Board of Directors Diversity and Interlock on acquisition performance

A quantitative research to the influence of Board diversity and Board interlock on acquisition performance

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I hereby present my final piece of work as a master student Strategic Management.

Abstract

Although much research has examined post-acquisition activities to improve acquisition performance, the pre-acquisition activities are relatively less known. In this thesis, the influence of board nationality and gender diversity, together with board interlock, were studied in connection to acquisition performance, building on the upper echelon theory of Hambrick and Mason (1984). I theorized that diversity in nationality and gender, and an interlock between the boards of the acquiring and target firm, lead to improved acquisition performance, due to a diversity in mentality, knowledge, resources and inside information. To obtain results, an event study has been executed among European firms with completed acquisition within the period 2007-2019. A multiple regression analysis examined the effect of the board of directors on the cumulative abnormal return, the measure used for acquisition performance. Almost no regression models were significant, hence no relationship has been found between board nationality and gender diversity and board interlock on cumulative abnormal returns. A robustness check did show a significant effect on board gender diversity, but due to the inconsistency of the significance further research is required. Yet, theoretical and practical contributions were made towards the upper echelon theory and acquisition research.

Keywords: board diversity, board interlock, acquisition performance, upper echelon theory

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1. Introduction

It is generally agreed upon that acquisitions are an important activity for organizational growth, innovation, and diversification (Datta & Grant, 1990; Bauer & Matzler, 2014; Vermeulen & Barkema, 2001; Jemison & Sitkin, 1986). Acquisitions happen on a frequent basis, however, this is not a direct indication that it is a successful instrument to achieve business goals. In fact, poor results are frequently attributed to acquisitions, e.g. through a decrease in share value of the acquirer. (Bauer & Matzler, 2014; Cording, Christmann & Bourgeois, 2002; Datta & Grant, 1990; Muehlfeld, Rao Sahib & Van Witteloostuijn, 2012; Schmidt & Fowler, 1990) Acquisition failure is predominantly attributed to poor post-acquisition integration (Bauer & Matzler, 2014; Datta & Grant, 1990; Vermeulen & Barkema, 2001). However, based on the literature, relatively little attention has been paid to how pre-acquisition activities can influence acquisition success, even though it is known that such factors (e.g. strategic fit, cultural fit) can be substantial in explaining acquisition success (Jemison & Sitkin, 1986; Bauer & Matzler, 2014; Kim & Finkelstein, 2009).

Before the acquisition is finalized, the board of directors (hereinafter referred to: BoD) has to vote to approve the acquisition of the target firm (Man Zhang & Greve, 2019; BW 2:107a), stating their influence on the acquisition process through their monitoring function (Boivie, Bednar, Aguilera & Andrus, 2016; Forbes & Milliken, 1999). This research has its focus on board diversity and board interlock, and its influence on acquisition performance. Board diversity incorporates the monitoring function the directors have, while board interlock includes the resource providing function of the BoD (Boivie et al., 2016; Hillman & Dalziel, 2003; Mizruchi, 1996). Through the acquisition decisions, the directors make, the outcome of the firm and the acquisition may be influenced. The upper echelon theory (Hambrick & Mason, 1984) does elaborate on this: "*organizational outcomes-strategic choices and performance levels-are partially predicted by managerial background characteristics*" (p. 193)[1]. Hambrick (2007) adds to this that executives' experiences, values, and personalities influence organizational decisions. Building on the upper echelon theory, a diversity in nationality and gender may lead to different backgrounds and personality trades that could lead to advantages in comparison to homogenous boards. Different nationalities may bring differences in cultural upbringing, which may influence their decision-making. A diversity of nationalities could

[1] The theory is originally focused on top management teams instead of the BoD, however, the upper echelon theory has been applied to the BoD in earlier research, also by comparing it to 'supra top management teams' (Post & Byron, 2015; Finkelstein, Hambrick & Cannella, 2009; Man Zhang & Greve, 2019).

contribute to more well-though decision-making through differences in characteristics, such as different entrepreneurial personality trades and risk-seeking behaviour. The same can be said for gender, as males and females may be brought up differently and have contrasting preferences, such as long-term thinking and risk-seeking behaviour. Capabilities, resources, experiences and external connections of the BoD which might contribute to acquisition performance (Martin, Gözübüyük & Becerra, 2015; Boeker & Goodstein, 1991; Feldman, 2016).

Directors also contribute to firm decisions through board interlocks (Beckman & Haunschild, 2002; Hillman, 2005). The term board interlock refers to "*when a person is on the board of directors of two or more corporations, providing a link or interlock between them*" (Fich & White, 2005, p.175). This thesis focuses on board interlocks between the acquiring firm and the target firm and whether it has influence on acquisition performance. Since acquisition performance depends on different factors (e.g. lack of information about the target firm concerning strategic fit, synergy or cultural fit) than firm performance, this thesis covers a new research area, not yet explored in connection to board diversity and interlock. It could be expected that board interlock can result in conflict of interest, of which, for example, Dutch law requires the directors with conflict of interest to withhold from the vote (BW 2:129). Yet, a director is not obligated to resign from the board or to abstain from voting, and break contact with the other directors, still having the opportunity to influence the judgments of the voting directors about the subject that creates conflict of interest. Through this, board interlock could have an influence on acquisition performance.

In an effort to examine the effects, if present, of diversity and interlock within the BoD on the acquisition performance, an event study has been performed. The relevance of this research is filling the knowledge gap of whether there is a link between the BoD diversity, board interlock, and acquisition performance since no research to date has investigated these effects. This knowledge gap is relevant in the sense that it provides organizational researchers with a theoretical contribution, they have long been interested in (Zona et al., 2018), to board diversity by providing a better understanding of the linkage with acquisition performance by building on Hambrick's Upper Echelon Theory (Hambrick & Mason, 1984). Moreover, as effects may present themselves, it could provide substantiation of board diversity and interlock influencing acquisition performance, creating the perception it could influence other firm performances as well. Furthermore, the aim of this research is to enrichen the knowledge about board interlock as a pre-acquisition activity, which may appear to be a variable of interest for acquisitions success or future research. The practical contribution is found within pre-

acquisition acts that could improve the process and the performance through understanding the contribution of a diverse BoD. Furthermore, examining whether board diversity can be expected to influence corporate outcomes, such as acquisition performance, is an increasing worldwide trend and thus making it a contemporary topic. It is important to emphasize that within literature often is referred to mergers and acquisitions combined, but the research objective and the data are solely focused on acquisitions due to the measurability of the influence of the BoD in the acquiring firm.

1.1. Research objective and question

Against this background, the objective of this master thesis was examining the influence of the diversity within the BoD on the acquisition performance of the acquiring firm. The BoD that was considered is of the acquiring firm. Thus, the following research question of this master thesis was formulated as:

What are the influences of the Board of Directors nationality diversity, gender diversity and Board Interlock of the acquiring firm on the acquisition performance?

The dependent variable is acquisition performance, which will measure if an acquisition was successful. I define acquisition performance in terms of cumulative abnormal return in the event window surrounding the announcement. The independent variable is the board diversity, which consists of diversity in gender and nationality within this thesis, and board interlock.

This report is divided into different chapters, with the following chapter providing theory relevant to the research subject and hypotheses resulting from this theoretical review. Subsequently, a chapter concerning the methodology. This chapter discusses the context of the research and the approach to gathering the data and analysing it. The chapter ‘results’ gives an explanation of the found results after conducting the research. After the results, the limitations of the research and implications for future research are presented. Finally, the discussion and conclusion of the research are given.

2. Conceptual development

In this chapter the main definitions are specified and remarks from scientific research about these definitions are shared. Furthermore, light is shed upon the influences, advantages and disadvantages of the definitions Upper Echelon Theory, board of directors, board diversity, board interlock, and acquisition performance.

2.1. An Upper Echelon Theory perspective

Why do organizations act the way they do? This is a subject of interest within Hambrick and Mason (1984) as they try to explain this question through the Upper Echelon Theory (hereinafter referred to: UET), which states that: "[*strategic choices and performance levels] are partially predicted by managerial background characteristics*" (p. 193). Hambrick and Mason (1984) presumed that UET includes mechanisms that connect experience to the outcomes of organizations, as the behaviour, background and characteristics of top managers influences their decision making (Man Zhang & Greve, 2019). More than a decade later, Knight et al. (1999) proved Hambrick's UET by finding a relationship between demographic characteristics of the top management and the strategic knowledge they possess. Hambrick and Mason (1984) include the concept of bounded rationality, which applies to situations decision makers face that go beyond their comprehension, using their comprehension, experience and characteristics to create a 'bounded rationality' perception of the situation. To create this perception, the UET connects past experiences of the managers to organizational outcomes, causing managers to re-use knowledge to make present decisions (Man Zhang & Greve, 2019). A point of attention is that the UET views the organization as a reflection of its top managers (Hambrick & Mason, 1984), dissimilar to this research's target group. However, recent strategic management literature applies UET to the BoD research (Man Zhang & Greve, 2019; Post & Byron, 2015; Finkelstein et al., 2009). Man Zhang and Greve (2019) mark that the UET is particularly important for the BoD; of the directors it is expected that they take their experiences into account when advising the organization about significant decisions. Further findings of Man Zhang and Greve (2019) ratify the application of the UET on the BoD, as their results show "*that the effects of board composition are stronger above the aspiration level, as one would expect from the greater board discretion when the firm has high performance*" (p. 56), which is consistent with UET. Post and Byron (2015) found that gender diversity "*positively contributes to board-decision making*" (p. 31) as a consequence of the cognitive frames of

female directors. This finding provides a connection between BoD and UET, considering it influences (the advice given to) an organization and its outcomes.

2.2. **Board of directors**

The BoD is an administrative body making its frequent reappearance within literature. The board's responsibilities were defined by Boivie et al. (2016), dividing it into the 'monitoring' and 'resource provision' role. While monitoring, directors play a distinct role in monitoring the management board on behalf of the shareholders (Hillman & Dalziel, 2003; Hillman et al., 2000; Feldman, 2016; Pearce & Zahra, 1992) reducing 'agency costs' from management pursuing self-interest at the expense of profit maximization (Hillman & Dalziel, 2003), also known as the governance function. In this role the directors attempt to align the interests of management and shareholders (Tacheva & Huse, 2006), through monitoring the firm and its leaders on subjects such as "*approving strategic actions, assessing managerial effort and performance"* (Boivie et al., 2016, p. 7). The second responsibility, providing resources, covers "*providing access to resources like advice, counsel, knowledge of external events, and/or influence with external stakeholders*" (Boivie et al., 2016, p. 9). The BoD is regarded for its highly-valued knowledge and expertise, aiding the process of defining and evaluating the firm's strategic decisions (Tacheva & Huse, 2006).

The term 'board of directors' refers to both one-tier and two-tier boards, in which the one-tier board executive directors are allowed to take place within the BoD, with a CEO that often acts as the chairman as well (Nadolska & Barkema, 2014). The two-tier board model consists of executive directors, also known as the management board, and nonexecutive directors, also named supervisory board. The supervisory board enables the directors to supervise and advise the executive management on behalf of the company, its stakeholders and shareholders (Nadolska & Barkema, 2014). These 'outside' or 'independent' directors are mostly recruited because of experience, knowledge and skills and because of their capability of resisting self-interested efforts through influencing board decisions, unlike some 'inside' directors (Pearce & Zahra, 1992; Kosnik, 1987). Within literature there is a consensus to be found, stating that an effective board has a higher proportion of independent directors (Zahra & Pearce, 1989; Dalton, Daily, Ellstrand & Johnson, 1998). According to Nadolska and Barkema (2014), a disadvantage of the two-tier structure is the dependence towards the top management for information about key decisions, such as acquisitions.

The supervisory board only meets several times a year and therefor it could be argued that their role in this process is insignificant. However, the entire BoD (executive and

nonexecutive) needs to give approval about larger investments and acquisitions (Man Zhang & Greve, 2019; Nadolska & Barkema, 2014), and has a positive influence on firm performance and acquisition decisions through their advising/service role (Deutsch, Keil & Laamanen, 2007; Westphal, 1999). Pfeffer (1972) explains the institutional role of the directors, which is connecting the firm to the environment and enabling access to resources. Given explanations of the BoD influences emphasize the contingencies on which the BoDs influence depend. The influence can be affected by the CEO and other executives, since the CEO may have appointed directors (Hermalin & Weisbach, 1998), the CEO is the chairman and dominates the board (Zajac & Westphal, 1996), or through the connection between the directors and the executives (Westphal, 1999).

To continue on the BoD influence, their influence is also researched and appointed on firm performance by several sources (Hillman, 2005; Dalton et al., 1998; Hillman & Dalziel, 2003; Pearce & Zahra, 1992; Miller & Del Carmen Triana, 2009), occasionally taking board diversity and interlock into account, and emphasizing the role of directors and the benefits that can be gained from it. The diversity and interlock bring a variety of valuable ideas, resources and experiences to the table, that may account for the positive relationship towards firm performance (Miller & Del Carman Triana, 2009; Kosnik, 1990; Adams & Funk, 2012). These statements align with the UET, as the background characteristics account for organizational outcomes and performance levels (Hambrick & Mason, 1984).

The influence towards firm performance can be considered as board capital (Hillman & Dalziel, 2003), in which a director provides both human capital, such as expertise and experience, and relational capital, referring to the (inter-organizational-)network, like social capital, such as the resources available within the network of the director (Haynes & Hillman, 2010). The board capital construct consists of 'capital breadth' and 'capital depth' (Haynes & Hillman, 2010). In which breadth includes "*the portfolio of directors' functional, occupational, social, professional experiences and extra-industry ties and captures the heterogeneity of the directors' human and social capital"* (Haynes & Hillman, 2010, p. 1145). Depth refers to the extent in which directors are in the firm's industry through board interlock, their experience in the industry, and "*the sum of the directors' intra-industry human and social capital*" (Haynes & Hillman, 2010, p. 1145). Board capital can be placed within another task of the BoD, namely providing resources (Hillman & Dalziel, 2003; Hillman, Cannella & Paetzold, 2000). The resources and information directors provide to the organization, is linked to improving firm performance.

2.3. **Board diversity**

Board diversity, as well as diversity in general, is a reoccurring topic within both academic research and society. Board diversity "*relates to board composition and the varied combination of attributes, characteristics and expertise contributed by individual directors in relation to board process and decision-making*" (Van der Walt & Ingley, 2003, p.219). The main focus of board diversity lies within observable, demographic characteristics as gender and ethnic diversity (Daily & Dalton, 2003).

Prior research within UET and other literature assumes that diversity between group members will generate a social barrier that will decrease the influence of minorities within the group on group decision making (Westphal & Milton, 2000). Positive remarks claim the opposite, as firms take advantage of the different perspectives and broader-mindedness of the directors caused by board diversity (Kosnik, 1987; Goodstein, Gautum & Boeker, 1994). These positive remarks flow from the advantage that heterogeneous groups, i.e. people with different backgrounds, may result in different points of view, creating a broader range of ideas and information (Adams & Funk, 2012; Miller & Del Carmen Triana, 2009). Hillman, Cannella and Harris (2002) add to this by stating that demographic differences of directors may influence strategic choices of the firm due to the 'divergent and unique views' due to differences in the board capital.

Despite the previous positive remarks, Goodstein et al. (1994) have counterarguments concerning the foregoing. Multiple authors described the diversity as an asset for firm performance, but Goodstein et al. (1994) claims that the board diversity results in an increase in conflict and a higher difficulty in creating cohesion due to the broader-mindedness. The conflicting ideas would result in delayed strategic decision making and action, and that diverse boards have a lower chance of initiating strategic change (Goodstein et al., 1994). However, Miller and Del Carmen Triana (2009) refutes the argument through the statement that homogeneous groups are hindered because of the high level of cohesion, explaining it induces pressures towards conformity upon the group members.

This research has its focus on board nationality diversity and board gender diversity. The reason that I decided to use these demographic characteristics in terms of relationship orientation (Jackson, 1992) is that these are characteristics that cannot be influenced or developed. Other characteristics, like age or education (can) change over time and influence the directors, whereas gender and nationality are set at birth. I suggest that through these demographic characteristics, the effects of constant, uninfluenceable effects can be studied.

2.4. **Board interlock**

Within strategic management literature there is abundant proof that board decision-making is influenced by experiences from board interlock (Man Zhang & Greve, 2019). A board interlock[2] is present "*when a person is on the board of directors of two or more corporations, providing a link or interlock between them*" (Fich & White, 2005, p. 175), and provides firms with the experience and the network of the directors (Deutsch et al., 2007). Studies suggest that board interlocks provide information about industry trends, strategies and practices, which lead to firms mimicking other firms of the director's portfolio (Deutsch et al., 2007; Kimberly and Evanisko, 1981). Scholars make a differentiation between inter- and intra-industry interlocks (Crossan & Apaydin, 2010; Haynes & Hillman, 2010), in which intra-industry refers to an interlock within the same industry, and inter-industry to an interlock outside the industry of the firm.

The consequences of board interlock on a firm are mostly considered in the light of the agency theory and the resource dependence theory (Boyd, Haynes & Zona, 2011). These theories, however, have opposing views of the influence of board interlock on performance outcomes (Zona et al., 2018). The agency theory claims that executives will strive to maximize personal profits instead of the shareholder's profits, creating agency costs and lower performance (Jensen & Meckling, 1976; Hillman & Dalziel, 2003; Hillman et al., 2000; Feldman, 2016; Pearce & Zahra, 1992). The resource dependency theory is more externally focused, in which board interlocks are a mean to critical resources (Hart, 1995; Hillman & Dalziel, 2003; Mizruchi, 1996; Zona et al., 2018). These two theories also described significantly different effects of board interlock on firm performance; within the agency theory literature, board interlock results in lower firm performance while the resource dependence theory literature describes an increase in firm performance due to board interlock.

Board interlock is a frequently returning subject within literature, in which the influence on different factors is analysed, such as the prior research of Mizruchi (1996), in which he claims that strategies and practices are dispersed through directors of interlocking BoDs. Connelly, Johnson, Tihanyi and Ellstrand (2011) researched this claim and proved that the BoD both support and hinder this process of diffusion. Board interlocks have a profound influence on the firm's decisions they are included in, such as acquisitions, premiums and CEO salaries (Beckman & Haunschild, 2002; Davis, 1991; Haunschild, 1994).

[2] As Heemskerk (2007) states, an interlock is not present if a director is also on the BoD within the same holding company.

Furthermore, board interlock grants the interlocking directors the opportunity to view the behaviour of other firms and take this knowledge to diminish the uncertainty related to strategic actions they plan to commence (Borgatti & Foster, 2003; Mizruchi, 1996). This can be achieved through three approaches. Firstly, interlocking enables directors to observe and identify strategies, possibilities and new ideas via participation in decision-making processes within other firms (Mizruchi, 1996; Connelly et al., 2011). Secondly, the first approach enables the opportunity to view the efficacy of the strategies of other firms (Strang & Soule, 1998). And lastly, the uncertainty in connection to strategies can be reduced through the information board interlocks provide (Beckman, Haunschild & Philips, 2004). The research of Kimberly and Evanisko (1981) adds to this by suggesting organizations mimic changes of other firms within their own firms, if the changes were seen to be successful within other firms.

Negative effects of board interlock can be found within 'overboarded' directors, which are directors that serve on "*too many boards*" (Harris & Shimizu, 2004, p. 115). Lipton and Lorsch (1992) give a consequence of 'overboarding': "*Based on our experience, the most widely shared problem directors have is lack of time to carry out their duties*" (p. 64). They claim that the performance of directors is negatively influenced by the amount of BoDs they serve. These directors are suspected to lack in fields such as monitoring, and increase the CEO power (Fich & White, 2003; Finkelstein, 1992; Harris & Shimizu, 2004). Accordingly, it is expected that time constraints due to overboarding reduce these directors' capabilities, such as providing advice (Harris & Shimizu, 2004). However, the research by Harris and Shimizu (2004) found results contradicting their hypothesis, overboarded directors have a favourable effect on abnormal returns and on key strategic decisions.

2.5. **Acquisition performance**

An acquisition is a strategic decision of a firm to take over another firm, and is a frequently used instrument for organizational growth, innovation, and diversification (Datta & Grant, 1990; Bauer & Matzler, 2014; Vermeulen & Barkema, 2001). Studies suggest that acquisitions derive from a managerial desire to self-serving goals, such as power or salary (Baumol, 1967; Williamson, 1963; Marris, 1964), or when executives are mimicking the acquisition activities of an interlocked firm (Haunschild, 1993). The latter has a further explanation by Harris and Shimizu (2004), as they state that: an acquisition is an event that requires close examination by the board.

However, acquisitions often fail to meet expectations (Haunschild, 1993; Datta & Grant, 1990) and are on average not profitable for the acquiring firm (Fowler & Schmidt, 1988). The

acquisition performance is studied, and several factors are given, such as the previously stated post-acquisition integration (Bauer & Matzler, 2014; Datta & Grant, 1990; Vermeulen & Barkema, 2001). The integration is particularly beneficial when compatibilities are reached on areas such as management styles, and organizational structures and cultures (Datta, 1991; Lubatkin, 1987; Marks as cited in Datta, 1991). Merging the firms together after the acquisition reduces costs in areas such as production, distribution and marketing (Howell, 1970).

Furthermore, literature also includes pre-acquisition activities that influence acquisition performance. Strategic fit is a factor frequently named (e.g. Jemison & Sitkin, 1986; Bauer & Matzler, 2014; Kim & Finkelstein, 2009), and embraces the ease in which two firms can be incorporated into one (Datta, 1991) and the degree in which the target firm contributes to the acquirer' strategy and financial and nonfinancial goals (Jemison & Sitkin, 1986). In successful acquisitions, the strategic fit is explained as the acquirer's analysis of how the strategic and economic factors of the target firm contribute to their firm by creating synergy and value (Jemison & Sitkin, 1986; Harrison, Hitt, Hoskisson & Ireland, 1991).

3. Hypothesis development

This chapter elaborates on the different hypotheses, which were composed on the basis of literature. Below the hypothesis, figure 1 drafts the conceptual model. The concepts within the boxes are the independent and dependent variables, which will be measured and tested.

3.1. **Board nationality diversity**

Studies have suggested that the BoD affects acquisition behaviour through influencing acquisition decisions (Deutsch, Keil & Laamanen, 2007). The BoD is a broad concept, and thus specified in earlier studies into board composition (e.g. Dalton et al., 1998; Pearce & Zahra, 1992; Hillman, 2005), and board diversity (e.g. Miller & Del Carmen Triana, 2009; Post & Byron, 2015; Adams & Funk, 2012). The premise that board diversity among directors will influence the acquisition performance is coherent with UET. As the preceding text states: the UET connects past experiences to organizational outcomes. With board diversity, a diversity of cognitive frames will emerge, which enables the chance of favourable organizational outcomes when these directors "*engage in mutual and collective interaction [and] share information, resources, and decisions"* (Hambrick, 2007, p. 336). Thus, a diversity of directors will bring a diversity of experiences to the table. This diversity enables different perspectives of a situation, creating a more inclusive representation of it. The diversity within UET is based on characteristics, which can be separated in psychological and observable characteristics. Due to the difficulty in capturing a director's cognitive frame, the observable characteristics of directors, such as race, age or gender, are often used in research relating to UET (Dezsö & Ross, 2012; Krishnan & Park, 2005; Post & Byron, 2015). Subsequently, Hambrick and Mason (1984) show the consequence of these characteristics on strategic choices, such as acquisition, and on performance.

Different forms of diversity are described to influence firm performance. Nationality is a less known area, as it is not as often studied. Delis, Gaganis, Hasan and Pasiouras (2016) studied nationality diversity as "*deep-rooted differences in cultural, institutional, social, psychological, physiological, and other traits that cannot be captured by other recently measured indices of diversity*" (p. 231). Moreover, cultural patterns are deeply rooted within a person, making them unlikely to considerably change through the following experiences (Hofstede & Hofstede as cited in Nielsen & Nielsen, 2013). This deep-rooted effect has a continuing impact on the perception and responses to strategic issues (Schneider & De Meyer, 1991). The results of Delis et al. (2016) proved that a firm's returns and value is positively

related to board nationality diversity. However, they did not study acquisition performance or other firm performance factors, but it is hypothesized that this type of diversity also has a positive influence on acquisition performance, due to the within-board differences discussed by Delis et al. (2016). However, Blau (as cited in Richard, Barnett, Dwyer & Chadwick, 2004) states that groups that are culturally heterogeneous groups are more prone to conflicts and communication problems than homogeneous groups; if members share worldviews, perceptions and a similar culture, they tend to communicate more with each other (Earley & Mosakowski, 2000). Communication problems and conflicts may have an unfavourable effect on the acquisition performance, as the process to agreement is more time consuming. However, homogenous groups that tend to communicate more with each other are more likely to easily agree, and through that, forget to touch upon possible points of issue. As an acquisition is a substantial decision, mapping all possible risks and opportunities is valuable.

On the other hand, Nielsen and Nielsen (2013) state the contradicting when applying it to top team managers, due to the lack of research on board nationality diversity, these results are generalized to the BoD and further studied in this research. Nielsen and Nielsen (2013) claim nationality diversity will lead to a significant positive effect on firm performance, due to better filtering, interpretation and processing of relevant information and experiences. As stated earlier, with a diversity of directors, a diversity of past experiences is brought to the table. These past experiences and diversity within the board contributes to mapping all the opportunities and risk, making well thought-out decisions about the acquisition and the targets. Hambrick, Davison, Snell and Snow (1998) confirm the previous stated, as they describe that multinational teams aim to appease their diverse experiences, engaging in thorough conversations, acknowledge alternatives and the creation of ideas. Nielsen and Nielsen (2013) view complex task solving and the generation of innovative solutions as a result. Also, Watson, Kumar, and Michaelsen (1993) proved that nationality diverse groups exceeded homogeneous groups considering perspectives and alternative generation. "*Since strategic decision making is a task characterized by high complexity, uncertainty, and lack of routines, nationality diversity is likely to improve the comprehensiveness and quality of [TMT] strategic decisions, which in turn influence firm performance*" (Nielsen & Nielsen, 2013, p. 375).

In summary, as Richard et al. (2004) stated, the relationship between cultural diversity and performance is complex and thus, this research area needs further research. Nationality diversity is expected to lead to a broader range of perspectives due to cultural differences, which lead to well-considered decision-making that increases the quality of the board decision and thus the chance of acquisition success. Furthermore, fit is of importance for a successful

acquisition performance and nationality heterogeneity can contribute to this in the case of non-domestic acquisitions. If a director has the same nationality or a similar culture as the target company, the director could judge whether it would lead to a cultural fit with the acquirer's culture. As mentioned earlier, cultural fit is a determent for acquisition performance. Based on the previous statements, I expect board nationality diversity to cause better acquisition performance, as a result of more thorough discussions of relevant information, leading to well-thought decision making and knowledge on a possible cultural fit between the acquirer and the target. The preceding leads to the following hypothesis:

Hypothesis 1: Board nationality diversity is positively related to acquisition performance.

3.2. **Board gender diversity**

When specifying on gender, Adams and Funk (2012) studied that board gender diversity may cause different behaviour than homogeneous boards due to the different priorities between male and female directors. Besides the priorities, Post and Byron (2015) claim that a difference in cognitive frames result in enlarging the knowledge of the BoD. Another remarkable difference between male and female directors is that the social network of females and minorities tend to be more diverse (Ibarra, 1992; Ibarra, 1995); these groups are more probable to uphold weaker ties with a broader range of contacts than white males. These weaker ties have their value in critical information for firm success (Granovetter, 1985). Moreover, female directors value interdependence more, stimulating cohesion among the directors (Post & Byron, 2015), sustaining that social network as well. Further positive effects caused by board gender diversity can be found within innovation, firm value, and the executing of the two 'main' responsibilities: monitoring and strategic involvement (Miller & Del Carmen Triana, 2009; Post & Byron, 2015).

In contrast to the previous statements, Post and Byron (2015) refer to other studies that mention decreased firm performance due to the presence of female directors (Darmadi, 2011; Minguez-Vera & Martin, 2011; Bøhren & Strøm, 2010) and studies that did not find the relationship between female board representation and firm performance (Carter, D'Souza, Simkins, & Simpson, 2010; Shrader, Blackburn, & Iles, 1997). Other studies made the statement that females have a more risk-averse nature (Adams & Funk, 2012; Eckel and Grossman, 2008), which actually is not stated to be a disadvantage (Bloom & Milkovich, 1998; Graham, Harvey & Puri, 2010; Walls & Dyer, 1996) and could be seen as an advantage to long-

term firm performance due to less harming activities. However, the data of Adams and Funk (2012) does not show an increase in risk aversion caused by female directors.

This research desires to address the effects of board diversity on acquisition performance, if present. The effects of board diversity have not yet been examined in regard to acquisition performance, but multiple studies investigating board diversity did find a positive influence for gender diversity in relation to firm performance (Miller & Del Carmen Triana, 2009; Carter, Simkins & Simpson, 2003; Erhardt, Werbel & Shrader, 2003). When connecting gender diversity to acquisition performance, a previously mentioned statement should be repeated: *an acquisition is an event that requires close examination by the board* (Harris & Shimizu, 2004). Due to the diversity, in this case gender, different perspectives are brought to the decision process. Research by Jackson (1992) found that heterogeneous groups lead to more creative idea generation, and Hambrick, Cho and Chen (1996) found that heterogeneous boards' actions and responses were of ample importance. These positive remarks combined with differences in gender characteristics trades lead to a broader variation of perspectives. Since an acquisition is a strategic decision, these perspectives may slow down decision-making, but also leads to well-considered decisions. As females and males may prioritize different aspects, it is likely that more risks and advantages will be highlighted. Adding to this that females are more likely to have a diverse network and maintain an extensive range of contacts which provide information, possibly from targets. This knowledge contributes to the acquisition performance since the BoD has knowledge prior to negotiations and acquisition about the target firm and how it could increase the performance. I propose, while considering UET and the previous arguments, that gender diversity on BoD affects the decision-making process due to the different cognitive frames and their maintained social network, and thus influencing the acquisition performance positively. Thus, following the preceding set of reasoning, I hypothesize that:

Hypothesis 2: Board gender diversity is positively related to acquisition performance.

3.3. **Board interlock**

Researchers have an enduring interest in the influence of board interlocks on varies firm outcomes, in particularly firm performance (Zona et al., 2018). The board interlock can be either a direct interlock, in which a director sits on the board of both firms, or an indirect interlock, in which a director of each firms also sits on the board of third firm (Wheelen, Hunger, Hoffman & Bamford, 2014). As stated earlier, board interlock is often studied in the

light of the resource dependence theory and the agency theory. The resource dependence theorists maintain that board interlocks improve performance, yet agency theorist argue the opposite.

The board is connecting a firm and its environment (Pfeffer, 1981), through providing necessary resources for the firm (Boeker & Goodstein, 1991). The social context in which a firm and its managers and directors exist result in social embeddedness (Granovetter, 1985), which affects several activities, such as acquisitions (Haunschild, 1993). The impact of social embeddedness on organizational behaviour is studied and proved the importance of board interlocks towards social embeddedness (Haunschild, 1993; Mizruchi, 1996; Davis, 1991). Haunschild (1993) describes the importance of the social networks, which are acquired through the board interlocks, as the networks are a source of acquisition models and information. Roa, Davis and Ward (2000) continue by stating: "*Interlocks play a crucial role in this process of information acquisition and interpretation*" (p.276). Also, the study by McDonald, Westphal & Graebner (2008) found prove that previous experience with acquisitions by outside directors, which may be obtained by an interlock with a third firm, is positively influencing acquisition performance. This is also confirmed by Kroll, Walters and Wright (2008): *"boards comprising experienced directors should be in a superior position to monitor and advise the management of acquiring enterprises"* (p. 364). Furthermore, Harris and Shimizu (2004) add that directors also provide knowledge besides resources. Mizruchi (1996) even argues that these interlocks are used as a communication mechanism. Through board interlock, acquisition-related information could be communicated, making them 'better' informed about acquisition information than firms with smaller interlock amounts (Haunschild, 1993). Harris and Shimizu (2004) add to this that directors may obtain experiences from other boards, which makes them efficient decision makers. They continue by claiming that directors enhance acquisition performance through their knowledge, which could include acquisition knowledge. Due to their experiences from other boards, patterns and issues may be recognized, helping in acquisition decisions (Harris & Shimizu, 2004). Furthermore, relational capital adds value to the resources and knowledge directors bring to the table, referring to the network of the director (Haynes & Hillman, 2010). These networks contribute to the gathering of information about industry trends, strategies and practices, and which leads to firms mimicking other firms of the director's portfolio (Deutsch et al., 2007; Kimberly and Evanisko, 1981). Also, the interlocking directors have another important resource within the network as they might have personal contact with managers that have the power concerning the firm's acquisitions (Haunschild, 1993).

Within literature, board interlock has varying outcomes concerning firm performance, with authors having opposing views. Yet, the board interlock provides experience, knowledge, resources and networks that could contribute to the acquisition performance. I expect that beforehand knowledge about a firm might increase the chance of an acquisition success. Against this background, the hypothesis that motivates this subject is:

Hypothesis 3: Board interlock is positively related to acquisition performance.

3.4. **Conceptual model**

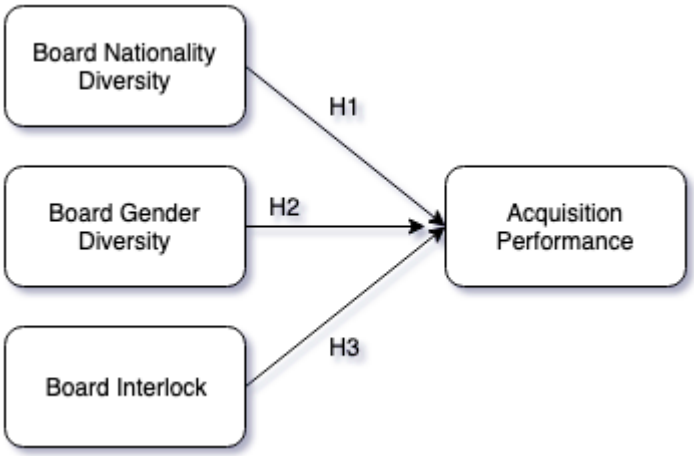

Figure 1 Conceptual model

4. Methodology

The aim of this thesis was to study the relation between board diversity and board interlock on acquisition performance. This chapter elaborates on the sample, data collection, research method and the used variables.

Sample

The choice of study method is quantitative research. Since an event study can be applied when the reaction to an announcement is measured in terms of share prices (Kabir & Roosenboom, 2003), this study opted for an event study using historical data which was derived from databases provided by the Radboud university. To test the hypotheses, three databases were required. The database BoardEx provides the organizational information, concerning the board diversity and board interlock. The database Zephyr provided information regarding acquisitions and general information about the firms. Finally Eikon was used to derive the total assets, and the cumulative abnormal return in order to measure acquisition performance. These databases were combined into one dataset and subsequently statistically analysed by using Stata. The data considers all listed firms that executed an acquisition and underwent an acquisition, of which both firms should be originated from within Europe. This requirement is set since BoardEx only contains information of BoDs within Europe. The dataset covered the time period 2007 – 2019 including domestic and non-domestic European acquisitions of firms of which the acquiring firm have either a one or two-tier board. The time period of 2007-2019 is determined on the information Zephyr provided, as no acquisitions were found outside this time period. Working solely with two-tier boards excludes the management boards influence and thus controls for board independency, as it focusses on the supervisory board (Nadolska & Barkema, 2014). Due to the fact the resulting dataset was of insufficient size, the effects of the different board structures were considered as a control variable.

The dataset used is substantially decreased due to missing data. At first the dataset contained 48,453 acquisition observations, which were derived from Zephyr. These observations include acquisitions within Europe in the year 2007 till 2019. From these observations 44,916 were deleted due to missing information. When linking the data to BoardEx, firstly a large amount was deleted since the company information was not present. This brought the observations down to 1,291 observations. From these observations, 1,223 could be used for board gender diversity, deleting 68 observations, 182 could be used for board nationality diversity, deleting 1109 observations, and 119 could be used for board interlock,

deleting 1172 observations. The high amount of deleted observations for board nationality diversity is the result of missing information about the nationality from one or more directors. If one case was missing, the whole board was excluded from the analysis. For board interlock the high amount of deleted observations is due to a substantial amount of target companies that were not included in the BoardEx file, making comparisons not possible. Therefor the missing information from some observations were manually searched on the internet, using Bloomberg, LinkedIn, company pages etc. If the missing data was not found on these platforms, assumptions were made based on their educational history, work history, spoken tongue and current residence. High amounts of missing values in the target firms resulted in a low amount of interlock observations. This resulted in a lower increase in the number of observations for board interlock compared to board nationality diversity. The eventual observations came down to 303 observations for board nationality diversity, 1226 for board gender diversity and 150 observations for board interlock.

Event studies

To obtain the acquisition performance, an event study is executed. This method measures the effect of an unanticipated event (e.g. acquisition announcement) on stock prices (McWilliams & Siegel, 1997), as stock prices are considered not to be prone to manipulation (Bromiley, Govekar & Marcus, 1988; McWilliams & Siegel, 1997). Through this, the effect of the event can be determined via the usage of (cumulative) abnormal return. The stock prices are viewed as an indication of the firm's value (McWilliams & Siegel, 1997). In order to calculate the abnormal returns, the market value (estimation window) is compared to the event window, which is a set amount of days prior and past the event.

The event study method is based on several assumptions. Firstly, it is assumed that markets are efficient (Bromiley, Govekar & Marcus, 1988; McWilliams & Siegel, 1997). This refers to the accessibility of stock prices that integrated all important information to all market traders. This results in the event delivering *new* information, of which the influence therefor could be examined through changes in stock prices. Secondly, unanticipated events, which refer to the market not having prior information on the event. The market traders obtain the information on the announcement day (McWilliams & Siegel, 1997). The third assumption concerns confounding effects (McWilliams & Siegel, 1997), which assumes that researchers have the ability to separate the effect of the measured event from other possible happening events. In other words, it is assumed that other events do not have confounding effects and do not influence the share prices.

However, critique on the method is also given. Firstly, McWilliams and Siegel (1997) point out that it is difficult to verify the moment in which the market traders were informed about the event. Furthermore, if the event window is long, controlling for confounding effects gets increasingly difficult (McWilliams & Siegel, 1997).

Dependent variable

Acquisition performance. Acquisition performance was measured via the stock prices cumulative abnormal return (CAR) in the time window around the acquisition announcement, displaying the market performance. Using CAR to measure acquisition performance has been used in previous studies in strategic research (Zaheer et al., 2010; Finkelstein & Haleblian, 2002; Singh & Montgomery, 1987). The CAR is the deviation between the expected return and the realized return of the organization, which is represented in the following formula (McWilliams & Siegel, 1997):

$$AR_{it} = R_{it} - (a_i + b_i R_{mt})$$

Here, AR_{it} is the abnormal return for firm *i* on day *t*. R_{it} is the actual return of firm *i* is on day *t*. R_{mt} is the rate of the market portfolio of stock on day *t*. Lastly, a_i and b_i are the parameters acquired from a regression of R_{it} on R_{mt} within the estimation period (McWilliams & Siegel, 1997). Continuingly, a standardized abnormal return (hereinafter referred to: SAR) is calculated and then cumulated over the days within the event window (*k*). To calculate the CAR, an event study is performed of which the estimation window prior to the event is 200 days, which starts 50 days prior to the event window. The event window (k) is 10 days prior and 10 days post-event. The CAR can then be calculated as follows (McWilliams & Siegel, 1997):

$$CAR_i = (1/k^{0.5}) \sum_{t=1}^{k} SAR_{it}$$

One of the difficulties of measuring CAR as a result of an announcement (as used in event studies like this) is that it does not measure the acquisition performance precisely, but a reflection of ‘a priori’ expectations (Datta, 1991; Montgomery & Wilson, 1986). However,

using abnormal returns as a ‘perfect’ predictor for future returns is frequently used, as mentioned by Abarbanell and Bushee (1998).

Independent variables

Board diversity. In this research, board diversity is targeting board gender diversity and board nationality diversity. Harrison and Klein (2007) make a distinction between three different kinds of diversity, namely separation, variety and disparity. As this research views nationality diversity of influence due to the culture the directors are brought up in, variety is the most relevant kind of diversity. The most suitable definition of according to Harrison and Klein (2007) would be variety diversity, recommending Blau’s index as a measure.

However, Blau’s index is more fixated on the influence of larger groups and hardly shows the difference in effect of less represented nationalities, of which an elaborate explanation is given in Appendix I. With the forgoing into consideration, a more suitable formula for the purpose of this research is the Shannon-Wiener-Index, which does show the effects of smaller represented nationalities:

$$\Delta_{Sh} = -\sum_{i=1}^{k} f_i \cdot \log f_i$$

Here, Δ_{Sh} is the Shannon-Wiener index, k is the number of nationalities and f_i is the relative frequency of the ith nationality.

The second diversity, board gender diversity, is measured by calculating the percentage of diversity by comparing the largest gender group to all the directors (Richard et al., 2004; Cumming, Leung & Rui, 2015), resulting in:

$$Board\ gender\ diversity = p/n$$

In this calculation, *p* is the amount of the biggest gender group within the board, and *n* is the total amount of directors. This outcome results into percentages from 0% if only one gender is represented, to 50% if the board consists of an equal distribution of female and male directors.

Board interlock. Board interlock has been acknowledged as a suitable measure to research the organizational implications of interfirm relationships (Mizruchi, 1996). This

research looks at the effect of board interlock in which a director is represented in the board of both the acquiring firm and the target firm, which is determined by checking for each director if he/she holds a position as director at the target company at the time of the acquisition. It is measured by the presence or absence of an interlock between the acquiring and target firm, with 0 being the absence of an interlock and 1 being the presence of an interlock.

Through this, the interlock data is aggregated per acquisition. An interlock is not present when the director holds positions in multiple BoDs within one holding company (Heemskerk, 2007), or when the firms in which the director holds position have the same parent firm. Thus those acquisitions were excluded.

Control variables

This research controls for the following variables, as they make their frequent appearance in the literature concerning either firm or acquisition performance:

Board size. Board size has been defined as the total number of directors on a BoD. Goodstein et al. (1994) stated that lack of participation and a declined motivation are a result of low coherence within larger boards, which are obstacles influencing the decision-making process. The size of the boards were compared in relation to the acquisition performance.

Prior firm performance of the acquiring firm. If the acquiring firm is already successful pre-acquisition, it is more likely that the acquisitions are valued high (Morck, Shleifer & Vishny, 1990). Firm performance may also have its influence on strategic board decision, as the directors may become hubris (Roll as cited in Finkelstein & Haleblian, 2002). This may result in an 'unsuccessful' acquisition. The firm's return on assets (hereinafter referred to: RoA) applied as a measure for the firm performance.

Industry relatedness. The market may value industry related acquisition as a result of possible synergies between the acquiring firm and the target firm (Finkelstein & Haleblian, 2002). Due to these synergies, industry relatedness was expected to influence acquisition performance (Singh & Montgomery, 1987). As Morck et al. (1990) do, Standard Industrial Classification (hereinafter referred to: SIC) codes were used to measure the relatedness of the acquirer's and target's industries. In this study, the acquirer and target firm are related if the acquirer and target firm used the same two-digit SIC code, and thus there is an intra-industry interlock. Unrelated acquisitions were coded '0' and related acquisitions were coded '1'.

Prior acquisition experience. Previous strategic management studies (Fowler & Schmidt, 1989; Bruton, Oviatt & White, 1994) suggest that firms with prior acquisition experience use their gained experience to improve following acquisitions. Furthermore, Kroll et al. (2008) suggest that directors with prior board experience with acquisitions are related to higher returns, which indicates that directors with experience positively contribute to strategic decision making for firm considering an acquisition or in an acquisition. Therefore, I control for prior acquisition experience among directors. The time period in which the experience was considered is 5 years before acquisition until the actual acquisition being studied (Kroll et al., 2008). Within this time period, knowledge depreciation influences the memory of the forgoing acquisitions. Empirical research differs on the depreciation per sector, but usually a general depreciation rate of 15 percent for knowledge stock per year has been applied (Hall, 1990; Hussinger, 2012). Thus, the 5 years prior to an acquisition were examined on other acquisitions and then accumulated. An acquisition within the same year was rewarded as 1.00 experience and the year prior was rewarded with .85 experience etc.

Board structure. As this research uses the data of both one- and two-tiered acquirers, the board independence has been controlled for (Chen, Crossland & Huang, 2016). Brick, Palmon and Wald (2006) found that CEO presence on the board, like in a one-tier board structure, decreases the independence of the board. As this control variable is nominal, a dummy variable was used. The control variable 'Board structure' is '0' for all the one-tier boards, and '1' for all the two-tier boards.

Analysis

For this study, the method of data analysis is a moderated multiple regression. Multiple regression analysis examines the relationship between the independent variables (predictors) 'board gender diversity', 'board nationality diversity' and 'board interlock' to the dependent variable 'acquisition performance'. This results in the following formula that is used for multiple regression:

$$Acquisition\ performance_i = \beta_0 + \beta_1 board\ gender\ diversity_i$$
$$+ \beta_2 board\ nationality\ diversity_i + \beta_3 board\ interlock_i + \beta_4 CV_i + \varepsilon_i$$

As the regression analysis has the assumption that the variables have to be of metric level (Field, 2013; Hair, Black, Babin & Anderson, 2014). Since board interlock is of non-metric level, it was therefore transformed into a dummy variable. For the analysis it was checked if the assumptions are met, if not, transformations were applied.

Data preparation

Prior to performing multiple regression, missing values, metric level of the variables and underlying assumptions were checked as follows:

Missing values. Firstly, the data was checked for missing values. The total dataset exists of 1291 observations, creating a high number of missing values for certain variables. Hair et al. (2010) mention a rule of thumb of <10% missing values for each individual case of observation. If the missing value exceed this percentage, it should be excluded from the study. However, when looking at the missing values of this study (Appendix II), board nationality diversity (76.5%) and board interlock (88.38%) show to exceed this rule of thumb excessively. Nevertheless, these variables were included in the analysis since they were important variables and still enough variables were present to perform a regression analysis of considerable size. When gathering data, relative acquisition size was initially included as control variable, however, the missing data for this variable was 75.6%. Since relative acquisition size was a control variable, it was not as important as the independent variables, and thus excluded from the data. Relative acquisition size was initially controlled for as relatively large acquisitions have a higher likeliness of affecting abnormal returns for acquirers due to their size (Asquith, 1983; Finkelstein & Haleblian, 2002). It was measured by obtaining a ratio between the target's total assets and the acquirer's total assets (Haleblian, Kim & Rajagopalan, 2006). In the

robustness check relative size was included to examine the possible effects on acquisition performance.

Metric scale. Secondly, as a regression needs variables of metric scale, dummies were generated to meet this requirement. The categorical variables were board interlock, industry relatedness and board structure, which were all binary and transformed into a dummy variable.

Normality. To check if the assumption of normally distributed was violated, the skewness and kurtosis were checked (Appendix III) for all variables except the dummy variables using the Jarque-Bera test. In each case the Null hypothesis of no normality was rejected. Also, prior to the Jarque-Bera test, the CAR, board size, prior firm performance, acquisition experience and relative acquisition size underwent a log transformation after which improved skewness and kurtosis results were acquired. However, for multiple variables the log transformation resulted in a substantial increase in missing values, harming the number of observations, except for the board size variable. Therefore, the non-transformed data has been examined, and a robustness check was performed to check the data with the transformations incorporated. The regression has used all the original variables except for board size, since the logarithm of board size does not increase the amount of missing values. Therefore, the regression has used all original variables except for board size.

Linearity. The following assumption is linearity, which was checked via conducting a scatterplot (Appendix IV). Since board interlock is categorical, it cannot be checked for linearity. The scatterplots do not produce any apparent non-linear patterns, therefore this assumption was not violated and no additional transformations were performed.

Homoscedasticity. The data was tested for heteroscedasticity using the Breusch-pagan test. The Null-hypothesis of constant variance could not be rejected since p=.97, stating the data was homoscedastic. Furthermore, when composing a plot, no clear patterns were found, confirming the Breusch-Pagan test.

Multicollinearity. Lastly, the last assumption of multicollinearity was assessed through the use of the variance inflation factor (VIF). When the VIF value exceeds 10 or the 1/VIF value is lower than .10, the assumption of multicollinearity is not met. Appendix V displays the VIF values, indicating that none of the variables violate the assumption, thus no further procedures were applied.

5. Results

The chapter 'results' provides the outcome of the analyses. Firstly, the descriptive statistics and correlation matrix provide a summary of the dataset. Thereafter, the results of the regression with regarding to the hypotheses are discussed. Finally, the chapter is ended by providing a summary of the results.

5.1. **Descriptive statistics**

Table 1 provides the descriptive statistics and the correlations, demonstrating an overview of the dataset and an idea of the relationships between the dependent variable and the predictors. The descriptive statistics and correlation table (Table 1) includes the one dependent variable, 3 independent variables and 5 control variables.

Several remarks can be made in relation to the descriptive statistics in table 1. Firstly, the high variation in the number of observations was noticeable, resulting in fewer observations when all were combined. Furthermore, there was quite some variation for the dependent variable CAR and the prior performance, which has been expressed in ROA, and results in both variables showing a high SD. The mean for board nationality diversity was moderately low with 0.53, as the maximum nationality diversity was 1.64. The mean of board interlock comes down to 0.62, indicating the data consists of more interlocks than no interlocks. Furthermore, the range of board size seems small, but it should be taken into consideration that it is the logarithm of the original board size data.

The correlation table shows several significant correlations, which can have a strength of -1 till 1. All significant correlations, marked by an asterisk, show a weak relationship, as a correlation coefficient of ± 0.1 indicates a small effect, ±0.3 a medium effect, and ±0.5 a large effect (Field, 2013).

The matrix showed a significant positive effect between board nationality diversity and acquisition performance (CAR) (0.122, $p<.05$), and board gender diversity and acquisition performance (0.074, $p<.05$). This was consistent with the hypothesized effects and suggests a positive effect of multiple nationalities representation and gender diversity within the BoD. However, board gender diversity has a small correlation effect, indicating it only affects acquisition performance slightly. Board interlock shows no significant correlation (0.072, $p=.39$) towards acquisition performance.

Furthermore, several control variables seem to correlate with variables of the model. Board size has significant positive effects regarding board nationality diversity, board gender

diversity and board interlock. This could be expected as larger boards increase the chance of different nationalities, genders and overlay with other boards. Also, acquisition experience (0.119) and board structure (-0.164) correlate highly significantly solely with board gender diversity ($p<.001$).

The hypotheses tested predict the positive effect of board nationality and gender diversity, and board interlock on acquisition performance. Table 2 provides the results of the multiple regression of five regression models. The first model performed a regression solely between the dependent variables and the control variables, excluding the independent variables. The second model consists of a model showing the main effect board nationality diversity, followed by models three and four that demonstrate the other main effects. Finally, model five shows all the main effects combined.

5.2. The effect of board nationality diversity on acquisition performance

Starting with hypothesis one, a low significant positive relationship between board nationality diversity and acquisition performance was found ($p=.055$), claiming that a higher diversity of nationalities within the board slightly leads to a higher acquisition performance. However, this effect may not be interpreted as the regression model itself was not significant (p=.184). Consequently, no support or rejection for hypothesis 1 was found.

5.3. The effect of board gender diversity on acquisition performance

The third regression model provides the results of the regressions including board gender diversity on acquisition performance. The model displays a positive effect of the main effect on acquisition performance, with a low significant effect ($p=.08$). However, similar to hypothesis one, the regression model was insignificant ($p=.215$) meaning no support or rejection can be found for hypothesis 2 and the significant effects may not be interpreted.

Table 1
Descriptive statistics and correlation matrix

	Mean	Std. Dev	Min	Max	Obs	CAR	Nationality Diversity	Gender Diversity	Board Interlock	BoardSize	Prior performance	Industry relatedness	Acquisition Experience	Board Structure
CAR	.32	10.26	-84.02	133.68	1191	1								
Nationality Diversity	.53	.46	0	1.64	303	0.122*	1							
Gender Diversity	.22	.14	0	.5	1226	0.074*	-0.099	1						
Board Interlock	.62	.48	0	1	150	0.072	-0.098	0.027	1					
BoardSize	2.28	.42	0	3.47	1291	-0.053	0.114*	0.103**	0.227**	1				
Prior performance	4.82	18.93	-433.96	334.85	1187	0.007	0.037	-0.030	0.052	-0.009	1			
Industry relatedness	.52	.50	0	1	1291	0.014	0.012	-0.015	-0.027	-0.016	-0.015	1		
Acquisition Experience	.66	.79	0	4.15	1291	-0.006	0.097	0.118**	-0.096	0.099**	0.012	-0.062*	1	
Board Structure	.51	.61	0	1	1	-0.024	0.099	-0.189**	0.019	0.049	0.892	0.062*	-0.099**	1

*Significant: * p<.05, **p<0.01*

5.4. **The effect of board interlock on acquisition performance**

Finally, regression model 4 provides the results for the regression of board interlock on acquisition performance. Firstly, the independent variable board interlock has a positive effect on acquisition performance, but the effect was not significant effect (p=.69). In other words the results do not indicate that a board interlock between directors of the acquirer's firm and the target firm leads to a higher acquisition performance. Of the control variables board structure has a significant positive effect on CAR (p<.1). Nevertheless, like the previous hypotheses, this regression model was not significant (p=.827). Due to the insignificance also the effects in this regression model may not be interpreted, and no support nor rejection has been found for hypothesis 3.

5.5. **Robustness check**

To test the robustness of the results, I firstly executed a robustness check for the acquisition experience. Acquisition experience was altered with a depreciation rate of both 5% and 25%. However, both alterations did not lead to a significant effect in any of the regression models, hence still no support has been found for the hypotheses.

A robustness check was also executed through three additional regression models in order to confirm that the models stay insignificant, regardless of the inclusion of relative acquisition size and the logarithm transformed variables. The first additional model used the same variables as the regression model previously described but included relative acquisition size (Appendix VI). Unfortunately, the total assets data from Zephyr and Eikon were missing for a substantial amount of observations, resulting in a high number of missing values. However, as relative acquisition size is a frequently used control variable in strategic management research, it could be valuable to include it regardless of the missing values. After including the variable, some effects made remarkable shifts in model 1 of Appendix VI. At first, board size was a significant effect, but adding relative acquisition size into the model resulted in an insignificant effect (p=.446). On the contrary, industry relatedness did get low significant (p<.1), whereas it firstly was insignificant. However, all the models were still insignificant and therefore these effects may not be interpreted.

The second additional regression model included the logarithms of the variables CAR, prior firm performance and acquisition experience, but it excluded relative acquisition size due to the high amount of missing values. When checking the assumptions, it became clear that the

Table 2
Regression Models

Model (DV = CAR)	**1**		**2**		**3**		**4**		**5**	
	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value
Board nationality diversity			2.078 (1.079)	.055					3.668 (1.917)	.058
Board gender diversity					4.299 (2.453)	.080			9.068 (5.598)	.108
Board interlock							1.366 (1.559)	.383	1.712 (1.601)	.287
Board size	-1.599 (.750)	.033	-1.365 (1.131)	.228	-.3440755 (.2173638)	.037	-.516 (1.961)	.441	-3.531 (2.152)	.103
Prior firm performance	.001 (.016)	.964	-.023 (.017)	.162	-.000093 (.0945183)	.996	.032 (.057)	.572	.023 (.057)	.680
Industry relatedness	.072 (.624)	.908	.817 (1.003)	.416	-.0404552 (.1606109)	.985	-.230 (1.560)	.883	-.158 (1.583)	.921
Prior acquisition experience	-.298 (.384)	.437	.387 (.666)	.562	-.3131201 (.1494852)	.272	.602 (.992)	.545	.182 (1.008)	.857
Board structure	-.151 (.658)	.818	.659 (1.033)	.524	.0942791 (.1850997)	.918	1.550 (1.580)	.329	1.721 (1.633)	.294
Constant	4.383 (1.772)	.014	.687) (2.765)	.804	2.156287 (.563604)	.056	-.132 (4.879)	.978	1.132 (4.893)	.817
Observations	1024		226		965		139		132	
F	1.14		1.48		1.39		0.47		0.98	
p -value	0.336		0.184		0.215		0.827		0.458	
R^2	0.006		0.033		0.009		0.021		0.060	
Adjusted R^2	0.001		0.011		0.002		-0.023		-0.002	

data was heteroscedastic, unlike the untransformed data. When checking the plot, it becomes clear that the heteroscedasticity was not severe and due to the small number of observations for regression model 5 of Appendix VII (n=33), as the other models do show homoscedasticity. The robustness check of Appendix VII demonstrated a low significant model 1 ($p<.1$) with two significant effects. Firstly, board size showed a negative significant effect (-0.447, $p<.05$) on acquisition performance. Furthermore, within the same model also prior acquisition experience has a negative significant effect (-.286, $p<.1$) on acquisition performance. The other regression models of Appendix VII show no significance and could therefore not be interpreted.

Appendix VIII includes the regression models with the logarithm transformed variables, included relative acquisition size. A remark for these models is the low number of observations, due to a high amount of missing values. The analyses showed no significant regression models, which again causes that the significant effects may not be interpreted.

Finally, a robustness check has been executed with a shorter event window, as acquisition literature often applies an event window with 5 days prior to the event and 5 days after (Walter et al., 2007; Zollo & Meier, 2008). After checking all the assumptions, 4 regressions were executed, similar to the previous robustness check that controlled for transformed variables and the control variable relative acquisition size. The regression model without logarithm transformed variables, but with the relative acquisition size demonstrated a significant main effect and a significant regression model ($p<.1$). In this model (Appendix IX) board gender diversity was positively significant (8.479, $p<.05$) in relation to acquisition performance. This outcome, however, did not confirm the robustness of the analysis, but it did support hypothesis 2 as the change in data proved the relationship. The normal probability plot showed some deviation from the regression line, but no substantial deviation, assuming the 'normality of the residuals' assumption was met, and that this regression model was suitable to perform a linear regression. Therefore, it can be assumed that board gender diversity does influence the acquisition performance pre-acquisition.

In conclusion, the robustness checks demonstrated similar results as the regression analysis previously described. Regardless of transformed variables and the inclusion of relative acquisition size, the regression models maintained their insignificance.

5.6. **Summary**

In the foregoing paragraphs, the hypotheses were tested through the results of the regression analyses. Table 2 contains an overview of the regression models and their results, in which the different independent variables were examined in connection to acquisition performance (CAR).

Besides the hypothesis testing, all variables were included in the same regression model to test the connection to the dependent variable.

In summary, all hypotheses cannot be rejected nor confirmed due to the insignificance of the regression models. The results of an insignificant regression model may not be interpreted. Also, the significant effects that were found in some of the regression models may not be interpreted due to this reason. However, the robustness check did provide hypothesis 2 with a significant effect when diminishing the event window to ±5 days.

6. Discussion

6.1. Discussion

In this report, I hypothesized that the composition of the BoD had a positive relationship towards acquisition performance. I stated this assumption based on the upper echelon theory of Hambrick and Mason (1984), which refers to the influence of managerial backgrounds on organizational outcomes and strategic choices. The conclusion was that this research could not confirm nor reject hypotheses 1 and 2 due to insignificant regression models, indicating no relationship was present between board gender diversity and board nationality diversity. However, after the execution of the robustness check, hypothesis 2 did find support when applying an event window of ±5 days. Moreover, I expected that an interlock between the BoD of the acquirer and the target would result in a higher acquisition performance due to the 'inside knowledge' of the target. The analysis demonstrated insignificant regression models. Similar to the other hypotheses, no support nor rejection for the hypothesis was found.

6.1.1. Reflection on the results

The effect of board nationality diversity. Since nationality diversity was theorized to improve strategic decision making, considering perspectives and generating alternatives (Nielsen & Nielsen, 2013; Watson et al., 1993), there was reason to believe that nationality diversity within the BoD results in improved decision making towards acquisitions. Yet, earlier research found no connection between the two. This report found no significant relationship between board nationality diversity and acquisition performance.

The regression analysis provided results dissimilar to my prior expectations, as no effect has been found due to an insignificant regression model. Board nationality diversity did show positive effects on acquisition performance in the non-transformed regression analysis. This would imply that a higher diversity of nationalities within the board increases the decision making of the board towards acquisitions. Based on the premise of the UET, the choices that top managers make (directors in this report) influence the firm's outcomes. However, the regression analyses, including the robustness checks, were all insignificant, so no positive effect of nationality diversity towards acquisition performance was actually present. An explanation might be that nationality diversity does not necessarily influence the acquisition performance beforehand. It is plausible that different nationalities do not improve the evaluation of target firms, have an increased network or a broader range of experience that aid the process. A distinction in different nationalities could bring varying opinions and perceptions that could

contribute to the post-acquisition integration process, but as the results show, not to the pre-acquisition activities. Another explanation may be the dependent variable, as the stock market is not in possession of the same knowledge as the directors, the CAR may be based on different aspects than the approval for the acquisition of the BoD. The CAR is a frequently used measurement for acquisition performance. However, it is a predictor of future performance, and therefore does not necessarily prove acquisition performance.

In conclusion, the results might suggest that the influence of the BoD on the pre-acquisition process is smaller than theorized within the literature (Boivie et al., 2016; Man Zhang & Greve, 2019; Nadolska & Barkema, 2014). Monitoring and approving the target selection could possibly be less influential than expected. Also, the board's task of providing resources might be not nationality bound or noticeable by the stock market.

The effect of board gender diversity. Besides nationality diversity, this report also underlined the possible influence of gender diversity on acquisition performance. As literature suggested that board gender diversity relates positively to firm performance (Miller & Del Carmen Triana, 2009; Carter et al., 2003; Erhardt et al., 2003), this relationship was not found regarding acquisition performance. This could imply that, similar to nationality diversity, it does not influence the pre-acquisition process.

Board gender diversity shows a low significant result ($p<.1$) in the regression analysis. However, the results of all first robustness checks refute this significant effect. Also, as none of the regression models were significant, no relationship was found. The lack of a relationship between gender diversity and firm performance is confirmed by Carter et al. (2010) and Shrader et al. (1997). Carter et al. (2010) describe some board diversity efforts solely as "window dressing". He continues by stating "*that the culture of the firm is not conducive to their success as directors*" (p. 44), not allowing the female directors to make use of their capabilities due to work environmental constraints. Another possible explanation is similar to the nationality diversity, as the influence of the board on the pre-acquisition process is exaggerated within the literature. In this phase, the BoD provide resources (e.g. information and/or possible target firms) and monitor the management board on behalf of the shareholders. The results could imply that the advantages of gender diversity have no influence on the acquisition performance, conversely to what some authors imply. Furthermore, the lack of relationship could also lie with the same explanation of nationality diversity, the CAR. The stock market is not aware of the considerations of the directors to execute an acquisition with that particular target firm and

base their decisions to buy or sell their shares on other (more visible) aspects. Also, as mentioned previously, the CAR is a prediction of future performance and no certainty.

When executing the final robustness check with the smaller event window, a significant effect occurred for board gender diversity when the non-transformed variables were applied, and relative acquisition size was included. This implies that board gender diversity does influence acquisition performance, contradicting the previous results. A plausible explanation for the change in significance is the smaller time window that excludes more confounding effects than the larger event window. However, the other robustness checks did not show this significant result, which shows the lack of robustness of the analysis. Due to the inconsistency of the results, it cannot be indicated that board gender diversity does influence acquisition performance and thus lacks structural validity. A possible explanation is that the presence of the shortened event window contaminated the results. As the main effect was not significant in the other analyses, I still cannot support nor reject hypothesis 2 due to inconsistencies.

In conclusion, my results show that demographic characteristics, such as nationality and gender, might not be suitable measures for acquisition performance. This does not support the UET of Hambrick and Mason (1984), as the decisions of the directors may influence the pre-acquisition process, but it does not show in the results.

The effect of board interlock. The results of my board interlock analysis were not consistent with the hypothesized effect. These results imply that no relationship was present between board interlock and acquisition performance. These results do not contradict the literature, as no direct connection between board interlock and acquisition performance was made to my knowledge. However, based on the advantages of board interlock (e.g. resource provision and experience) it was a plausible relationship and therefore hypothesized.

Nevertheless, the BoD is in possession of knowledge of the target firm when an interlock is present. This information is still expected to be of great value, and thus the explanation for the lack of a relationship is found elsewhere. Firstly, it could be argued that board interlock does not improve the acquisition performance as it could result in conflicting interest between the management board and the board of directors. Board independency could prevent this conflict of interest and, through that, the influence on the director's opinions. However, this research controlled for board independency through board structure, which also showed no significant results in research model 4. Another plausible explanation was the dependent variable. The stock market might not be aware of the inside knowledge the interlocks provide, that could possibly enhance the chance of success of an acquisition.

6.1.2. Theoretical contributions

This study has several theoretical contributions. Firstly, it contributes to Hambrick and Mason's (1984) upper echelon theory. Through the results, insights are provided that demonstrate the lack of influence of the demographic characteristics of the BoD on acquisition performance. The nationality and gender diversity within the BoD revealed no relationship with the CAR, contradicting the essence of the UET, as it states: *"[strategic choices and performance levels] are partially predicted by managerial background characteristics*" (Hambrick & Mason, 1984, p. 193). Hambrick and Mason (1984) presumed that UET includes mechanisms that connect experience to the outcomes of organizations, as the behaviour, background and characteristics of top managers influence their decision making (Man Zhang & Greve, 2019). The results did not exhibit the previous effects, as no relationship was present at all. Thus, the upper echelon theory was not fully applicable in this case. As mentioned previously, the dependent variable is dependent on the stock market. However, the stock market is not aware of the considerations within the acquisition process, and thus bases their decisions on other aspects. The data does not show the eventual success of the acquisition as CAR is frequently used as a predictor. Moreover, the lack of relationship could be contributed to the fact that there simply was no relationship between the demographic characteristics, board interlock and acquisition performance. In the last case, the upper echelon theory is provided with new information of how fixed demographic characteristics influence strategic choices. Knight et al. (1999) proved Hambrick's UET by finding a relationship between demographic characteristics of the top management and the strategic knowledge they possess, but aside from Knight et al. (1999) little attention has been paid to the demographic characteristics in connection to the upper echelon theory. This research implies that fixed demographic characteristics do not influence pre-acquisition activities, and through that acquisition performance, but it does not exclude that fixed demographic characteristics could influence other strategic outcomes. In other words, my study contributes to the upper echelon theory by questioning its base premise, as my results showed that the demographic characteristics do not influence the acquisition performance.

Furthermore, I contribute to the literature regarding pre-acquisition activities that could improve the acquisition performance by presenting that board nationality diversity, board gender diversity, and board interlock are no suitable pre-acquisition activities. The data presented the literature with the knowledge that a board interlock between acquirer and target is not an uncommon phenomenon, even though it could result in a conflict of interest. To the best of my knowledge, board interlock specifically between acquirer and target has not been a

point of interest within prior research. This research confirms that it is no point of interest for pre-acquisition activities but could be fascinating towards different dependent variables within acquisition research. Finally, I contribute to acquisition literature regarding pre-acquisition activities. Acquisition literature mainly has its focus on post-acquisition activities and this research shines light upon the other activities. Unfortunately, no relationship has been found, but it still provides a contribution as these characteristics can be excluded for future acquisition research.

6.1.3. Practical implications

Aside from the theoretical implications, this study also provides practical implications. Firstly, this study demonstrates no relationships between board nationality and gender diversity on acquisition performance. The lack of relationship proves that organizations should not invest extra effort in finding diverse directors solely for an improvement in their acquisition decisions. However, this statement cannot be made with complete certainty, as measuring acquisition performance through the cumulative abnormal returns did not provide facts but predictions.

Furthermore, my findings provided information about the presence of board interlocks between acquirers and targets. As my data demonstrated that these interlocks were not uncommon, the acquirer should ensure that no conflict of interest could negatively influence the process.

This study indicates that no relationship was present. Investing in diverse boards and focusing on target companies that have a board interlock is not more profitable and therefore not advisable. Furthermore, as board interlocks are more frequent than I expected, it is advisable that acquirers keep this in mind to prevent conflict of interest that harm the acquisition process or the decision process for choosing target firms.

6.1.4. Limitations and opportunities for future research

While conducting this study and writing this thesis, several limitations revealed itself. Firstly, a frequently acknowledged limitation was the lack of sufficient data. Obtaining significant results about the hypotheses was not accomplished, possibly due to the small number of observations. The limited dataset was due to the merging of 3 databases, of which different information was missing. Resultant from the forgoing were the variables with the high missing values, respectively board nationality diversity, board interlock and relative acquisition size. The missing value percentage was of such magnitude, that the variables should be excluded from the study. Relative acquisition size was excluded from the dataset for that particular

reason, even though it was an important control variable, frequently mentioned in other acquisition studies. On the other hand, the independent variables were not removed due to their importance for this research. Keeping missing values can have a significant effect on the results from the data. It also prevented the use of the transformed variables and the inclusion of the relative acquisition size variable, as including those would extensively diminish the observations. The amount of observations has been enlarged manually, but that also brings limitations as the nationality of some directors was assumed on, based on their educational history, work history, spoken tongue, and their current and past residence. As this data collection is a human process, it is sensitive to mistakes and could therefore harm the reliability of the study. However, this was substantiated speculation and therefore any harm was minimized.

Another concern is focused towards the measurement of the dependent variable, cumulative abnormal return. The first remark towards CAR consists of the assumption that the market makes a 'prediction' of the success of an event through obtaining shares, that lead to abnormal returns. However, the stock prices are just an indication of the firm's value (McWilliams & Siegel, 1997), but no actual proof. Therefore, it could be disputed whether CAR was the right measure for acquisition performance or not. However, when measuring the acquisition performance at a certain time period after the completion of the acquisition, other measurement issues arise; when the acquisition performance is measured at a certain time period after the completion, other factors could have influenced the performance measure.

Furthermore, the use of a long event window should also be discussed, as it difficulty harmonizes with the assumption of market efficiency (McWilliams & Siegel, 1997). It must be noted that the test window of 21 days is not a 'long event window', but acquisition research often applies test windows of 11 days. The used event window is prone to influences of other events, such as leaked information about the acquisition and catches the whole acquisition process. The length of this event window was based on other acquisition studies (e.g. Chatterjee, Lubatkin, Schweiger & Weber, 1992; Meznar, Nigh & Kwok, 1994), and acquisition research reviewed by Kummer (n.d.) and to control for possible early awareness of the acquisition and possible revaluation (Chatterjee et al., 1992). Additionally, Brown and Warner (1980) have shown that short-window event studies do not significantly improve the CAR estimation. However, as acquisition literature more often use shorter event windows, a robustness check was executed, and a significant main effect presented itself. However, as the data was not robust, it was not considered as support for hypothesis 2. This outcome does result in a future research opportunity; board gender diversity did show a significant result in one of

the analyses, implying that the significant board gender diversity arises from one small change in the data. Uncovering the actual cause of the change in significance requires additional research.

Another limitation, although also applied by other studies, was the use of the two-digit SIC code for identifying the industry relatedness. The SIC codes contain more numbers, specifying the industry more specifically. As the dataset was rather small, a more specified sector may lead to even less significance due to industries only being represented once. However, if the number of observations was larger if it did not include as many missing values, it would be recommendable to use the more extensive SIC codes for industry relatedness. Another control variable with a limitation is the acquisition performance. Firstly, within literature the depreciation rate is often dependent of the industry the firms are in. However, the depreciation rate of 15% was all overarching knowledge depreciation rate and used as not every industry had a known depreciation rate. Secondly, the acquisition performance assumes that the composition of the BoD is left unchanged. However, in reality directors can leave the BoD and with them their knowledge of previous acquisitions. This variable does not take the withdrawal of directors into account.

Finally, several limitations with regard to the BoD can be made. First of all, board nationality diversity assumes that the cultural differences between every country are of the same degree. However, it is likely to assume that neighbouring countries have more cultural similarities than countries further separated. Furthermore, directors could have an immigrant background of which his/her parents have a different background. The directors do get the upbringing from their parents but are also influenced by the environment they are brought up in. Therefore, their mentality could be leaning more towards the country they were brought up in, than the nationality they inherited from their parents. That is why it could be argued whether observational characteristics are were sufficient.

Coming from these limitations, opportunities for future research present themselves. First of all, future research should focus on obtaining more observations in order to include the logarithm transformations without substantially harming the number of observations. With more observations, certain findings could be confirmed with more certainty. Subsequently, it could guarantee a sizeable dataset that prevents unignorably missing data. Furthermore, I would suggest looking into other factors of the directors than observational characteristics, as strategic decision making includes complex psychological processes. Also, as one robustness check showed a significant model, the variables board size and prior acquisition experience could result in significant pre-acquisition activities, as these variables were significant in one model.

However, further research has to be done to either confirm or reject this. Subsequently, further research on the influence of demographic characteristics on strategic choices could lead to interesting results. Even though these results prove the contrary, Knight et al. (1999) did prove a connection.

Furthermore, it is advisable to look into other acquisition performance measures than the cumulative abnormal return. This measure does not provide certainty of the performance of the firm after an acquisition but a prediction. Even though the CAR is frequently used as a measure, it does not prove whether the firm will perform the same as the prediction.

7. Conclusion

The purpose of this study was to obtain knowledge of the principal definitions of this research, respectively board nationality diversity, board gender diversity and board interlock, and examine possible relationships of these definitions in connection to acquisition performance.

Concluded from the literature, it was concluded that the board of directors have a substantial influence on the acquisition process, as they have to approve the acquisition before it can be finalized and can provide the acquirer with target firm from their network. Building on the UET (Hambrick & Mason, 1984), characteristics were assumed to influence strategic choices and outcomes. Directors bring knowledge and experience into the firm and advise the firm based on these resources. Based on this knowledge, it was expected, and confirmed within the literature, that a diversity of directors could lead to a diversity of knowledge, experience and network ties, resulting in improved, well-rationalized decisions (about acquisitions and target firms) than less diverse boards. In addition, I theorized that board interlocks are crucial for obtaining resources, such as information, and network ties. Furthermore, the board of directors is said to have an influence on the acquisition process, hence the assumptions that board diversity and board interlock positively influence the acquisition performance.

Contrary to my beliefs, my findings provided no consistent significant results and almost no significant regression models. Hence, no hypothesis could be supported nor rejected, meaning there was no relationship between board diversity and board interlock on acquisition performance.

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Appendices

Appendix I: Shannon-Wiener Index

Since the Blau-index is more often used in management diversity research and the Shannon-Wiener-index is more common in biology research and species diversity (Spellerberg & Fedor, 2003), the Blau-index is expected to be a better diversity index for this research. However, the Shannon-Wiener index has been applied for *board nationality diversity* due to its higher sensitivity in changes in smaller groups.

Shannon-Wiener-Index:

$$\Delta_{Sh} = -\sum_{i=1}^{k} f_i \cdot \log f_i$$

Blau-index:

$$B = 1 - \sum {f_i}^2$$

For the Blau-index holds that the value for the quadratic function f_i^2 tends to increase rapidly for higher values for f_i. Therefore, high values for f_i, which are caused by large groups, dominate the result of the Blau-index. On the contrary, small values for f_i, which are caused by small groups, will have a low effect on the resulting Blau-index. In case small changes occur in a small group but the composition of the largest group stays the same, the effect will be hardly seen from the resulting Blau-index. Although, changing the composition of the large group will have a large effect on the resulting Blau-index.

Opposed to the Blau-index, the Shannon-Wiener-index includes a logarithmic component. In the range for f_i, which is 0 till 1, the absolute value of the logarithmic component will increase for lower values for f_i. Although, due to the fact f_i is also used for multiplying with $\log(f_i)$, the Shannon-Wiener-index tends to show a more linear increase in the range of f_i. This ensures that the Shannon-Wiener index shows similar changes due to changes in both small and large values for f_i, i.e. small and large groups, making the Shannon-Wiener index the more preferable option compared to the Blau index in case of small group changes.

The effects of changes in both small and large groups can be seen in the example shown in the table below:

Three groups with each 17 members are given. Every group has 3 nationalities, namely Dutch (NL), German (D) and Spanish (ES). Every group has a different distribution of its members in every nationality:

	Group 1	Group 2	Group 3
NL	1	2	1
D	4	3	3
ES	12	12	13

This results in the following values for Blau's diversity index and Shannon's diversity Index:

	Group 1	Group 2	Group 3
Blau-Index	0.4429	0.4567	0.3806
Shannon-Wiener-Index	0.7530	0.8037	0.6779

The results show that changes in the composition of the large group have a higher effect on the Blau-index compared to changes in the composition of the small group since: $\left|G_{1,Blau} - G_{3,Blau}\right| \approx 7 \cdot |G_{1,Blau} - G_{2,Blau}|$. *On the contrary, the results show similar results on the Shannon-Wiener-index for changes in both the small and the large groups* $\left|G_{1,Shannon} - G_{3,Shannon}\right| \approx 1.5 \cdot |G_{1,Shannon} - G_{2,Shannon}|$.

Appendix II: Missing Values

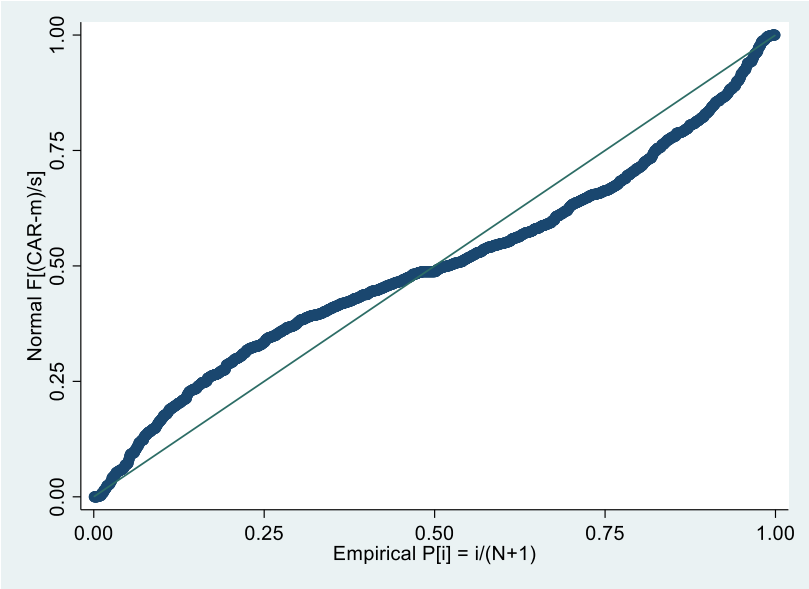
Variable	Missing	Total	Percent Missing
CAR	100	1,291	7.75
Board Nationality Diversity	988	1,291	76.53
Board Gender Diversity	65	1,291	5.03
Board Interlock	1141	1,291	88.38
Board Size	0	1,291	0.00
Prior Firm performance	104	1,291	8.06
Industry Relatedness	0	1,291	0.00
Acquisition Experience	0	1,291	0.00
Board Structure	81	1,291	6.27
Relative Acquisition Size	976	1,291	75.60

Appendix III: Normality

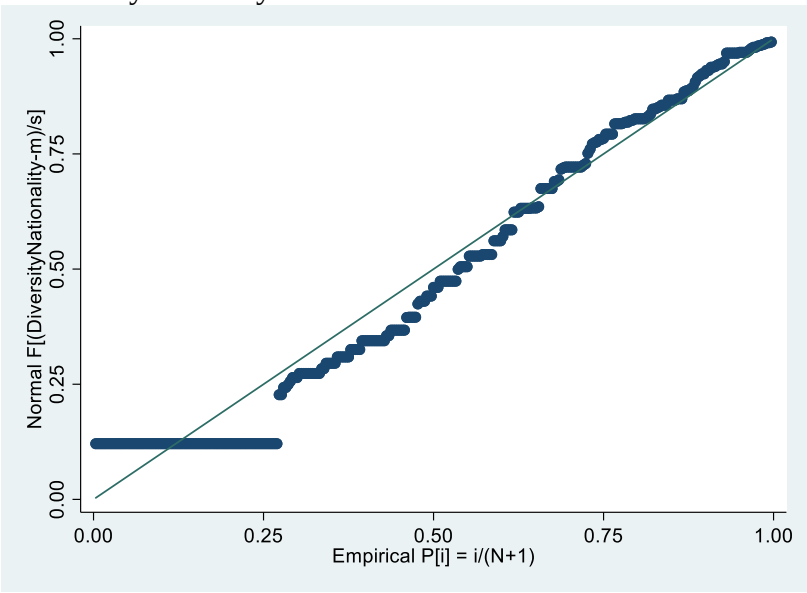
		Before log transformation:	**After log transformation:**
CAR	Skewness	1.231	-.991
	Kurtosis	32.896	5.224
Board Size	Skewness	1.035	-.209
	Kurtosis	4.554	3.343
Prior firm performance	Skewness	-6.238	-.979
	Kurtosis	326.635	6.159
Acquisition Experience	Skewness	1.2644	.201
	Kurtosis	4.363	2.315
Relative acquisition size	Skewness	14.938	.185
	Kurtosis	239.758	3.423

Normality of the residuals:

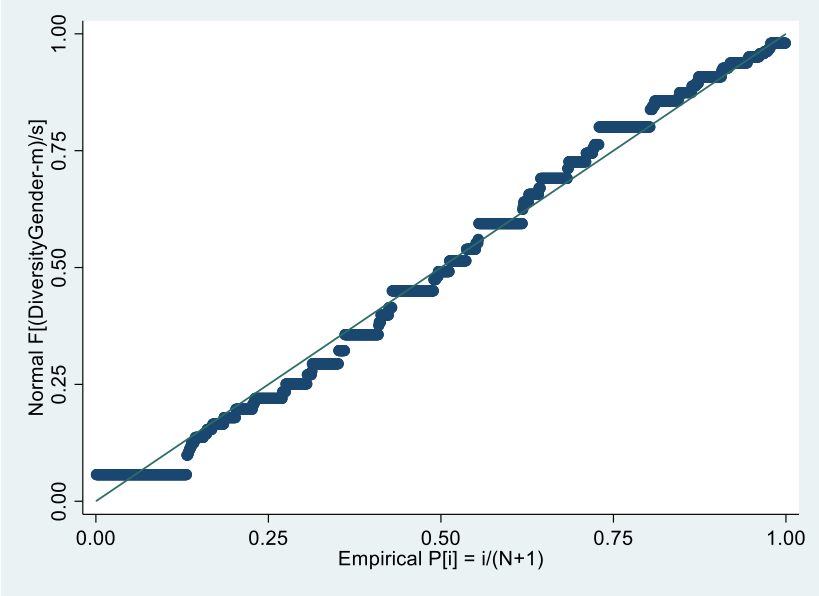
CAR:



Nationality Diversity:

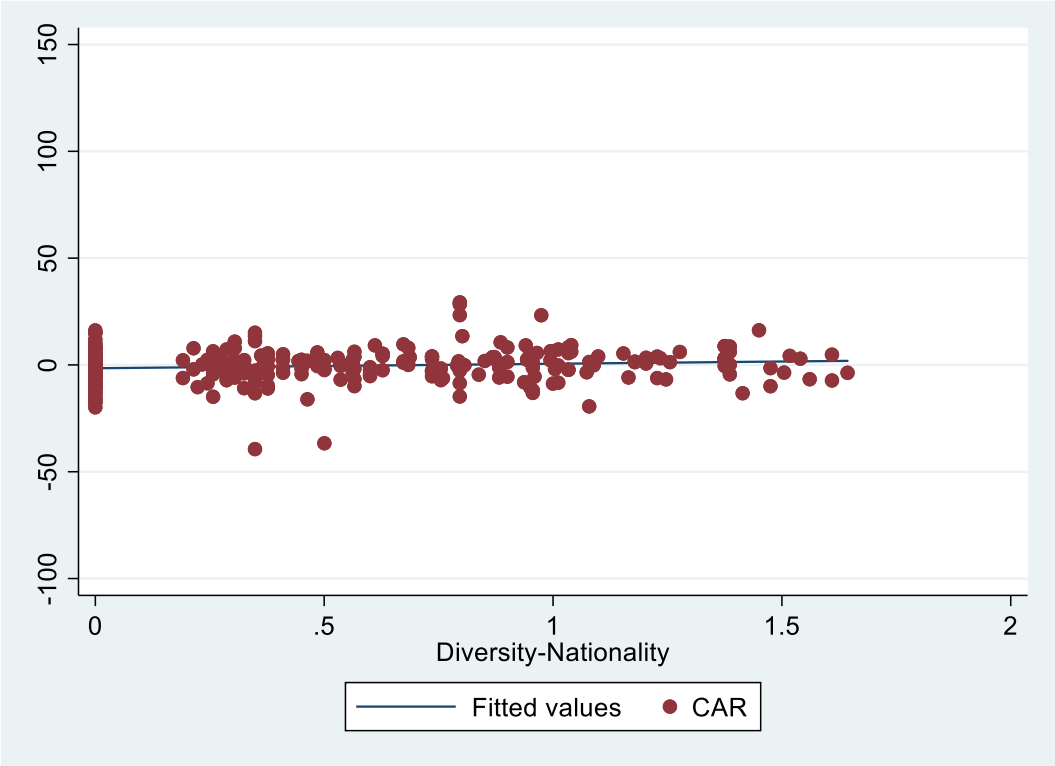


Gender Diversity:

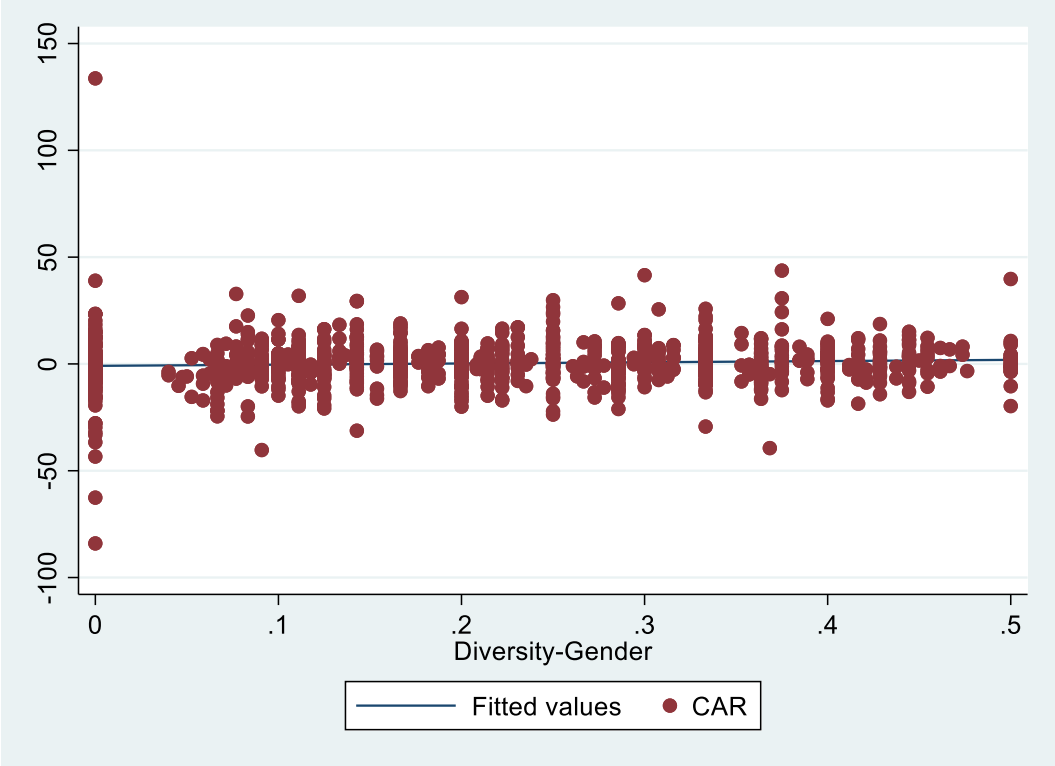


Appendix IV: Linearity

CAR on Nationality Diversity:



CAR on Gender Diversity:



Appendix V: Multicollinearity

Variable	VIF	1/VIF
Board Nationality Diversity	1.11	.900
Board Gender Diversity	1.22	.817
Board Interlock	1.09	.913
Board Size	1.33	.754
Prior Firm Performance	1.05	.954
Industry Relatedness	1.12	.891
Acquisition experience	1.14	.875
Board Structure	1.23	.812

Appendix VI: Robustness check regression model 1

Model (DV = Cumulative Abnormal Return)	**1**		**2**		**3**		**4**		**5**	
	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value
Board nationality diversity			3.917 (1.825)	.034					4.891 (2.137)	.025
Board gender diversity					3.917 (1.825)	.724			1.518 (6.736)	.822
Board interlock							1.706 (1.959)	.386	1.874 (1.967)	.343
Board size	-1.135 (1.486)	.446	-1.701 (2.156)	.432	-1.701 (2.156)	.532	-1.630 (2.313)	.483	-2.715 (2.491)	.279
Prior firm performance	.025 (.026)	.345	-.000 (.059)	.995	-.000 (.059)	.359	-.0156 (.060)	.797	-.017 (.059)	.769
Industry relatedness	2.197 (1.239)	.077	1.280 (1.721)	.459	1.280 (1.721)	.056	1.008 (1.833)	.584	.954 (1.830)	.603
Prior acquisition experience	-.127 (.780)	.871	-.528 (1.112)	.636	-.528 (1.112)	.758	.398 (1.225)	.746	-.126 (1.212)	.917
Board structure	1.104 (1.254)	.379	-.037 (1.762)	.983	-.037 (1.762)	.391	-.001 (1.923)	.999	.317 (1.923)	.870
Relative acquisition size	-.024 (.014)	.102	.053 (.038)	.173	.053 (.038)	.234	.061 (.039)	.116	.053 (.038)	.173
Constant	.127 (3.837)	.974	.668 (5.591)	.12	.668 (5.5910	.852	.084 (6.226)	.989	.565 (6.184)	.927
Observations	271		115		260		101		98	
F	1.54		1.22		1.06		0.60		1.04	
p-value	0.164		0.300		0.389		0.757		0.416	
R^2	0.034		0.074		0.029		0.043		0.096	
Adjusted R^2	0.012		0.013		0.002		-0.029		0.004	

Appendix VII: Robustness check regression model 2

Model (DV = Cumulative Abnormal Return)	**1**		**2**		**3**		**4**		**5**	
	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value
Board nationality diversity			-.130 (.379)	.733					-.681 (.739)	.366
Board gender diversity					-.338 (.614)	.583			-.681 (2.654)	.800
Board interlock							-.462 (.602)	.450	-.658 (.659)	.328
Board size	-.447 (.203)	.029	.189 (.401)	.638	-.341 (.2170	.118	1.370 (.792)	.095	1.965 (.995)	.060
Prior firm performance	-.036 (.093)	.702	.099 (.189)	.604	-.001 (.095)	.993	.634 (.434)	.156	.604 (.477)	.218
Industry relatedness	.010 (.157)	.949	.258 (.337)	.446	-.031 (.160)	.845	.947 (.650)	.157	1.347 (.741)	.082
Prior acquisition experience	-.286 (.146)	.051	-.106 (.328)	.747	-.317 (.149)	.035	-.023 (.603)	.970	.438 (.798)	.588
Board structure	.079 (.174)	.649	.419 (.342)	.225	.115 (.184)	.533	.816 (.547)	.147	.837 (.604)	.179
Constant	2.335 (.530)	.000	.182 (1.080)	.867	2.131 (.563)	.000	-3.857 (2.383)	.117	-4.938 (2.616)	.071
Observations	242		75		230		34		33	
F	1.90		0.43		1.49		1.01		0.85	
p -value	0.095		0.853		0.182		0.442		0.569	
R^2	0.039		0.037		0.039		0.183		0.221	
Adjusted R^2	0.018		-0.048		0.013		0.001		-0.039	

Appendix VIII: Robustness check regression model 3

Model (DV = Cumulative Abnormal Return)	**1**		**2**		**3**		**4**		**5**	
	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value
Board nationality diversity			-1.378 (.799)	.101					-1.612 (.989)	.129
Board gender diversity					-.748 (1.605)	.644			44.887 (4.449)	.294
Board interlock							.257 (1.200)	.834	.134 (1.083)	.904
Board size	-1.018 (.531)	.061	.366 (1.054)	.732	-.802 (.678)	.243	.253 (1.371)	.856	-.813 (1.590)	.619
Prior firm performance	-.063 (.291)	.828	-.328 (.777)	.678	.058 (.313)	.853	-.102 (1.030)	.922	-1.469 (.823)	.264
Industry relatedness	-.099 (.389)	.800	.731 (.689)	.302	-.009 (.425)	.984	.624 (.853)	.476	1.469 (.833)	.103
Prior acquisition experience	-.306 (.384)	.429	.980 (.711)	.184	-.301 (.417)	.474	.420 (.840)	.625	2.507 (1.160)	.052
Board structure	.099 (.385)	.798	.794 (.691)	.265	.163 (.438)	.711	.908 (.766)	.254	.929 (.818)	.278
Relative acquisition size	-.135 (.069)	.055	-.272 (.152)	.092	-.127 (.078)	.112	-.081 (.194)	.683	-.265 (.189)	.186
Constant	3.479 (1.657)	.041	-.111 (3.262)	.973	2.805 (1.937)	.155	-.579 (4.154)	.891	2.686 (4.524)	.564
Observations	57		27		52		23		22	
F	1.19		1.11		0.82		0.37		1.02	
p-value	0.328		0.399		0.580		0.903		0.476	
R^2	0.125		0.289		0.115		0.149		0.433	
Adjusted R^2	0.020		0.028		-0.026		-0.249		0.008	

Appendix IX: Robustness check regression model 4

Model (DV = Cumulative Abnormal Return)	**1**		**2**		**3**		**4**		**5**	
	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value	Coef.	*p* Value
Board nationality diversity			-1.098 (1.498)	.465					.079 (1.746)	.964
Board gender diversity					8.479 (3.298)	.011			10.618 (5.452)	.055
Board interlock							.132 (1.565)	.933	-.086 (1.587)	.957
Board size	.653 (1.032)	.527	-.711 (1.809)	.695	.308 (1.100)	.780	-.498 (1.872)	.791	-2.189 (2.039)	.286
Prior firm performance	.026 (.018)	.149	-.011 (.047)	.807	.023 (.018)	.188	-.019 (.047)	.692	-.019 (.047)	.683
Industry relatedness	.958 (.854)	.263	.885 (1.413)	.533	.757 (.865)	.383	1.483 (1.449)	.309	.940 (1.496)	.532
Prior acquisition experience	-.212 (.543)	.696	-.034 (.933)	.971	-.397 (.554)	.474	-.031 (.998)	.975	-.118 (1.026)	.908
Board structure	-1.119 (.858)	.193	-.454 (1.449)	.755	-.708 (.911)	.438	-.487 (1.549)	.754	-.372 (1.583)	.815
Relative acquisition size	.006 (.010)	.472	-.004 (.030)	.901	-.013 (.027)	.620	-.005 (.030)	.857	-.005 (.030)	.878
Constant	-.849 (2.657)	.750	2.397 (4.714)	.612	-1.695 (2.762)	.540	1.554 (4.987)	.756	3.460 (5.065)	.496
Observations	253		107		242		95		93	
F	0.97		0.20		1.94		0.23		0.60	
p-value	0.444		0.985		0.064		0.978		0.797	
R^2	0.023		0.014		0.055		0.018		0.061	
Adjusted R^2	-0.001		-0.056		0.027		-0.061		-0.041	