Value in Diversity? A Quantitative Examination of Board Diversity and Financial Performance of Publicly Listed Firms in Germany

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ABSTRACT

The board of directors is said to be one of the most important corporate governance functions, especially with regard to their placement at the top of corporations' hierarchy and their assigned decisional power by shareholders. This means that choosing the right composition of directors that possess a diverse set of knowledge and skills to fulfill their fiduciary duties is of huge importance. Therefore, this research paper investigates demographic board diversity characteristics, in terms of gender, nationality and age, in relation to financial firm performance in Germany. However, prior research results on this topic are rather irresolute. The main body of literature claims for value in diversity, as it should bring complementary perspectives and experiences to the boardroom, that in turn lead to increased decision-making quality, better market understanding and thus performance. However, another part of the literature also highlights the fact that too less and too much diversity can have adverse effects as well. This means, the effect of board diversity on performance is not straight-forward explainable. Therefore, the possible linear as well as quadratic effects of these variables have been examined. Generally, the results show no significant relationship between board diversity and firm performance. However, only in the case of nationality diversity, a constant significantly linear and negative relationship with ROA and ROE has been found, opposite as hypothesized. With regard to the results of this paper and prior study results, diversity management of directors is of importance and should be treated as any other business investment, as it can affect firm performance, positively and negatively.

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1. INTRODUCTION

Corporate governance is one of the most important factors that affect the successful management of companies all over the world. It is defined as the way companies are directed and controlled by mechanisms such as incentives, laws, ownership and boards. (Conyon and Thomson, 2012). Good corporate governance is aimed at, since it supports market liquidity and investor confidence (Brown and Caylor, 2004). Particularly, one generic mechanism of corporate governance has become steady research attention in the management literature during the last decades, namely the board of directors. They arise whenever there is a separation of ownership and control, and thus are elected by shareholders to address corporate governance issues (Fama and Jensen, 1993). Thus, they represent the most important decision-making body in a corporation (Ferreira, 2010). This means that choosing the right composition of board members is said to be one of the most important aspects to ensure a profitable business. Moreover, the increased global business conduct requires more and more individuals in leadership positions that are able to understand and engage in a competitive multi-cultural business environment that is steadily changing (Burke and Mattis, 2000). Therefore, boards are typically staffed with diverse members which possess the adequate skills to perform this role (Ferreira and Kirchmaier, 2013). Director heterogeneity plays an important part in how boards function (Fidanoski et al., 2014), and its management represents one aspect of good corporate governance (Rampling, 2016).

Especially board gender diversity represents a hot topic of corporate governance the past years, whether academically or publicly debated. The importance of this topic is also reflected in the recent introduction of board gender policies across Europe. Board gender diversity is still quite low although there is an upward trend across Europe (Ferreira and Kirchmaier, 2013, European Union, 2012, Carter et al., 2003). Nevertheless, Germany had a female board membership percentage below the European average of 25% in 2015 (European Women on Boards, 2016). This shows, that the acceptability of women in leadership positions in Germany seems to be still rather low, still supporting the glass ceiling effect. The country's gender quota has become binding in the beginning of 2016. The law applies to large companies and requires these to fill up supervisory board positions with non-executive females to a level of least 30% (DIP, 2015). Moreover, results are different among academic research still questioning the real effect of board gender diversity on board on firm performance. Adams and Ferreira (2009), found on average a negative effect of gender-diverse boards on firm performance. Other researchers have found a positive relation of firm profitability, as measured by the ROA, and the proportion of female board directors (Adams & Kirchmaier, 2013, Carter et al., 2003, Catalyst, 2007).

However, in this increased world of hyper-competition, internationalization and global demographic changes, the effect of board nationality diversity on corporate financial performance seems to be important to investigate as well. Especially, in a country like Germany that has accepted a huge number of refugees during the last few years. The majority of these people, being possessed with a different cultural background, might become an integral part of the German workforce in a few years, increasing the diversity among potential board candidates (Erhardt et al., 2003). Moreover, having different national backgrounds, which increases cultural sensitivity towards other nationalities, is critical for corporate leaders working in a global context (Carter et al., 2003). However, also here research literature found different results. On the on hand, some researchers have found a positive significant relation between cultural diversity and firm performance (Carter et al., 2003, Erhardt, Wervel & Shrader, 2003). On the other hand, research by Zahra & Stanton (1988) have found no effect between these variables.

Another important component of board diversity is depicted by age diversity. With the recent demographic changes in the workforce, the board of directors are affected as well. Older directors have year-long work experience and the necessary connections to help a company. On the other hand, with the increased technological world, firms require younger directors that are capable of understanding the new-age business challenges. The main body of literature that examined age diversity and firm performance found a negative relationship (Zajac et al., 1991, Bantel & Jackson, 1989, Østergaard et al., 2011).

As already mentioned, since board diversity is an important part of good corporate governance, this topic deserves further research investigation, especially with regard to the dissonant results among components of board diversity by different researchers. This research will focus its investigation under a new country context, namely Germany. German corporate governance is different because there is a mandatory two-tier structure, which means that the German boards are composed of a supervisory and management board (Conyon & Thomson, 2012). Moreover, literature for this specific country is lacking, although literature on Europe is generally increasing on this topic (Conyon & Mallin, 1990, Ferreira & Kirchamaier, 2013). Therefore, this research paper aims to scrutinize the validity of some propositions that state that board diversity is affecting a firm's financial position. Based on this, following research question has been established:

- *What is the effect of board diversity on the financial performance of publicly listed firms in Germany?*

This paper is structured as follows. In the next section, key literature findings about board diversity and financial performance will be presented. Based on these, the later-mentioned hypotheses will be deduced. Afterwards, the methodology section follows, which describes how the variables under investigation will be measured to test the hypotheses. Thereafter, the results section will present the key findings of the regression analysis. The last section contains the conclusion and limitations of this research paper.

2. LITERATURE REVIEW AND HYPOTHESES

2.1. Agency Theory

"Agency theory is the theoretical framework most often used by investigators in finance and economics to understand the link between board characteristics and firm value" (Carter et al., 2013, p.37). Boards arise whenever there is a separation of ownership and control, known as the agency problem. They are elected by shareholders to act as their trustees, protecting their vested interest in the company (Fama and Jensen, 1993, Kim et al., 2010). Thereby, the board is assigned with several duties and responsibilities (Cadbury, 1992, Kim et al, 2010). They fulfill a monitoring and advisory function towards the mangers of the company as well as evaluate the overall direction of the

business by approving major strategic and financial decisions and by governing corporate governance issues (Conyon and Thomson, 2012). Therefore, the roles of the board are three-fold, namely to direct, govern and supervise. Being charged with these roles, the board is said to be an important corporate governance function and might be a firm's most important internal watchdog due to its placement at the top of the corporate hierarchical structure. (Kim et al, 2010). The board's decisions affect the shareholders, employees, customers, suppliers and all the other stakeholders as well as the firm's long-term success. This also means that the board performance depends on the capabilities of the directors to fulfill their roles. In order to fulfill these roles, it requires the board to be well-balanced, perceptive and anticipatory. Thus, a multi-perspective board is required to effectively manage and carry out these wide-ranging tasks and to achieve effective board performance. Therefore, boards should be composed of directors with diverse backgrounds and characteristics to achieve a complementary combination of talents and perspectives (Mishra & Jhunjhunwala, 2013).

2.2 Board Diversity

Board diversity represents the heterogeneous formation of a board in terms of education, experience, nationality, race, gender, culture, lifestyle and many other aspects of which an individual is composed of (Mishra & Jhunjhunwala, 2013, Carter et al., 2003). This research focuses on the observable demographic factors gender, nationality and age. Demographic characteristics and composition of executives appear to influence their decisions, corporate strategy and responsiveness to changes which influences productivity and financial firm effectiveness (Østergaard et al., 2011, Robinson & Dechant, 1997). The more diverse the background among board members, the more far-ranging is a firm's knowledge base, the spectrum of perspectives, the access to a broad set of resources and the better the understanding of business situations in the marketplace. In turn, this can lead to increased financial firm performance (Mishra & Jhunjhunwala, 2013, Conyon & Thomson, 2012, Carter et al., 2003, Østergaard et al., 2011). Diversity leads to more creativity, improved decision-making quality and more effective solutions, since group thinking is reduced. This is due to the creation of a natural conflict of different perspectives which hinders to reach quick consensus because beliefs and attitudes do vary systematically with demographic variables instead of being randomly distributed (Conyon & Thomson, 2012, Carter et al., 2003, Broome at el., 2011). However, on the other side, heterogeneity is also associated with increased conflicts and decreased communication which can impact the decision-making process and board outcomes (Bantel & Jackson, 1989). Moreover, having a too diverse board can have reverse effects as well. Excessive heterogeneity among board members often leads to competitive behavior and stretched decision making because of contrary opinions and not sharing a common (technical) language which can lead to reduced group cohesion and information sharing, increased conflicts and communication breakdowns (Campion & Higgs, 1995, Ancona & Caldwell, 1992, Østergaard et al., 2011). Moreover, this can also lead to increased interaction costs, higher turnover of group members and ineffective decisions that can affect the financial firm performance (Broome at el., 2011, Mishra & Jhunjhunwala, 2013, Østergaard et al., 2011, Bantel & Jackson, 1989). Generally, literature on diversity suggests that diversity improves the decision-making process but also might negatively impact group dynamics. Therefore, board diversity is said to be a double-edged sword. This is also recognized by McIntyre et al. (2007) who argue that "too less" as well as "too much" diversity might have disadvantageous effects on financial firm performance and therefore suggest a possible inverted U-shaped relationship between board diversity and firm performance. Based on these general findings and arguments concerning board diversity and firm performance, in the following sections always two hypotheses will be established per board diversity variable. The first one claims for a positive linear relationship because the majority of literature argues for the value in diversity. The second hypotheses claim for an inverted U-shaped relationship between board diversity and financial firm performance because the level of diversity seems to play an important role.

2.2.1 Board Gender Diversity

Women and men behave differently, therefore they also provide complementary skills. They often perceive the world differently and therefore they also interpret information and opportunities systematically different (Koellinger et al., 2008). Contrary to men, women are said to execute a more intuitive and democratic leadership style that encourages the involvement of multiple perspectives from various stakeholders. This in turn can strengthen relationship building and board dynamics by reducing conflicts and it can have positive effects on financial firm performance (Mishra & Jhunjhunwala, 2013, McKinsey & Company, 2008). Women also pose more tough questions and more often address controversial problems which can lead to increased decision quality (Mishra & Jhunjhunwala, 2013). Moreover, women represent an important part and driver of the economy. In Europe, women are driving about 70% of the purchasing decisions. Even in industries with normally male-dominated consumers, they depict a growing driving force in purchasing decisions. This means that female board members should be better at understanding consumer behavior and the needs of diverse market segments, leading to the introduction of new products, a larger customer base and a competitive advantage. In turn, this can lead to increased market share and earnings (McKinsey & Company, 2007). Zahra & Stanton (1988) and Carter et al. (2010) have found no significant relationship between board gender diversity and firm performance. Results by Adams and Ferreira (2009 have shown a that firm performance is worse the more gender-diverse the board. Erhardt et al. (2003) and Ferreira and Kirchmaier (2013) have found a positive relationship between female board representation and firm value. According to Catalyst (2007), women board directors are related to better firm performance. Their research shows that the companies with the most women board directors performed better in terms of ROA and ROE than the companies with the least women board directors. Furthermore, they concluded that firms with at least three women board directors lead to better than average firm performance. This is also supported by Kramer et al. (2006) who state that the number of women on boards can make a difference. A sole female director may feel less comfortable if the number of female board members increases. Moreover, they claim for a "critical mass " which is achieved by three or more female board members because in that case female directors are no longer perceived as outsiders and their views and ideas will be taken more serious. This can improve board discussions and dynamics significantly and therefore also firm performance. Thus, literature and results are again inconsistent and also indicate that too less and too much gender diversity can have adverse effects on firm performance. Therefore, following hypotheses have been established:

H1: *Board gender diversity has a positive relationship with financial firm performance.*

H2: *Board gender diversity follows an inverted U-shaped relationship with financial firm performance.*

2.2.2 Board Nationality Diversity

Showing cultural sensitivity is of huge importance, especially in an international-oriented environment, to understand how different countries and customers operate and think (Carter et al, 2003, Burke and Mattis, 2000, Mishra & Jhunjhunwala, 2013, Fidanoski et al., 2014). Therefore, people that have a different ethnic background can help to bring new perspectives and solutions because of a different lifestyle, expertise and cultural background compared to domestic board members (Cox et al., 1991, Fidanoski et al., 2014). Moreover, foreign board members can help firms to broaden their access to a variety of resources and networks. However, in turn, these foreign members might lack understanding of domestic affairs and therefore may contribute less effectively. Some studies have found a statistically significant positive relation between minorities and firm performance, measured by Tobin's Q or ROI and ROA (Carter et al., 2003, Erhardt et al., 2003). Other studies have found no statistically significant relationship between ethnic diversity and firm performance (Engelen et al., 2012, Zahra & Stanton, 1988, Carter et al., 2010). Representatives of minorities might show a lack of commitment and less job satisfaction, however, these effects might become marginalized as the number of this minority group rises (Milliken & Martins, 1996). However, boards with high proportion of nationality diversity, might also negatively impact board functioning, since different backgrounds and perspectives might lead to less communication among these members (Mishra & Jhunjhunwala, 2013). And board functioning is important and related to firm performance (Zahra & Pearce, 1989). Based on these different results and arguments following hypotheses have been established:

H3: *Nationality diversity has a positive relationship with financial firm performance.*

H4: *Nationality diversity follows an inverted U-shaped relationship with financial firm performance.*

2.2.3 Board Age Diversity

Traditionally, boards are staffed with directors being mainly senior-aged. However, as already mentioned, living in a competitive and digital age, firms require competences of younger professionals that possess an understanding of these technical and digital problems firms face nowadays. Younger directors are said to be more agile, supportive of innovation, take more risky decisions and better at understanding complex concepts. On the other side, older directors are said to be more experienced, possess more wisdom and can apply a more holistic approach towards boardroom decisions. Furthermore, senior directors often possess strong personal networks, which can be helpful since an important role of boards is the acquisition of resources and the building of relationships for the company (Conyon & Thomson, 2012). Moreover, having a board with directors of different ages can be helpful to better understand different stakeholders of the company which are also composed of different age groups. Furthermore, age heterogeneity seems to improve the solvation of complex tasks (Wegge et al., 2008). Furthermore, such boards will be a more balanced board because different age groups will bring different perspectives and approaches to problems because different generations may experience different political, economic and technological trends that can influence their point of view and ideas (Østergaard et al., 2011, Mishra & Jhunjhunwala, 2013, Bantel & Jackson, 1989). Moreover, perspectives of differently-aged board members are likely to differ as a natural development of the aging process (Bantel & Jackson, 1989). Furthermore, age diversity decreases the likelihood of harmful and emotional conflicts since age similarity more often leads to career comparisons which might possibly lead to rivalry among members (Pelled et al., 1999). This in turn, again might impact group functioning and firm performance. Some researchers have found no relationship between age diversity and innovative firm performance (Bantel & Jackson, 1989) whereas other researchers have found a significant negative relationship (Zajac et al., 1991, Østergaard et al. 2011). Although these researchers investigated the effect of age diversity in firms on innovative capability, one can apply their findings to the boardroom level considering that the tasks at the table include complex decision-making and also require innovative thinking (Østergaard et al., 2011). Moreover, innovative capability also affects firm performance. Bantel & Jackson (1989) argue that the dysfunctional effects of age diversity may only occur in the case of very high levels of diversity. However, they simultaneously argue that such a high level of diversity is less likely to be found in top management teams. Murphy and McIntyre (2007) also highlight the fact that the degree of age diversity can affect results. Therefore, they claim that low as well as high levels of age diversity are associated with low firm performance due to communication breakdowns and conflicts. Thus, moderate age diversity is associated with better performance. Their results confirm an inverted U-shaped relationship between board age diversity and firm performance. Based on these findings, following hypotheses have been developed:

H5: *Board age diversity has a positive relationship with financial firm performance.*

H6: *Board age diversity follows an inverted U-shaped relationship with financial firm performance.*

3. METHODOLOGY

3.1 Research Model

To investigate the effect of board diversity and financial firm performance the following research models are used:

(1) $Y_{it} = a + b1(X)_{it} + b2(BoardSize)_{it} + b3(FirmSize)_{it} + b4\text{-}11(Industry) + e$

(2) $Y_{it} = a + b1(X)_{it} + b2(X^2)_{it} + b3(BoardSize)_{it} + b4(FirmSize)_{it} + b5\text{-}12(Industry) + e$

where $Y = \begin{cases} ROA \\ ROE \\ Tobin'sQ \end{cases}$ where $X = \begin{cases} Gender\ Diversity \\ Nationality\ Diversity \\ Age\ Diversity \end{cases}$

where Firm Size $= \begin{cases} LnSales \\ LnEmployees \end{cases}$

and i= to denote firms
and t= to denote years (2014 – 2016)

These models enable the separate examination of the three independent board diversity variables and therefore might bring better insights in terms of their possible individual effect on the three dependent variables.

3.2 Measurement of Variables

3.2.1 Independent Variables: Measures of Board Diversity

Board gender diversity is measured as the proportion of women to men on a board (Ferreira and Kirchmaier, 2013, Liu et al., 2013, Carter et al, 2003, Fidanoski et al., 2014). Therefore, first the number of female board members per board will be counted, and then divided by the total number of board members (board size), to attain the percentage of board women representatives. For nationality diversity, as well a percentage value for non-German representation will be derived by dividing the number of non-Germans on a board by the total board size per company (Carter et al, 2003, Fidanoski et al., 2014). Most of the research has focused on minority representation in the boardroom. However, these studies focused on US firms (Carter et al., 2003, 2010, Erhardt et al., 2003, Zahra & Stanton, 1988). In the US, minorities are represented by Hispanics, African Americans and Asians (Carter et al, 2003). However, since this study is based on German firms, the definition of minorities in the US used by the literature cannot be applied in this context. Moreover, Germany has many minorities that are not easy to classify. Therefore, nationality will be used to deduce the diversity. In the case of bi or tri-nationality the first nationality has been taken while simultaneously it has been checked whether it could fit to the origin of the last name of that board member. In the case of absence of information, nationality has been approximated and deduced from the full name of the board member. The age of board members is represented by a natural number. Therefore, age diversity can be measured by taking the standard deviation of age per board (Østergaard et al., 2011, MyIntyre et al., 2007).

3.2.2 Dependent Variables: Measures of Firm Performance

The key purpose of financial performance measures is to indicate a firm's ability to create revenues in excess of expenses. Furthermore, they show whether a firm is able to create value and to compensate shareholders for risk (Bertoneche & Knight, (2001). Firm performance will be measured by using three different financial variables, namely return on assets (ROA), return on equity (ROE), and Tobin's Q. Return on assets (ROA) is said to be the most popular measure of financial profitability. It is measured by net income (gross profit – operating expenses – interest & taxes) divided by total assets (Hillier et al., 2014, Liu et al, 2014, Adams & Ferreira, 2009, Carter et al., 2003, Erhardt et al., 2003, McIntyre et al., 2007, Fidanoski et al., 2014). This ratio measures a firm's ability to turn assets into profit. A higher value of ROA is an indication of higher earnings. Another profitability measure is return on equity (ROE) which is defined as net income divided by total (shareholders') equity. This measure indicates how shareholders have benefitted during a year. Since improving shareholders' value is one of the main goals of firms, ROE is said to be one of the most important ratios to shareholders and to be a true measure of performance, from an accounting perspective. A higher value of ROE is a positive sign for efficiency and profitableness. However, one has to mention that ROA and ROA are profitability ratios based accounting rates of return and should properly be called return on book equity and return on book assets. Thus, a disadvantage of these two measures is that they only focus on the past, reflecting historical numbers at a point in time (McIntyre et al., 2007, Hillier et al., 2014). Therefore, also a market value ratio will be included, to provide a better picture of the true financial firm performance. Tobin's Q is a widely-used measure to proxy firm performance (Liu et al, 2014). It is depicted by the ratio of a firm's market value (total equity plus total liabilities and debts) to its book value of assets (total equity plus total liabilities and debts) (Adams & Ferreira, 2009, Carter et al., 2003). Tobin's Q indicates a firm's present-day worth relative to its present-day replacement costs (Hillier at el., 2014). A value of one, means that the firm should be of equal worth to its assets. A low Q value lies between zero and one and indicates that the cost to replace a company's assets is bigger than its stock value. This means that the firm's stock is undervalued. In contrast, a Q value higher than one implies that a firm's stock is overvalued since the firm's stock is more expensive than its assets replacement costs. This overvaluation might be achieved due to higher generated earnings than could have been expected based on a firm's financial assets. Another reason for a disproportionate market value can be due to expected positive earnings. Thus, Tobin's Q is also a market value ratio with forward-looking characteristics, which is said to have a greater ability to capture board contributions to firm performance (McIntyre et al., 2007).

3.2.3 Control Variables

Since the variables can be affected or explained by other third variables, also called spuriousness, it is important to include and control for third variables to see whether they have an effect on the variables of this model. Firms that have more females and nationally diverse board members tend also to be larger firms with a larger board than firms with no females and minorities on the board. Furthermore, these firms performed better in ROA, but worse in terms of Tobin's Q (Adams & Ferreira (2009), Carter et al., 2003). Therefore, it is important to control for board and firm size. Firm size will be measured by the number of employees. However, this measure might not adequately represent firm size for all companies. Reason for that is that large firms might have fewer employees because they rely more on machines and technology. Therefore, sales will be added as a second measure, which represents another proxy for firm size (Adams & Ferreira, 2009). Board size is added as another control variable because as already stated, larger boards tend to be found in larger firms which are more profitable. Contrary to the results of Adams & Ferreira (2009), who found firm size to be positively related to ROA and Tobin's Q, there is also literature stating that smaller firms perform financially better than larger boards (Conyon & Thomson, 2012, Yermarck, 1996). Therefore, it is important to include board size as a control variable because it is associated with firm performance (Adams & Ferreira, 2009, Ferreira & Kirchmaier, 2013, Erhardt et al., 2003). Board size refers to the total number of board members. Germany has a mandatory two-tier board structure, therefore, the number board members of both boards will be summed (Ferreira & Kirchmaier, 2013). This board structure often leads to larger boards (Adams & Ferreira, 2009). Board members will include CEOs and executives, represented in the management board, and chairman, non-executives and employee representatives, represented mainly in the supervisory board. Proxies will be excluded because they only represent board of directors in the case of absence. Additionally, industry dummy variables will be used as well. Reason for that is that literature has shown that there is a difference among industries and financial firm performance. Different industries operate under different market dynamics like different levels of market competition that can impact financial performance. Industry dummies have

been used as well by Carter et al. (2003), Ferreira & Kirchmaier (2013), Erhardt et al. (2003) and Engelen et al. (2012). The industry classifications provided by Orbis have been used in this paper. In total, eight industry dummies have been created. Another industry has been created representing the residual industries. Appendix A presents the industrial distribution of this sample.

4. DATA

This research is designed as a panel of quantitative nature, trying to examine the relationship and effect of board gender diversity and financial firm performance. The units under investigation are German publicly limited firms being listed on the Frankfurter Börse stock exchange. Data for financial performance, board size, board gender diversity, board age diversity and board nationality diversity has been collected from ORBIS, a financial database of the Bureau van Dijk, in combination with manual collection from annual reports in case of doubt of the reliability of the data. Moreover, data about the financial performance of these firms has been collected for the period 2014 to 2016. This period was chosen to provide an up-to-date picture of the topic and the results. After applying this search strategy, a sample of 305 firms has been extracted. Furthermore, since financial data was gathered for three years, 915 firm-year observations were expected. However, due to some missing data and removed outliers the main regression analyses, presented later in this paper, ended up with 697 firm-year observations that contained full data for the regressions on Tobin's Q, 813 firm-year observations for all regressions for ROA and 802 for ROE.

5. RESULTS

5.1 Robustness Checks

In order to perform the linear regression several assumptions have to be examined as a robustness check in advance. The possible presence of autocorrelation could lead to biased estimates, therefore, the Durbin-Watson test is conducted to detect the presence and magnitude of autocorrelation. An acceptable value for this test should range between 1.5 and 2.5, preferably around 2 (Huizingh, 2007). The results of the test approached a value of 2 for each regression model and therefore indicate no autocorrelation. Normality distribution has been checked by visually examining the histograms and QQ plots of the variables. To limit the effect of outliers on the parameter estimates, a 95% winsorization has been conducted. Furthermore, homoscedasticity has also been examined by inspecting the scatterplot of the standardized residuals. The residuals were distributed with no obvious pattern. Moreover, multicollinearity has been checked for via the Variation Inflation Factor test and via the correlation matrix (table 2). Strong correlations, approximately above a value of 0.8 are examined. The VIF value should be under 10 for each variable (McIntyre et al., 2007). In the case of gender diversity and gender diversity squared, as well as age diversity and age diversity squared, the VIF increased slightly under and above 10. However, this increase in the VIF, indicating multicollinearity among the independent variables, was expected since the squared variables have been derived from their linear variables which also represent the same construct (McIntyre et al., 2007). Since these values are still very close to the 10, the VIF will still be regarded as acceptable. Moreover, in these cases evading multicollinearity here is not of interest, since a possible non-linear effect is tried to be identified.

5.2 Descriptive Statistics

The descriptive statistics overview can be found in Table 1. ROE and ROA are slightly skewed to the left since their mean value is smaller than their median value. Tobin's Q is slightly skewed to the right and has a mean value of about 0.75 which means that the majority of the German firms in this sample is undervalued. This is different from the results by Fidanoski et al. (2014). They examined board diversity and firm performance for 175 firms in Southeast Europe (Macedonia, Croatia, Serbia, Bosnia and Herzegovina and Greece) and had a mean value of 2,09 for Tobin's Q, indicating that their market generally overvalues these firms. Moreover, their Tobin's Q ranged from 0 to 21.13, while in this model Tobin's Q varies much less, having a minimum value of 0.31 and a maximum value of 1.61, indicating that the German market is less volatile in terms of Tobin's Q. Sales has a mean value of 2.226 million and is skewed to the right with a median value of 0.182 million. The number of employees ranges between 14 to 74.428 thousand workers, with a mean value of 8.159 workers indicating that on average firms in this sample employ a large number of employees. The average board size revolves around 13 members, with a maximum board size of 29 which is passable for a governance systems with a two-tier board structure. Also, a standard deviation of around 8 board members seems to be salable. These findings are very similar to the ones of Ferreira and Kirchmaier for the years 2000 until 2010 (2013). Their sample for German firms had an average board size of 14, a maximum board size of 30 and a standard deviation of 7 members. The average gender diversity proportion is about 18.3% with a maximum of 40%. In the sample of Ferreira and Kirchmaier (2013), the average gender diversity in Germany was 6% and the maximum gender diversity approximates 38%. As can be seen, female representation has increased over the past years. The mean value of 18.3% for female board representatives is quite similar to the one of Fidanoksi et al. (2014) with a mean value of 16% for Southeast European firms. However, their firms had a maximum female representation of 75%, which is high compared to Germany. This also shows that Germany is in 2016 still below the European average of 25 % of the former year (European Women on Boards, 2016). Moreover, the minimum value for gender diversity in this

Table 1: Descriptive Statistics

	Variable	Mean	Median	Std. Dev.	Min	Max	N
1	ROA	0.026	0.033	0.073	-0.181	0.151	879
2	ROE	10.709	12.483	17.113	-35.666	41.762	864
3	Tobin's Q	0.753	0.680	0.328	0.310	1.610	714
4	Sales (mln)	2.226	0.182	5.146	0.004	20.104	827
5	Employees	8159	813	18610	14	74428	885
6	Board Size	13.105	11	7.559	5	29	915
7	GenDiv	0.183	0.200	0.125	0	0.400	915
8	NatDiv	0.130	0.115	0.128	0	0.414	915
9	AgeDiv	21.030	22.661	7.001	6.242	29.872	915

Table 2: Correlation Matrix

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
ROA [1]	1											
ROE [2]	**0.886**	1										
Tobin's Q [3]	**-0.421**	**-0.294**	1									
LnSales [4]	**0.184**	**0.273**	**-0.194**	1								
LnEmployees [5]	**0.157**	**0.234**	**-0.203**	**0.916**	1							
Board Size [6]	0.033	0.110	**-0.128**	**0.762**	**0.770**	1						
GenDiv [7]	0.010	0.021	**-0.131**	**0.300**	**0.330**	**0.340**	1					
NatDiv [8]	**-0.131**	-0.041	-0.006	**0.215**	**0.208**	**0.144**	**0.225**	1				
AgeDiv [9]	0.028	-0.023	-0.038	0.030	0.101	0.098	**0.163**	-0.007	1			
GenDiv² [10]	0.038	-0.006	-0.083	-0.015	0.003	-0.026	-0.039	-0.027	**0.901**	1		
NatDiv² [11]	-0.022	-0.016	-0.004	0.025	0.008	0.065	0.010	-0.080	**-0.181**	**-0.270**	1	
AgeDiv² [12]	0.018	0.023	-0.112	**0.237**	**0.247**	**0.259**	**0.946**	**0.157**	**0.167**	-0.017	0.007	1

Bold correlation coefficients indicate statistical significance at p < 0.001*.**

sample is 0%. This means, especially with regard to the introduction of the female board gender quota there are still German boards that exclude female directors from their boards. However, since the quota has only become binding at the beginning of 2016 this is comprehensible since such a change of the board composition requires time for the firms to find the right female candidates. The non-Germans proportion in this sample averages about 13% and is similar to the female percentage with a maximum value of about 41.4%. Again, compared to the nationality diversity mean value of firms in Southeast Europe with 28% and a maximum of 100% (Fidansoksi et al., 2014), the German nationality diversity in this sample is low. Moreover, the minimum percentage value for non-Germans is also 0%, meaning there are German boards totally composed of Germans. However, this is not surprising. Nevertheless, the standard deviation value for both, gender diversity and non-German diversity is about 13% which is an indication that several firms in this sample have an acceptable proportion of female and non-German board members. Board age diversity has a mean value of 21 years, which is quite high, with a minimum age diversity of around 6 years.

5.3 Bivariate Test

To examine the strength and direction among the variables of this model a correlation matrix is presented in Table 2. However, the correlation coefficient only reflects the linear type of relationship between two variables (Huizingh, 2007). This means, that if there is a strong correlation among two variables but the relationship is non-linear, the correlation coefficient should approach a value of zero. Furthermore, this measure of linear relationship between two variables is not dependent on the units of measurement (Evans, 2014). Concerning the three dependent financial variables, one can say that there is a strong positive correlation (0.886) between the two dependent variables ROA and ROE, which means the higher ROA, the higher also ROE and vice versa. This, however, could be expected because the two are similar financial accounting measures. Moreover, the two accounting measures ROA (-0.421) and ROE (-0.294) are significantly negatively correlated with Tobin's Q, which means the higher ROA and ROE, the lower Tobin's Q. Board size is also negatively correlated with Tobin's Q with a value of -0.128. This also means that the larger the board size, the larger the decrease in Tobin's Q. Furthermore, the two firm size measures, sales (-0.194) and number of employees (-0.203), are also significantly negatively correlated with Tobin's Q, which means that the larger the firm size, the larger the decrease in Tobin's Q. However, on the other side, sales and number of employees are positively correlated with ROA (0.184 and 0.157) and ROE (0.273 and 0.234), which is also not surprising, especially in the case of sales since it represents a component of these measures. This means the larger the firm size, the higher the profitability in terms of ROA and ROE. However, these results are not surprising because larger firms are often performing financially better. Additionally, the two firm size measures, sales and number of employees, are also positively and significantly associated with board size (0.762 and 0.77), the proportion of female (0.30 and 0.33) and non-German directors (0.215 and 0.234). This means, the larger the firm, the larger also the board size, the female and non-German board representation. Ferreira and Kirchmaier (2013), also found firm size to be positively related to board size, which is not very surprising because larger firms require more governance. The positive correlation between firm size and gender diversity, which means that the larger the firm, the higher the proportion of females on the board, confirms results by Adams and Ferreira (2009) and Carter et al. (2003). The proportion of non-German and female board members also positively correlates with each other (0.225). This is in concordance with the findings of Carter et al (2009), who also found that the number of nationally diverse board members is increasing with the number of female board members and that the proportion of female (0.34) and nationally diverse board members (0.144) is increasing with board size. Nevertheless, one has to mention that the two firm size measures, sales and number of employees, have a very strong positive correlation (0.916) which is justifiable because they have been chosen as representative control variables for firm size and therefore also represent the same construct. However, since their correlation coefficient is above 0.80, the model will suffer from multicollinearity. Therefore, regressions will be run separately on both firm size measures to avoid this problem. This decision will be taken up later again in the regression results part. There is a very strong and positive correlation (0.901) between age diversity and the quadratic gender diversity variable. However, since these two variables will be examined separately in the main regressions (table 3-5), this should not represent a big problem. Concerning all three independent board diversity variables, one can say that none of them has a high and significant correlation with one of the three dependent financial variables. This might lead to the possible conclusion that the board diversity variables in this model are likely to be related to firm performance in a non-linear manner or being not

related to firm performance at all. Except gender diversity (-0.131) and nationality diversity (-0.131) are negatively correlated with Tobin's Q and ROA respectively. Adams and Ferreira (2009) also found firms with female board members to have worse performance in terms of Tobin's Q. These correlation results mean that the higher the diversity proportion in terms of female and non-German board members, the less the financial performance in terms of these two financial measures. These correlations might already be an indication that the above-deduced hypotheses of a possible positive and linear relationship between gender and nationality diversity and firm performance, are unsupported by this evidence. Nevertheless, these are just the correlation results and thus do not test whether board diversity causes financial performance.

5.4 Multivariate Regression Results

As already mentioned in the bivariate test section, the two firm size measures, sales and number of employees correlate strongly with each other, which depicts a problem of multicollinearity. Therefore, the regressions have been run separately with each firm size measure. The regressions that included sales, but not number of employees, depict the main regression models (tables 3-5) in this paper, because these models have in most of the cases a higher adjusted R^2, and therefore explain more of the variation in the three dependent variables. Moreover, the regression models with sales also show stronger significance levels.

5.4.1 Regressions with Control Variables Only

The first regressions, which can be found in the appendix B, have been run on all three dependent variables with the control variables solely. This will give an indication of how well the model performs without the main predictor variables of board diversity. Model 1, 2 and 3 in this table explain between 6.4% and 11.9% of the variation in firm performance. Board size follows a significant negative relationship with ROA at a significance level of $p < 0.001$ and ROE at $p < 0.01$. This means that each additional board member will lead to a decrease ROA and ROE by -0.003 and -0.556 respectively. Moreover, sales are positively related with ROA (0.013) and ROE (3.598) at $p < 0.001$, which means the higher the sales, the higher the ROA and ROE. However, in terms of Tobin's Q, there is a significant negative relationship at the $p < 0.05$, which means the higher the sales, the higher the decrease in Tobin's Q. These regression results between sales and financial firm performance are in accordance with the results already presented in the correlation matrix (table 2). Furthermore, several industries, namely manufacturing, wholesale and retail trade, repair of motor vehicles and motor cycles, and professional scientific and technical activities have a negative relationship to the reference industry category, which is financial and insurance activities, at a significance level of $p < 0.05$ and $p < 0.01$. Additionally, the industry transportation and storage is negatively related to the reference category in terms of ROA at a significance level of $p < 0.001$. This means that there are differences among industries since some of them perform less profitable in term of ROE and ROA in comparison to the financial and insurance activities industry. In the case of Tobin's Q, industries seem not to differ significantly in performance compared to the reference industry. These results concerning the control variables remain similar across all other regressions that follow.

5.4.2 Regression Results for Gender Diversity

Model 1, 3 and 6 of table 3 examine the possible linear relationship between board gender diversity and financial firm performance. As can be seen, gender diversity indicates a negative direction with all three dependent variables (β for ROA= -0.008, β for ROE= -6.020 and β for Tobin's Q= -0.266). However, this relationship is not significant and therefore no relationship is found between gender diversity and financial firm performance. Therefore, hypothesis 1, which claimed for a positive linear relationship between board gender diversity and all three financial firm performance variables has to be rejected. This contradicts the results of Erhardt et al. (2003) and Ferreira and Kirchmaier (2013) who found a positive effect of gender diversity on firm performance.

In model 2, 4 and 6 of table 3 the variable gender diversity squared has been added to examine the possible existence of an (inverted) U-shaped relationship. To claim for an inverted quadratic relationship, the results require a significant positive beta coefficient for the linear term and a significant negative beta coefficient for the quadratic term of the board diversity variable. Simultaneously, this also means that if significant opposite directions of the beta coefficients will be found on the linear and squared variable, there is evidence for an U-shaped relationship. In all three models, the directions of beta coefficients for the linear and squared gender diversity variable are not as expected. Moreover, none of them is significant and therefore also no evidence of an inverted U-shaped relationship is present. This means, that hypothesis 2 is rejected for all three dependent variables.

5.4.3 Regression Results for Nationality Diversity

As can be seen in model 1 and 3 of table 4, the proportion of non-German board members shows a negative linear relationship, significant at $p < 0.01$ for ROA and significant at $p < 0.05$ for ROE. This means that with each additional non-German board member, ROA and ROE decrease by 0.085 and 14.52, respectively. This significantly negative linear relationship is also reflected in the correlation matrix (table 2) presented earlier, especially in the case of ROA, which showed a significant negative association between nationality diversity and ROA at the significance level $p < 0.001$. These results are contrary to the results of Carter et al. (2003) and Erhardt et al. (2003) who found a positive relationship between board nationality diversity and firm performance in terms of ROA and Tobin's Q. All in all, hypothesis 3, which states nationality diversity is positively related with firm performance, can be rejected for all three dependent variables.

Model 2, 4 and 6 of table 4 additionally included the variable nationality diversity squared to examine if there is an inverted quadratic relationship with firm performance as hypothesized. In all three models of this table, the linear and squared nationality diversity coefficients are not in the hypothesized direction and are insignificant, which means there is no evidence of an inverted U-shaped relationship between nationality diversity and financial firm performance and therefore hypothesis 4 is rejected. However, mentionable is that the significantly negative linear relationships between nationality diversity and financial firm performance in terms of ROA ($p < 0.01$) and ROE ($p < 0.05$) found before (model 1 and 3, table 4), remain the same in model 2 and 4.

5.4.4 Regression Results for Age Diversity

Table 5 represents the regression results for age diversity and financial firm performance. Again, model 1, 3 and 6 examined the possible linear relationship between board age diversity and ROA, ROE and Tobin's Q, respectively. In all three models, the beta coefficients of the age diversity variables, independent of the direction, are insignificant. This means there is no evidence of a linear relationship between age diversity and financial firm

Table 3: Regressions on Gender Diversity

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
GenDiv	-0.008	-0.008	-6.020	-6.028	-0.266	-0.266
	(-0.29)	(-0.27)	(-0.88)	(-0.88)	(-1.52)	(-1.55)
GenDiv²		0.000		-0.007		-0.006
		(0.60)		(-0.05)		(-1.87)
LnSales	0.013***	0.013***	3.651***	3.650***	-0.032*	-0.033*
	(4.07)	(4.06)	(5.45)	(5.43)	(-2.02)	(-2.10)
Board Size	-0.003***	-0.003***	-0.540**	-0.540**	0.005	0.005
	(-3.35)	(-3.35)	(-3.16)	(-3.16)	(1.20)	(1.31)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.094	0.094	0.119	0.118	0.071	0.082
F-Statistic	3.409	3.084	4.521	4.240	2.254	2.379
N	825	825	814	814	707	707

Table 4: Regressions on Nationality Diversity

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
NatDiv	-0.085**	-0.086**	-14.520*	-14.570*	0.001	0.020
	(-2.92)	(-2.97)	(-2.21)	(-2.25)	(0.05)	(0.11)
NatDiv²		-0.000		-0.001		0.002
		(-0.06)		(-0.07)		(0.57)
LnSales	0.014***	0.014***	3.811***	3.810***	-0.035*	-0.035*
	(4.62)	(4.62)	(5.86)	(5.86)	(-2.17)	(-2.15)
Board Size	-0.003***	-0.003***	-0.575***	-0.574***	0.004	0.004
	(-3.64)	(-3.63)	(-3.39)	(-3.39)	(0.99)	(0.92)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.116	0.115	0.128	0.127	0.063	0.062
F-Statistic	3.859	3.508	4.866	4.451	1.897	1.769
N	825	825	814	814	707	707

Table 5: Regressions on Age Diversity

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
AgeDiv	0.000	0.000	0.015	0.030	-0.003	-0.002
	(0.79)	(0.79)	(0.11)	(0.20)	(-1.12)	(-0.79)
AgeDiv²		-0.012		-8.674		-0.602
		(-0.17)		(-0.50)		(-1.44)
LnSales	0.013***	0.013***	3.606***	3.643***	-0.037*	-0.034*
	(4.09)	(4.01)	(5.41)	(5.43)	(-2.38)	(-2.11)
Board Size	-0.003***	-0.003***	-0.559**	-0.555**	0.005	0.005
	(-3.40)	(-3.41)	(-3.24)	(-3.24)	(1.21)	(1.25)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.096	0.095	0.118	0.117	0.067	0.073
F-Statistic	3.313	3.118	4.454	4.182	2.002	2.226
N	825	825	814	814	707	707

Table 3, 4, and 5 represent regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

performance. This also means hypothesis 5 which claimed for a positive linear relationship, is rejected for all three dependent This also means, hypothesis 5, which claimed for a positive linear relationship, is rejected for all three dependent variables. However, this is in accordance with the findings of Bantel and Jackson (1989) who have found no relationship between age diversity and performance.

Model 2, 4 and 6 of table 5 again investigated the possibility of an inverted quadratic relationship with firm performance as hypothesized. In these models, both the linear and squared beta coefficients of board age diversity are not indicating the desired directions, except for model 2 (β for AgeDiv= 0.000 and β for AgeDiv²= -0.012). However, all three models show no significance. This means, there is no evidence of an inverted U-

shaped relationship between board age diversity and financial firm performance. Therefore, hypothesis 6 has to be rejected for all three dependent financial variables. This is also contrary to the findings of Murphy and McIntyre (2007) who found evidence of an inverted U-shaped relationship between board age diversity and firm performance.

5.4.5 Regression Results: Full Model

Additional regressions have been run which examined all independent variables together. Appendix C presents the full model where model 1, 3 and 5 examine the combined possible linear effect of the three independent variables on ROA, ROE and Tobin's Q, respectively. In model 1 and 3 of this table, one can see that the negative linear relationship between nationality diversity and financial firm performance, in terms of ROA (-0.085) and ROE (-13.02), remained significant at $p < 0.01$ and $p < 0.05$, respectively. Overall, this means that the significant negative relationship between nationality diversity and financial firm performance has remained constant throughout all models in terms of ROA and ROE with regard to the possible effect of the other two board diversity variables.

Model 2, 4 and 6 additionally added all three squared board diversity variables to the three linear board diversity variables that have already been included in model 1, 3 and 5. Again, in all three models, no indication of a significant inverted U-shaped relationship can be found. Only in model 6, which examines all linear and squared board diversity variables in terms of Tobin's Q, changes have occurred. Board age diversity has turned positive and is significant at a level of $p < 0.01$, which means that an increase in age diversity leads to an increase in Tobin's Q of 0.021. Additionally, gender diversity squared turned significant as well with a beta coefficient of -0.028 at a significance level of $p < 0.01$. However, there is still no evidence of an inverted U-shaped relationship between gender diversity and Tobin's Q because the linear gender diversity variable has a negative beta coefficient and is insignificant. Therefore, this emerged significant beta coefficient for gender diversity squared is meaningless.

5.4.6 Additional Regressions

As already mentioned at the beginning of the regression results part, the control variables sales and number of employees have been separated in the regressions due to high correlation. The regressions that included only number of employees as firm size control variable can be found in the appendices D-H. The regression results are very similar to the regression that included sales only. The only striking difference is that in the regressions with number of employees as firm size control variable, the significantly negative and linear relationship between nationality diversity and ROA has remained but disappeared for ROE. Moreover, also regressions have been run that included both, sales and number of employees, as firm size control variable. However, these regressions have not been included in this research paper. In these regressions, board nationality diversity has remained significantly negative and linear for ROA ($p < 0.01$) and also for ROE ($p < 0.05$). Thus, the negative and significant relationship between nationality diversity and ROE that disappeared in the regressions with number of employees only, reappeared in the model where both sales and number of employees have been included. All in all, one can say that as already assumed and mentioned in the bivariate test results part (section 5.3) there seems to be no relationship between the independent board diversity variables and financial firm performance. Only in the case of nationality diversity, there is a significant negative relationship between ROA and ROE. Especially, the relationship between nationality diversity and ROA has remained in all models, even in the regressions that included number of employees only and in the regressions that included both firm size control variables. This significant relationship (-0.131) was also already indicated in the correlation matrix (table 2). Moreover, just as McIntyre et al. (2007) have pointed out, it is interesting to mention that the near-term performance indicators ROA and ROE have produced significant results, especially with regard to nationality diversity, whereas Tobin's Q, which is a measure of the market's evaluation of long-term performance, is not, probably because it is a more volatile measure and therefore harder to achieve significance.

6. DISCUSSION AND CONCLUSION

Since years, researchers are trying to examine the link between board of director diversity and financial firm performance. However, results are irresolute. According to the majority of literate, expectations are directed towards seeing value in diversity and therefore is mainly described as having positive effects on firm performance (Østergaard et al., 2011, Robinson & Dechant, 1997, Carter et al., 2003). However, there is also a part of theory and research that highlighted the negative effects of more diversity within groups. It is said that "too less " and "too much" diversity can also negatively affect firm performance (McIntyre et al., 2007, Bantel & Jackson, 1989). Thus, board diversity can exhibit double-directional effects. Therefore, this paper was investigating following research question:

- *What is the effect of board diversity on the financial performance of publicly listed firms in Germany?*

After the confirmation of the significant influence of the control variables on firm performance, and evidence for differences in financial performance among industries, following results have been found in terms the independent variables and firm performance. In the case of board gender diversity, research has shown mixed results. The majority has found a positive (Erhardt et al., 2003, Ferreira and Kirchmaier, 2013, Catalyst, 2007, McKinsey and Company, 2008) while others have found a negative effect of board gender diversity on financial firm performance (Adams & Ferreira, 2009). In none of the main regressions in tables 3-5 and in the full model (Appendix C) gender diversity showed any significant relationship with financial firm performance. Possible reasons for no relationship could be the following. The mean proportion of female board members averaged around 18.3% which is not that high. It could be that for female board members to contribute significantly positive, it requires a higher representation of female directors in the German boardrooms. From the 315 publicly firms that are listed on the Frankfurter Börse, 37 firms have no female board representatives (12%) and 58 have only one female board representative (19%), which might indicate tokenism according to Ferreira and Kirchmaier (2013). In total, this represents almost one third of the sample (31%). According to them, the increased international pressure to provide females with equal chances on top leadership positions during the last years, forced many firms, especially the larger ones, to include more females to their board for reputational reasons. This pressure might have even increased in Germany, because of its board gender quota introduction at the beginning of 2016. Moreover, results by Adams and Ferreira (2009), Ferreira and Kirchmaier (2013) and Carter et al. (2003) have found that boards that have at least one women on their board tend to be larger boards and that larger boards in general have more women and minority directors, which might indicate that these

females have only been added based on their sex, without the simultaneous consideration of their suitability for a director position in terms of skills and experience and without the consideration of replacing other board directors by them.

The regression results on nationality diversity have shown a significant negative linear relationship between the proportion of non-German board members and ROA and ROE, but not for Tobin's Q, with no further indication of a non-linear relationship. However, hypothesized and expected was a positive linear relationship because nationally diverse board members are said to think differently and come up with new perspectives and solutions due to their cultural background (Cox et al., 1991). A possible reason for that is provided by Milliken and Martins (1996), who say that national diverse members might feel less integrated due to cultural differences and therefore contribute less effectively to strategic board decisions that can impact firm performance. However, they also claim that this negative effect decreases with increased nationality diversity. The average percentage value of non-Germans in this sample is around 13% and the maximum percentage value around 41%. Moreover, in this context the term "situational ethnicity" provided by Cox et al. (1991) might be of importance. Given that in this sample several board members were bi- or even tricultural, it could mean that these members may switch to their German norms because it is the dictating one in the boardroom. This means that the true non-German percentage in this sample may be even lower as indicated. There was no board that had a nationality diversity that was around 50% or even higher. If this would have been the case, maybe different positive results on ROA and ROE would have shown. Thus, to add positively to firm performance through nationality diversity, a possible higher number of board members, diverse in national heritage, is required to contribute significantly.

In the case of age diversity, no significant relationship between board age diversity and financial firm performance has been found in the main regression models of table 3-5. However, in the main full model version (Appendix C, model 6) age diversity turned significantly positive. This can mean that age diversity alone might not be sufficient to significantly affect firm performance in terms of Tobin's Q. Therefore, this relationship is well noticed but rather regarded as less consistent, especially with regard to the negative significance of nationality diversity that remained more consistent throughout all regressions.

All in all, to answer the initial research question, this paper was not able to find any clear and significant pattern of linear and or quadratic relationships between all three demographic board diversity characteristics and all three financial firm performance measures. Zenger and Lawrence (1989), highlight the fact that the influence of the various components of demographic diversity can be different. This is also evident in this paper. The relationship is not straightforward explainable. Even if there had been a significant inverted relationship between at least one of the three independent variables and financial firm performance, and thus an optimum diversity value could have been calculated, cautious should be made with generalization attempts. Determining a "good" or "critical mass" in terms of valuable board diversity is hard because there is no "one-size-fits-all" level since each firm is unique and operates under different conditions. However, only in the case of nationality diversity, there seems to be a consistently significant but negative relationship with firm performance in terms of ROA and ROE. Therefore, also the value-in-diversity hypotheses cannot be confirmed by this research model. Nevertheless, prior studies were able to find a significant positive relationship between nationality and other board diversity characteristics and firm performance. Therefore, in any case, board diversity management is of huge importance as it can affect financial performance, positively and negatively. Businesses should aim for a balanced board where "a core of similarity among group members is desirable […], and the need for heterogeneity, to promote problem solving and innovation, must be balanced with the need for organizational coherence and unity of action" (Cox et al. 1991, p.52). Moreover, as already pointed out by Erhardt et al. (2003), director diversity may be an obvious effort to reduce discrimination at the boardroom level, which might mean that companies appoint directors only for the sake of diversity. This might be fatal, given the importance of boards in corporate governance frameworks and their decisional power. Simultaneously, this effort makes can make it unclear whether board diversity impacts firm performance. Therefore, nowadays a fundamental requirement of the business environment is to view and treat diversity initiatives as any other business investment. This in turn requires the creation of a compelling business story for diversity with a clear link to firms' strategic corporate objectives (Robinson & Dechant, 1997). Shareholders, employees and nomination committees are required to decide by themselves which directors and characteristics are suitable in bringing their company forward based on their corporate mission and vision.

7. LIMITATIONS AND FUTURE STUDY

Firstly, this study solely focused on observable demographic aspects of board diversity. Other board diversity characteristics that could be included for future research might be of cognitive nature. For instance, educational background. Fidanoski et al. (2014) have found a significant positive relationship between educational diversity and ROA. This might also lead to a larger variation explained in financial performance. Another limitation of this paper is that board member information in Orbis is only represented for the last year 2016. This means that past information on board member composition was not provided. However, because this research was aimed at showing statistical significance, it was also aimed at including a larger number of firm-year observations. Therefore, financial performance of the last two years has nevertheless been added to the ones of 2016. This means that board diversity characteristics of 2016 have been applied to these two years of financial firm performance as well. This decision was based on the assumption that board compositional changes are not enormously different from year to year, especially because directors are normally appointed for several consecutive years. Nevertheless, therefore claims of causation, especially in the case of nationality diversity, should be treated with caution in this research paper. Moreover, the problem of endogeneity might be present. As Ferreira and Kirchmaier (2013) and McIntyre et al. (2007) have pointed out, the good or bad performance of firms can also have an impact on board composition and therefore board diversity. Furthermore, this research examined board diversity without separating and examining these characteristics for supervisory and management board. This decision was based on the fact that the way Orbis represents board characteristics information made it difficult to differentiate between supervisory and management board. Therefore, cumulative counting was used. The same was applied in the case of manual computation to ensure mutual comparability. Therefore, future research could be focused on investigating whether board diversity is quite different between the two boards in the context of firm performance. Moreover, Watson et al. (1993) have found out that homogeneous boards are better performing in the short-

term, whereas heterogeneous boards perform better in the long-term. Therefore, a longer time period might bring better and different results concerning board diversity and firm performance. Nevertheless, this study extends the existing literature on corporate governance by having examined the link between demographic board diversity characteristics and financial performance in a different country-specific context, namely, Germany.

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6. APPENDICES

Appendix A

Industry Distribution		
Manufacturing, wholesale & retail (C)	130	43%
Information & communication (J)	48	16%
Financial & insurance activities (K)	30	10%
Professional, scientific & technical activities (M)	23	8%
Repair of motor vehicles & motor cycles(G)	19	6%
Real estate activities (L)	14	5%
Transportation & storage (H)	10	3%
Miscellaneous industries (Misc)	31	10%
Total	305	100%

Appendix B

Regressions with control variables only			
	Model 1	Model 2	Model 3
	ROA	ROE	Tobin's Q
LnSales	0.013***	3.598***	-0.035*
	(4.12)	(5.45)	(-2.27)
Board Size	-0.003	-0.556**	0.004
	(-3.34)	(-3.19)	(1.01)
Industry Dummies	yes	yes	yes
Adjusted R^2	0.095	0.119	0.064
F	3.686	4.911	2.110
N	825	814	707

Appendix B represents regressions with ROA (model 1), ROE (model 2) and Tobin's Q (model 3) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix C

Full Model

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
GenDiv	-0.001	-0.033	-4.458	-22.44	-0.244	-0.256
	(-0.03)	(-0.35)	(-0.64)	(-1.02)	(-1.35)	(-0.43)
NatDiv	-0.085**	-0.082**	-13.970*	-13.020*	0.031	0.045
	(-2.94)	(-2.89)	(-2.14)	(-2.00)	(0.18)	(0.25)
AgeDiv	0.000	0.001	0.021	0.230	-0.002	0.021**
	(0.72)	(0.63)	(0.17)	(0.58)	(-0.81)	(2.71)
GenDiv²		-0.001		-0.259		-0.028**
		(-0.46)		(-0.62)		(-3.32)
NatDiv²		-0.000		-0.024		-0.001
		(-0.02)		(-0.16)		(-0.42)
AgeDiv²		0.064		40.74		-0.642
		(0.28)		(0.74)		(-0.47)
LnSales	0.014***	0.015***	3.853***	3.932***	-0.034*	-0.024
	(4.50)	(4.37)	(5.76)	(5.76)	(-2.05)	(-1.42)
Board Size	-0.003***	-0.003***	-0.566***	-0.577***	0.005	0.001
	(-3.71)	(-3.58)	(-3.71)	(-3.40)	(1.34)	(0.35)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.116	0.113	0.127	0.126	0.071	0.099
F-Statistic	3.337	2.745	4.219	3.600	1.968	2.343
N	825	825	814	814	707	707

Appendix C represents regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix D

Regressions with control variables only

	Model 1 ROA	Model 2 ROE	Model 3 Tobin's Q
LnEmployees	0.013***	3.310***	-0.040*
	(3.99)	(4.75)	(-2.28)
Board Size	-0.003***	-0.484**	0.004
	(-3.35)	(-2.84)	(1.06)
Industry Dummies	yes	yes	yes
Adjusted R²	0.073	0.089	0.063
F-Statistic	3.004	3.653	2.039
N	849	838	703

Appendix D represents regressions with ROA (model 1), ROE (model 2) and Tobin's Q (model 3) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix E

Regressions on Gender Diversity						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	ROA	ROA	ROE	ROE	Tobin's Q	Tobin's Q
GenDiv	-0.018	-0.008	-7.270	-6.000	-0.197	-0.259
	(-0.58)	(-0.26)	(-1.00)	(-0.84)	(-1.04)	(-1.47)
GenDiv²		0.000		-0.007		-0.005
		(0.60)		(-0.05)		(-1.80)
LnEmployees	0.013***	0.014***	3.392***	3.575***	-0.037*	-0.034*
	(3.95)	(4.14)	(4.76)	(4.90)	(-2.15)	(-2.03)
Board Size	-0.002***	-0.003***	-0.469**	-0.478**	0.004	0.004
	(-3.34)	(-3.42)	(-2.81)	(-2.84)	(1.15)	(1.20)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.072	0.082	0.091	0.096	0.066	0.079
F	2.735	2.877	3.383	3.332	2.091	2.296
N	849	816	838	805	703	697

Appendix E represents regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix F

Regressions on Nationality Diversity						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	ROA	ROA	ROE	ROE	Tobin's Q	Tobin's Q
NatDiv	-0.083**	-0.075*	-12.270	-11.780	0.074	-0.004
	(-2.65)	(-2.58)	(-1.74)	(-1.77)	(0.40)	(-0.02)
NatDiv²		0.000		0.019		0.001
		(0.16)		(0.13)		(0.44)
LnEmployees	0.014***	0.015***	3.464***	3.667***	-0.041*	-0.038*
	(4.36)	(4.55)	(4.93)	(5.11)	(-2.44)	(-2.24)
Board Size	-0.003***	-0.003***	-0.497**	-0.503**	0.004	0.004
	(-3.58)	(-3.63)	(-2.94)	(-2.95)	(1.07)	(0.96)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.093	0.098	0.096	0.102	0.063	0.061
F	3.154	3.211	3.440	3.415	1.832	1.677
N	849	816	838	805	703	697

Appendix F represents regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix G

Regressions on Age Diversity

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
AgeDiv	0.000	0.000	-0.044	-0.028	-0.002	-0.002
	(0.49)	(0.56)	(-0.34)	(-0.21)	(-0.91)	(-0.68)
AgeDiv²		-0.041		-11.980		-0.381
		(-0.51)		(-0.64)		(-0.82)
LnEmployees	0.013***	0.013***	3.298***	3.352***	-0.041*	-0.039*
	(4.01)	(3.96)	(4.73)	(4.70)	(-2.54)	(-2.25)
Board Size	-0.003***	-0.003***	-0.477**	-0.475**	0.005	0.004
	(-3.41)	(-3.42)	(-2.86)	(-2.86)	(1.20)	(1.18)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.072	0.072	0.088	0.088	0.064	0.066
F	2.761	2.531	3.304	3.133	1.975	2.034
N	849	849	838	838	703	703

Appendix G represents regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.

Appendix H

Full Model

	Model 1 ROA	Model 2 ROA	Model 3 ROE	Model 4 ROE	Model 5 Tobin's Q	Model 6 Tobin's Q
GenDiv	-0.008	-0.024	-5.265	-19.770	-0.188	-0.283
	(-0.27)	(-0.25)	(-0.71)	(-0.86)	(-0.98)	(-0.47)
NatDiv	-0.082**	-0.073*	-11.630	-10.530	0.092	0.031
	(-2.65)	(-2.53)	(-1.66)	(-1.57)	(0.49)	(0.17)
AgeDiv	0.000	0.000	-0.033	0.002	-0.002	0.023**
	(0.46)	(0.21)	(-0.25)	(0.00)	(-0.65)	(3.03)
GenDiv²		0.000		-0.014		-0.029***
		(0.04)		(-0.03)		(-3.61)
NatDiv²		0.000		0.019		-0.002
		(0.29)		(0.12)		(-0.50)
AgeDiv²		0.058		39.120		-0.586
		(0.25)		(0.70)		(-0.42)
LnEmployees	0.014***	0.015***	3.506***	3.702***	-0.039*	-0.027
	(4.31)	(4.44)	(4.90)	(5.02)	(-2.21)	(-1.61)
Board Size	-0.003***	-0.003***	-0.481**	-0.477**	0.005	0.002
	(-3.64)	(-3.61)	(-2.93)	(-2.82)	(1.27)	(0.45)
Industry Dummies	yes	yes	yes	yes	yes	yes
Adjusted R²	0.091	0.095	0.095	0.099	0.066	0.101
F-Statistic	2.706	2.480	2.970	2.669	1.855	2.363
N	849	816	838	805	703	697

Appendix H represents regressions with ROA (model 1 and 2), ROE (model 3 and 4) and Tobin's Q (model 5 and 6) as dependent variables. T statistics are represented in parentheses beneath the beta coefficients. Statistical significance is indicated with stars (significance levels: $p < 0.05$*, $p < 0.01$**, $p < 0.001$***). All parameters have been winsorized at 95%. Standard errors have been clustered at the firm-level and the absence of heteroscedasticity and autocorrelation has been confirmed.