TOB	0.0867***	0.0028	0.0038**	0.0074***
	(0.0264)	(0.0020)	(0.0019)	(0.0029)
Constant	-3.3964***	-1.0957**	-1.5854***	-0.7817*
	(0.6181)	(0.5273)	(0.4772)	(0.4473)
Observations	5,307	9,670	14,977	14,102
Number of firms	849	1,744	2,185	1,805
Log-likelihood	-4703	-9002	-13738	-15308

Four specifications of the random effects negative binomial model including observations of publicly listed companies in different sub-samples over the period 1999-2019. The sub-samples are only firms from countries with: (11) binding board gender quotas, (12) non-binding board gender quotas, (13) binding and non-binding board gender quotas and (14) no board gender quotas at all. All specifications use the main variables including year, industry and country fixed effects. Normal standard errors are reported in parentheses. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4.7: Robustness check with sub-samples of France, Germany, the UK and all three together

VARIABLES	(15) CAI	(16) CAI	(17) CAI	(18) CAI
FBR	0.0059	-0.4169	-0.2493	-0.1482
	(0.2707)	(0.4165)	(0.1826)	(0.1345)
BOARD	-0.0032	-0.0178	0.0088	0.0032
	(0.0098)	(0.0112)	(0.0117)	(0.0058)
BI	0.3259**	-0.2709	-0.2645**	-0.1304
	(0.1608)	(0.1892)	(0.1238)	(0.0859)
AGE	-0.0143**	0.0201*	-0.0265***	-0.0147***
	(0.0067)	(0.0104)	(0.0055)	(0.0039)
DUAL	0.1344*	-0.1200	-0.1705***	-0.0981***
	(0.0760)	(0.0800)	(0.0499)	(0.0362)
ROA	1.8084***	1.5853***	0.3468***	0.4612***
	(0.3472)	(0.4348)	(0.1060)	(0.0981)
LEV	-0.0040	-0.0572	-0.5975***	-0.4195***
	(0.1915)	(0.2827)	(0.1321)	(0.1017)
SIZE	0.3087***	0.3263***	0.1875***	0.2248***
	(0.0266)	(0.0406)	(0.0193)	(0.0142)
FCF	-0.3325***	-0.2855**	0.0303	-0.0102
	(0.1247)	(0.1193)	(0.0398)	(0.0323)
CASH	-0.1323	-0.3885	-0.6507***	-0.4641***
	(0.3137)	(0.3403)	(0.1570)	(0.1281)
TOB	0.0268	0.0485**	0.0031*	0.0040**
	(0.0294)	(0.0204)	(0.0017)	(0.0016)
Constant	-2.4567***	-3.1403***	0.0098	-0.8146**
	(0.6382)	(1.0308)	(0.4451)	(0.3521)
Observations	3,688	2,861	10,677	17,226
Number of firms	324	278	930	1,532
Log-likelihood	-3874	-2832	-9349	-16218
Country fixed effects	No	No	No	Yes

Four specifications of the random effects negative binomial model including observations of publicly listed companies in different sub-samples over the period 1999-2019. The sub-samples are: (15) only French firms, (16) only German firms, (17) only UK firms and (18) firms from these three countries altogether. All specifications use the main variables including year and industry fixed effects. Normal standard errors are reported in parentheses. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

5. Conclusion and discussion

Recent years have seen an increasing amount of attention devoted to female executives, directors and managers, both in the society and in the academic literature. Motivated by the psychological findings that men are more competitive, more (over)confident and less risk-averse than women, studies began investigating the effects of gender differences in corporate leadership on activities, policies, outcomes and decision making of firms. This includes studying the effects of female directors on corporate matters such as M&As, which is one of the most risky and impactful activities firms engage in. To my knowledge however, the relationship between female board representation and corporate acquisition intensity has not yet been studied in an European context. Hence, this thesis expands the existing literature by answering the following research question: *"What impact do female directors have on the acquisitiveness of publicly listed firms within Europe?"*.

Using a sample of 45,932 firm-year observations from 2,821 publicly listed companies in Europe during the period 1999 – 2019, this study has five main results. These results are found using a random effects negative binomial model[23] and controlling for board and financial characteristics of firms as well as for year, industry and country fixed effects. The first main results is that no significant relationship is found between the percentage of women on the board and the number of acquisition deals a firm engages in. The first hypothesis, which predicts that board gender diversity decreases the corporate acquisitiveness, must therefore be rejected. A potential explanation for not finding a significant relationship is the lack of within-firm variation in the percentage of female directors over time, which makes finding a statistically significant effect more difficult (Zhou, 2001). This result is robust to two alternative measures of corporate acquisition intensity: (1) excluding deals that do not lead to an increase of the target's shares held by the acquirer from below 50% prior to the acquisition to above 50% after the acquisition and (2) the net assets from acquisitions over total assets ratio. Also, this result is robust to various sub-samples. This finding does furthermore not support the social identity theory or the claim that women tend to be less overconfident and more risk-averse than men, nor is it in line with the results of related studies such as Chen et al. (2016), Levi et al. (2014) and Dowling and Aribi (2013), which all report a negative and significant relationship.

The second main result is that a negative and highly significant relationship is found between female board representation and corporate acquisitiveness when acquisition deals with a value below 5% of the acquirer's end-of-year market capitalization are excluded. It is demonstrated that the number of high value acquisition deals decreases by 5.45% when the proportion of female directors increases with 10%. A potential explanation for this result is that high value acquisition deals always require significant involvement of the board whereas low value deals might not. Hence by excluding the latter, it is assumed that the board and thus the directors are always involved in the acquisition

[23] The only exception is the 7th regression specification, which uses a standard random effects model as the dependent variable NAFA is continuous instead of discrete.

decision of firms. Consequently, the lower overconfidence and higher risk-aversion of female directors can start playing a role which causes firms to be less acquisitive.

The third main result is that when the standard female director ratio is replaced by a tenure-weighted female director ratio, a negative and highly significant effect on corporate acquisitiveness is found. It is demonstrated that the number of acquisition deals decreases by 2.87% when the proportion of tenure by female directors increases with 10%. This might be explained by the premise that it takes some time before newly appointed (female) directors have an actual impact on the decision making process of firms. As a result, the relatively higher overconfidence and lower risk-aversion of the sitting male directors cause firms to be more acquisitive. This could explain why the relationship between the tenure-weighted female director ratio and corporate acquisitiveness is found to be both negative and highly significant while the standard female director ratio is not.

The fourth main result is that no significant difference in corporate acquisitiveness is found between firms with and without at least 30% or 3 women on the board. The second hypothesis, which states that firms with a critical mass of at least 30% female directors are relatively less acquisitive, must therefore be rejected. This result indicates that no support is found for the critical mass theory in either relative or absolute terms. Consequently, this result is not in line with papers such as Joecks et al. (2013) and Konrad et al. (2008), who both find that women on corporate boards influence the decision making of firms when they reach a critical mass of either 30% or 3.

The fifth and final main result is that firms with at least one women on the board are associated with 4.53% less acquisition deals. Hypothesis 3, which predicts that firms with at least one female director are significantly less acquisitive than firms without any female directors, must thus be accepted. Using an alternative measure, it is shown that this result is not driven by and thus robust to potential window dressing and tokenism of board gender diversity by firms. The same finding is reported by e.g. Chen et al. (2016) and Bazel-Shoham et al. (2017) and supports the social identity theory stating that the presence of one single female director can change the decision making and consequently the acquisitiveness of firms.

This thesis has both academic and practical implications. First, as mentioned before, it expands the literature by being the first to study the relationship between board gender diversity and corporate acquisitiveness for firms in Europe. This is academically relevant since differences in for example the institutional quality, corporate governance regime or type of financial system between European and non-European countries might cause the relationship to be different as well. Therefore, the findings of this thesis contribute to a clearer understanding of the impact of female directors on the acquisitiveness of European firms. The second academic implication is that, next to the main results, it is tested whether the relationship between female board representation and corporate acquisition intensity differs between firms from European countries with binding, non-binding and no board gender quotas. These additional results contribute to the existing literature regarding the impact of board gender quotas on M&A activity, which to my knowledge has only been studied twice in a

relatively limited context: by Ahern and Dittmar (2012) for Norwegian firms and by Matsa and Miller (2013) for Scandinavian firms. With respect to practical implications, the findings of this thesis are relevant for all parties involved in the market of corporate control (M&As). These parties are predominantly companies, both acquirers and potential targets, but also legislators such as national governments. Examples of practical implications for these parties are provided in the introduction.

This thesis also has several limitations and shortcomings. Despite being already discussed in the method section, they are briefly summarized here including its cause and consequences. First, corporate acquisition intensity is measured by the number of announced, completed, pending and postponed acquisition deals a company makes within one year. This means that only accepted acquisition bids are taken into account and rejected bids are excluded. That is because the latter are usually not made public and hence its data is not available through Zephyr. Due to this shortcoming, the effect of interest is imperfectly measured since accepted acquisition bids do not just depend on the acquirer's (board) characteristics but often also on that of the target company. For instance when a firm completes relatively less acquisition deals, that could be due to a higher percentage of women on their board or due to e.g. target companies rejecting more offers. The former is the effect of interest, while the latter is a confounding bias which leads to both effects becoming indistinguishable.

Secondly, only publicly listed companies are incorporated in the sample and private/non-listed companies are excluded. In contrast to publicly listed companies, private companies usually do not publicly disclose information about their M&A activities, board information and financials since they are not obligated to do so through mandatory disclosure regulations. As a consequence, the required data of these companies is rarely available. Moreover, Eikon only contains data of publicly listed companies. For these reasons only publicly listed companies are examined, which limits the generalizability of this study. Also, this might lead to different results compared to studies that take private firms into account.

Thirdly, all regression analyses in this thesis use normal instead of robust standard errors because the negative binomial model does not support the latter. In contrast to robust standard errors, normal standard errors are biased when the data is heteroscedastic. This may be problematic as biased standard errors could lead to inaccurate t- and p-values, despite yielding unbiased coefficient estimates.

As a recommendation, future research could explore whether the negative effect of female board representation on corporate acquisitiveness is due to gender differences in overconfidence, risk-aversion or due to board diversity. Since this thesis does not measure either of these three potential causes directly and is thus unable to disentangle them, such research would provide a clearer and better understanding of why women in boardrooms lead to fewer acquisitions deals. Another recommendation for future studies is to solve and deal with the aforementioned limitations of this thesis. This means that they should try to measure corporate acquisitiveness by the number of acquisition bids rather than deals in order to rule out potential confounding biases and to better

capture the effect of interest. Levi et al. (2014) for example succeeds in this. Also, future studies should not solely examine publicly listed companies but also take private/non-listed companies into account. This would expand the generalizability of their results. Finally, further research could apply alternative statistical models such as the (zero-inflated) Poisson model or the zero-inflated negative binomial model and use robust or firm-clustered standard errors. This would enhance the robustness of the results.

6. Bibliography

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics, 94*(2), 291-309.

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: does gender matter? *Management Science, 58*(2), 219-236.

Ahern, K. R., & Dittmar, A. K. (2012). The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation. *The Quarterly Journal of Economics, 127*(1), 137-197.

Akbar, S., Kharabsheh, B., Poletti-Hughes, J., & Shah, S. Z. A. (2017). Board structure and corporate risk taking in the UK financial sector. *International Review of Financial Analysis, 50*, 101-110.

Allison, P. D. (2005). *Causal Inference with Panel Data*. Paper presented at the Annual Meeting of the American Sociological Association, August, Philadelphia, PA.

Ashforth, B. E., & Mael, F. (1989). Social identity theory and the organization. *The Academy of Management Review, 14*(1), 20-39.

Barber, B. M., & Odean, T. (2001). Boys will be boys: gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics*, *116*(1), 261-292.

Bazel-Shoham, O., Lee, S. M., Rivera, M. J., & Shoham, A. (2017). Impact of the female board members and gaps in linguistic gender marking on cross-border M&A. *Journal of World Business, 55*(2), 100909.

Billett, M., & Qian, Y. (2008). Are overconfident ceos born or made? evidence of self-attribution bias from frequent acquirers. *Management Science, 54*(6), 1037-1051.

Branscombe, N. R., Schmitt, M. T., & Harvey, R. D. (1999). Perceiving pervasive discrimination among African Americans: implications for group identification and well-being. *Journal of Personality and Social Psychology, 77*(1), 135-149.

Burgess, Z., & Tharenou, P. (2002). Women board directors: characteristics of the few. *Journal of Business Ethics*, *37*(1), 39-49.

Cameron, A. C., & Trivedi, P. K. (1998). *Regression Analysis of Count Data*. Cambridge, UK: Cambridge University Press.

Carter, D., Simkins, B., & Simpson, W. (2003). Corporate governance, board diversity, and firm value. *The Financial Review, 38*(1), 33-53.

Chen, G., Crossland, C., & Huang, S. (2016). Female board representation and corporate acquisition intensity. *Strategic Management Journal, 37*(2), 303-313.

Chen, L. H., Gramlich, J., & Houser, K. A. (2019). The effects of board gender diversity on a firm's risk strategies. *Accounting & Finance, 59*(2), 991-1031.

Cheng, S. (2008). Board size and the variability of corporate performance. *Journal of financial economics, 87*(1), 157-176.

Coles, J. L., Daniel, N. D., & Naveen, L. (2014). Co-opted boards. *The Review of Financial Studies, 27*(6), 1751-1796.

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature, 47*(2), 448-474.

Defrancq, C., Huyghebaert, N., & Luypaert, M. (2016). Influence of family ownership on the industry-diversifying nature of a firm's M&A strategy: empirical evidence from continental Europe. *Journal of Family Business Strategy, 7*(4), 210-226.

Di Giovanni, J. (2005). What drives capital flows? The case of cross-border M&A activity and financial deepening. *Journal of International Economics, 65*(1), 127-149.

Doukas, J., & Petmezas, D. (2007). Acquisitions, overconfident managers and self-attribution bias. *European Financial Management, 13*(3), 531-577.

Dowling, M., & Aribi, Z. A. (2013). Female directors and UK company acquisitiveness. *International Review of Financial Analysis, 29*, 79-86.

Duchin, R. (2010). Cash holdings and corporate diversification. *The Journal of Finance, 65*(3), 955-992.

Eckel, C. C., & Grossman, P. J. (2008). Men, women and risk aversion: experimental evidence. *Handbooks in Economics, 28*(1), 1061-1076.

Ely, R. J. (1995). The power in demography: Women's social constructions of gender identity at work. *Academy of Management Journal, 38*(3), 589-634.

Erhardt, N., Werbel, J., & Shrader, C. (2003). Board of director diversity and firm financial performance. *Corporate Governance: An International Review, 11*(2), 102-111.

European Institute for Gender Equality. (2020). *Gender Statistics Database*. Retrieved from: https://eige.europa.eu/gender-statistics/dgs/indicator/wmidm_bus_bus__wmid_comp_compbm

Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics, 43*(2), 153-193.

Farrell, K. A., & Hersch, P. L. (2005). Additions to corporate boards: the effect of gender. *Journal of Corporate Finance, 11*(1), 85-106.

Graham, J. R., Harvey, C. R., & Puri, M. (2013). Managerial attitudes and corporate actions. *Journal of Financial Economics, 109*(1), 103-121.

Haleblian, J., Devers, C. E., McNamara, G., Carpenter, M. A., & Davison, R. B. (2009). Taking stock of what we know about mergers and acquisitions: a review and research agenda. *Journal of Management, 35*(3), 469-502.

Harford, J. (1999). Corporate cash reserves and acquisitions. *The Journal of Finance, 54*(6), 1969-1997.

Harford, J. (2005). What drives merger waves? *Journal of Financial Economics, 77*(3), 529-560.

Heider, F. (1958). *The psychology of interpersonal relations.* New York, NY: Wiley.

Hewstone, M., Rubin, M., & Willis, H. (2002). Intergroup bias. *Annual Review of Psychology, 53*(1), 575-604.

Hogg, M. A. (2006). Social identity theory. In P. J. Burke (Ed.), *Contemporary Social Psychological Theories* (pp. 111-136). Stanford, CA: Stanford University Press.

Hogg, M.A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *The Academy of Management Review, 25*(1), 121-140.

Holt, C. A., & Laury, S. K. (2002). Risk aversion and incentive effects. *The American Economic Review, 92*(5), 1644-1655.

Hsiao, C. (2014). *Analysis of panel data*. Cambridge, UK: Cambridge University Press.

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics, 108*(3), 822-839.

Huse, M. (2008). Women directors and the 'black box' of board behavior. In S. Vinnicombe, V. Singh, R. J. Burke, D. Bilimoria, & M. Huse (Eds.), *Women on Corporate Boards of Directors: International Research and Practice* (pp. 140-151). Cheltenham, UK: Edward Elgar.

Hyun, H. J., & Kim, H. H. (2010). The determinants of cross-border M&As: the role of institutions and financial development in the gravity model. *World Economy, 33*(2), 292-310.

Jackson, S. E. (1992). Consequences of group composition for the interpersonal dynamics of strategic issue processing. In J. Dutton, A. Huff, & P. Shrivastava (Eds.), *Advances in Strategic Management* (pp. 345-382). (8th volume). Greenwich, CT: JAI Press.

Jensen, M. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review, 76*(2), 323-329.

Jensen, M. (1988). Takeovers: their causes and consequences. *The Journal of Economic Perspectives, 2*(1), 21-48.

Jensen-Vinstrup, M., Rigamonti, D., & Wulff, J. (2018). European cross-border acquisitions: long-run stock returns and firm characteristics. *Journal of Multinational Financial Management, 47-48,* 31-45.

Joecks, J., Pull, K., & Vetter, K. (2013). Gender diversity in the boardroom and firm performance: what exactly constitutes a "critical mass?". *Journal of Business Ethics, 118*(1), 61-72.

Johnson, D. D. P., McDermott, R., Barrett, E. S., Cowden, J., Wrangham, R., McIntyre, M. H., Rosen, S. P. (2006). Overconfidence in war games: Experimental evidence on expectations, aggression, gender and testosterone. *Proceedings of the Royal Society B: Biological Sciences, 273*(1600), 2513-2520.

Jovanovic, B., & Rousseau, P. (2002). The q-theory of mergers. *American Economic Review, 92*(2), 198-204.

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263-291.

Kanter, R. M. (1977a). *Men and women of the organization* (pp. 206-242). New York, NY: Basic Books.

Kanter, R. M. (1977b). Some effects of proportions on group life: Skewed sex ratios and responses to token women. *American Journal of Sociology, 82*(5), 965-990.

Kim, D., & Starks, L. (2016). Gender diversity on corporate boards: Do women contribute unique skills? *The American Economic Review, 106*(5), 267-271.

Kolasinski, A., & Li, X. (2013). Can strong boards and trading their own firm's stock help ceos make better decisions? evidence from acquisitions by overconfident ceos. *The Journal of Financial and Quantitative Analysis, 48*(4), 1173-1206.

Konrad, A. M., & Kramer, V. (2006). How many women do boards need? *Harvard Business Review, 84*(12), 22-24.

Konrad, A. M., Kramer, V., & Erkut, S. (2008). Critical mass: The impact of three or more women on corporate boards. *Organizational Dynamics, 37*(2), 145-164.

Krishnan, G., & Parsons, L. (2008). Getting to the bottom line: An exploration of gender and earnings quality. *Journal of Business Ethics, 78*(1-2), 65-76.

Levi, M., Li, K., & Zhang, F. (2010). Deal or No Deal: Hormones and the Mergers and Acquisitions Game. *Management Science, 56*(9), 1462-1483.

Levi, M., Li, K., & Zhang, F. (2014). Director gender and mergers and acquisitions. *Journal of Corporate Finance, 28*, 185-200.

Lundeberg, M. A., Fox, P. W., & Punćcohaŕ, J. (1994). Highly confident but wrong: Gender differences and similarities in confidence judgments. *Journal of Educational Psychology, 86*(1), 114-121.

Malmendier, U., & Tate, G. (2005). Ceo overconfidence and corporate investment. *Journal of Finance, 60*(6), 2661-2700.

Malmendier, U., & Tate, G. (2008). Who makes acquisitions? ceo overconfidence and the market's reaction. *Journal of Financial Economics, 89*(1), 20-43.

Matsa, D. A., & Miller, A. R. (2013). A Female Style in Corporate Leadership? Evidence from Quotas. *American Economic Journal: Applied Economics, 5*(3), 136-169.

Milliken, F. J., & Martins, L. L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review, 21*(2), 402-433.

Morck, R., Shleifer, A., & Vishny, R. (1990). Do Managerial Objectives Drive Bad Acquisitions? *The Journal of Finance, 45*(1), 31-48.

Moschieri, C., & Campa, J. (2009). The European M&A Industry: A Market in the Process of Construction. *Academy of Management Perspectives, 23*(4), 71-87.

Netter, J., Stegemoller, M., & Wintoki, M. (2011). Implications of data screens on merger and acquisition analysis: A large sample study of mergers and acquisitions from 1992 to 2009. *Review of Financial Studies, 24*(7), 2317-2357.

O'Brien, R. M. (2007). A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Quality & Quantity, 41*(5), 673-690.

Peterson, R. S., & Nemeth, C. J. (1996). Focus versus flexibility: majority and minority influence can both improve performance. *Personality and Social Psychology Bulletin, 22*(1), 14-23.

Plaksina, Y., Gallagher, L., & Dowling, M. (2019). Ceo social status and m&a decision making. *International Review of Financial Analysis, 64*, 282-300.

Rossi, S., & Volpin, P. (2004). Cross-country determinants of mergers and acquisitions. *Journal of Financial Economics, 74*(2), 277-304.

Sapienza, P., Zingales, L., & Maestripieri, D. (2009). Gender differences in financial risk aversion and career choices are affected by testosterone. *Proceedings of the National Academy of Sciences, 106*(36), 15268-15273.

Schubert, R., Brown, M., Gysler, M., & Brachinger, H. W. (1999). Financial decision-making: are women really more risk-averse? *The American Economic Review, 89*(2), 381-385.

Shi, W., Hoskisson, R. E., & Zhang, Y. A. (2017). Independent director death and CEO acquisitiveness: Build an empire or pursue a quiet life?. *Strategic Management Journal, 38*(3), 780-792.

Spencer Stuart. (2019). *2019 U.S. Spencer Stuart Board Index*. Retrieved from: https://www.spencerstuart.com/-/media/2019/ssbi-2019/us_board_index_2019.pdf

Tajfel, H. (1978). The achievement of group differentiation. In H. Tajfel (Ed.), *Differentiation between social groups: Studies in the social psychology of intergroup relations* (pp. 77-98). London, UK: Academic Press.

Tajfel, H. (1982). *Social identity and intergroup relations.* Cambridge, England: University Press.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin, & S. Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33-47). Monterey, CA: Brooks/Cole.

Tajfel, H., & Turner, J. C. (1985). The social identity theory of intergroup behavior. In S. Worchel, & W. G. Austin (Eds.), *Psychology of intergroup relations* (pp. 7-24). (2nd edition). Chicago, IL: Nelson-Hall.

Torchia, M., Calabrò, A., & Huse, M. (2011). Women directors on corporate boards: From tokenism to critical mass. *Journal of Business Ethics, 102*(2), 299-317.

Turner, J. C. (1975). Social comparison and social identity: Some prospects for intergroup behaviour. *European Journal of Social Psychology, 5*(1), 1-34.

Turner, J. C. (1996). Henri Tajfel: an introduction. In W. P. Robinson (Ed.), *Social Groups and Identities: Developing the Legacy of Henri Tajfel* (pp. 1-23). Oxford, UK: Butterworth-Heinemann.

Westphal, J. D., & Milton, L. P. (2000). How experience and network ties affect the influence of demographic minorities on corporate boards. *Administrative Science Quarterly*, *45*(2), 366-398.

Wiersema, M. F., & Bantel, K. A. (1992). Top management team demography and corporate strategic change. *Academy of Management Journal*, *35*(1), 91-121.

Wildschut, T., & Insko, C. A. (2007). Explanations of interindividual-intergroup discontinuity: a review of the evidence. *European Review of Social Psychology*, *18*(1), 175-211.

Witt, J. L. B. (1994). The Gendered Division of Labor in Parental Caretaking: Biology or Socialization?. *The Journal of Women & Aging*, *6*(1-2), 65-89.

Yim, S. (2013). The acquisitiveness of youth: CEO age and acquisition behavior. *Journal of financial economics*, *108*(1), 250-273.

Yzerbyt, V., & Demoulin, S. (2010). Intergroup relations. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of Social Psychology* (pp. 1024-1083). (2nd volume, 5th edition). New York, NY: Wiley.

Zhou, X. (2001). Understanding the determinants of managerial ownership and the link between ownership and performance: comment. *Journal of Financial Economics*, *62*(3), 559-571.

7. Appendix

7.1 Overview of all countries and number of companies per country included in the sample

Country name	ISO 3166-1 alpha-2 code	ISO 3166-1 alpha-3 code	Frequency	Percentage	Cumulative
Austria	AT	AUT	32	1.13	1.13
Belgium	BE	BEL	60	2.13	3.26
Croatia	HR	HRV	2	0.07	3.33
Cyprus	CY	CYP	12	0.43	3.76
Czech Republic	CZ	CZE	3	0.11	3.86
Denmark	DK	DNK	43	1.52	5.39
Faroe Islands	FO	FRO	1	0.04	5.42
Finland	FI	FIN	75	2.66	8.08
France	FR	FRA	330	11.70	19.78
Germany	DE	DEU	283	10.03	29.81
Gibraltar	GI	GIB	4	0.14	29.95
Greece	GR	GRC	20	0.71	30.66
Guernsey	GG	GGY	15	0.53	31.19
Hungary	HU	HUN	5	0.18	31.37
Iceland	IS	ISL	4	0.14	31.51
Ireland	IE	IRL	70	2.48	34.00
Isle Of Man	IM	IMN	14	0.50	34.49
Italy	IT	ITA	114	4.04	38.53
Jersey	JE	JEY	46	1.63	40.16
Luxembourg	LU	LUX	27	0.96	41.12
Malta	MT	MLT	3	0.11	41.23
Monaco	MC	MCO	1	0.04	41.26
Netherlands	NL	NLD	100	3.54	44.81
Norway	NO	NOR	86	3.05	47.86
Poland	PL	POL	31	1.10	48.95
Portugal	PT	PRT	29	1.03	49.98
Romania	RO	ROU	2	0.07	50.05
Russian Federation	RU	RUS	44	1.56	51.61
Slovakia	SK	SVK	1	0.04	51.65
Slovenia	SI	SVN	1	0.04	51.68
Spain	ES	ESP	93	3.30	54.98
Sweden	SE	SWE	153	5.42	60.40
Switzerland	CH	CHE	128	4.54	64.94
Turkey	TR	TUR	20	0.71	65.65
United Kingdom	GB	GBR	969	34.35	100.00
Total			**2,821**	**100.00**	
Other	N/A	N/A	27	0.96	N/A

7.2 Durbin-Wu-Hausman tests of the main study

Variables	(1) CAI	(2) CAI	(3) CAI
Chi-squared (11)	222.44	249.96	168.03
Prob>Chi-squared	0.0000	0.0000	0.0000

Column: (1) testing of hypotheses 1 with FBR as independent variable, (2) testing of hypothesis 2 with FBR_30PLUS as independent variable and (3) testing of hypothesis 3 with FD_1PLUS as independent variable. All specifications are using the negative binomial model with CAI as dependent variable and include all control variables except the fixed effects.

7.3 Durbin-Wu-Hausman tests of the robustness checks

Variables	(1) CAI_EXCL_DV	(2) CAI_EXCL_STAKE	(3) CAI_EXCL_BOTH	(4) NAFA	(5) CAI	(6) CAI	(7) CAI
Chi-squared (11)	97.45	168.03	104.20	253.28	252.42	231.17	221.92
Prob>Chi-squared	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Column: (1–3) excluding certain deals, (4) using NAFA instead of CAI as an alternative measure of corporate acquisition intensity, (5) using TW_FBR instead of FBR as an alternative measure of female board representation, (6) using FD_3PLUS instead of FBR_30PLUS, as an alternative measure of the critical mass theory and (7) FD_2PLUS instead of FD_1PLUS as an alternative measure of the social identity theory. All specifications are using the negative binomial model except for the fourth specification which uses a standard random/fixed effects model. Each specification furthermore includes the relevant dependent or independent variables as well as all control variables except the fixed effects.

7.4 Overview dependent variables used as robustness checks per year

Year	Average CAI_EXCL_DV	Sum CAI_EXCL_DV	Average CAI_EXCL_STAKE	Sum CAI_EXCL_STAKE	Average CAI_EXCL_BOTH	Sum CAI_EXCL_BOTH
1999	0.2364	74	1.0186	383	0.1787	52
2000	0.3212	150	1.0055	544	0.2831	124
2001	0.2113	123	0.6999	485	0.1691	93
2002	0.1987	126	0.6829	519	0.1457	87
2003	0.1476	107	0.6342	553	0.1332	91
2004	0.1922	162	0.7131	716	0.1902	152
2005	0.2616	265	0.7712	944	0.2526	244
2006	0.2834	316	0.7957	1,079	0.2762	293
2007	0.2760	342	0.8343	1,269	0.2772	326
2008	0.1753	224	0.6865	1,082	0.1697	205
2009	0.1143	144	0.3784	585	0.1043	124
2010	0.1467	187	0.5351	839	0.1364	164
2011	0.1565	211	0.5860	991	0.1481	188
2012	0.1266	173	0.5281	912	0.1163	149
2013	0.1215	169	0.4698	832	0.1140	149

2014	0.1703	250	0.5412	1,025	0.1647	227
2015	0.1742	273	0.5454	1,142	0.1741	257
2016	0.1402	222	0.4998	1,066	0.1408	210
2017	0.1338	220	0.5160	1,175	0.1320	205
2018	0.1557	255	0.4743	1,081	0.1548	239
2019	0.1174	192	0.3849	888	0.1133	175
Total		**4,185**		**18,110**		**3,754**

7.5 Overview board gender quotas per country

Country	**Type of board gender quota**	**Quota %**	**Passage year**
Austria	Non-binding quota	n.s.	2008
Belgium	Binding quota	33%	2011
”	Non-binding quota	30%	2008
Croatia	No quota	n.a.	n.a.
Cyprus	No quota	n.a.	n.a.
Czech Republic	No quota	n.a.	n.a.
Denmark	Non-binding quota	n.s.	2010
Faroe Islands	No quota	n.a.	n.a.
Finland	Non-binding quota	n.s.	2008
France	Binding quota	40%	2011
”	Non-binding quota	20%	2010
Germany	Binding quota	30%	2015
”	Non-binding quota	n.s.	2010
Gibraltar	No quota	n.a.	n.a.
Greece	No quota	n.a.	n.a.
Guernsey	No quota	n.a.	n.a.
Hungary	No quota	n.a.	n.a.
Iceland	Non-binding quota	40%	2010
Ireland	No quota	n.a.	n.a.
Isle Of Man	No quota	n.a.	n.a.
Italy	Binding quota	33%	2011
Jersey	No quota	n.a.	n.a.
Luxembourg	Non-binding quota	n.s.	2009
Malta	No quota	n.a.	n.a.
Monaco	No quota	n.a.	n.a.
Netherlands	Non-binding quota	n.s.	2008
Norway	Binding quota	40%	2003
Poland	Non-binding quota	n.s.	2010
Portugal	Binding quota	20%	2017
Romania	No quota	n.a.	n.a.
Russian Federation	No quota	n.a.	n.a.
Slovakia	No quota	n.a.	n.a.
Slovenia	No quota	n.a.	n.a.
Spain	Non-binding quota	40%	2007
Sweden	Non-binding quota	n.s.	2010
Switzerland	No quota	n.a.	n.a.

Turkey	No quota	n.a.	n.a.
United Kingdom	Non-binding quota	n.s.	2012

Note that Belgium, France and Germany first adopted a non-binding gender quota before adopting a binding gender quota.

7.6 Overview coefficients and significance levels of variable of interest in different analyses

Regression column	**Description**	**Standard analysis with random effects and no winsorizing**	**Analysis with fixed effects and no winsorizing**	**Analysis with random effects and winsorizing**
	Main analysis			
1	FBR	-0.0963	0.1551	-0.1297
2	FBR_30PLUS	-0.0054	0.0330	-0.0108
3	FD_1PLUS	-0.0464*	-0.0184	-0.0457*
	Alternative dependent variable			
4	EXCL_DV	-0.5607***	-0.1487	-0.5831***
5	EXCL_STAKE	-0.0218	0.2129*	-0.0581
6	EXCL_BOTH	-0.5533***	-0.1507	n.a.
7	NAFA	-0.0060	-0.0014	-0.0066**
	Alternative independent variable			
8	TW_FBR	-0.2913***	-0.2793**	-0.2640**
9	FD_3PLUS	-0.0321	0.0064	-0.0213
10	FD_2PLUS	-0.0590**	-0.0143	-0.0504*
	Quota sub-samples			
11	Binding	-0.2934	-0.5225*	-0.3765
12	Non-binding	-0.0113	0.1816	-0.1860
13	(Non-)binding	-0.0636	-0.0737	-0.1964
14	No quota	-0.1695	0.3030	-0.1342
	Country sub-samples			
15	France	0.0059	0.3299	0.0373
16	Germany	-0.4169	-0.7567	-0.1020
17	UK	-0.2493	0.0552	-0.3876**
18	All 3 together	-0.1482	0.1332	-0.1975

The independent variable (of interest) in column 4-7 and 11-18 is FBR, while the independent variable of column 1-3 and 8-10 is the one in the description. All three analyses include the control variables and use the negative binomial model except the 7th specification. The fixed effects analyses excludes industry and country fixed effects as these are time-invariant variables and would hence be dropped from the regressions. The other two analyses include all three fixed effects: year, industry and country. The data of each variable in the winsorizing analyses is winsorized at the 1% level in both tails, except the dummies FBR_30PLUS, FD1_PLUS, FD_3PLUS, FD_2PLUS and DUAL. Asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.