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Board Diversity and Firm Financial Performance: Gender-, Nationality- and Age Diversity in European Boardrooms

Author: Alina Woschkowiak (s4794508)

Supervisor: Dr. Max Visser

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Abstract

This thesis examines the relationship between demographic diversity in the board of directors and the financial performance of European firms. Demographic board diversity is conceptualised as gender, nationality and age diversity as well as a diversity index is constructed to investigate the combined overall diversity effect. Theory suggests that diversity leads to more effective strategic decision-making, creativity and innovations and thereby affects the financial performance positively, while diverse boards are also associated with integration costs and more time-consuming processes. In general, this research assumes that the more demographic diversity in the board of director, the better the financial performance of firms which is measured as return on assets (ROA) and Tobin's Q. A cross-sectional empirical analysis investigates the largest European companies listed on the STOXX Europe 600 Index in the year 2016. Selecting European countries extends the diversity literature as well as the impact of the demographic characteristics nationality and age diversity and the effect of an overall diversity index on a firm's performance has been only rarely studied before. The findings reveal that overall demographic board diversity has a significant and positive effect on the financial performance of firms. Also, gender and nationality board diversity significantly improve the financial performance, while the influence of age diversity is insignificant. This empirical study contributes to make sense of the inconclusive results of past studies and gives theoretical and practical implications for policy makers and the management of modern companies.

Keywords: Board of directors, demographic diversity, gender diversity, nationality diversity, age diversity, overall board diversity index, financial performance

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1 Introduction

In the last decades, the composition and diversity of board members have become a relevant corporate governance issue for managers, directors and shareholders of medium and larger corporations (Adams, 2015; Carter, Simkins, & Simpson, 2003). The globalisation of business operations has led to a complexity of today's environment in terms of increasing international competitive pressure, new technologies, market fluctuations, societal changes as well as affected the composition and the degree of diversity within organisations (Maznevski, 1994; Milliken & Martins, 1996; Shrader, Blackburn, & Iles, 1997). These changes require the integration and understanding of how diversity in organisational groups, like the board of directors, affects the outcomes and value of firms (Maznevski, 1994; Milliken & Martins, 1996). Corporate and board diversity has caught public attention and is represented in the press and political debates due to shareholder and institutional investor proposals to increase diversity (Adams, 2015; Carter et al., 2003). Especially a greater representation of women in higher positions and boardrooms has been supported by the introduction of gender quotas or softer regulations in some European countries like Norway, Sweden and France (European Women on Boards (EWoB's), 2016).

In general, these developments have increased demographic diversity in terms of gender, age and ethnical background among the workforce, top management teams and the board of directors of companies. The number of women in the board of STOXX Europe 600 companies has increased from on average 1.5 women in 2011 to 2.8 female board members in 2015 (EWoB's, 2016).[1] Hence, women representation has nearly doubled from 13.9% of all board members to 25% on average, while the board size remained stable over that five-year period (EWoB's, 2016). In addition, the growth in female directors has led to greater age diversity among board members worldwide. Approximately 9% of newly appointed board members between 2015 and 2016 have been younger than 45, while the global average age is 61 (Egon Zehnder, 2017). Even though nationality diversity in the board of directors is less common than gender diversity, also cross-cultural differences in experiences and knowledge have gained more importance (Egon Zehnder, 2017). Especially Western European countries indicate higher numbers of non-national board members due to higher labour mobility across country borders (Egon Zehnder, 2017).

Such an increase in demographic board diversity may be advocated for a moral or political reason and represents the active effort to reduce discrimination and promote equality and fairness in the public (Erhardt, Werbel, & Shrader, 2003; Randoy, Thomsen, & Oxelheim, 2006; Rivas, 2012). However, if diversity is also favourable for a company's performance is less clear for which reason it became a key question in diversity research. While diversity in corporate groups has been associated with group interaction problems in the past, it seems like nowadays an intuitive belief of corporate managers and

[1] The STOXX Europe 600 index represents 600 large, medium and small capitalisation companies in 17 European countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. See https://www.stoxx.com/index-details?symbol=SXXP for more information.

researchers is that diversity contributes positively to group performance and the value of firms (Carter et al., 2003; Jackson, Joshi, & Erhardt, 2003; Maznevski, 1994; Walt & Ingley, 2003).

However, theory suggests that, on the one hand, group diversity leads to more efficient strategic decision-making, creativity and innovations and, on the other hand, heterogeneity negatively affects the dynamics of a group and hence can be also value destroying. In line with these mixed theoretical suggestions about the effect of diversity, existing empirical studies are also characterised by inconclusive results. Research about the effect of gender diversity on firm performance showed that an increase in board member diversity can positively affects the financial outcome (Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Mahadeo, Soobaroyen, & Hanuman, 2012), but also negatively (Darmadi, 2011; Shrader et al., 1997), while other studies fail to find significant results (Carter, D'Souza, Simkins, & Simpson, 2010; Smith, Smith, & Verner, 2006). Moreover, racial diversity reveals a positive effect on firm performance (Carter et al., 2003; Erhardt et al., 2003) or has no effect (Carter et al., 2010). Researches about age diversity among the board of directors are limited but indicate either positive results (Mahadeo et al., 2012) or no effect at all (Darmadi, 2011).

Taking into account recent developments in European boardrooms and the inconclusive empirical results, this calls for a better understanding of board diversity and its effect on the performance of firms to ensure good corporate governance and more effective boards. Therefore, the purpose of this thesis is to empirically examine the relationship between the board diversity indicators gender, age and nationality and the creation of shareholder value of European companies by addressing the following research question:

How does demographic diversity in the board of directors affect the financial performance of firms?

This research contributes to the literature and the understanding of board diversity in theoretical and empirical ways. First of all, theoretically board diversity is assumed to have positive as well as negative effects on the firm's performance and especially diversity in the boardroom has been less studied than workforce diversity for which reason empirical studies can contribute to the practical understanding of modern companies and its managers. If the empirical relationship between board diversity and the financial performance of firms is positive, this has important implications for the governance of firms which may consider greater diversity among board members, while a negative relationship raises the need to understand the cost factor of diversity inclusion (Carter et al., 2010). In addition, if this research cannot find significant results, public policies may be needed e.g. regarding the implementation of legal quotas to increase diversity (Carter et al., 2010).

Second, while past diversity research focuses on workforce diversity and their effect on group outcomes, studying the board of directors is a new, less researched topic in the literature. In addition, those studies which investigated the board mainly define diversity in terms of gender and partly in terms

of racial minorities (Adams, 2015; Carter et al., 2010). Therefore, this research aims to make sense of the inconclusive results by conceptualising board diversity in a broader term, namely gender, age and nationality diversity. Thus, analysing the effects of nationality diversity and age diversity in the board of directors will enrich the diversity literature. In addition, this thesis is one of the first empirical contributions which tests for the effect of overall diversity by constructing two diversity indices. The diversity indices consist of gender, nationality and age diversity and therefore allow to examine the combined effect of the three demographic diversity aspects.

Third, this study focuses on European listed companies at the STOXX Europe 600 index as most research on board diversity and firm performance have been conducted in the US context, but a European empirical perspective is limited (Campbell & Mínguez-Vera, 2008; Smith et al., 2006).[2] This also allows conducting a cross-country analysis of European economies, instead of only investigating one country.

Finally, past studies use many different measures for firm performance, whereas some researcher advocate market-based measures and others accounting-based measures. In order to be able to compare the results of this study with past and future research about the effect of board diversity on firm performance, this study makes use of the mostly used market-based and accounting-based measures for firm performance, namely Tobin's Q (e.g. Campbell & Mínguez-Vera, 2008; Carter et al., 2010, 2003; Darmadi, 2011; Oxelheim & Randøy, 2003) and return on assets (e.g. Carter et al., 2010; Darmadi, 2011; Erhardt et al., 2003; Mahadeo et al., 2012; Shrader et al., 1997), respectively.

The structure of the thesis is divided into two parts: a literature review of theoretical frameworks and prior empirical studies which is followed by an empirical research. First of all, chapter 2 explains the structure and functions of the board of directors as a corporate governance mechanism as well as contains the theoretical foundation of this research about the general effect of diversity on firm performance. Based on the theory and past empirical studies the specific effects and hypotheses for gender, nationality and age diversity are developed. Chapter 3 describes the research design including data and methodology as well as contains the analysis of data. The empirical findings and the answer to the developed hypotheses are given in chapter 4. Finally, chapter 5 concludes and discusses the regression outcomes, provides theoretical and practical implications, specifies the limitations of this research and gives future research recommendations.

[2] See appendix I for an overview of previous related research studies and their country selection.

2 Literature Review and Hypotheses

This chapter elaborates the current theoretical and empirical academic literature related to this research. First of all, an overview of corporate boards and their tasks, functions and one-tier or two-tier structure is explained. Next, the meaning of diversity and the general effects of diversity are elaborated by referring to theoretical approaches. Finally, a literature review of previous empirical research is given to underline the separate diversity effects of the demographic characteristics gender, nationality and age which serves as the foundation for developing the hypotheses of this research.

2.1 Corporate Governance and Board of Directors

Corporate governance is, in general, the system which is responsible for directing and controlling a company (Adams, 2015; Campbell & Mínguez-Vera, 2008). Economic theory assumes that the board of directors has an important internal function and is a crucial corporate governance mechanism of large firms (Baysinger & Butler, 1985; Fama & Jensen, 1983; Rose, 2007). The agency theory is the most often used theoretical framework in economics to explain the relationship between the board of directors and the value and performance of companies (Carter et al., 2003). In this framework, the board of directors is the governance mechanism to control and monitor managers and aims to represent shareholder interests by increasing shareholder value and preventing opportunistic behaviour of managers (Fama & Jensen, 1983; Finkelstein & Hambrick, 1996; Shrader et al., 1997). Hence, the role of the board is to solve agency problems between manager and shareholders through effective strategic decision-making in e.g. setting compensation and replacing self-interested manager (Baysinger & Butler, 1985; Carter et al., 2003; Finkelstein & Hambrick, 1996; Shrader et al., 1997).

Based on legal rules, corporate boards traditionally have a one-tier or a two-tier structure to fulfil their responsibilities of supervision. In some European countries, e.g. in Germany and the Netherlands, companies consist of a dual or two-tier board structure which can be distinguished between a supervisory and a management board (Adams, 2015; Jungmann, 2006; Maassen, 1999). In this structure, executive and non-executive directors are represented in separate boards: the management board consists of executive directors and the supervisory board of non-executive or independent, outside directors that are not employed at the company and who usually represent labour and shareholder interests (Jungmann, 2006; Maassen, 1999). Hence, the functions of the board of directors are separated in which the supervisory board is responsible for monitoring, appointing and dismissing the members of the management board as well as can intervene in cases in which the company's interest is violated (Jungmann, 2006; Maassen, 1999). On the other hand, the management board is responsible for managing the company's day-to-day affairs and executes strategic tasks by setting long-term goals and guidelines (Darmadi, 2011; Jungmann, 2006).

However, most Anglo-American companies, e.g. in the UK and US, are characterised by an unitary board, which is a one-tier or single board of directors, consisting of executive and non-executive directors who are in charge of the company's management (Adams, 2015; Jungmann, 2006; Maassen,

1999). Compared to a two-tier structure, no clear distinction between the tasks of executive and non-executive directors is made in a unitary board, but non-executive directors are also mainly concerned with a control function and directors are usually elected or dismissed by the shareholders of the company (Jungmann, 2006). However, the key assumption for a positive effect of board activities on the firm performance is that the board is independent which means directors will not collude with outside directors for self-interest incentives but actually have the incentive to establish reputation and become expert monitors (Carter et al., 2003).

2.2 The Effects of Diversity

Diversity can be understood as any difference in attributes between individuals which distinguishes a person from oneself (Williams & O'Reilly, 1998). Previous research on diversity has led to the common distinction between two types of diversity: observable and non-observable diversity. Observable board diversity can be understood in terms of demographic diversity such as gender, age, and nationality or racial background which are visible attributes, while differences in non-observable attributes such as cultural values, educational knowledge or personality characteristics represent cognitive diversity (Erhardt et al., 2003; Jackson et al., 2003; Maznevski, 1994; Milliken & Martins, 1996; van Knippenberg & Schippers, 2006). However, most research about the effect of diversity on firm performance focus on observable, demographic diversity. Also, this research conceptualises diversity in terms of demographic diversity of board member's gender, age and nationality.

Group diversity and its effects can occur on different organisational levels such as in the board of directors, top management and the workforce (Milliken & Martins, 1996). Reviewing past empirical literature about corporate diversity shows that many studies focus on workforce diversity and its effect on group- and firm performance. However, board diversity has been only recently more researched and hence is gaining more importance nowadays. Therefore, this research assumes like most previous studies in this research field, that board diversity has similar effects like workforce diversity on the value of firms (e.g. Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003).

Those studies base their arguments on the **business case theory** which was developed by Robinson & Dechant (1997) and is closely related to Cox & Blake (1991) arguments. The theory emphasises the importance of diversity management for operating a business and assumes that greater corporate workforce diversity increases a firm's financial value in the long-run and short-run. Hence, the main reason for managing overall corporate diversity is that diversity can be understood as a driver for business growth. As today's consumer market became increasingly diverse, corporate diversity promotes a *better understanding of the marketplace* because diverse employees offer specific knowledge and understanding of different cultures. Moreover, corporate diversity supports *to build more effective global relationships* due to different cultural competencies which can be incorporated into marketing, sales and customer service strategies. In addition, the theory assumes that demographic diversity influences the competitive strategy and financial performance because diversity *enhances corporate*

leadership effectiveness and thus the board of directors (Robinson & Dechant, 1997). Furthermore, the business case theory argues that this greater effectiveness of corporate leaderships and the workforce can be explained by an *increase in creativity and innovation* as well as *higher quality of problem-solving* due to managing diversity (Robinson & Dechant, 1997).

The last two arguments are closely related to the resource-based theory and human capital theory which also serve as a theoretical framework for the effects of diversity on the performance of firms (Carter et al., 2010; Richard, 2000; Shrader et al., 1997). According to the **resource-based theory**, a company consists of many resources namely all assets, capabilities, organisational processes, firm attributes, information and knowledge which can be used to effectively implement value-creating strategies (Barney, 1991). The theory argues that instead of the industry structure, a company's ability to utilise and apply those resources can determine a company's competitive advantage if these resources are unique or difficult to imitate (Barney, 1991; Shrader et al., 1997). Hence, it is assumed that the board of directors is a provider of resources, called board capital, which affects the performance of firms (Hillman & Dalziel, 2003). Board capital can refer to any resources like human capital or social (relational) capital, where the latter provides communication and information channels and is the resource of having social network ties to other firms (Hillman & Dalziel, 2003; Terjesen, Sealy, & Singh, 2009; Walt & Ingley, 2003). Therefore, greater board diversity implies more unique and valuable resources a company can make use of to improve its performance. Additionally, greater social capital provides benefits due to trust and reduces uncertainty by linking the outside environment to the firm as well as by accumulating information and skills (Miller & Del Carmen Triana, 2009; Shrader et al., 1997; Walt & Ingley, 2003).

Especially the human capital of a company's employees, management and board members are key resources for achieving a competitive advantage (Barney, 1991). This emphasises that the **human capital theory** complements the idea of the resource-based theory about the diversity effects on firm performance. According to the human capital theory by Becker (1964), human capital refers to "a person's stock of education, experience, and skills that can be used to the benefit of an organization" (Carter et al., 2010, p. 398). Hence, human capital resources of employees and board of directors include training, experience, judgement, intelligence as well as individual knowledge and insights as those are among all resources most difficult to duplicate by competitors (Barney, 1991). Human capital such as cultural competence is seen as a valuable resource which is scarce and hard to imitate (Richard, 2000), while human capital in terms of education differs especially between men and women as "women have traditionally made fewer investments in education and work experience" (Terjesen et al., 2009).

However, resource-based and human capital theory assume that homogeneity in firm resources within groups prevents a firm from gaining a competitive advantage (Barney, 1991; Carter et al., 2010). Therefore, managing and increasing diversity in the board of directors provides different beneficial resources. Especially a diverse human capital leads to a *variety of different perspectives* which are based on different experiences, knowledge and information that can be critically evaluated and thereby may

result in more *effective group decision-making and problem-solving* (Carter et al., 2010; Cox & Blake, 1991; Erhardt et al., 2003; Maznevski, 1994; Robinson & Dechant, 1997; Shrader et al., 1997). This also implies that an organisation which is characterised by diversity has access to a greater talent pool (Carter et al., 2010). In addition, a broader view due to diversity allows a better understanding and utilisation of the complex business environment and increases the acceptance and openness to environmental and strategic changes (Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Richard, 2000; Shrader et al., 1997). Moreover, different perspectives and a greater acceptance of changes may also lead to *higher creativity and innovations* (Cox & Blake, 1991; Erhardt et al., 2003; Richard, 2000; Rivas, 2012; Robinson & Dechant, 1997). Especially diversity in the demographic variables gender, age and racial background can stimulate creativity and innovations as it is assumed that attitudes and cognitive functioning are not randomly distributed but vary among these variables (Robinson & Dechant, 1997). Overall, a diverse group of board members is associated with holding collectively a unique mix of resources or board capital which is almost impossible to imitate by competitors as well as cannot be transferred to other companies. Hence, it only adds value to the board's governance function who is possessing this system of resources (Richard, 2000; Walt & Ingley, 2003).

Regarding the function of the board of directors to solve agency problems between shareholder and manager, the **agency theory** provides alternative arguments to explain the impact of diversity on the value of firms. Agency theorists assert that greater diversity *increases the boards effectiveness of monitoring and controlling* the activities of managers (Carter et al., 2003; Hillman & Dalziel, 2003; Terjesen et al., 2009). The reason is that diversity increases the independence of board members because directors with different gender, ethnic or cultural background may ask different questions compared to those directors with more traditional backgrounds which leads to a more active board (Carter et al., 2003; Randoy et al., 2006; Walt & Ingley, 2003). However, Carter et al. (2003) also acknowledge that diverse perspectives do not necessarily lead to more effective execution of their monitoring and controlling tasks as diverse board members may be marginalised. Therefore, the agency theory does not provide a clear prediction about the relationship between board diversity and firm financial performance, but still considers that board diversity may be beneficial (Carter et al., 2003). However, as there is no single theory explaining the link between board diversity and firm performance, this thesis is in line with the assumption by Hillman & Dalziel (2003) of combining theories and that the increased board capital due to diversity will affect monitoring and controlling tasks as well as provides resources to a company.

All before mentioned theories emphasised the advantages of diversity, but a positive effect on performance depends on the integration and communication of a diverse group (Erhardt et al., 2003; Maznevski, 1994; Terjesen et al., 2009). According to the **social identity theory**, people define themselves and others, who share the same social identity e.g. in terms of gender or race, as in-group members and everyone else who has a different social identity as out-group who encounter difficulties to be accepted and integrated (Terjesen et al., 2009). Firms which promote diversity and manage to

integrate diverse groups have a competitive cost advantage relative to firms that do not manage their diversity. Therefore, firms that fail in integrating diversity face higher turnover costs and/or higher absenteeism due to dissatisfied women and minorities with regard to their jobs and future perspectives (Cox & Blake, 1991; Robinson & Dechant, 1997).

This underlines that heterogeneity in groups does not only offer opportunities, but companies may also face challenges. Williams & O'Reilly (1998) suggest that homogeneous groups tend to communicate and cooperate more due to sharing the same opinions as well as encounter fewer emotional conflicts. Like mentioned before, Carter et al. (2003) suggest that different perspectives and opinions of a diverse board may not always contribute to more efficient monitoring of managers as the positive effect of board diversity might be marginalised. Hence, diversity can lead to increased conflicts and complexity in decision-making and thereby reduce the speed of acting and responding which might lead to an overall lower firm performance (Campbell & Mínguez-Vera, 2008; Rivas, 2012; Smith et al., 2006). This has been confirmed in an empirical study by Hambrick, Cho, & Chen (1996) whose results indicate that heterogeneous top management teams, measured as functional, educational and tenure diversity, were reacting and responding slower to competitor's initiatives.

This time-consuming processes can become a problem for firms that operate in competitive environments which requires to react quickly to changes in the environment (Hambrick et al., 1996; Smith et al., 2006). Murray (1989) found in his study that the direction of the diversity effect in top management groups of US Fortune firms is related to the degree of competition in the market a firm is operating in. While homogeneous groups are acting more efficiently in markets characterised by intense competitive pressure, heterogeneous groups are more likely able to adapt to market and environmental changes which makes them work more efficiently in such circumstances.

Therefore, diversity is described as a "double-edged sword" in the literature (Milliken & Martins, 1996), which increases the likelihood for creativity, innovation and high-quality decision-making and, on the other hand, increases integration costs, is time-consuming and may generate more conflicts due to more opinions. In general, there is no single theory which explains the relationship between board diversity and the financial performance of firms, but various theories offer arguments and insights. With respect to the business case, resource-based, human capital and agency theory, it seems logical to expect that higher diversity in the board of directors will lead to higher levels of firm performance compared to homogeneous boards. Especially on the board of director's level, the main diversity effects are better monitoring and controlling skills and the generation of creativity, innovations as well as high-quality decision-making through a variety of perspectives. This leads to the following general hypothesis:

The more demographic diversity in the board of directors, the better the financial performance of firms.

2.3 Demographic Board Diversity and Hypotheses Development

Considering the before mentioned general effects of diversity, a distinction between the different aspects of diversity and their impacts on firm performance is crucial for a better understanding of the separate effects in empirical analyses (Rivas, 2012; van Knippenberg & Schippers, 2006). Therefore, the following subchapters discuss the underlying separate effects of the three demographic diversity aspects gender, nationality and age which serves as the basis for deriving the hypotheses for this research. This review is based on previous empirical research which is characterised by mixed results and hence emphasises the need for further diversity research.[3]

2.3.1 Gender Diversity

Gender is the most debated diversity type in the literature and has caught growing attention by investors, in politics, media and in general social situations because many companies situated in Western European countries like France, Spain and Italy have instituted board quotas and are characterised by the largest number of young directors (Egon Zehnder, 2017; Kang et al., 2007; Labelle, Francoeur, & Lakhal, 2015). Many empirical studies about the relationship between the representation of women in the board and firm performance conclude that gender diversity has a positive effect (e.g. Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Labelle et al., 2015; Lückerath-Rovers, 2013; Mahadeo et al., 2012), while some studies find a negative effect (e.g. Adams & Ferreira, 2009; Darmadi, 2011; Shrader et al., 1997) and others fail to find significant results (e.g. Carter et al., 2010; Randoy et al., 2006; Rose, 2007; Smith et al., 2006).

According to the agency theory, diverse boards in terms of gender, but also in ethnicity and cultural background, are characterised by higher degrees of board independence as women are not part of an "old boys' network" as well as diverse board members may ask more critical questions about board activities and are thus more effective in monitoring managers (Carter et al., 2003; Ruigrok, Peck, & Tacheva, 2007). Based on this argument, a positive effect of gender diversity on firm performance, measured with Tobin's Q, was confirmed by Carter et al. (2003), however, a later study in 2010, failed to find a significant effect on Tobin's Q and ROA. Also, the study by Rose (2007) is based on the argument that gender diversity reduces agency problems as diverse boards are more likely to act in accordance to shareholder interests. Also, this study fails to find a statistically significant impact of gender diversity on the Tobin's Q performance measure of Danish listed companies.

Furthermore, empirical results suggest that a balanced gender composition of boards affect the quality of monitoring because women are more likely to be part of monitoring-related committees compared to male directors, which is an important corporate governance control mechanism, particularly in countries with less developed external mechanisms (Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008). On the one hand, the effect is positive if women bring new perspectives to enhance the

[3] See appendix I for an overview of previous related research studies and their effects of board diversity on the financial performance of firms.

decision-making of the board but, on the other hand, the general effect on firm performance might be negative in case of appointing women to the board simply due to societal pressure to reduce gender discrimination and promote equality (Campbell & Mínguez-Vera, 2008). This demonstrates that a greater female representation can be driven by economic and ethical or practical reasons.

Smith et al. (2006) examine gender diversity on the performance of Danish firms and argue that greater gender diversity could improve the public image of the firm which may positively affect the behaviour of customer and thus lead to an increase in the financial performance of firms. Hence, a practical reason to increase the representation of women is that they could serve as a symbolic value inside as well as outside the company and thereby may link the company with shareholders (Erhardt et al., 2003; Walt & Ingley, 2003). Inside a company, a higher representation of women in the board of directors or top management positions can be associated with a mentor or role model effect for women at lower levels of an organisation and thereby may influence their career development and aspiration (Dezso & Ross, 2012; Smith et al., 2006; Walt & Ingley, 2003). Outside the company, the aim of a higher female representation in the boardroom might be to signal higher firm reputation and corporate social responsibility (CSR) compared to other companies (Miller & Del Carmen Triana, 2009; Walt & Ingley, 2003). Bear, Rahman, & Post (2010) proves this and found evidence that the number of women in the board increase CSR ratings of companies and hence firm reputation.

With regard to the resource dependency theory, gender diversity in groups allows to include and evaluate a variety of knowledge and perspectives which represent the respective gender, as research has found that women and men feature different perspectives and ideas which contribute positively to the performance by combining them (Maznevski, 1994). This is in line with Erhardt et al. (2003) who refer to different empirical studies which are all in favour for a positive effect by arguing that especially women support the strategic planning process more effectively relatively to men because their perspectives, experiences and values are often closely aligned with the company needs. In addition, women react more sensitive to issues which are important to women as well as may better understand consumer behaviour and their needs (Kang et al., 2007; Walt & Ingley, 2003). Theoretically, diverse boards in terms of gender "are better able to secure advice, legitimacy, effective communication, commitment, and resources for their firm than all-male boards" (Srinidhi, Gul, & Tsui, 2011, p. 1613). Research found that women in higher positions show a more cooperative and supportive managerial behaviour than men and thereby increase the intrinsic motivation of other individuals in the group which contributes to creativity and higher firm performance (Dezso & Ross, 2012). Therefore, especially for innovation intensive firms, it is expected that higher female representation in top managements benefits the financial performance of firms (Dezso & Ross, 2012).

Furthermore, an exploratory study by Shrader et al. (1997) also assumes that firms which consist of a higher percentage of women in top positions will positively affect a firms financial performance. They base their arguments on the resource-based theory and argue that firms that employ higher percentages of women manager perform better as they have chosen from a bigger talent pool and therefore have recruited more capable and qualified applicants. However, while their empirical results show that a higher percentage of women in a management position has indeed a positive effect on different performance measures, an increase in female board of director members reveals to decrease the financial outcome of firms. This indicates the inconclusive results about the effect of board gender diversity. Miller & Del Carmen Triana (2009) argue that the reason for these mixed empirical results might be due to the wrong assumption of a direct relationship between gender diversity and firm performance. Therefore, they assume an indirect relationship and claim that firm reputation and innovation are mediating the effect of gender diversity on the performance of firms.

In general, an increase in female directors may have the following effects which explain a better financial firm performance: diversity reduces discrimination and makes boards a better representation of a diverse societies, improves decision-making due to a variety of new perspectives, experiences and values represented by women, promotes the corporate image inside to colleagues and outside to shareholders and customers. This leads to the following hypothesis:

Hypothesis 1: The more gender diversity in the board of directors, the better the financial performance of firms.

2.3.2 Nationality Diversity

Most studies in the US context examine racial diversity by measuring the percentage of minorities in the board of directors which is defined as African Americans, Asians and Hispanic members or by distinguishing between non-white and white board members as a percentage of the total board (Carter et al., 2003; Erhardt et al., 2003; Miller & Del Carmen Triana, 2009; Richard, 2000). Such empirical studies conclude that racial board diversity is improving the financial value of firms, while Carter et al. (2010) failed to find significant results.

However, as the focus of this research is on European firms it does not seem intuitive to measure racial diversity, like those studies analysing the US context, as it can be assumed that the representation of these minorities is much less in European boards. Therefore, it is interesting to examine how many different nationalities a European board of directors consists of and thereby measuring nationality diversity by assuming similar diversity effects like racial diversity because race and/or ethnicity is a distinction within a nationality (Richard, 2000).

Differences in the racial or national background of people have been associated with differences in their attitudes, values and norms which display their national cultural (Cox, Lobel, & McLeod, 1991). The study by Richard (2000) defines racial diversity as cultural diversity and examines the combined

effect of a culturally diverse workforce and the business strategy on firm performance in the banking industry. Based on the resource-based theory and the unique human capital of culturally diverse people, he concludes that cultural diversity increases firm performance which positively affects a firm's competitive advantage.

Overall, empirical evidence about the specific effects of nationality diversity, instead of racial diversity, on firm performance is limited. The research by Darmadi (2011) about Indonesian firms fails to find significant results for the impact of nationality diversity on Tobin's Q and return on assets. Also, Randoy et al. (2006) fail to find significant results for nationality diversity, measured as percentage of foreigners, on the performance of Nordic firms. However, a study on Korean board of directors by Choi, Park, & Yoo (2007) shows that the presence of foreigners influence the performance of firms positively. Milliken & Martins (1996) conclude that the results of different researches indicate that nationality diversity in groups may lead to a wider variety of different perspectives which can lead to more creativity and a positive performance outcome, but that this effect requires a certain degree of group member integration to overcome the feeling of discrimination of foreign nationalities. Based on the agency theory, Ruigrok, Peck, & Tacheva (2007) find evidence that foreign board members are more likely to be independent compared to female members and hence are more effective in their monitoring task.

Theoretically, it is assumed that culturally diverse groups (is here associated with nationality diversity) are better in developing alternative solutions to a problem and are able to evaluate such alternatives more efficiently by setting specific criteria which drives a more efficient decision-making process compared to culturally homogeneous groups (Maznevski, 1994). Compared to other demographic diversity variables, especially cultural diversity and international teams are beneficial for the performance of firms that operate abroad or deal with local partners in the respective board members country (Maznevski, 1994). The business case theory predicts that nationally diverse team members provide a range of specific knowledge and information about the members and consumers of the nation which offers a unique resource and a better understanding of the marketplace which drives business growth (Maznevski, 1994; Robinson & Dechant, 1997). Assuming similar effects for nationality diversity like for racial diversity as well as similar diversity effect on the level of board of directors like on the workforce level, this research will investigate the following hypothesis:

Hypothesis 2: The more nationality diversity in the board of directors, the better the financial performance of firms.

2.3.3 Age Diversity

The effect of age diversity has been researched on different performance outcomes. Talavera, Yin, & Zhang (2018) focus on bank profitability and found a negative. Tarus & Aime (2014) found that age diversity produces less strategic change and the study by Hafsi & Turgut (2013) indicates that diverse boards weaken the social performance of firms effect of board age diversity, which may result from cognitive conflicts and lower group cohesion.

However, the effects of age diversity on the financial firm performance is either insignificant or positive. Even though age diversity theoretically can have negative effects on outcomes due to more difficulties in the social integration of different viewpoints (Williams & O'Reilly, 1998), negative empirical evidence are not common in the literature of board diversity. Research about the board of directors age diversity in Norway, Denmark and Sweden turned out to be not statistically significant on the stock market performance of firms (Randoy et al. 2006). Also, research by Darmadi (2011) could not find statistically significant results for age diversity in Indonesian boards of directors on ROA and Tobin's Q as a measure for firm performance. On the other hand, some studies which investigate the relationship between age board diversity on the firm financial performance show positive results (e.g. Kim & Lim, 2010; Mahadeo et al., 2012).

Kim & Lim (2010) conclude in their empirical research about the diversity in Korean boardrooms that the age of independent outside directors is positively related to the value of a company. They argue that the age of directors can be associated with the skills and knowledge of individuals, where young directors are more productive and older board members feature longer experiences. Therefore, as age diversity increases within a board, it is assumed that the combination of productivity and knowledge or experience can create synergies which may positively affect the performance of a firm. Hence, this argument refers to the resource-based view that age diversity creates access to more resources, perspectives and information which enhances the decision-making of a group or board of directors (Williams & O'Reilly, 1998).

Mahadeo et al. (2012) investigate board heterogeneity of listed companies in emerging market economies and found a positive effect on firms' returns of assets. They argue that this can be explained by a more effective way in the division of labour due to different strategic and operational aspects among generations. Moreover, they assume that differences in age indicate differences in social and cultural values which contributes positively to teamwork outcomes. On the other side, age diversity may also lead to difficulties in the communications and conflicts in the social integration of different generations (Rivas, 2012).

Similar arguments with respect to the division of labour effect are stated by Kang, Cheng, & Gray (2007). They found evidence that the size of a board is related to the age range of directors and advocate age diversity as this provides firms with perspectives of different age groups for a successful and effective planning. They argue that a wider age range among board members is needed and supports the distribution of tasks as older members can contribute their accumulated experience and resources over

years, while the middle old members can execute tasks and responsibilities and the youngest can accommodate energy to make future plans.

Moreover, research by Barker & Mueller (2002) revealed evidence that risk-taking regarding innovation strategies is dependent on age by arguing that younger CEO's are more likely to be risk-seeking as their career and financial security has a longer horizon than that of older CEO's. Considering this difference in the aversion of risk, Rivas (2012) assumes that the risk-seeking behaviour of young group members counterbalances with the experience and resources of older members. Therefore, Rivas (2012) argues that age diversity in the board of directors and in top management teams leads to a higher willingness to learn, taking risk and are more likely to provide advice and resources.

In general, age can be seen as a proxy for the life experiences of individuals (Talavera et al., 2018). Hence, all arguments provided in empirical studies are in line with the resource-based view and human capital theory which assume that the differences in behaviour, knowledge and experiences of younger and older board member complement one another and increase the board capital which generates positive firm outcomes. Therefore, this research tests the hypothesis:

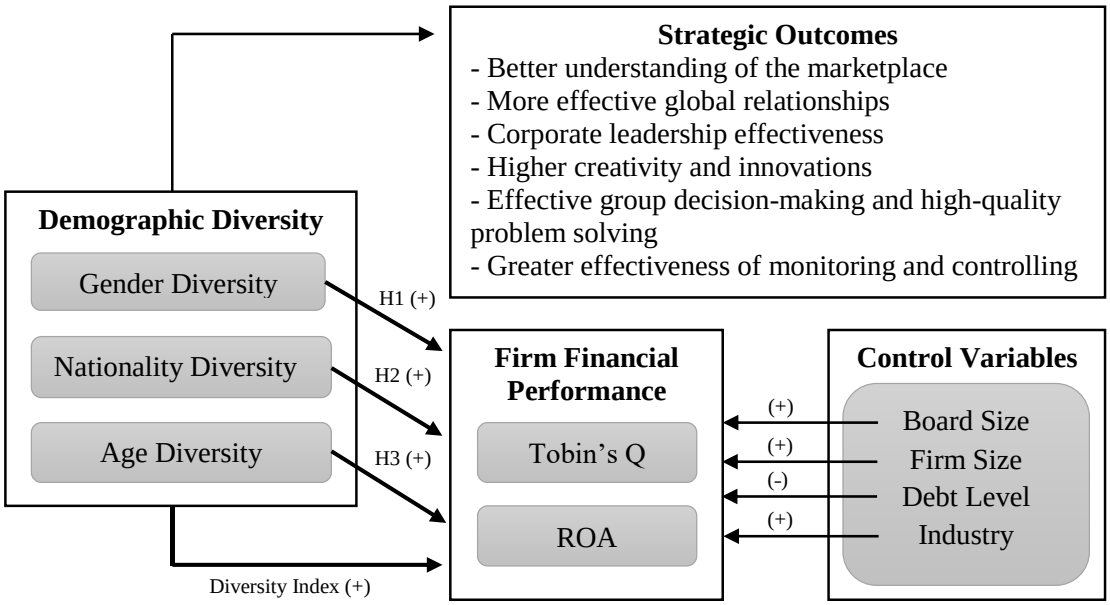
Hypothesis 3: The more age diversity in the board of directors, the better the financial performance of firms.

3 Research Design

3.1 Methodology

Quantitative research is conducted to investigate the relationship between demographic board diversity and the financial performance of firms. All hypotheses are empirically tested using the statistical tool STATA. The following figure 1 gives an overview of the conceptual model of this research, including all hypotheses regarding the impact of gender, nationality, and age diversity on the financial performance of firms and their expected direction of relation as well as all control variables.

Figure 1: Conceptual Model



The research is a cross-sectional analysis of European board of directors in the year 2016, which is the most recent and complete data available in the databases BoardEx and Eikon. While a number of previous studies perform a panel data analysis (e.g. Adams & Ferreira, 2009; Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Choi et al., 2007; Lückerath-Rovers, 2013; Rose, 2007; Smith et al., 2006), other also conduct a cross-sectional analysis (e.g. Carter et al., 2003; Darmadi, 2011; Erhardt et al., 2003; Mahadeo et al., 2012; Randoy et al., 2006; Shrader et al., 1997). However, a cross-sectional analysis is appropriate for this research as it provides a statistical answer to the research question if demographic diversity in the board of directors affects the financial performance of a firm. This research is interested in the effect of diversity in the boardroom itself and if board diversity has implications for the financial performance of firms, but not how the impact is over time for which reason a cross-sectional analysis is preferred over a panel data analysis. In addition, a cross-sectional analysis is useful for hierarchical regression analyses (e.g. Erhardt et al., 2003; Shrader et al., 1997) and avoids the problems such as serial correlation of residuals which is observed over time. Also, to capture the time effect of demographic diversity in the boardroom, a panel over a long time period is required as the composition

of boards only changes slowly over years (Bhagat & Black, 2001), but demographic data is not reported regularly and hence not available over long time periods (Carter et al., 2003).

Different regressions are performed in order to test for all hypotheses developed in chapter 2. As the number of observations differs among all diversity variables, the impact of each diversity variable on the financial performance of firms is tested in a separate regression analysis. This allows to include all available observations for each variable of interest, as otherwise the number of observations for a regression consisting of all demographic diversity variables would be reduced to the lowest number of observations available. After that, the combined effect of all diversity variables is tested by means of the overall diversity indices. Hence, the sample size in this regression is reduced to the number of observation available for all variables. Moreover, the effect of each diversity variable is tested once on ROA and once on Tobin's Q as a proxy for financial firm performance. For all following regression functions, the index *i* represents the company's board of directors as a unit of analysis and ε is the added error term of the equation. *Log* indicates that the variable is transformed to its natural logarithmic form which is further explained in chapter 3.4. The relationship between the percentage of women on the board of directors and the financial performance of firms tests the first hypothesis with the following regression functions:

Hypothesis 1:

$$\text{Log (ROA)}_i = ß_0 + ß_1 \text{ GENDER DIVERSITY}_i + ß_2 \log \text{(BOARD SIZE)}_i + ß_3 \log \text{(FIRM SIZE)}_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

$$\text{Log (TOBIN'S Q)}_i = ß_0 + ß_1 \text{ GENDER DIVERSITY}_i + ß_2 \log \text{(BOARD SIZE)}_i + ß_3 \log \text{(FIRM SIZE)}_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

The second hypothesis investigates the relationship between nationality diversity and the financial performance of firms. Nationality diversity is measured relatively as the percentage of nationalities as well as in absolute numbers, thus, the number of nationalities present in the boardroom of companies. The effect of both measures for nationality diversity is tested on ROA and Tobin's Q with a total of four regressions. The regression functions are as follows:

Hypothesis 2:

$$\text{Log (ROA)}_i = ß_0 + ß_1 \text{ NATIONALITY DIVERSITY}_i + ß_2 \log \text{(BOARD SIZE)}_i + ß_3 \log \text{(FIRM SIZE)}_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

$$\text{Log (TOBIN'S Q)}_i = ß_0 + ß_1 \text{ NATIONALITY DIVERSITY}_i + ß_2 \log \text{(BOARD SIZE)}_i + ß_3 \log \text{(FIRM SIZE)}_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

Moreover, the following regression functions test the third hypothesis which examines the effect of age diversity in the boardroom on the financial performance of European firms, where age diversity is measured as the coefficient of variation of age in the boards of companies.

Hypothesis 3:

$$\text{Log (ROA)}_i = ß_0 + ß_1 \text{ AGE DIVERSITY}_i + ß_2 \log (\text{BOARD SIZE})_i + ß_3 \log (\text{FIRM SIZE})_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

$$\text{Log (TOBIN'S Q)}_i = ß_0 + ß_1 \text{ AGE DIVERSITY}_i + ß_2 \log (\text{BOARD SIZE})_i + ß_3 \log (\text{FIRM SIZE})_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

Finally, after all demographic diversity aspects are tested separately, the general hypothesis is tested to investigate the overall effect of demographic diversity on the financial performance of firms. In doing so, both diversity indices which are constructed in this thesis are tested on ROA and Tobin's Q in a total of four regressions based on the following functions:

General Hypothesis:

$$\text{Log (ROA)}_i = ß_0 + ß_1 \text{ DIVERSITY INDEX}_i + ß_2 \log (\text{BOARD SIZE})_i + ß_3 \log (\text{FIRM SIZE})_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

$$\text{Log (TOBIN'S Q)}_i = ß_0 + ß_1 \text{ DIVERSITY INDEX}_i + ß_2 \log (\text{BOARD SIZE})_i + ß_3 \log (\text{FIRM SIZE})_i - ß_4 \text{ DEBT LEVEL}_i + ß_5 \text{ INDUSTRY}_i + \varepsilon_i$$

3.2 Sample

The sample for this research comprises all European firms listed at the STOXX Europe 600 index in April 2016,[4] which consists of 600 large companies in 17 European countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom. A list of all companies included in this research is given in appendix II and was retrieved from the database Eikon. In addition, appendix III provides a list which indicates how many companies of each country are included in this research. It is noticeable that 27.6% of companies are from Great Britain, 13.6% are from France and 11% are from Germany. For all other countries, the number of companies is less than 10% of the total number of 594 companies.

[4] April 2016 is chosen to make sure that all companies in the research sample were listed in 2016 as the index and its company components are reviewed quarterly every third Friday in March, June, September and December and become effective the next trading.
See https://www.stoxx.com/document/Indices/Common/Indexguide/stoxx_index_guide.pdf for more information.

The investigation year 2016 was chosen due to data availability as it is the most recent and almost complete data available for all variables. However, for 6 companies no demographic data was found for which reason the total sample size dropped to 594 companies and 8362 directors. After merging the data, it turned out that data for firm performance was only available for 586 companies. Even though 586 firm performance observations are available, not all data is available for all variables which means that the number of companies included in each regression depends on the variables involved.

There are several reasons to investigate STOXX Europe 600 companies. First, empirical research about companies in Europe is lacking. Reviewing past empirical board diversity studies reveals that almost all researches investigate large US companies e.g. listed as US Fortune 500 or 1000 company or at the S&P 500 index (e.g. Adams & Ferreira, 2009; Carter et al., 2010, 2003; Erhardt et al., 2003; Miller & Del Carmen Triana, 2009; Shrader et al., 1997). Those empirical studies which do not analyse US companies, however, mostly focus on companies located in a single country like Spain, the Netherlands, Denmark or Korea. This emphasises the second reason to use STOXX Europe 600 companies: it allows to conduct a cross-country research instead of only focusing on one European country which increases the validity of the results. The restriction of data to only one country would reduce the generalisability of the results because they may not apply for other countries due to differences in the economy and its environment, capital markets, culture or corporate governance structures (Kang et al., 2007). Therefore, as the US and European economies show e.g. differences in financial markets, whereas the US is market-oriented and Europe is characterised by a bank-based market, it is crucial to closer investigate European companies. Finally, the data for listed companies at the stock exchange is easier accessible and it can be assumed that larger companies may also show a higher representation of board diversity which makes it suitable as a research sample.

3.3 Data

3.3.1 Dependent Variables – Financial Firm Performance

The dependent variable of this research is the financial performance of the STOXX Europe 600 firms and is based on the assumption of financial theorists that the aim of companies is the maximisation of shareholder value (Bromiley, 1990). In the literature, researchers debate if stock market-based measures such as Tobin's Q ratio and market return or accounting-based profitability measures such as ROA, return on equity (ROE) or return on sales (ROS) are a more appropriate proxies for the financial value of firms (Gentry & Wei Shen, 2010; Richard, Devinney, Yip, & Johnson, 2009).

On the one hand, it is argued that accounting-based measures are too sensitive to a company's accounting system and their choices of asset valuation principles e.g. with regards to their depreciation schedule (Richard et al., 2009; Rose, 2007). In addition, accounting-based proxies focus on the past or short-term financial performance of a firm as it is based on events that have already taken place and therefore reduce the explanatory power for future expectations (Campbell & Mínguez-Vera, 2008; Gentry & Wei Shen, 2010; Richard et al., 2009). However, accounting measures are most common when

measuring a company's performance as they display the overall profitability of firms and its validity has been proven by empirical evidence to be related to economic returns (Richard et al., 2009; Shrader et al., 1997). In general, ROA, ROI and ROE are proxies for the return on shareholder value (Shrader et al., 1997).

In contrast, market-based measures focus on the future or long-term financial performance of firms and reflect the expectations of the market for future earning and hence serves as a proxy for a company's ability to create shareholder value as well as a firm's comparative advantage (Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Gentry & Wei Shen, 2010; Rose, 2007). However, many financial theorists question the underlying assumption of market efficiency which means that when using market-based performance measures, it is assumed that the stock price of a company represents all available information and equals the company's net present value (Bromiley, 1990). However, the assumption of full information does not have to be true as a firm's manager is able to choose the information they disclose to investors (Gentry & Wei Shen, 2010).

Disregarding this debate, market-based as well as accounting-based measures for the financial performance of firms are widely accepted (Gentry & Wei Shen, 2010). Therefore, many different measures were used in empirical studies about board diversity and its impact on a company's value, which makes it difficult to compare the results with each other.[5] Thus, the analysis of this research makes use of the most commonly used proxies in each domain for the purposes of comparison to other research results, namely ROA as an accounting-based measure and Tobin's Q ratio as a market-based measure. Table 1 provides a summary of the dependent variables, their label in the analysis, measurement and references to previous literature. ROA is measured as net income divided by the book value of total assets in percent. It indicates a company's ability to how efficiently a firm produces profit in excess of expenses by the given assets and hence measures accounting income (Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Talavera et al., 2018). The Tobin's Q ratio is defined as the sum of the market value of equity and the book value of liabilities divided by the book value of total assets, where the denominator indicates the replacement costs for the firm's current assets (Rose, 2007). If the stocks of a firm are more expensive than its replacements costs of assets, the Tobin's Q ratio is greater than 1. This implies that the firm's stocks are overvalued and that the firm can increase their value by using their available resources efficiently (Campbell & Mínguez-Vera, 2008; Carter et al., 2010). A high ratio (greater than 1), may also indicate evidence for growth opportunities or even a comparative advantage (Rose, 2007). On the other side, if the ratio is less than 1 this means that the replacement costs of assets are higher than the firm's stock market value and thus the firm is undervalued. This situation implies that the available resources of a firm were not used efficiently (Campbell & Mínguez-Vera, 2008; Rose, 2007). Instead of measuring income like ROA does, Tobin's Q measures the wealth of a company's shareholders and creditors (Carter et al., 2010). Both, the Tobin's Q ratio and ROA, were calculated manually with the data provided by Eikon.

[5] See appendix I for a summary of empirical studies and their measurement for firm performance.

Table 1: Dependent Variables - Financial Firm Performance

Dependent Variables	Variable Label	Measurement	Reference
Tobin's Q	Q	Sum of the market value of equity and the book value of liabilities divided by the book value of total assets	Adams & Ferreira (2009); Campbell & Mínguez-Vera (2008); Carter et al. (2010, 2003); Choi et al. (2007); Darmadi (2011); Kim & Lim (2010); Rose (2007)[6]
Return on assets (ROA)	ROA	Net income divided by book value of total assets in percent	Adams & Ferreira (2009); Carter et al. (2010); Darmadi (2011); Erhardt et al. (2003); Labelle et al. (2015); Mahadeo et al. (2012); Randoy et al. (2006); Shrader et al. (1997); Talavera et al. (2018)

3.3.2 Independent Variables – Demographic Board Diversity

The independent variables of this research are the demographic diversity variables gender, nationality and age of the members in the board of directors for each company as well as two constructed overall board diversity indices. All demographic data for the directors is retrieved from the database BoardEx based on the ISIN codes of each company listed on the STOXX Europe 600 in April 2016. Data about the gender of directors is complete for all 594 companies in the sample. Unknown nationalities of directors were searched for on the company homepages and annual reports, but some companies do not provide any data about the directors' nationality for which reason those companies were dropped from the sample. 495 companies in total provide sufficient information about its board members nationality in order to include it in the analysis. However, 571 director nationalities out of 6891 directors were missing for these 495 companies. Therefore, it is assumed that those unknown nationalities do not represent an additional nationality in the company's board but are conform with an existing nationality in the board. This assumption is reasonable because the missing nationalities represent only 8.3% of the whole sample and the data revealed that most companies that did not provide full information also exhibit lower diversity in terms of nationality. Moreover, data about the age of directors was not complete for which reason it was calculated manually based on the date of birth given by the database BoardEx or by looking at the company web pages, annual reports and Bloomberg.com. Companies with too many missing data about the age of directors were deleted from the sample. In total, 570 companies provided sufficient information to calculate age diversity for each company's board of directors.

The measurement for all diversity variables for each company's board of directors is based on previous researches and is calculated manually with the demographic data mentioned before. All independent variables and how they are labelled in the regression analysis, their measurement and references to previous literature is summarised in table 2 at the end of this subchapter. Gender diversity is defined as the percentage of female directors in the board and is calculated as a total number of women

[6] All researches use Tobin's Q as proxy, but the definition of measurement differs among studies due to data availability.

in the board divided by the total number of board members. Nationality diversity is measured in two different ways. First, as total number of different nationalities in the board and, second, as percentage of nationalities calculated as total number of different nationalities in the board divided by the total number of board members.

The measurement of age diversity is not consistent in the diversity literature and differs among studies. Some studies categorise the ages of directors into age bands (e.g. Kim & Lim, 2010; Mahadeo et al., 2012), others use the standard deviation of age as a proxy, the average board members age (e.g. Randoy et al., 2006), the Blau index (Darmadi, 2011) or the coefficient of variation (CV) of age (O'Reilly, Caldwell, & Barnett, 1989; Pelled, Eisenhardt, & Xin, 1999; Tarus & Aime, 2014). Following the latter approach, age diversity in this research is represented by the CV of age which is calculated as the standard deviation (σ) of a company's board age divided by the mean (μ) of its board age, hence CV = $\frac{\sigma}{\mu}$ (Allison, 1978). The CV has been chosen as it is among the most commonly used statistical index in organisational researches which is suitable to compare the impact of demographic diversity on various firm levels such as the board of directors, top-management teams or different departments (Bedeian & Mossholder, 2000). In addition, the CV is especially useful as it does not rely on the variation caused by the absolute size of the board because the age deviation is presented relative to its own mean (Bedeian & Mossholder, 2000). O'Reilly et al. (1989) argues that the CV is "the most direct and scale-invariant measure of dispersion" (p. 25). Hence, the CV "indicates how large within-group differences among scores in a response variable tend to be in comparison to their average magnitude" (Bedeian & Mossholder, 2000, p. 286), where the minimum score is zero in finite samples and the response variables in this research is the age of directors. The higher the CV of age, the higher the age diversity within a board of directors (Tarus & Aime, 2014). In a review about different measures of dispersion by Allison (1978), he explains that the coefficient of variation is the appropriate choice to measure the dispersion for variables like age as the marginal utility of age is not strictly increasing as well as not especially relevant.

Furthermore, a board diversity index is constructed to measure the effect of overall diversity in demographic characteristics within a given board. This allows to combine the variables gender, nationality- and age diversity into one variable and to test the general hypothesis that the more demographic diversity in the board of directors, the better the financial performance of firms. Almost no previous study has investigated the effect of board diversity on the financial performance of firms by means of an overall diversity index. However, the researches about board diversity by Randoy et al. (2006) and Hafsi & Turgut (2013) make use of an overall index in addition to the investigation of the separate diversity effects. Therefore, this research will follow both approaches as they are based on the same idea as this research, namely testing board diversity separately for each demographic characteristic as well as testing the effect of the combined overall board diversity index. Randoy et al. (2006) simply sum up the values for each diversity variable within a board of directors. Thus, the summed-up value

represents the diversity index for each firm. In this research, the diversity index according to the approach of Randoy et al. (2006) is calculated as follows for each company's board of directors *i*:

$$\textbf{\textit{Board Diversity Index 1}}_{i} = \sum Percentage\ of\ Female\ Directors, Percentage\ of\ Nationalities, Coefficient\ of\ Variation\ of\ Age$$

On the other hand, Hafsi & Turgut (2013) introduced an *diversity in boards index* to analyse the impact of board diversity on the corporate social performance.[7] The index is created by using a tercile split methods and hence dividing the variables gender-, nationality- and age diversity into three groups. Hafsi & Turgut (2013) suggest that the criteria to establish the three groups is if a company has values below the average, around average or above the average of all companies in the sample. Hence, these three groups represent the levels of diversity in a company's board for each variable, where above average means the highest level of diversity.

However, as the study by Hafsi & Turgut (2013) does not specifically define the criteria for companies possessing values around average, it seems plausible to categorise the companies on the basis of the standard deviation from the mean value of each diversity variable. The diversity measures used for the index are the percentage of female directors, the percentage of nationalities and the coefficient of variation of age as all are relative measures. For each company's board diversity variable, values smaller than the mean value less standard deviation of a variable represent below average diversity, values in the range between the standard deviation around the mean indicate companies with average diversity and a company possesses above average diversity if its value is greater than the mean value plus the standard deviation. If a company's diversity value is below average it gets the score 0, if the value is on average it gets the score 1 and if the value is above average the company is coded with 2. This coding is done for all companies in the sample and all variables. Finally, the scores for all variables within a company are summed up to an overall board diversity index for each company which indicates the degree of diversity. Therefore, the minimum diversity score is 0, while a board of directors with the highest diversity scores 6. The following table shows the basic idea of the diversity index construction employed for each board of directors in the sample of this research. For a more detailed calculation for categorising the boards into scores for each diversity variables see appendix IV. The overall index which is used in the regression analysis is calculated as follows for each company's board of directors *i*:

$$\textbf{\textit{Board Diversity Index 2}}_{i} = \sum Gender\ Diversity\ Score, Age\ Diversity\ Score, Nationality\ Diversity\ score$$

[7] The research by Hafsi & Turgut (2013) investigates diversity *in* boards based on the director characteristics gender, ethnicity, age, experience and tenure as well as the diversity *of* boards based on the board characteristics board size, director independence, director stock ownership and board leadership duality. However, to measure the overall diversity *of* boards they construct a different index to that of the index for diversity *in* boards. Corporate social performance is the dependent variable of this research.

Construction of the Board Diversity Index

Diversity Value (X) / Diversity Score	Below Average Diversity X < Mean – Std. Dev.	Average Diversity Mean – Std. Dev. < X < Mean + Std. Dev.	Above Average Diversity X > Mean + Std. Dev.
Gender Diversity	0	1	2
Nationality Diversity	0	1	2
Age Diversity	0	1	2

Notes: X indicates the company's value for the percentage of female directors, percentage of nationalities and the CV of age. Depending on the value of each diversity aspect and the respective mean and standard deviation of that diversity variable, diversity scores are given to the company. The diversity index for each company is the sum of the diversity scores for each diversity aspect.

Table 2: Independent Variables - Demographic Board Diversity

Independent Variables	Variable Label	Measurement	Reference
Gender diversity	Female	Percentage of female directors in the board calculated as total number of women divided by total number of board members	Adams & Ferreira (2009); Campbell & Mínguez-Vera (2008); Carter et al. (2003); Darmadi (2011); Erhardt et al. (2003); Labelle et al. (2015); Lückerath-Rovers (2013); Mahadeo et al. (2012); Randoy et al. (2006); Shrader et al. (1997); Smith et al. (2006); Talavera et al. (2018)
Nationality diversity	Nat. (#)	Total number of nationalities in the board	- Number of ethnic minorities: Carter et al. (2010) - Number of foreign directors: Ruigrok et al. (2007)
	Nat. (%)	Percentage of nationalities in the board calculated as total number of nationalities divided by total number of board members	- Percentage of foreign directors: Darmadi (2011); Randoy et al. (2006); Rose (2007); Talavera et al. (2018) - Percentage of ethnic minorities (racial diversity): Carter et al. (2003); Erhardt et al. (2003); Miller & Del Carmen Triana (2009)
Age diversity	Age	Coefficient of variation of age (CV) calculated as standard deviation of board age divided by the mean of board age	O'Reilly et al. (1989); Pelled et al. (1999); Rivas (2012); Talavera et al. (2018); Tarus & Aime (2014)
Diversity Index	Index 1	Sum of each company's values for percentage of female directors, percentage of nationalities and the CV of age	Randoy et al. (2006)
	Index 2	Sum of each company's score for gender-, nationality-, and age diversity based on the mean and standard deviation of these variables	Hafsi & Turgut (2013)

3.3.3 Control Variables

Several variables are added to the regression analysis in order to control for other factors which can influence the financial performance of firms. The first control variable is the size of a company's board which has been found in the literature to have a positive impact on financial firm performance, especially on Tobin's Q (Carter et al., 2010; Jackling & Johl, 2009). It can be assumed that larger boards are characterised by more external linkages, a greater variety of knowledge and information from different directors which leads to better information assessing, more efficient decision-making and can result in a better financial performance (Carter et al., 2010; Jackling & Johl, 2009; Labelle et al., 2015). However, opposing results has been found as well which suggest a negative effect on firm performance due to more agency related problems and higher conflict potentials with an increase in board size (Carter et al., 2010; Labelle et al., 2015). In addition, with an increase in the number of board members, it is more likely that the board is represented by a larger number of women, nationalities and different ages which has to be accounted for (Carter et al., 2010). All in all, following previous studies indicate that the size of a board needs to be included as a control variable in the assessment of this research, but the direction of the sign on the performance of the firm is not entirely clear. Board size is measured as the total number of directors in the boardroom and is calculated manually for each company by means of the current and historical data about the start and end dates of director positions which are provided by the database BoardEx. Due to the circumstances of manually calculating the board size, some assumptions were made. First, all directors for whom the start date and end date where unknown were deleted from the dataset and assumed to not be present in the board. Second, some directors are appointed to the board of directors in more than one company or have changed companies within the year of 2016 and therefore were counted once for each company they were present. Third, all directors of a company who have been in the board in 2016 were counted even though a director's position ended before the end of the year. Hence, even if a director only has been a director in January 2016, s/he is included in the calculations for board size. This means that if there has been a change in position within the year, both directors are included in the dataset which increases the size of the board. However, this does not influence the results about the impact of demographic diversity on firm performance because females and nationalities are measured as a percentage relative to board size and the CV of age is relative to the mean of age and does not rely on the variation caused by the absolute size of the board.

Furthermore, by using the STOXX Europe 600 as a selection of companies, it is assumed that all companies in this sample are large in terms of assets, employees and revenues. However, those companies still show variations in their relative size for which reason information about their total assets are used to control for firm size effects on performance. The size of a firm is assumed to have a direct and positive effect on the financial performance of firms due to the likelihood of realising economies of scale and market power (Labelle et al., 2015; Richard, 2000; Smith et al., 2006). In addition to more effective operations, larger firms have easier access to external funds and attract more capital which can increase their profits (Labelle et al., 2015). Hence, the size of a firm is related to its market returns and

especially total assets have been found to be related to Tobin's Q as a measure of performance (Carter et al., 2010). However, also a negative relationship has been found empirically which can be explained by the fact that larger firms may suffer from more agency related problems like information asymmetry as well as opposing interests within a company (Campbell & Mínguez-Vera, 2008; Choi et al., 2007; Labelle et al., 2015). Even though mixed results exist about the direction of the relationship, the size of a firm is important for which reason this research includes the size of a firm as the second control variable and is measured as the total assets of a firm. The data is retrieved from the database Eikon which defines total assets for all non-financial industries as the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.[8]

Moreover, the debt level or leverage ratio of a firm is included as a third control variable. Previous researchers have found that the level of a company's debt is negatively related to the financial performance measures ROA and Tobin's Q (Dezso & Ross, 2012; Jackling & Johl, 2009). The debt level accounts for the amount of risk involved in a firm's operations (Labelle et al., 2015) and is negatively related to firm performance because companies can afford more regularly debt payments when consisting of high amounts of cash (Dezso & Ross, 2012). Hence, a high company's debt level indicates higher costs in the case of bankruptcy (Campbell & Mínguez-Vera, 2008). The data for the debt level of all companies is retrieved from the database Eikon and is measured as the sum of short-term and long-term debt divided by total assets of the firm multiplied by 100.[9]

Finally, despite controlling only for firm-specific effects, it is also controlled for industry effects as the relationship between board diversity and the financial performance of firms can differ across industries (e.g. Carter et al., 2010; Jackson et al., 2003; Kang et al., 2007). Kang et al. (2007) investigate the association between diversity in the board of directors and industries. They found that the industry type affects the age range of directors in the board of Australian companies and suggest that if the company's industry offers products and services for consumers of different ages, a diverse board in terms of age would represent the consumer interests as well as enhance the variety of perspectives. Moreover, it is argued that women directors are more likely in service-oriented, labour-intensive industries (Farrell & Hersch, 2005), while others are more precise in arguing that companies in the financial sector have on average the most female directors (Carter et al., 2003; Lückerath-Rovers, 2013). In industries which are more common for women, the pool of women is simply greater to become part

[8] The determinants for total assets are different for financial companies. For banks, total assets represent the sum of cash & due from banks, total investments, net loans, customer liability on acceptances (if included in total assets), investment in unconsolidated subsidiaries, real estate assets, net property, plant and equipment and other assets. For insurance companies, total assets represent the sum of cash, total investments, premium balance receivables, investments in unconsolidated subsidiaries, net property, plant and equipment and other assets. For other financial companies, total assets represent the sum of cash & equivalents, receivables, securities inventory, custody securities, total investments, net loans, net property, plant and equipment, investments in unconsolidated subsidiaries and other assets.

[9] The debt level for banks is measured as: (Short Term Debt + Long Term Debt) / (Total Assets - Customer Liabilities on Acceptances) * 100. The debt level for other financial companies is measured as: (Short Term Debt + Long Term Debt) / (Total Assets - Custody Securities) * 100.

of the board of directors (Farrell & Hersch, 2005; Lückerath-Rovers, 2013). In addition, Carter et al. (2003) argue that like women, also minorities are more likely to be present in the financial service industry. Therefore, the general industry classification for each company in this sample is included as a categorical variable which distinguishes between the following industries: Industrial, Utility, Transportation, Bank/Savings & Loan, Insurance, other Financials. Appendix VI provides a more detailed description e.g. how many companies belong to which industry. The industry classification codes are retrieved from the database Eikon. See table 3 for all control variables and their label used in the regression analysis, their measurement and references to previous literature.

Table 3: Control Variables

Control Variables	**Variable Label**	**Measurement**	**Reference**
Board size	Board	Total number of directors in the boardroom	Adams & Ferreira (2009); Campbell & Mínguez-Vera (2008); Carter et al. (2010, 2003); Darmadi (2011); Erhardt et al. (2003); Jackling & Johl (2009); Kim & Lim (2010); Labelle et al. (2015); Lückerath-Rovers (2013); Mahadeo et al. (2012); Randoy et al. (2006); Richard (2000); Shrader et al. (1997)
Firm size	Firm	Total assets in Euro	Campbell & Mínguez-Vera (2008); Carter et al. (2010, 2003); Darmadi (2011); Erhardt et al. (2003); Jackling & Johl (2009); Kim & Lim (2010); Labelle et al. (2015); Lückerath-Rovers (2013); Richard (2000)
Debt level	Debt	The sum of short-term and long-term debt divided by total assets in percent	Campbell & Mínguez-Vera (2008); Jackling & Johl (2009); Kim & Lim (2010); Labelle et al. (2015)
Industry	Industry	Categorical variable: 1 = Industrial 2 = Utility 3 = Transportation 4 = Bank/Savings & Loan 5 = Insurance 6 = Other Financials	Carter et al. (2003); Erhardt et al. (2003); Kang et al. (2007); Lückerath-Rovers (2013); Miller & Del Carmen Triana (2009); Randoy et al. (2006)[10]

[10] All empirical studies control for industry but categorise the industries differently or use a dummy variable to distinguish between only two industries e.g. Erhardt, Werbel, & Shrader (2003) distinguish between production or service industry.

3.4 Analysis of Data

3.4.1 Descriptive Statistics of Variables

Table 4 reports a descriptive statistic for all untransformed variables used in this research. The performance measure ROA shows on average positive values for the sample companies with a mean of 5.67%. Thus, those companies efficiently generate profits from their given assets. However, the overall variation is 148.43% which ranges from -28.91% to 242.08%. This implies that there are large differences among companies, while some companies do not operate efficiently and others are highly efficient. On average, Tobin's Q as a proxy for the financial performance of firms indicates that the companies in this sample have been financially successful in 2016. The mean value of Tobin's Q is 1.97 which is above 1 and therefore implies that the market value of these firms is greater than its replacement costs of assets. Hence, companies that feature a Tobin's Q value equal to or higher than the mean operate efficiently and possess growth opportunities. However, the variation between companies is relatively high with a variance of 9.56 and a minimum value of 0.58 and a maximum value of 68.84. Especially the high maximum value may indicate an outlier or even influential case which requires further investigations because the value of Tobin's Q usually fluctuates around 1.

Also, the representation of women in the board of directors varies among companies. Some companies do not employ female directors at all, while the maximum value of female board members is 64% of all board members. However, the mean value shows that on average 26% are female board members with a rather low variance of 0.01% and a standard deviation of 11%. Figure 2 in appendix V demonstrates graphically the distribution of female board members relative to the company's board size.

Table 4: Descriptive Statistic of Untransformed Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	N	Mean	Min.	Max.	Std. Dev.	Variance	Skewness	Kurtosis
ROA	586	5.67	-28.91	242.08	12.18	148.43	12.79	244.35
Q	586	1.97	0.58	68.84	3.09	9.56	17.62	375.22
Females	594	0.26	0.00	0.64	0.11	0.01	0.04	2.92
Nat. (%)	495	0.29	0.05	0.86	0.15	0.02	0.80	3.44
Nat. (#)	495	3.73	1.00	10.00	1.89	3.58	0.55	2.97
Age	570	0.14	0.05	0.33	0.04	0.001	1.00	5.06
Mean Age	570	58.09	46.50	69.91	3.42	11.67	-0.01	3.50
Index 1	490	0.68	0.24	1.24	0.18	0.03	0.35	2.72
Index 2	490	2.98	1.00	5.00	0.90	0.81	0.07	2.99
Board	594	14.08	3.00	46.00	5.89	34.75	1.60	6.79
Firm/10000	586	7759.30	7.26	260649.27	23648.08	5.59e+08	5.86	45.30
Debt	580	24.91	0.00	166.61	17.60	309.6884	1.41	10.24

Notes: All variables are untransformed. The variable Mean Age indicates the average age of boards which is useful to describe the data, but the variable is not used for regression analyses. The variable Firm/10000 indicates the size of the firms which is measured as total assets divided by 10000 to reduce the high values for convenience.

Nationality diversity is measured relative to the total number of board members and in absolute numbers. Figure 3 in appendix V illustrates the distribution of the numbers of nationalities in the board of directors. The number of nationalities a board consists of ranges from 1 to 10 different nationalities. This is equivalent to the maximum that 86% of the board members have different nationalities and thus are highly diverse. However, the figure indicates that a board of directors with 5 or more different nationalities is rather unusual. European companies in this sample set have on average 3 to 4 different nationalities present in the board of directors with a variance of 3.58 directors.

As age diversity is measured as coefficient of variation (Age), a closer look at the mean age of boards (Mean Age) is more insightful for an overview of the age of directors. The average age of boards in European companies is 58 years which varies between 46 and 70 years. This is also displayed graphically in figure 4 in appendix V. Especially the coefficient of variation as a proxy for age diversity indicates that European boards show rather low age diversity with a variance value of 0.001.

Moreover, the first diversity index, which sums up the values for each diversity variable, indicates a relatively low variation of 0.03 between the board of directors and ranges from 0.24 to 1.24. The second categorical diversity index can take values from 1 to 6. However, the index has a minimum value of 1 and a maximum value of 5 which means that none of the companies in the sample has reached the highest value of overall diversity. On average, a company features a diversity score of approximately 3 out of 6. In appendix IV, a detailed description is given for the distribution of scores for the variables gender-, nationality- and age diversity. For all diversity aspects, most companies manifest a score of 1 from a scale between 0 and 2 for each diversity variable.

European boards in this sample consist on average of 14 board members, with a minimum of 3 and a maximum of 46 members. This indicates a high variation between companies of almost 35 members. A possible reason for the high variance in the size of boards is given by Shrader et al. (1997) who presume that some firms had to downsize their employees and that manager and members in the management and supervisory boards were most affected. Another explanation for the high maximum number might be some outliers which need to be further investigated.

The size of the firms, measured as total assets, is divided by 10000 in table 4 for convenience due to high numbers. The average European company in this sample features total assets amounting to 77,593,000 euros. However, this varies a lot among companies from 72,600 euros to more than 2.6 billion euros and a standard deviation of around 236 million euros.

Moreover, also the debt level varies a lot among companies, ranging from no debt to 166% of total assets. On average, the companies show a relatively low debt level of almost 25% of total assets. The high maximum value in combination with the high variance among companies needs to be further investigated for outliers or another explanation. The description of the distribution of industries and hence the number of companies that are present in each industry is given in appendix VI. The table displays that most of the companies, 67%, are industrial companies, while the rest of the companies are evenly distributed among the other industries.

Furthermore, table 4 also displays the skewness and kurtosis values for each variable. The values indicate that the variables ROA, Tobin's Q, board size, firm size and debt level are skewed. This can be noticed as the skewness values are different from zero as well as the kurtosis values are above 3. Thus, these variables need to be transformed in order to achieve an approximately normal distribution to meet the OLS assumption of normality (Studenmund, 2014). Therefore, these variables, except the debt level, are transformed to their natural logarithmic form and are further used in all regression analyses.[11]

Table 5 provides a descriptive statistic of all variables employed to analyse the impact of board diversity on the performance of firms and hence consist of the transformed variables. By transforming the variables, also the variance and standard deviation values become smaller. This is especially appreciated as the transformation reduces the high variance of the Tobin's Q ratio and firms size. However, even after transforming Tobin's Q, the kurtosis value is still relatively high. In addition, the debt level of companies has been not transformed and hence shows a very high variance and maximum value. Therefore, as a next step of the data analysis, it is needed to diagnose these issues by testing for outliers and potential influential cases.

Table 5: Descriptive Statistic of Transformed Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	N	Mean	Min.	Max.	Std. Dev.	Variance	Skewness	Kurtosis
ROA	538	1.25	-4.49	5.49	1.33	1.87	-1.17	5.14
Q	586	0.48	-0.55	4.23	0.51	0.26	1.73	8.85
Females	594	0.26	0.00	0.64	0.11	0.01	0.04	2.92
Nat. (%)	495	0.29	0.05	0.86	0.15	0.02	0.80	3.44
Nat. (#)	495	3.73	1.00	10.00	1.89	3.58	0.55	2.97
Age	570	0.14	0.05	0.33	0.04	0.001	1.00	5.06
Index 1	490	0.68	0.24	1.24	0.18	0.03	0.35	2.72
Index 2	490	2.98	1.00	5.00	0.90	0.81	0.07	2.99
Board	594	2.57	1.10	3.83	0.38	0.14	0.30	3.36
Firm	586	16.44	11.19	21.68	1.71	2.92	0.58	3.18
Debt	580	24.91	0.00	166.61	17.60	309.79	1.41	10.24

Notes: The variables ROA, Q, Board and Firm are transformed to their natural logarithm to achieve an approximately normal distribution. All other variables remain untransformed.

[11] The debt level of companies also features a kurtosis value above 10. However, only the transformation to its squared value would slightly change the value closer to 3. Due to only a small improvement and involving difficulties of interpreting the estimated coefficient, the variable remains untransformed. However, in this case it is important to examine outliers and the reason for the high variation of debt level values among companies.

3.4.2 Outliers and Influential Cases

As the descriptive statistic of the untransformed as well as transformed variables in table 4 and 5 indicated the potential of outliers in the sample set, it is tested graphically and numerically if these observations have an influential impact on the regression results. First, the extreme values of all variables are investigated. It becomes conspicuous that the maximum value of ROA and Tobin's Q as well as the minimum value of firm size are extreme values and belong to the same company ID 487.[12] In line with the high variance among companies in their level of debt, also this variable shows extreme observations with very high values of company ID 535 and 541.

The second step is a graphical analysis of outliers by plotting the regression outcome against the dependent variables. Graph 1 in appendix VII shows the influence on Tobin's Q. It proves the outliers for the level of debt and gives a clear indication that the values of the company ID's 487, 535 and 541 may have an impact on the regression outcome, where the company ID's 535 and 541 also feature the before mentioned extreme debt level values. In addition, company ID 487 is an outlier in all plots because it is the company which features the extreme maximum Tobin's Q value of 68.84 as well as the extreme maximum ROA value of 242.08%. Furthermore, graph 2 in appendix VII indicates the influence of the observations on the dependent variable ROA. The plot between ROA and the level of debt also indicates that company ID 535 is an outlier and may influence the regression outcome. In addition, company ID 489 and 503 appear in all plots and need to be tested for potential influential cases.

Therefore, as a third step, the numerical Cook's Distance test is conducted to detect influential cases with high residuals because they would have a negative effect on the regression outcome (Cook, 1977). The Cook's Distance indicates the difference between estimated coefficients when conducting a regression with and without an observation. Hence, the influence of each individual observation on the estimation outcome is tested. If the critical Cook's Distance value $D_i > 4/n$, where n is the number of observations and i indicates each company, the observation can be considered as an influential case and needs to be further investigated. The highest values of the Cook's Distance test for ROA as dependent variable belong to the company ID's 535, 503, 304 and 489, while for Tobin's Q the company ID's 487, 119, 541 and 535 have the highest Cook's Distance values.[13]

As the numerical results are in line with the graphical observations and the analysis of extreme values, the companies mentioned above were further investigated by means of removing the observations one by one from each regression in order to examine if the observations have an influential impact on the regression outcome. As a result, the observations of the company ID's 541 and 535 are removed from all regression analyses. This is because both companies feature extreme high values for the level of debt which significantly influence the impact of a company's debt level on the financial performance of firms. Thus, when leaving in the two companies, the effect of the level of debt is

[12] Appendix II provides a list of all companies and their ID number used in this research.

[13] The Cook's Distance outcome disclosed more potential influential cases, but they were less significant. Therefore, as the highest Cook's Distance values are in line with the graphically analysis of outliers only those observations are further investigated.

insignificant, whereas removing the observations makes the level of debt statistically significant with a negative impact on the financial performance like expected. This decision is reasonable as the debt level variable is not transformed and features a skewed distribution, but after removing these two companies, it can be seen in table 6 that the debt level becomes approximately normally distributed with a skewness value of 0.53 and kurtosis value of 3.28. Moreover, deleting company ID 487, which has the extreme Tobin's Q and ROA values, would also reduce the kurtosis value of Tobin's Q to 4.87 but removing the company does not have a significant effect on the regression outcomes for which reason the company remains in the sample. This might be explained by the fact that Tobin's Q has been transformed to its logarithmic form, which already reduces the variation among variables, however, the debt level was not transformed. Thus, all other companies which indicated an outlier in the graphical and/or numerical tests only had a small influence on the size of the coefficients and hence are no influential observation for which reason they remain in the sample.

Table 6: Descriptive Statistic of the Debt Level

Variable	(1) N	(2) Mean	(3) Min.	(4) Max.	(5) Std. Dev.	(6) Variance	(7) Skewness	(8) Kurtosis
Debt	578	24.53	0	98.15	16.31	265.99	0.53	3.28

Notes: The table displays the values for the variable debt level after removing two observations which turned out to be influential cases on the regression outcome. Removing the observations changes the debt level to an approximately normal distribution.

3.4.3 Multicollinearity

Multicollinearity arises when explanatory variables of the regression are perfect linear functions of another which signifies the violation of the classical OLS assumptions (Studenmund, 2014). In case of high correlation, the variance of the estimated coefficients increases which also leads to an increase in standard errors and thus has implications for hypothesis testing (Studenmund, 2014). Therefore, the variables in this thesis are tested by means of a correlation matrix in table 7 which displays the relationships between any two variables used in the regressions analyses. Gender diversity and age diversity are not significantly correlated with the firm performance variables when focusing on the direct relationship and also do not feature any high correlation to other explanatory variables, except for the overall diversity indices. The number of nationalities in the board seems to be negatively and significantly correlated to the dependent variables but only with a very low correlation coefficient of 12.9%. All control variables show a statistically significant relationship with the performance variables ROA and Tobin's Q. Like mentioned before, the direction of the relation between board size and firm performance and firm size and firm performance is not clear. According to this correlation matrix, the size of boards, as well as firms, are negatively correlated to firm performance when focusing only on the direct relationship between the two variables with a correlation coefficient of around 27% and 61%

to 65%, respectively. Like it was expected, the debt level of companies is also negatively correlated with the financial performance of firms.

In general, no significantly high correlations between independent variables can be detected, disregarding the overall diversity indices. As the overall diversity indices are constructed by means of the separate diversity variables, the high correlations make sense. This will not alter the results as the indices and single diversity variables will be tested separately. However, board size and firm size are correlated with 48.7%. As it becomes difficult to distinguish and estimate the effects of explanatory variables with an increase in correlation, a VIF (Variance Inflation Factor) test is conducted to indicate the severity of multicollinearity by means of the variance of the estimated coefficients. The test results are reported in appendix VIII which show a mean VIF of 1.26 with ROA as the dependent variable and 1.27 with Tobin's Q as the dependent variable. As the VIF value is smaller than the critical value of 10, it can be concluded that multicollinearity is not a problem in this research.

Table 7: Correlation Matrix

	(1) ROA	(2) Q	(3) Females	(4) Nat. (%)	(5) Nat. (#)	(6) Age	(7) Index 1	(8) Index 2	(9) Board	(10) Firm	(11) Debt	(12) Industry
ROA	1.000											
Q	0.627***	1.000										
Females	0.004	-0.013	1.000									
Nat. (%)	-0.005	0.106*	-0.058	1.000								
Nat. (#)	-0.129**	-0.066	0.008	0.763***	1.000							
Age	0.076	0.031	0.019	-0.160***	-0.074	1.000						
Index 1	0.034	0.099*	0.548***	0.776***	0.635***	0.097*	1.000					
Index 2	0.047	0.058	0.542***	0.432***	0.432***	0.366***	0.762***	1.000				
Board	-0.269***	-0.282***	0.037	-0.298***	0.324***	0.159***	-0.161***	0.021	1.000			
Firm	-0.658***	-0.611***	0.128**	0.000	0.331***	-0.087*	0.064	0.046	0.487***	1.000		
Debt	-0.096*	-0.093*	0.036	-0.024	-0.005	0.003	0.006	0.013	0.043	0.042	1.000	
Industry	-0.401***	-0.428***	0.009	-0.108*	-0.048	-0.016	-0.103*	-0.074	0.086*	0.383***	-0.072	1.000

Note: *, **, *** indicate significance at the 5%, 1% and 0.1% levels, respectively.

3.4.4 Heteroscedasticity

Furthermore, especially the problem of heteroscedasticity may arise in cross-sectional analyses (Studenmund, 2014). Heteroscedasticity violates the classical assumption of OLS estimators because the variance of the error term increases which leads to a bias in the standard errors of the estimated regression coefficients (Studenmund, 2014). This has consequences for the statistical testing of significance as well as means that according to the Gauss-Markov theorem, the OLS estimator is no longer the best linear unbiased estimator (BLUE) as it does not feature the lowest variance and hence becomes biased (Studenmund, 2014). To ensure that the assumption of the non-existence of heteroscedasticity is met in a classical linear regression model, the Breusch-Pagan/ Cook-Weisberg test is conducted to detect potential heteroscedasticity of the error terms in this research. The null hypothesis of the test is that the error term is homoscedastic and hence has a constant variance and the alternative hypothesis is that the error term is heteroscedastic and hence demonstrates an increasing variance. This test was conducted for each of the performed regressions and indicates indeed the presence of heteroscedasticity. This can be concluded because the p-value of the chi2 statistic is very low which means that the null hypothesis is rejected at a significance level of 1%. Therefore, all regressions are corrected for heteroscedasticity and performed with robust standard errors.

3.4.5 Endogeneity

Moreover, as pointed out by Hermalin & Weisbach (2001), endogeneity is a major concern in the literature that may affect the relationship between the corporate governance board characteristics and firm performance because the financial performance of a firm could also influence the composition of the board and its diversity. Hence, the relationship between demographic diversity and the firm value is endogenous defined which means that the explanatory variable is correlated with the error term of the equation (Carter et al., 2010). Therefore, reverse causality could be a concern in this research as diverse directors affect the performance of the firm but it is also possible that better performing firms may hire more diverse directors (Carter et al., 2010). On the other hand, it can be also argued that women are scarce commodities at the board of directors and this is why they may choose to work for firms which are better performing (Farrell & Hersch, 2005).

Some previous researches take the problem of endogeneity into account and treat it in different ways (e.g. Adams & Ferreira, 2009; Bhagat & Black, 2001; Campbell & Mínguez-Vera, 2008; Carter et al., 2010, 2003; Choi et al., 2007; Smith et al., 2006). Usually, reverse causality can be treated with an instrumental variable approach, the two-stage least square model, as otherwise if a variable is not exogenous defined and hence not outside the system of the equation, the coefficient estimates become biased which violates the Grauss-Markov assumptions for OLS estimators (Carter et al., 2003; Smith et al., 2006). However, this approach requires the use of instrumental variables which are highly statistically correlated with the endogenous independent variables gender, age and nationality respectively but are not allowed to have an impact on the performance of a firm (Adams & Ferreira,

2009). Due to a lack of data availability, this research could not find appropriate variables which fulfil the conditions to serve as an instrumental variable. As an alternative to partly treat endogeneity, previous studies used one-year lagged values for the endogenous variable to reduce potential reverse causality biases even though the variable is not completely exogenous defined (Carter et al., 2010; Choi et al., 2007; Jackling & Johl, 2009; Joecks, Pull, & Vetter, 2013; Labelle et al., 2015). Therefore, this research will use the lagged values of the variables gender-, nationality- and age diversity as a robustness check. However, Bhagat & Black (2001) assert that the composition of boards usually change slowly over time for which reason the problem of endogeneity is not so serious. Therefore, first all regressions are performed using the diversity variables of the base year 2016 and then the same regression is conducted as a robustness test with the diversity variables measured in 2015, while all other variables remain with 2016 values. The results for the robustness tests are given in appendix IX.

4 Empirical Results

The purpose of the empirical analysis is to investigate how demographic diversity in the board of directors affects the financial performance of firms. Therefore, the analysis starts by investigating hypotheses 1 to 3 which is the effect of each demographic diversity variable separately. This is followed by answering the general hypothesis by means of the two constructed diversity indices which assumes an overall positive effect of board diversity on firm performance. In the end, the effects of the included control variables in each regression are analysed and compared to previous empirical studies.

The impact of all demographic diversity variables on the firm financial performance is analysed once controlled for industry effects and once neglecting the industry a company operates in. The reason of performing two regressions is to illustrate that when controlling for industries, the effect is that strong on the performance of firms that some firm-specific control variables become insignificant. However, when neglecting the industry of companies, these firm-specific control variables become statistically significant. Following the studies by e.g. Joecks et al. (2013) and Randoy et al. (2006), the coefficients for each industry category are not shown in the regression results as this research is not interested in the specific effects of different industries on the financial firm performance. The purpose is simply to control for industry effects as it is assumed that the relationship between board diversity and performance may differ across industries. Therefore, each regression model which is controlled for industry effects is indicated with 'YES', while regressions which do not account for the industry of companies are indicated with 'NO'.

Moreover, all dependent, independent and control variables in the regression analyses are standardised by computing *z-scores* for every variable in the sample. This is done by subtracting the mean (μ) from each variable's value (X) and then divide the results by the standard deviation (σ) of the variable (Studenmund, 2014; Wooldridge, 2012). Hence, standardised variables (*z-scores*) = $\frac{X-\mu}{\sigma}$.
All standardised variables feature the properties of a 0 mean value and a standard deviation of 1 (Studenmund, 2014). The purpose is that standardised beta coefficients allow comparing the effect size among variables in a regression by rescaling the different measurements of variables into the unit of standard deviations. Thus, the beta coefficients indicate the effect of an increase in the standard deviation of the independent variable on the standard deviation of the dependent variable. However, standardising variables do not affect the statistical significance compared to unstandardized variables.(Wooldridge, 2012). In addition, all regressions are conducted with robust standard errors to correct for heteroscedasticity.

Also, this empirical analysis makes use of the adjusted R-Squared instead of the normal R-Squared to adjust for the increase in fit when adding variables to the equation. It also allows to compare the fits of equations with the same dependent variable but different numbers of independent variables (Studenmund, 2014). This is important as each regression is conducted once with the variable industry and once without. For a cross-sectional data set, a R-squared of around 0.5 can be considered as a good fit (Studenmund, 2014).

4.1 Gender Diversity

Hypothesis 1 states that gender diversity in the board of directors positively influences the financial performance of firms. Table 8 shows the empirical results for ROA in regression (1) and (2) and for Tobin's Q in regression (3) and (4) as a measure of firm performance. Both regressions for ROA consist of 531 observations with a goodness of fit, measured by the adjusted R-squared, of 0.46 when controlling for industry effects in regression (1) and an adjusted R-squared of around 0.44 without capturing industry effects in regression (2). Thus, the goodness of fit indicates that the estimated regression fits the sample data. Moreover, the variable gender diversity in regression (1) and (2), measured as the percentage of female directors, has a positive sign and the p-value indicates that the relationship is highly significant and different from zero at a 1% significance level with a robust standard error of 0.03 in both regressions. Thus, greater gender diversity increases ROA. In addition, the standardised coefficients indicate that the effect of gender diversity is slightly greater when neglecting industry effects. An increase of one standard deviation in the percentage of female directors leads to an 0.0878 increase in the standard deviation of ROA when controlling for industry effects and a slightly greater effect of 0.0891 standard deviations otherwise. However, in both regression models the magnitude of gender diversity on ROA is greater than that of the control variables board size and debt level on the financial performance of firms.

Table 8: Gender Diversity - Percentage of Female Directors

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Females	0.0878***	0.0891***	0.0676**	0.0770**
	(0.0300)	(0.0305)	(0.0336)	(0.0350)
Board	0.0532	0.0753**	0.00319	0.0336
	(0.0364)	(0.0377)	(0.0345)	(0.0354)
Firm	-0.636***	-0.714***	-0.521***	-0.629***
	(0.0399)	(0.0386)	(0.0537)	(0.0473)
Debt	-0.0738**	-0.0606*	-0.141***	-0.119***
	(0.0348)	(0.0351)	(0.0384)	(0.0391)
Industry	YES***	NO	YES***	NO
N	531	531	578	578
adj. R^2	0.460	0.437	0.428	0.380

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Gender diversity (Females) is measured as the percentage of female directors in the board which is the ratio of the number of female directors to the total number of directors. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

The measure of performance for regression (3) and (4) is Tobin's Q and captures data about the board of directors of 578 companies. The adjusted R-squared is 0.43 when controlling for industry effects and is slightly smaller of 0.38 otherwise. Also, the effect of gender diversity on Tobin's Q is positive and significant at a 5% level. Thus, greater gender diversity increases Tobin's Q. Also, with Tobin's Q as dependent variable, the effect of gender diversity is greater when neglecting industry effects (standardised coefficient of 0.077) in regression (4) compared to regression (3) in which it is controlled for industries (standardised coefficient of 0.0676).

Moreover, a robustness test is performed in order to partly treat the problem of endogeneity. Hence, all regressions in table 8 are conducted again but in which gender diversity is measured in the year 2015 and hence is one year lagged. The results are displayed in appendix IX. They indicate no significant difference and hence the effect of gender diversity on the financial performance of firms is robust. Thus, hypothesis 1 can be confirmed as all regressions show a positive and significant impact of the percentage of female directors on ROA and Tobin's Q. This means that the more gender diversity in the board of directors, the better the financial performance of firms. However, the effect size of gender diversity is slightly greater on ROA than on Tobin's Q as well as the significance level of the effect is higher on ROA. This suggests that the proxy choice for the financial performance of firms may affect the regression results.

4.2 Nationality Diversity

Table 9 and 10 show the results to test hypothesis 2 that the higher the nationality diversity in the board of directors, the better the financial performance of firms. The effect of nationality diversity, which is measured as the percentage of nationalities, is given in table 9 and the effect measured in absolute numbers is given in table 10. In both tables, the dependent variable in regression (1) and (2) is ROA and contains 441 observations and the dependent variable in regression (3) and (4) is Tobin's Q which consist of 479 observed board of directors. It can be noticed that the goodness of fit is slightly bigger when considering industry effects in the estimations. For ROA as a measure of performance, the adjusted R-squared is 0.44 when controlling for industry effects in both regression models (1) and decreases to 0.42 when ignoring the industry in both regressions (2). The same applies to Tobin's Q, where the adjusted R-squared drops from around 0.41 in the regression models (3) to 0.38 in regression (4) in both tables. However, for a cross-sectional data set, the displayed adjusted R-Squared can be considered as a good fit.

In general, the results indicate that the variable nationality diversity has a positive impact on the financial performance of firms, except for regression (1) in table 9 in which the effect is negative but also insignificant with a very small standardised coefficient of -0.001. However, it is noticeable that the effect of nationality diversity for both measurements, thus in absolute and relative terms, is insignificant on ROA, but is statistically significant at a 1% level on Tobin's Q. In addition, when measuring firm performance as ROA in table 9 and 10, the standardised coefficients of both nationality diversity proxies

also show that the effect size is very small compared to the significant effect size on Tobin's Q. This also holds in the robustness test, shown in appendix IX, in which nationality diversity is lagged for one year to treat endogeneity issues. Thus, the insignificant results of nationality diversity on ROA are robust.

Table 9: Nationality Diversity - Percentage of Nationalities

Dependent Variable	(1) ROA	(2) ROA	(3) Q	(4) Q
Nat. (%)	-0.00102	0.0249	0.111**	0.142***
	(0.0452)	(0.0454)	(0.0433)	(0.0416)
Board	0.121***	0.154***	0.0558	0.0950**
	(0.0404)	(0.0410)	(0.0494)	(0.0477)
Firm	-0.653***	-0.725***	-0.544***	-0.637***
	(0.0443)	(0.0435)	(0.0645)	(0.0559)
Debt	-0.0861**	-0.0722*	-0.148***	-0.125***
	(0.0394)	(0.0402)	(0.0457)	(0.0457)
Industry	YES***	NO	YES***	NO
N	441	441	479	479
adj. R^2	0.442	0.425	0.408	0.376

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Nationality diversity (Nat. (%)) is measured as the percentage of nationalities in the board which is the ratio of the total number of nationalities to the total number of board members.
*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

On the other hand, when focusing on Tobin's Q as dependent variable, the effect of nationality diversity is statistically significant and positive for both measurements in table 9 and 10. Regression (3) in table 9 displays that a greater nationality diversity in the board, measured as percentage of nationalities, is associated with an increase in Tobin's Q at a 5% significance level and a standardised coefficient of 0.111 when controlling for industry effects. When disregarding a company's industry in regression (4), the effect of the percentage of nationalities on Tobin's Q becomes even statistically significant at a 1% level and the effect becomes slightly stronger with a standardised coefficient of 0.142. Also, the robustness test of the lagged nationality diversity variable in appendix IX indicates that also when controlling for industry effects, the impact of diversity is significant at a 1% level.

Also, the absolute measure for nationality diversity in regression (3) and (4) in table 10 has a positive impact on Tobin's Q and the p-values indicate that both coefficients are highly significant and different from zero at a 1% significance level with robust standard errors of around 0.04. The robustness

test for the number of nationalities in 2015 shows robust results with the same size of coefficients at 1% significance level in appendix IX. Considering the magnitude of nationality diversity on Tobin's Q in table 9 and 10, the standardised coefficients indicate that, when disregarding industry effects, the impact of nationality diversity in the board of directors is greater than the impact of the control variables board size and debt level.

Overall, hypothesis 2 can be confirmed which states that the more nationality diversity in the board of directors, the better the financial performance of firms, but only when measuring the financial performance with the market-based measure Tobin's Q. For ROA, the hypothesis needs to be rejected. This implies that the measurement choice for the financial performance of firms is affecting the outcome of a board diversity effects. Thus, this underlines the mentioned debate about accounting-based and market-based performance measures and the difficulties of comparing results among empirical studies as previous studies make use of many different measurements and hence report different outcomes.

Table 10: Nationality Diversity - Number of Nationalities

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Nat. (#)	0.0292	0.0562	0.130***	0.162***
	(0.0465)	(0.0469)	(0.0412)	(0.0400)
Board	0.115***	0.130***	-0.0193	-0.000982
	(0.0417)	(0.0430)	(0.0422)	(0.0422)
Firm	-0.662***	-0.732***	-0.553***	-0.645***
	(0.0437)	(0.0432)	(0.0649)	(0.0565)
Debt	-0.0859**	-0.0722*	-0.145***	-0.122***
	(0.0397)	(0.0404)	(0.0455)	(0.0454)
Industry	YES***	NO	YES***	NO
N	441	441	479	479
adj. R^2	0.443	0.428	0.412	0.382

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Nationality diversity (Nat. (#)) is measured as the total number of nationalities in the board.
*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

4.3 Age Diversity

The empirical results to test the hypothesis that more age diversity in the board of directors increases the financial performance of firms is given in table 11. The dependent variable of the regression models (1) and (2) is ROA. Both models consist of 511 observations and an adjusted R-squared of 0.45 including the variable industry and 0.43 otherwise. The effect of age diversity on Tobin's

Q is shown in regression (3) and (4) and is based on 554 company's board of directors and an adjusted R-Squared of 0.42 and 0.37. Even though the adjusted R-Squared decreases slightly, the goodness of fit indicates that the estimated regressions fit the sample for a cross-sectional data.

In all regressions, the p-values of age diversity indicate that the effect of age diversity on the financial performance of firms is statistically insignificant and, except for regression (1), also negative but the standardised coefficients are very small. Also, the robustness test to treat endogeneity biases in appendix IX indicates insignificant and negative beta coefficients. Therefore, hypothesis 3 has to be rejected as more age diversity in the board of directors does not statistically improve the financial performance of firms.

However, when analysing the data for the age of directors, it becomes clear that only one or two young directors are present in very few boards and by taking the mean age of boards, to calculate the coefficient of variation, almost no variation can be observed anymore among the board of directors. This can be also seen in the descriptive statistic which indicates a variance of 0.001 for the coefficient of variation of age. Thus, as the board of directors in this sample of European firms are not really diverse in term of age, the negative sign might indicate that this low diversity could have a negative effect on the financial performance of firms.

Table 11: Age Diversity - Coefficient of Variation of Age

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Age	0.0000982	-0.000917	-0.0243	-0.0347
	(0.0320)	(0.0323)	(0.0371)	(0.0395)
Board	0.0570	0.0801**	0.0208	0.0566
	(0.0364)	(0.0381)	(0.0381)	(0.0393)
Firm	-0.628***	-0.705***	-0.519***	-0.629***
	(0.0400)	(0.0392)	(0.0549)	(0.0483)
Debt	-0.0743**	-0.0615*	-0.134***	-0.111***
	(0.0369)	(0.0373)	(0.0403)	(0.0410)
Industry	YES***	NO	YES***	NO
N	511	511	554	554
adj. R^2	0.453	0.430	0.418	0.370

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Age diversity (Age) is measured as the coefficient of variation of age.

*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

4.4 Overall Demographic Board Diversity

Before analysing the overall combined effect of board diversity, the effect sizes for all separate diversity variables are compared which can be done due to standardised variables. Considering ROA, the effect of gender diversity is the greatest among all diversity variables with a standardised coefficient of approximately 0.09 in regression (1) and (2) in table 8. However, gender diversity is the only diversity variable that is statistically significant on ROA, as nationality diversity is only significantly different from zero on Tobin's Q and age diversity is not significant at all.

Regarding Tobin's Q as the dependent variable, both proxies for nationality diversity seem to have the greatest effect on the financial performance of firms compared to gender and age diversity. The effect of the absolute measure is also slightly higher with standardised regression coefficients of 0.13 and 0.162 compared to the coefficients of 0.111 and 0.142 of the relative measure. In contrast, the effect of gender diversity is half that small on Tobin's Q which is displayed by the standardised coefficient of 0.0676 and 0.077, while age diversity is not statistically significant. This indicates that nationality diversity has a greater effect on the performance of firms than gender diversity. Thus, each diversity aspects contributes differently strong to an increase in the financial performance of firms for which reason it is important to analyse the separate effects of diversity before combining the diversity effects into a diversity index.

However, the empirical results of overall demographic diversity in the board of directors on the financial performance of firms and thus the combined effect of the variables gender-, nationality- and age diversity is represented in table 12 and 13. The diversity index 1, which is constructed by summing up the values of all aspect of diversity for each observation, is shown in table 12. Regression models (1) and (2) in this table show the effect on ROA which is based on 436 company observations and an adjusted R-Squared of 0.44 if it is controlled for industry effects and 0.42 otherwise. The regression results show that the effect of overall diversity is positive and statistically significant at a level of 10% with a standardised coefficient of 0.07 when controlling for industry effects (table 12, regression (1)). When industry effects are not considered, the effect on ROA is significantly different from zero at a 5% level and becomes slightly bigger to a coefficient of 0.0925 (table 12, regression (2)). Thus, greater overall board diversity is associated with better financial performance of firms. Moreover, the effect of the diversity index 1 on Tobin's Q is displayed in the regression models (3) and (4) in table 12. Compared to ROA as the dependent variable, the effect is highly significant on a 1% level and the magnitude of overall board diversity is greater on Tobin's Q with standardised coefficients of 0.138, when controlling for industry effects, and 0.167 otherwise.

Table 12: Diversity Index 1 - Summed up

Dependent Variable	(1) ROA	(2) ROA	(3) Q	(4) Q
Index 1	0.0700*	0.0925**	0.138***	0.167***
	(0.0414)	(0.0415)	(0.0431)	(0.0419)
Board	0.139***	0.166***	0.0435	0.0777*
	(0.0392)	(0.0399)	(0.0477)	(0.0463)
Firm	-0.670***	-0.735***	-0.541***	-0.632***
	(0.0442)	(0.0433)	(0.0655)	(0.0564)
Debt	-0.0881**	-0.0767*	-0.148***	-0.127***
	(0.0400)	(0.0404)	(0.0460)	(0.0459)
Industry	YES***	NO	YES***	NO
N	436	436	474	474
adj. R^2	0.443	0.429	0.409	0.378

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Overall board diversity (Index 1) is measured for each company as the sum of the values for the percentage of females, percentage of nationalities and the CV of the age of directors.

*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Furthermore, overall board diversity is also measured by giving scores to each aspect of board diversity in each board of directors. The empirical regression outcome of the effect of this overall diversity index 2 is given in table 13. The dependent variable in regression (1) and (2) is ROA and consists of 436 board of directors and an adjusted goodness of fit of 0.44 when taking into account industry effects and 0.42 if not. When controlling for industry effects in regression (1), the impact of overall board diversity is not statistically significant but becomes significant at a 10% level when neglecting industry effects in regression (2). Thus, overall board diversity is associated with an increase in ROA but only when neglecting industry effects. This underlines the before mentioned suggestion that the relationship between the industry and the financial firm performance is such strong that it takes away the significant influence of other variables.

The effect of the overall board diversity index 2 on Tobin's Q can be seen in the regression models (3) and (4) with 474 observations and an adjusted R-Squared of around 0.4 which decreases to 0.36 when ignoring industry effects. Similar to the results of diversity index 1, the effect of diversity index 2 is stronger on Tobin's Q than on ROA in terms of significance. While the diversity index 2 is only significant on ROA when neglecting industry effects in regression (2), overall diversity on Tobin's Q is statistically different from zero at a 5% significance level even when controlling for industry and

becomes highly significant at a 1% level when not considering the company's industry. Hence, overall board diversity index 2 is associated with an increase in Tobin's Q.

That the effect of overall board diversity is stronger on Tobin's Q than on ROA for both diversity indices might be explained when inspecting the separate effects of board diversity and their effect size mentioned at the beginning of this subchapter. While only gender diversity has a significant influence on ROA, Tobin's Q is significantly influenced by gender and nationality diversity. Thus, this affects the impact of the overall diversity indices. All in all, the general hypothesis that the more demographic diversity in the board of directors, the better the financial performance of firms can be confirmed by both constructed diversity indices even though the separate effect of age diversity is not statistically different from zero.

Table 13: Diversity Index 2 - Categories

Dependent Variable	(1) ROA	(2) ROA	(3) Q	(4) Q
Index 2	0.0562	0.0706*	0.0799**	0.0978***
	(0.0364)	(0.0364)	(0.0355)	(0.0363)
Board	0.119***	0.140***	0.00349	0.0315
	(0.0388)	(0.0396)	(0.0433)	(0.0427)
Firm	-0.655***	-0.719***	-0.509***	-0.601***
	(0.0440)	(0.0433)	(0.0624)	(0.0549)
Debt	-0.0876**	-0.0750*	-0.145***	-0.121***
	(0.0399)	(0.0405)	(0.0463)	(0.0462)
Industry	YES***	NO	YES***	NO
N	436	436	474	474
adj. R^2	0.442	0.426	0.397	0.361

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. Overall board diversity (Index 2) is measured as the sum of each company's score for gender-, nationality-, and age diversity based on the mean and standard deviation of these variables.

*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

4.5 Control Variables

In terms of control variables, the predicted direction of the sign of a company's **board size** was not clear on ROA and Tobin's Q due to inconclusive outcomes of previous empirical studies. The regression outcomes of this analysis suggest a positive impact with this sample set of European companies even though board size is not significantly different from zero in all regressions. However, in those regressions in which the board size has a significant effect, the effect is positive on the financial performance of firms. This can be explained by a higher likelihood that bigger boards possess a variety of know-how and information as well as more external linkages to other company's board members which positively affects a more efficient decision-making process of boards and hence increases firm performance (Carter et al., 2010; Labelle et al., 2015). Moreover, the empirical outcomes suggest that the effect of board size is stronger on ROA than on Tobin's Q. The coefficient of the number of board members is not statistically significant on Tobin's Q when testing gender -, nationality- and age diversity as well as the overall diversity index 2.[14] In addition, it seems that the effect of the board size is not strong enough when also controlling for industry effects. This can be seen when e.g. testing gender diversity on ROA in table 8 or age diversity in table 11 on ROA. In these regressions, the coefficient of board size is insignificant when including the industry of companies and becomes mostly statistically significant at a 5% significance level when neglecting industry effects. Thus, when controlling for industry effects, it takes away the significance of board size on the financial performance of firms. In general, the effect size of the total number of board members on ROA is between 0.07, indicated by the standardised coefficient, in the regressions of testing gender diversity in table 8 and around 0.15 when testing the percentage of nationalities in table 9.

Furthermore, previous board diversity studies found positive as well as negative associations between the control variable **firm size** and the financial performance of firms. The empirical results of this thesis suggest that the effect of firm size on firm performance is negative and highly significant at 1% significance level in all performed regression models. The standardised coefficient for firm size varies approximately between -0.5 and -0.7 standard deviations with a robust standard error between 0.03 and 0.05. Thus, the firm size of companies, measured as total assets, has the greatest standardised effect on the financial performance relative to all other independent and control variables in this research. The robust negative effect indicates that the greater the size of a firm, the lower the financial performance. Even though the direction of sign seems counter-intuitive, also some other empirical studies found a negative association. Campbell & Mínguez-Vera (2008) found that the size of Spanish companies negatively influences Tobin's Q and Choi et al. (2007) found also a highly negative

[14] The effect of board size is only insignificant in the regression in which the number of nationalities is used as a proxy for nationality diversity in table 10. However, board size is significant when using the percentage of nationalities as a measure and when not considering industry effects. Also, when testing the overall diversity index 1 in table 12, the board size significantly influences Tobin's Q at a 10% level, but only when neglecting industry effects.

significant effect on Tobin's Q for Korean firms.[15] In addition, the empirical results by Labelle et al. (2015) of US and European companies indicate a highly statistically significant and negative impact of the size of firms on ROA and also Erhardt et al. (2003) findings suggest a negative relationship between the size of US firms and ROA but the effect is insignificant. Thus, this negative results suggest that the STOXX Europe 600 companies may have more agency problems such as information asymmetry and different manager interests in large firms than they can benefit from their firm size e.g. due to economies of scale or easier excess to external funds (Labelle et al., 2015; Smith et al., 2006). Similar arguments for the negative relationship are given by Choi et al. (2007) who explain that larger firms are in general also more diversified which may lead to higher agency and bureaucratic costs and thus reduce firm performance. Another practical explanation for a negative significant effect could be that the data analysed in this research is only taken from the year 2016. Thus, as the effect is not analysed over time in a panel data set, the negative effect only holds for the companies in the year 2016, however, this cannot be generalised to other years which might show a positive relationship.

According to theory and previous empirical studies, the **debt level** of companies as a control variable is expected to influence the performance of firms negatively as it is associated with the operational risk of companies. In all regression models of this study, the debt level is negative like expected and statistically different from zero at a significance level of at least 10% on ROA and the effect of debt on Tobin's Q is even greater and also highly significant at a 1% significance level in all regression models (3) and (4). In general, the results prove that an increase in the level of debt of companies is associated with a lower financial performance of firms.

As mentioned in the beginning, each regression was performed twice, once controlling for **industry** effects and once otherwise. For all performed regressions, the adjusted R-Squared is slightly bigger when controlling for industry effects compared to the estimations neglecting the industry in which a company operates. In addition, the effect of industry on the financial performance of firms seems to be strong, so that the coefficient of board size becomes insignificant in some regressions. Also, when testing for the overall impact of demographic board diversity in table 12 and 13, both diversity indices become more statistically significant when not considering industry effects. Thus, it suggests that the relationship between board diversity and the financial performance of firms can differ across industries (e.g. Carter et al., 2010; Jackson et al., 2003; Kang et al., 2007).

As all variables in this analysis are standardised, **comparing the size** of control variables reveals that the negative effect of firm size on the financial performance of firms is the greatest in size and is highly significant at a 1% significance level in all regressions. Moreover, the effect of the board and firm size becomes greater when neglecting industry effects, while the effect size of the debt level becomes smaller and thus less negative.

[15] However, Kim & Lim (2010) also investigates Korean companies and could only find a negative but insignificant relationship.

5 Discussion & Conclusion

The globalisation of businesses and the political promotion for equality at the workplace are factors amongst others which have led to an increasing interest in the effect of demographic board diversity on the financial performance of firms. The effects of demographic diversity are based on many different theoretical arguments, where some advocate diversity and some associate complexity and integration problems with higher degrees of diversity. The business case theory emphasises that greater corporate diversity is associated with a variety of knowledge and cultural competencies which offer a better understanding of the marketplace and enhances the effectiveness of global relationships and corporate leaderships (Cox & Blake, 1991; Robinson & Dechant, 1997). Closely related are the arguments of the resource-based and human capital theory. It is claimed that the board of directors is a provider of unique resources such as human capital or social capital which can be utilised by a company to achieve a competitive advantage and thus increase the financial performance (Barney, 1991; Hillman & Dalziel, 2003; Shrader et al., 1997; Terjesen et al., 2009). While different social capital provides access to many networks and information channels, diverse human capital in boards leads to a variety of different perspectives and experiences which could support a more effective group decision-making and problem-solving process as well as may result in higher creativity and innovations (Carter et al., 2010; Cox & Blake, 1991; Erhardt et al., 2003; Maznevski, 1994; Shrader et al., 1997). Moreover, related to the function of the board of directors, the agency theory assumes that a diverse board consists of more independent board members for which reason the board executes more effectively its monitoring and controlling tasks (Carter et al., 2003; Hillman & Dalziel, 2003; Terjesen et al., 2009). However, a diverse group of directors may also decrease the financial performance. The social identity theory emphasises difficulties in the integration of different social identities and some other theorists assert that a variety of perspectives increase complexity and thus decision-making and problem-solving becomes more time-consuming (Campbell & Mínguez-Vera, 2008; Hambrick et al., 1996; Rivas, 2012; Smith et al., 2006; Terjesen et al., 2009).

In line with these different theoretical arguments for the effect of demographic board diversity on the value of firms, also previous empirical studies reveal inconclusive results. Therefore, this thesis aims to make sense of the inconclusive results by trying to answer the research question how demographic diversity in terms of gender, nationality and age affects the financial performance of the largest European companies, listed at the STOXX Europe 600 index in 2016. Firm performance is measured as ROA and Tobin's Q ratio. The empirical findings reveal that, first of all, hypothesis 1 is confirmed which means that the more gender diversity in the board of directors, the better the financial performance of firms. The effect is statistically significant at a 1% significance level when measured as ROA and at a 5% significance level when measured as Tobin's Q. Thus, this thesis is in line with most previous research studies (e.g. Campbell & Mínguez-Vera, 2008; Erhardt et al., 2003; Labelle et al., 2015; Lückerath-Rovers, 2013; Mahadeo et al., 2012) and implies that a higher female representation in the board of directors is beneficial for the value of large European companies. Theoretically, female directors may

serve as a symbolic value, function as role model, are assumed to have a higher degree of independence and positively contribute due to a variety of knowledge, perspectives and values represented by women (Carter et al., 2003; Erhardt et al., 2003; Maznevski, 1994; Rose, 2007; Walt & Ingley, 2003). The empirical outcomes imply that firms should consider increasing the ratio of female directors in boards not only to decreases discrimination issues or to improve a company's image but also because female directors indeed make an impact that matters.

Second, the regression outcomes show that the second hypothesis is partly confirmed as more nationality diversity in the board of directors leads to a better financial performance of firms only if measured with the market-based measure Tobin's Q. Previous empirical studies about the relationship between board diversity and the financial performance used different proxies and reveal inconclusive results as some found positive some negative and some no effect at all. Thus, the insight that the effect on nationality diversity differs between the two measurements for performance indicates that the choice of the performance measure is crucial when conducting research with the purpose to compare the empirical results to other studies. Therefore, the previous inconclusive results may be partly explained by the use of many different performance measures. A theoretical implication is that the outcome of different studies can be only compared when using the same measurement for the dependent variable. Further research studies need to take into account different proxies for firm performance to be able to compare the results among studies and investigate if there is also a difference in outcomes between other accounting-based and market-based measures. However, the findings suggest that directors with different national backgrounds positively contribute to the value of firms by incorporating especially social capital like cultural competences and network ties which is a unique resource to understand foreign markets and to build global relationships (Maznevski, 1994; Robinson & Dechant, 1997).

If greater diversity in the age of directors positively affects the financial firm performance was tested with the third hypothesis. This hypothesis has to be rejected as no statistically significant effect of age diversity has been found which is in line with e.g. research by Darmadi (2011) and Randoy et al., (2006). However, when closely analysing the data about the director's age it is noticeable that variation in the age of directors is lacking and that European boards are on average relatively old which may explain the insignificant results. Thus, further research is suggested with a sample set which features more age variation within the board of directors. Apart from this practical reason, theoretically the insignificant results imply that the combination of different experiences, knowledge, productivity, social and cultural values which are associated with different ages does not create synergies which are strong enough to improve the financial performance of firms. Also, the study by Darmadi (2011) found that age diversity is insignificant but that board members who are younger than 50 years indeed increase firm performance. Thus, as the results of this thesis also imply that age diversity in the boardroom is not value destroying for European companies, managers should still consider increasing the proportion of young directors to promote equality and to reach more age diversity.

Moreover, this thesis is one of the first which analysed overall demographic board diversity by constructing two diversity indices to test the combined effect of gender, nationality and age diversity. The general hypothesis that greater overall demographic diversity leads to a better financial performance of firms can be confirmed by both constructed diversity indices on ROA and Tobin's Q. Hence, even though the separate aspect of age diversity has no significant impact on the value of firms, the overall combined effect of greater diversity is beneficial for European companies.

These findings have some further theoretical implications. In general, the statistically significant findings of the separate effects of gender and nationality and the overall diversity indices suggest that board diversity consists rather of many different demographic aspects than only the gender of directors like most of the previous empirical studies have investigated. In addition, the effect size of nationality diversity is even greater than that of gender diversity on the financial performance of firms. Thus, researchers should conceptualise board diversity in broader terms and analyse many different demographic director characteristics. In addition, as this and most other empirical researches only focus on observable or demographic diversity, further research about cognitive diversity in non-observable aspects such as cultural values, educational knowledge or personality characteristics would enrich the diversity literature.

Furthermore, the finding that age diversity does not significantly influence the performance of firms, but that overall diversity indeed improves the financial performance, suggests that the combination of different diversity aspects is crucial for the success of companies and that the different diversity aspects may complement one another to a positive effect. Thus, as this research is one of the first in employing an overall diversity index, further research is needed to test for a combined effect of different diversity aspects. However, the evidence that board diversity consists of many demographic aspects but that not all of them have a significant impact also implies that it is important for researcher to understand the theoretical reasoning behind the effect of each separate diversity aspect before exploring empirically the effect of overall diversity in the board of directors.

Also, some practical implications for the management of companies, the government or policy makers in Europe can be deduced from this research. The positive effect of greater gender and nationality diversity implies that manager should consider rising demographic diversity among board members with regard to a higher representation of females or different nationalities. The research provides evidence that next to the moral reasons to promote equality, the incentives of manager to employ greater diversity should be also to increase the company's profits by means of a variety of perspectives, knowledge and experiences by different board members.

Especially the insignificant relation between age diversity and the financial performance implies that public policies such as an implementation of legal quotas may be necessary to increase diversity as previous research has shown that the introduction of gender quotas and softer regulations have led to a higher representation of women in European boardrooms (Carter et al., 2010; EWoB's, 2016). However, some European countries have a voluntary approach which allows public companies to set their own

diversity targets which they would like to achieve and others have implemented binding quotas through legislation (Catalyst, 2014). Before implementing quotas for other diversity aspects, further research is needed to determine if a country should adopt quotas or if market forces and the business cycle should regulate diversity in the boardroom. It has to be investigated if the political pressure in terms of binding quotas also benefits companies by having a positive impact on a firm's financial performance or if binding quotas could harm profits and are counterproductive for firms when they only fulfil ethical reasons and serve as a mandatory tool to promote equality.

Furthermore, this empirical research has some limitations that need to be addressed for the recommendation for future researches. Even though this study is one of the first which focuses on European boardrooms, the sample only includes large listed companies at the STOXX Europe 600 index as the financial information are more likely to be available. This implies that the results of this study only represent the impact of board diversity in large firms but may not be generalised to smaller companies in Europe. Thus, future research could investigate the effect of board diversity on the financial performance of smaller, non-listed companies to compare the results to bigger companies. Erhardt et al. (2003) assume that it might be possible that especially smaller firms benefit from larger diversity as the effort of each board member attracts higher awareness in a smaller firm.

Moreover, the results only reveal that diversity positively affects the financial performance of firms, but the theoretical drivers of the board members behaviour are not clear. Thus, it is not possible to conclude in which sense the behaviour of a diverse board differs from another board (Erhardt et al., 2003). It is only possible to explain that gender and nationality diversity have a significant effect but not that the effect is specifically driven by e.g. female related values, more cultural knowledge or a higher likelihood of board independence. Further research could be conducted to understand the drivers of diversity effects in form of observations or surveys about the working atmosphere in diverse boardrooms. In addition, as diversity is in general relatively low at the board level, such as the low variation in the data for age diversity has shown, it is also of importance for managers and policy makers to understand the barriers of diversity. Thus, further research about the barriers to increase diversity could help in creating policies or managerial regulations to tackle and overcome these barriers, as evidence reveals that greater board diversity benefits a company's financial value.

Regarding methodological limitations, even though the cross-sectional method of this thesis is appropriate to understand the effect of board diversity itself, the data only consists of one financial period. This suggests that the findings may not be representative for other financial periods due to e.g. shocks in the economy. Further research which is interested in the effect of board diversity on the financial performance of firms over time should consider a panel data analysis. This method would also take into account unobserved heterogeneity among firms which affects the firm performance and cannot be captured by cross-sectional studies (Campbell & Mínguez-Vera, 2008; Smith et al., 2006).

Moreover, endogeneity is an issue to consider in board diversity studies for which reason some empirical studies make use of a two-stage least squares method by means of an instrumental variable approach (e.g. Carter et al., 2003; Smith et al., 2006). This research could not find an instrumental variable which fulfils the conditions for this method for which reason an alternative robustness test is conducted with one year lagged diversity variables in order to reduce potential reverse causality biases. However, the lagged board diversity variables are still not completely exogenous defined and thus do not completely control for reverse causality (e.g. Carter et al., 2010; Choi et al., 2007).

Finally, the study is also limited in term of the assumptions drawn for the empirical analysis. Due to weak data availability about the directors' nationalities, it was assumed that 8.3% of the director's data included in the research do not represent an additional nationality in the board of directors. In addition, the board size of companies was calculated manually based on the information provided by the database BoardEx. Therefore, it might be possible that the number of board members is too high as in case of a change in board members within the year 2016, both directors are included. Given that further research has access to this information, a suggestion is to only include directors who are board members at the end of the fiscal year of that company.

In conclusion, regardless of the limitations of this study, the empirical findings allow to answer the research question that greater demographic diversity in the board of directors positively affects the financial performance of European firms. However, the assessment showed that not all separate demographic diversity aspects play a significant role, but overall the effect is statistically significant. Thus, companies should consider employing from a wider talent pool to foster financial profits by diversifying their boardrooms.

References

Adams, M. (2015). Board Diversity: More than a Gender Issue. *Deakin Law Review*, *20*, 123–152.

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

Allison, P. D. (1978). Measures of Inequality. *American Sociological Review*, *43*(6), 865–880.

Barker, V. L., & Mueller, G. C. (2002). CEO Characteristics and Firm R&D Spending. *Management Science*, *48*(6), 782–801.

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120.

Baysinger, B. D., & Butler, H. N. (1985). Corporate Governance and the Board of Directors: Performance Effects of Changes in Board Composition. *Journal of Law, Economics, & Organization*, *1*(1), 101–124.

Bear, S., Rahman, N., & Post, C. (2010). The Impact of Board Diversity and Gender Composition on Corporate Social Responsibility and Firm Reputation. *Journal of Business Ethics*, *97*(2), 207–221.

Becker, G. (1964). *Human Capital*. Chicago, Illinois: University of Chicago Press.

Bedeian, A. G., & Mossholder, K. W. (2000). On the Use of the Coefficient of Variation as a Measure of Diversity. *Organizational Research Methods*, *3*(3), 285–297.

Bhagat, S., & Black, B. (2001). The Non-Correlation between Board Independence and Long-Term Firm Performance. *Journal of Corporation Law*, *27*, 231–274.

Bromiley, P. (1990). On the Use of Finance Theory in Strategic Management. *Advances in Strategic Management*, *6*, 71–98.

Campbell, K., & Mínguez-Vera, A. (2008). Gender Diversity in the Boardroom and Firm Financial Performance. *Journal of Business Ethics*, *83*(3), 435–451.

Carter, D. A., D'Souza, F., Simkins, B. J., & Simpson, W. G. (2010). The Gender and Ethnic Diversity of US Boards and Board Committees and Firm Financial Performance. *Corporate Governance: An International Review*, *18*(5), 396–414.

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate Governance, Board Diversity, and Firm Value. *Financial Review*, *38*(1), 33–53.

Catalyst. (2014). Increasing Gender Diversity on Boards: Current Index of Formal Approaches. New York: Catalyst. Retrieved from http://www.catalyst.org/knowledge/increasing-gender-diversity-boards-current-index-formal-approaches

Choi, J. J., Park, S. W., & Yoo, S. S. (2007). The Value of Outside Directors: Evidence from Corporate Governance Reform in Korea. *Journal of Financial and Quantitative Analysis*, *42*(4), 941–962.

Cook, R. D. (1977). Detection of Influential Observation in Linear Regression. *Technometrics*, *19*(1), 15–18.

Cox, T. H., Lobel, S. A., & McLeod, P. L. (1991). Effects of Ethnic Group Cultural Differences on Cooperative and Competitive Behavior on Group Task. *Academy of Management Journal*, *34*(4), 827–847.

Cox, Taylor H., & Blake, S. (1991). Managing Cultural Diversity: Implications for Organizational Competitiveness. *Academy of Management Executive*, *5*(3), 45–56.

Darmadi, S. (2011). Board Diversity and Firm Performance: The Indonesian Evidence. *Corporate Ownership and Control*, *8*(2–4), 450–466.

Dezso, C. L., & Ross, D. G. (2012). Does Female Representation in Top Management Improve Firm Performance? A Panel Data Investigation. *Strategic Management Journal*, *33*(9), 1072–1089.

Egon Zehnder. (2017). 2016 Global Board Diversity Analysis. Retrieved from https://30percentclub.org/assets/uploads/UK/Third_Party_Reports/2016_GBDA_DIGITAL_FINAL.pdf

Erhardt, N. L., Werbel, J. D., & Shrader, C. B. (2003). Board of Director Diversity and Firm Financial Performance. *Corporate Governance: An International Review*, *11*(2), 102–111.

European Women on Boards (EWoB's). (2016). Gender Diversity on European Boards – Realizing Europe's Potential: Progress and Challenges. Retrieved from http://european.ewob-network.eu/wp-content/uploads/2016/04/EWoB-quant-report-WEB-spreads.pdf

Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *The Journal of Law & Economics*, *26*(2), 301–325.

Farrell, K. A., & Hersch, P. L. (2005). Additions to Corporate Boards: The Effect of Gender. *Journal of Corporate Finance*, *11*(1), 85–106.

Finkelstein, S., & Hambrick, D. (1996). *Strategic Leadership: Top Executives and Their Effects on Organizations*. Minneapolis: West Publishing Company.

Gentry, R. J., & Wei Shen. (2010). The Relationship between Accounting and Market Measures of Firm Financial Performance: How Strong Is It? *Journal of Managerial Issues*, *22*(4), 514–530.

Hafsi, T., & Turgut, G. (2013). Boardroom Diversity and its Effect on Social Performance: Conceptualization and Empirical Evidence. *Journal of Business Ethics*, *112*(3), 463–479.

Hambrick, D. C., Cho, T. S., & Chen, M.-J. (1996). The Influence of Top Management Team Heterogeneity on Firms' Competitive Moves. *Administrative Science Quarterly*, *41*(4), 659–684.

Hermalin, B. E., & Weisbach, M. S. (2001). *Boards of Directors as an Endogenously Determined Institution: A Survey of the Economic Literature* (Working Paper No. 8161). National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w8161

Hillman, A. J., & Dalziel, T. (2003). Boards of Directors and Firm Performance: Integrating Agency and Resource Dependence Perspectives. *Academy of Management Review*, *28*(3), 383–396.

Jackling, B., & Johl, S. (2009). Board Structure and Firm Performance: Evidence from India's Top Companies. *Corporate Governance: An International Review*, *17*(4), 492–509.

Jackson, S. E., Joshi, A., & Erhardt, N. L. (2003). Recent Research on Team and Organizational Diversity: SWOT Analysis and Implications. *Journal of Management*, *29*(6), 801–830.

Joecks, J., Pull, K., & Vetter, K. (2013). Gender Diversity in the Boardroom and Firm Performance: What Exactly Constitutes a "Critical Mass?" *Journal of Business Ethics*, *118*(1), 61–72.

Jungmann, C. (2006). The Effectiveness of Corporate Governance in One-Tier and Two-Tier Board System. *European Company and Financial Law Review*, *3*(4), 426–474.

Kang, H., Cheng, M., & Gray, S. J. (2007). Corporate Governance and Board Composition: diversity and independence of Australian boards. *Corporate Governance: An International Review*, *15*(2), 194–207.

Kim, H., & Lim, C. (2010). Diversity, Outside Directors and Firm Valuation: Korean Evidence. *Journal of Business Research*, *63*(3), 284–291.

Labelle, R., Francoeur, C., & Lakhal, F. (2015). To Regulate Or Not To Regulate? Early Evidence on the Means Used Around the World to Promote Gender Diversity in the Boardroom. *Gender, Work & Organization*, *22*(4), 339–363.

Lückerath-Rovers, M. (2013). Women on Boards and Firm Performance. *Journal of Management & Governance*, *17*(2), 491–509.

Maassen, G. F. (1999). *An International Comparison of Corporate Governance Models*. Amsterdam: Spencer Stuat.

Mahadeo, J. D., Soobaroyen, T., & Hanuman, V. O. (2012). Board Composition and Financial Performance: Uncovering the Effects of Diversity in an Emerging Economy. *Journal of Business Ethics*, *105*(3), 375–388.

Maznevski, M. L. (1994). Understanding Our Differences: Performance in Decision-Making Groups with Diverse Members. *Human Relations*, *47*(5), 531–552.

Miller, T., & Del Carmen Triana, M. (2009). Demographic Diversity in the Boardroom: Mediators of the Board Diversity–Firm Performance Relationship. *Journal of Management Studies*, *46*(5), 755–786.

Milliken, F. J., & Martins, L. L. (1996). Searching for Common Threads: Understanding the Multiple Effects of Diversity in Organizational Groups. *The Academy of Management Review*, *21*(2), 402–433.

Murray, A. I. (1989). Top Management Group Heterogeneity and Firm Performance. *Strategic Management Journal*, *10*, 125–141.

O'Reilly, C. A., Caldwell, D. F., & Barnett, W. P. (1989). Work Group Demography, Social Integration, and Turnover. *Administrative Science Quarterly*, *34*(1), 21–37.

Oxelheim, L., & Randøy, T. (2003). The Impact of Foreign Board Membership on Firm Value. *Journal of Banking & Finance*, *27*(12), 2369–2392.

Pelled, L. H., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the Black Box: An Analysis of Work Group Diversity, Conflict and Performance. *Administrative Science Quarterly*, *44*(1), 1–28.

Randoy, T., Thomsen, S., & Oxelheim, L. (2006). *The Performance Effects of Board Diversity in Nordic Firms*. Norway: Nordic Innovation Centre.

Richard, O. C. (2000). Racial diversity, business strategy, and firm performance: A resource-based view. *Academy of Management Journal*, *43*(2), 164–177.

Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring Organizational Performance: Towards Methodological Best Practice. *Journal of Management*, *35*(3), 718–804.

Rivas, J. L. (2012). Diversity & Internationalization: The Case of Boards and TMT's. *International Business Review*, *21*(1), 1–12.

Robinson, G., & Dechant, K. (1997). Building a Business Case for Diversity. *Academy of Management Executive*, *11*(3), 21–31.

Rose, C. (2007). Does Female Board Representation Influence Firm Performance? The Danish Evidence. *Corporate Governance: An International Review*, *15*(2), 404–413.

Ruigrok, W., Peck, S., & Tacheva, S. (2007). Nationality and Gender Diversity on Swiss Corporate Boards. *Corporate Governance: An International Review*, *15*(4), 546–557.

Shrader, C. B., Blackburn, V., & Iles, P. (1997). Women In Management And Firm Financial Performance: An Exploratory Study. *Journal of Managerial Issues*, *9*, 355–372.

Smith, N., Smith, V., & Verner, M. (2006). Do Women in Top Management Affect Firm Performance? A Panel Study of 2,500 Danish Firms. *International Journal of Productivity and Performance Management*, *55*(7), 569–593.

Srinidhi, B., Gul, F. A., & Tsui, J. (2011). Female Directors and Earnings Quality. *Contemporary Accounting Research*, *28*(5), 1610–1644.

Studenmund, A. H. (2014). *Using Econometrics: A Practical Guide* (Sixth Edition). Harlow: Pearson Education Limited.

Talavera, O., Yin, S., & Zhang, M. (2018). Age Diversity, Directors' Personal Values, and Bank Performance. *International Review of Financial Analysis*, *55*, 60–79.

Tarus, D. K., & Aime, F. (2014). Board Demographic Diversity, Firm Performance and Strategic Change: A Test of Moderation. *Management Research Review*, *37*(12), 1110–1136.

Terjesen, S., Sealy, R., & Singh, V. (2009). Women Directors on Corporate Boards: A Review and Research Agenda. *Corporate Governance: An International Review, 17*(3), 320–337.

van Knippenberg, D., & Schippers, M. C. (2006). Work Group Diversity. *Annual Review of Psychology, 58*(1), 515–541.

Walt, N., & Ingley, C. (2003). Board Dynamics and the Influence of Professional Background, Gender and Ethnic Diversity of Directors. *Corporate Governance*, *11*(3), 218–234.

Williams, K., & O'Reilly, C. A. (1998). Demography and Diversity in Organizations: A Review of 40 Years of Research. *Research in Organizational Behavior*, *20*, 77–140.

Wooldridge, J. M. (2012). *Introductory Econometrics: A Modern Approach* (5th ed.). Mason, Ohio: South-Western Cengage Learning.

Appendix I – Literature Review

Authors, Year	Data, Country, Year	Diversity Variables, Measurement	Main Results	Firm Performance Measurement
Adams & Ferreira (2009)	1939 US firms based on industry (1996-2003)	Gender diversity (dummy for presence, percentage of women)	Negative	ROA, Tobin's Q
Campbell & Mínguez-Vera (2008)	68 Spanish firms (1995-2000)	Gender diversity (percentage of women, Blau index, Shannon index)	Positive	Tobin's Q
Carter et al. (2003)	638 US Fortune 1000 firms (1997)	Gender diversity (percentage of women) Racial diversity (percentage of minorities)	Positive	Tobin's Q
Carter et al. (2010)	US firms in S&P 500 index (1998-2002)	Gender diversity (number of women directors) Ethnic minorities (number of ethnic minority directors)	Insignificant	ROA and Tobin's Q
Choi et al. (2007)	457-464 Korean firms (1999-2002)	Nationality diversity (dummy for foreign outside board members)	Positive	Tobin's Q
Darmadi (2011)	169 listed firms on Indonesian Stock Exchange (2007)	Gender diversity (proportion of women, Blau index) Age diversity (proportion of members less than 50 years, Blau index) Nationality diversity (proportion of foreign nationals, Blau index)	Gender (-), age as proportion (+), age as Blau index and national diversity insignificant	Tobin's Q, ROA
Erhardt et al. (2003)	112 US Fortune 1000 firms (1998)	Gender diversity (percentage of women) Racial diversity (percentage of minorities)	Positive	Return on assets (ROA), return on investments (ROI)
Kim & Lim (2010)	592 Korean firms (1999-2006)	Age diversity of independent outside directors (based on age categories)	positive	Tobin's Q
Labelle et al. (2015)	US and European countries (2009 & 2011)	Gender diversity (percentage of women) Mediator: soft gender quota	Positive (gender diversity in interaction with gender quotas is negative)	ROA

Lückerath-Rovers (2013)	116 Dutch firms listed on the Amsterdam Euronext stock exchange (2005-2007)	Gender diversity (percentage of women)	Positive on ROE	ROE, ROS, Return on invested capital (ROIC)
Mahadeo et al. (2012)	39 listed firms on the Stock Exchange of Mauritius (2007)	Gender diversity (percentage of women) Age Diversity (categorical variable of age bands)	All significant: age (+), gender (+)	ROA
Randoy et al. (2006)	459 largest traded firms of Denmark, Norway and Sweden (2005)	Gender diversity (percentage of women) Age diversity (standard deviation) Nationality diversity (percentage of foreigners)	All insignificant	Market to book value ratio, ROA
Richard (2000)	574 banks from California, Kentucky and North Carolina	Racial (cultural) diversity (Blau index)	Positive	ROE
Rivas (2012)	US and Europe (2005-2007)	Age diversity (coefficient of variation = standard deviation divided by the mean)	Board and TMT age diversity is insignificant	Degree of internationalisation
Rose (2007)	Danish firms listed on the Copenhagen Stock Exchange (1998-2001)	Gender diversity (percentage of women) Nationality diversity (percentage of foreigners/ non-Danish)	All insignificant	Tobin's Q
Shrader et al. (1997)	200 US firms (1992)	Gender diversity (percentage of women)	Negative	Return on sales (ROS), ROA, ROI, ROE
Smith et al. (2006)	2500 Danish firms (1993-2001)	Gender diversity (percentage of women)	Insignificant	Gross profit/net sales, contribution margin/net sales, operating income/net assets, net income/net assets
Talavera et al. (2018)	97 Chinese banks (2009-2013)	Age Diversity (coefficient of variation)	Negative	ROA, ROE

Appendix II – Companies listed at the STOXX Europe 600 in April 2016

ID	ISIN	Company Name
1	GB00B1YW4409	3I GROUP PLC
2	NL0000852564	AALBERTS INDUSTRIES NV
3	CH0012221716	ABB LIMITED
4	GB0000031285	ABERDEEN ASSET MANAGEMENT PLC
5	FR0000120404	ACCOR
6	BE0003764785	ACKERMANS & VAN HAAREN
7	ES0167050915	ACS ACTIVIDADES DE CONSTRUCCION Y SERVICIOS SA
8	CH0010532478	ACTELION AG
9	CH0012138605	ADECCO GROUP AG
10	DE000A1EWWW0	ADIDAS AG
11	NL0000303709	AEGON N.V.
12	GB00BK1PTB77	AGGREKO PLC
13	SE0000221723	MEDA AB
14	NL0011794037	KONINKLIJKE AHOLD DELHAIZE NV
15	FR0000120073	AIR LIQUIDE
16	NL0000009132	AKZO NOBEL N.V.
17	DE0008404005	ALLIANZ SE
18	GRS015003007	ALPHA BANK SA
19	FR0010220475	ALSTOM SA
20	GB0008754136	TATE & LYLE PLC
21	GB0008782301	TAYLOR WIMPEY PLC
22	AT0000730007	ANDRITZ AG
23	GB00B1XZS820	ANGLO AMERICAN PLC
24	GB0000456144	ANTOFAGASTA PLC
25	GB0000595859	ARM HOLDINGS PLC
26	IT0003506190	ATLANTIA SPA
27	FR0000120628	AXA SA
28	GB0009697037	BABCOCK INTERNATIONAL GROUP PLC
29	GB0002634946	BAE SYSTEMS PLC
30	GB0000961622	BALFOUR BEATTY PLC
31	CH0012410517	BALOISE HOLDING LTD
32	ES0113679I37	BANKINTER, S.A.
33	GB0031348658	BARCLAYS PLC
34	GB0000811801	BARRATT DEVELOPMENTS PLC
35	GB00B02L3W35	BERKELEY GROUP HOLDINGS PLC
36	GB0000566504	BHP BILLITON PLC
37	FR0000120966	SOCIETE B I C SA
38	DE0005909006	BILFINGER SE
39	SE0000862997	BILLERUDKORSNAS AB (PUBL)
40	IE00BD1RP616	BANK OF IRELAND
41	GB0002875804	BRITISH AMERICAN TOBACCO P.L.C.
42	GB0001367019	BRITISH LAND COMPANY PLC
43	GB0001411924	SKY PLC
44	GB0030913577	BT GROUP PLC
45	GB0001001592	BTG PLC
46	GB00B0744B38	BUNZL PLC
47	IT0005252207	DAVIDE CAMPARI MILANO SPA
48	SE0000379190	CASTELLUM AB
49	GB00B033F229	CENTRICA PLC
50	CZ0005112300	CEZ A.S
51	GB0002162385	AVIVA PLC
52	CH0012142631	CLARIANT AG
53	GB0007668071	CLOSE BROTHERS GROUP PLC
54	FR0000120222	CNP ASSURANCES
55	GB00B07KD360	COBHAM PLC
56	BE0003593044	COFINIMMO S.A.
57	DK0060448595	COLOPLAST AS
58	BE0974256852	ETABLISSEMENTS FR. COLRUYT SA
59	DE000CBK1001	COMMERZBANK AKTIENGESELLSCHAFT
60	GB00BD6K4575	COMPASS GROUP PLC
61	FR0000045072	CREDIT AGRICOLE SA
62	CH0012138530	CREDIT SUISSE GROUP AG
63	IE0001827041	CRH PLC
64	GB00BYZWX769	CRODA INTERNATIONAL PLC
65	GB0009457366	DAILY MAIL AND GENERAL TRUST PLC
66	DE0007100000	DAIMLER AG
67	GB0002652740	DERWENT LONDON PLC
68	DE0005140008	DEUTSCHE BANK AG
69	DE0005810055	DEUTSCHE BOERSE AG
70	DE0007480204	DEUTSCHE EUROSHOP AG
71	DE0008232125	DEUTSCHE LUFTHANSA AG
72	DE0005552004	DEUTSCHE POST AG
73	DE0005557508	DEUTSCHE TELEKOM AG
74	DE000A0HN5C6	DEUTSCHE WOHNEN SE
75	GB0002374006	DIAGEO PLC
76	GB0059822006	DIALOG SEMICONDUCTOR PLC
77	GB00BYN59130	DOMINO'S PIZZA GROUP PLC
78	GRS323003012	EUROBANK ERGASIAS SA
79	FR0000130452	EIFFAGE
80	PTEDP0AM0009	EDP - ENERGIAS DE PORTUGAL S.A.
81	SE0000103814	ELECTROLUX AB
82	SE0000163628	ELEKTA AB (PUBL)
83	GB0002418548	ELEMENTIS PLC
84	FI0009007884	ELISA OYJ
85	NL0006144495	RELX NV
86	CH0016440353	EMS-CHEMIE HOLDING AG
87	ES0130670112	ENDESA SA
88	IT0003128367	ENEL SPA
89	IT0003132476	ENI - ENTE NAZIONALE IDROCARBURI
90	SE0000108656	TELEFONAKTIEBOLAGET LM ERICSSON
91	AT0000652011	ERSTE GROUP BANK AG
92	FR0000121667	ESSILOR INTERNATIONAL SA
93	FR0000121121	EURAZEO SE
94	FR0000038259	EUROFINS SCIENTIFIC SE (FRENCH BRANCH)
95	FR0000121147	FAURECIA SA
96	NL0010877643	FIAT CHRYSLER AUTOMOBILES NV
97	SE0008374250	FINGERPRINT CARDS AB
98	IT0003856405	LEONARDO SPA
99	GB0003452173	FIRSTGROUP PLC
100	CH0001752309	GEORG FISCHER AG
101	DK0010234467	FLSMIDTH & COMPANY A/S
102	CH0319416936	FLUGHAFEN ZURICH AG
103	SE0000242455	SWEDBANK AB
104	BE0974264930	AGEAS SA
105	FI0009007132	FORTUM OYJ
106	FR0000133308	ORANGE SA
107	DE0005773303	FRAPORT AG FRANKFURT AIRPORT SERVICES WORLDWIDE
108	DE000A0Z2ZZ5	FREENET AG
109	DE0005785604	FRESENIUS SE & CO KGAA
110	DE0005785802	FRESENIUS MEDICAL CARE AG & CO. KGAA
111	DE0005790430	FUCHS PETROLUB SE
112	CH0364749348	VIFOR PHARMA AG
113	FR0000064578	FONCIERE DES REGIONS - GFR
114	ES0116870314	GAS NATURAL SDG, S.A.
115	FR0010208488	ENGIE SA
116	CH0030170408	GEBERIT AG
117	FR0010040865	GECINA
118	IT0000062072	ASSICURAZIONI GENERALI SPA
119	DK0010272202	GENMAB A/S
120	DE000A0LD6E6	GERRESHEIMER AG
121	SE0000202624	GETINGE AB
122	CH0010645932	GIVAUDAN SA
123	GB0030646508	GKN PLC
124	IE0000669501	GLANBIA PLC
125	GB0009252882	GLAXOSMITHKLINE PLC

126	DK0010272632	GN STORE NORD A/S
127	BE0003797140	GROEP BRUSSEL LAMBERT NV
128	ES0143416115	SIEMENS GAMESA RENEWABLE ENERGY SA
129	GB00B0HZP136	GREENE KING PLC
130	GB0004052071	HALMA P.L.C.
131	GB0004065016	HAMMERSON PLC
132	DE0008402215	HANNOVER RUECK SE
133	GB0004161021	HAYS PLC
134	DE0006047004	HEIDELBERGCEMENT AG
135	NL0000008977	HEINEKEN HOLDING
136	NL0000009165	HEINEKEN NV
137	CH0012271687	HELVETIA HOLDING AG
138	DE0006048432	HENKEL AG AND CO. KGAA
139	SE0000106270	H & M HENNES & MAURITZ AB
140	FR0000052292	HERMES INTERNATIONAL SCA
141	SE0000103699	HEXAGON AB
142	CH0012214059	LAFARGEHOLCIM LTD
143	GB0005405286	HSBC HOLDINGS PLC
144	FI0009000459	HUHTAMAKI OYJ
145	ES0144580Y14	IBERDROLA S.A.
146	GB00BZ02MH16	NEX GROUP PLC
147	NL0012059018	EXOR NV
148	NL0000360618	SBM OFFSHORE NV
149	FR0000120859	IMERYS SA
150	GB00BGLP8L22	IMI PLC
151	AT0000809058	IMMOFINANZ AG
152	GB0004544929	IMPERIAL BRANDS PLC
153	GB00B61TVQ02	INCHCAPE PLC
154	ES0148396007	INDITEX
155	SE0000190126	INDUSTRIVARDEN AB
156	DE0006231004	INFINEON TECHNOLOGIES AG
157	NL0011821202	ING GROEP N.V.
158	FR0000125346	INGENICO GROUP SA
159	IT0001063210	MEDIASET
160	IT0000062957	MEDIOBANCA SPA
161	GB0005758098	MEGGITT P.L.C.
162	DE0006599905	MERCK KGAA
163	DE0007257503	CECONOMY AG
164	FI0009007835	METSO OYJ
165	GB0005576813	HOWDEN JOINERY GROUP PLC
166	DE0006602006	GEA GROUP AG
167	GB0030232317	PAGEGROUP PLC
168	FR0000121261	COMPAGNIE GENERALE DES ETABLISSEMENTS MICHELIN SCA
169	GB0006043169	WM MORRISON SUPERMARKETS PLC
170	DE0008430026	MUENCHENER RUECKVERSICHERUNGS GESELLSCHAFT AG
171	FR0000120685	NATIXIS
172	GB00BDR05C01	NATIONAL GRID PLC
173	SE0000117970	NCC AB
174	CH0038863350	NESTLE S.A.
175	GB0032089863	NEXT PLC
176	SE0008321293	NIBE INDUSTRIER AB
177	FI0009000681	NOKIA OY
178	FI0009005318	NOKIAN TYRES PLC
179	SE0000427361	NORDEA BANK AB
180	NO0005052605	NORSK HYDRO ASA
181	CH0012005267	NOVARTIS AG
182	DK0060534915	NOVO NORDISK AS
183	DK0060336014	NOVOZYMES A/S
184	GB00B77J0862	OLD MUTUAL PLC
185	AT0000743059	OMV AKTIENGESELLSCHAFT
186	GRS419003009	GREEK ORGANISATION OF FOOTBALL PROGNOSTICS SA
187	FI0009014377	ORION OYJ
188	NO0003733800	ORKLA ASA
189	GRS260333000	HELLENIC TELECOMMUNICATIONS ORGANISATION S.A.
190	NO0003054108	MARINE HARVEST ASA
191	CH0021783391	PARGESA HOLDING SA
192	GB0006776081	PEARSON PLC
193	GB00B18V8630	PENNON GROUP PLC
194	FR0000120693	PERNOD RICARD
195	GB0006825383	PERSIMMON PLC
196	FR0000121501	PEUGEOT S.A.
197	NL0000009538	KONINKLIJKE PHILIPS NV
198	CH0012549785	SONOVA HOLDING AG
199	FR0000121485	KERING
200	FR0000124570	COMPAGNIE PLASTIC OMNIUM
201	DE000PAH0038	PORSCHE AUTOMOBIL HOLDING SE
202	IE00BWT6H894	PADDY POWER BETFAIR PLC
203	DE000TUAG000	TUI AG
204	DE000PSM7770	PROSIEBENSAT 1 MEDIA SE
205	GB00B1Z4ST84	PROVIDENT FINANCIAL PLC
206	GB0007099541	PRUDENTIAL PLC
207	CH0018294154	PSP SWISS PROPERTY AG
208	FR0000130577	PUBLICIS GROUPE SA
209	NL0012169213	QIAGEN N.V.
210	GB00B01C3S32	RANDGOLD RESOURCES LIMITED
211	NL0000379121	RANDSTAD NV
212	GB00B24CGK77	RECKITT BENCKISER GROUP PLC
213	IT0003828271	RECORDATI SPA
214	ES0173093024	RED ELECTRICA CORPORACION SA
215	GB00B2B0DG97	RELX PLC
216	FR0000131906	RENAULT (REGIE NATIONALE DES USINES) SA
217	GB00B082RF11	RENTOKIL INITIAL PLC
218	ES0173516115	REPSOL SA
219	GB00BMHTPY25	REXAM PLC
220	GB0000282623	AMEC FOSTER WHEELER PLC
221	DK0060228559	TDC AS
222	FR0000131708	TECHNIP SA
223	SE0005190238	TELE2 AB
224	IT0003497168	TELECOM ITALIA SPA
225	ES0178430E18	TELEFONICA SA
226	NO0010063308	TELENOR GROUP ASA
227	CH0012453913	TEMENOS GROUP AG
228	GB0008847096	TESCO PLC
229	NO0003078800	TGS-NOPEC GEOPHYSICAL COMPANY ASA
230	FR0000121329	THALES SA
231	FR0010918292	TECHNICOLOR SA
232	DE0007500001	THYSSENKRUPP AG
233	DK0060477503	TOPDANMARK A/S
234	FI0009000285	AMER SPORTS OYJ
235	FR0000120271	TOTAL SA
236	NL0009739416	POSTNL
237	GB0007739609	TRAVIS PERKINS PLC
238	SE0000114837	TRELLEBORG AB (PUBL.)
239	GB0001500809	TULLOW OIL PLC
240	FR0000054470	UBISOFT ENTERTAINMENT SA
241	CH0244767585	UBS GROUP AG
242	BE0003739530	UCB SA
243	GB0009123323	ULTRA ELECTRONICS HOLDINGS PLC
244	CH0000816824	OC OERLIKON CORPORATION PFAEFFIKON AG
245	FR0000124711	UNIBAIL RODAMCO SE
246	IT0005239360	UNICREDIT SPA
247	NL0000009355	UNILEVER N.V.
248	GB00B10RZP78	UNILEVER PLC
249	IT0004810054	UNIPOL GRUPPO SPA
250	FI0009005987	UPM-KYMMENE OYJ
251	DE0005089031	UNITED INTERNET AG
252	FR0013176526	VALEO SA
253	DK0010268606	VESTAS WIND SYSTEMS AS
254	GB0009292243	VICTREX PLC
255	FR0000125486	VINCI
256	ES0184262212	VISCOFAN SA
257	FR0000124141	VEOLIA ENVIRONNEMENT SA
258	FR0000127771	VIVENDI SA
259	GB00BH4HKS39	VODAFONE GROUP PUBLIC LIMITED COMPANY
260	DE0007664039	VOLKSWAGEN AG
261	SE0000115446	VOLVO AB

262	NL0009432491	KONINKLIJKE VOPAK NV
263	FI0009003727	WARTSILA OYJ ABP
264	GB0009465807	WEIR GROUP PLC
265	NL0000289213	WERELDHAVE N.V.
266	GB00B1KJJ408	WHITBREAD PLC
267	DK0060738599	WILLIAM DEMANT HOLDING
268	JE00BFNWV485	FERGUSON PLC
269	NL0000395903	WOLTERS KLUWER NV
270	JE00B8KF9B49	WPP PLC
271	ES0184933812	ZARDOYA OTIS SA
272	FR0000125684	ZODIAC SA
273	CH0011075394	ZURICH INSURANCE GROUP LIMITED
274	FR0010242511	ELECTRICITE DE FRANCE
275	IT0003153415	SNAM SPA
276	BE0003810273	PROXIMUS NV
277	FR0010340141	AEROPORTS DE PARIS
278	NL0011375019	STEINHOFF INTERNATIONAL HOLDINGS NV
279	IT0003261697	AZIMUT HOLDING SPA
280	GB0000536739	ASHTEAD GROUP PLC
281	NO0010208051	YARA INTERNATIONAL ASA
282	NL0000334118	ASM INTERNATIONAL NV
283	NL0010273215	ASML HOLDING NV
284	SE0007100581	ASSA ABLOY AB
285	GB0006731235	ASSOCIATED BRITISH FOODS PLC
286	GB0009895292	ASTRAZENECA PLC
287	GB0000608009	WS ATKINS PLC
288	SE0006886750	ATLAS COPCO AB
289	FR0000051732	ATOS SE
290	LU1598757687	ARCELORMITTAL SA
291	GB00BVFD7Q58	STANDARD LIFE ABERDEEN PLC
292	PTGAL0AM0009	GALP ENERGIA SGPS, S.A.
293	CH0009002962	BARRY CALLEBAUT AG
294	DE000BASF111	BASF SE
295	DE000BAY0017	BAYER AG
296	DE0005190003	BAYERISCHE MOTOREN WERKE AG
297	CH0038389992	BB BIOTECH AG
298	GB00B1FP8915	BBA AVIATION PLC
299	ES0113211835	BANCO BILBAO VIZCAYA ARGENTARIA SA
300	IT0005218752	BANCA MONTE DEI PASCHI DI SIENA SPA
301	IT0000064482	BANCA POPOLARE DI MILANO SCARL
302	IT0000784196	BANCA POPOLARE DI SONDRIO SCPA
303	IT0000066123	BPER BANCA SPA
304	PTBCP0AM0015	BANCO COMERCIAL PORTUGUES, S.A.
305	ES0113860A34	BANCO SABADELL
306	ES0113790226	BANCO POPULAR ESPANOL
307	ES0113900J37	BANCO SANTANDER SA
308	DE0005200000	BEIERSDORF AG
309	GB0000904986	BELLWAY P.L.C.
310	FR0000131104	BNP PARIBAS SA
311	SE0000869646	BOLIDEN AB
312	FR0000039299	BOLLORE
313	NL0000852580	KONINKLIJKE BOSKALIS WESTMINSTER NV
314	DE000A1PHFF7	HUGO BOSS AG
315	IE00B00MZ448	GRAFTON GROUP PLC
316	GB0031743007	BURBERRY GROUP
317	GB0031638363	INTERTEK GROUP PLC
318	GB00B5N0P849	JOHN WOOD GROUP PLC
319	GB0031698896	WILLIAM HILL PLC
320	FR0000120503	BOUYGUES SA
321	GB0001859296	BOVIS HOMES GROUP PLC
322	GB0007980591	BP PLC
323	DE000A1DAHH0	BRENNTAG AG
324	IT0004827447	UNIPOLSAI ASSICURAZIONI SPA
325	FR0000125338	CAPGEMINI SE
326	SE0000695876	ALFA LAVAL AB
327	DE0005408116	AAREAL BANK AG
328	GB00B23K0M20	CAPITA PLC
329	SE0000667925	TELIA COMPANY AB
330	GB0007365546	CARILLION PLC
331	DK0010181759	CARLSBERG AS
332	GB0031215220	CARNIVAL PLC
333	FR0000120172	CARREFOUR S.A.
334	SE0000872095	SWEDISH ORPHAN BIOVITRUM AB (PUBL)
335	GB00BD8QVH41	INTERCONTINENTAL HOTELS GROUP PLC
336	FR0000125585	CASINO, GUICHARD-PERRACHON ET CIE
337	FR0000035081	ICADE
338	ES0171996087	GRIFOLS SA
339	DK0060227585	CHR HANSEN HOLDING A/S
340	FR0000130403	CHRISTIAN DIOR
341	FR0000125007	COMPAGNIE DE SAINT GOBAIN SA
342	GB00B0YG1K06	RESTAURANT GROUP PLC
343	DE0005439004	CONTINENTAL AG
344	ES0124244E34	MAPFRE SA
345	GB00BYQ0JC66	BEAZLEY PLC
346	FR0000120644	DANONE SA
347	DK0010274414	DANSKE BANK AS
348	FR0000121725	DASSAULT AVIATION
349	FR0000130650	DASSAULT SYSTEMES SE
350	GB00B0F99717	BERENDSEN PLC
351	IE0002424939	DCC PLC
352	BE0003562700	DELHAIZE GROUP SA
353	NL0000009827	KONINKLIJKE DSM N.V.
354	DK0060079531	DSV A/S
355	DE0005565204	DUERR AG
356	DE000ENAG999	E.ON SE
357	NL0000235190	AIRBUS SE
358	GB00B7KR2P84	EASYJET PLC
359	FR0000121204	WENDEL SE
360	BE0974293251	ANHEUSER BUSCH INBEV NV
361	GB00BYT1DJ19	INTERMEDIATE CAPITAL GROUP PLC
362	IT0000072618	INTESA SANPAOLO SPA
363	GB00B17BBQ50	INVESTEC PLC
364	SE0000107419	INVESTOR AB
365	SE0008373906	KINNEVIK AB
366	IT0001465159	ITALCEMENTI SPA
367	FR0000077919	JCDECAUX SA
368	PTJMT0AE0001	JERONIMO MARTINS SGPS SA
369	SE0000806994	JM AB
370	GB00BZ4BQC70	JOHNSON MATTHEY PUBLIC LIMITED COMPANY
371	CH0102659627	GAM HOLDING AG
372	DK0010307958	JYSKE BANK AS
373	DE000KSAG888	K&S AG
374	CH0011795959	DORMAKABA HOLDING AG
375	BE0003565737	KBC GROUP NV
376	IE0004906560	KERRY GROUP PLC
377	FI0009000202	KESKO OYJ
378	GB0033195214	KINGFISHER PLC
379	IE0004927939	KINGSPAN GROUP PLC
380	FR0000121964	KLEPIERRE SA
381	CZ0008019106	KOMERCNI BANKA, A.S.
382	NL0000009082	KONINKLIJKE KPN NV
383	FI0009013403	KONE OYJ
384	CH0025238863	KUEHNE UND NAGEL INTERNATIONAL AG
385	FR0000130213	LAGARDERE S.C.A.
386	GB00BYW0PQ60	LAND SECURITIES GROUP PLC
387	GB0005603997	LEGAL & GENERAL GROUP PLC
388	FR0010307819	LEGRAND S.A.
389	GB0006834344	INTU PROPERTIES PLC
390	DE0006483001	LINDE AKTIENGESELLSCHAFT
391	CH0010570759	CHOCOLADEFABRIKEN LINDT & SPRUENGLI AG
392	GB0008706128	LLOYDS BANKING GROUP PLC
393	GB00B0SWJX34	LONDON STOCK EXCHANGE GROUP PLC
394	CH0013841017	LONZA GROUP AG
395	FR0000120321	L'OREAL
396	SE0000825820	LUNDIN PETROLEUM AB

397	IT0001479374	LUXOTTICA GROUP SPA
398	FR0000121014	LVMH MOET HENNESSY LOUIS VUITTON SE
399	DE0005937007	MAN SE
400	GB00B83VD954	MAN GROUP PLC
401	GB0031274896	MARKS AND SPENCER GROUP PLC
402	DK0010244508	AP MOELLER MAERSK A/S
403	DE0007030009	RHEINMETALL AG
404	CH0210483332	COMPAGNIE FINANCIERE RICHEMONT SA
405	GB0007188757	RIO TINTO PLC
406	CH0012032048	ROCHE HOLDING AKTIENGESELLSCHAFT
407	GB00B63H8491	ROLLS ROYCE HOLDINGS PLC
408	GB00BVFNZH21	ROTORK P.L.C.
409	GB00B7T77214	ROYAL BANK OF SCOTLAND GROUP PLC
410	GB00BKKMKR23	RSA INSURANCE GROUP PLC
411	GB0007197378	RPC GROUP PLC
412	LU0061462528	RTL GROUP
413	FR0013269123	RUBIS SCA
414	DE0007037129	RWE AG
415	IE00BYTBXV33	RYANAIR HOLDINGS PLC
416	GB00B8C3BL03	THE SAGE GROUP PLC
417	FR0000073272	SAFRAN
418	GB00B019KW72	J SAINSBURY PLC
419	FI0009003305	SAMPO OYJ
420	SE0000667891	SANDVIK AB
421	FR0000120578	SANOFI S.A.
422	DE0007164600	SAP SE
423	DE0007165631	SARTORIUS AG
424	NO0003028904	SCHIBSTED ASA
425	CH0024638196	SCHINDLER HOLDING AG
426	FR0000121972	SCHNEIDER ELECTRIC SE
427	GB0002405495	SCHRODERS PLC
428	FR0010411983	SCOR SE
429	GB0007908733	SSE PLC
430	FR0000121709	SEB SA
431	SE0000163594	SECURITAS AB
432	LU0088087324	SES S.A.
433	GB00B1FH8J72	SEVERN TRENT PLC
434	CH0002497458	SGS SA
435	GB0007990962	SHAFTESBURY PLC
436	JE00B2QKY057	SHIRE PLC
437	DE0007236101	SIEMENS AG
438	CH0000587979	SIKA AG
439	SE0000148884	SKANDINAVISKA ENSKILDA BANKEN
440	SE0000113250	SKANSKA AB
441	SE0000108227	AB SKF
442	GB00B5ZN1N88	SEGRO PLC
443	GB0009223206	SMITH & NEPHEW PLC
444	GB0008220112	DS SMITH PLC
445	GB00B1WY2338	SMITHS GROUP PLC
446	FR0000031122	AIR FRANCE KLM SA
447	FR0000130809	SOCIETE GENERALE
448	FR0000121220	SODEXO
449	BE0003470755	SOLVAY SOCIETE ANONYME
450	GB0004835483	SABMILLER PLC
451	GB0003308607	SPECTRIS PLC
452	GB00BWFGQN14	SPIRAX-SARCO ENGINEERING PLC
453	DE0005501357	AXEL SPRINGER AG
454	FR0000051807	TELEPERFORMANCE SE
455	GB0007669376	ST. JAMES'S PLACE PLC
456	DE0007251803	STADA ARZNEIMITTEL AG
457	GB00B6YTLS95	STAGECOACH GROUP PLC
458	GB0004082847	STANDARD CHARTERED PLC
459	NO0010096985	STATOIL ASA
460	NL0000226223	STMICROELECTRONICS NV
461	FI0009005961	STORA ENSO OYJ
462	CH0012280076	STRAUMANN HOLDING AG
463	SE0000112724	SVENSKA CELLULOSA SCA AB
464	SE0007100599	SVENSKA HANDELSBANKEN AB
465	CH0012255151	THE SWATCH GROUP AG
466	SE0000310336	SWEDISH MATCH AB
467	CH0014852781	SWISS LIFE HOLDING AG
468	CH0008742519	SWISSCOM
469	DK0010311471	SYDBANK AS
470	CH0011037469	SYNGENTA AG
471	IT0003487029	UNIONE DI BANCHE ITALIANE SPA
472	GB00B09LSH68	INMARSAT PLC
473	ES0115056139	BOLSAS Y MERCADOS ESPANOLES SHMSF SA
474	GB00B0WMWD03	QINETIQ GROUP
475	GB00B01FLG62	G4S PLC
476	IT0003242622	TERNA RETE ELETTRICA NAZIONALE SPA
477	GB00B01TND91	BOOKER GROUP PLC
478	GB00B03MLX29	ROYAL DUTCH SHELL PLC
479	DE0005470405	LANXESS AG
480	GB00B02J6398	ADMIRAL GROUP PLC
481	ES0130960018	ENAGAS SA
482	FR0004035913	ILIAD SA
483	FI0009013296	NESTE OYJ
484	GB00B06QFB75	IG GROUP HOLDINGS PLC
485	GB00B0744359	ESSENTRA PLC
486	GB00BD8YWM01	MICRO FOCUS INTERNATIONAL PLC
487	GB00B2987V85	RIGHTMOVE PLC
488	ES0118900010	FERROVIAL SA
489	GB00B0H2K534	PETROFAC LIMITED
490	AT0000606306	RAIFFEISEN BANK INTERNATIONAL AG
491	GB00B0LCW083	HIKMA PHARMACEUTICALS PLC
492	IT0004176001	PRYSMIAN SPA
493	LU0075646355	SUBSEA 7 S.A.
494	SE0000652216	ICA GRUPPEN AB
495	FR0010221234	EUTELSAT COMMUNICATIONS
496	IM00B7S9G985	PLAYTECH PLC
497	NL0000400653	GEMALTO N.V.
498	NO0010582521	GJENSIDIGE FORSIKRING ASA
499	BE0003826436	TELENET GROUP HOLDING NV
500	FR0010259150	IPSEN SA
501	DK0060636678	TRYG A/S
502	CH0024608827	PARTNERS GROUP HOLDING
503	CH0023405456	DUFRY AG
504	CH0008038389	SWISS PRIME SITE
505	GB00B1VZ0M25	HARGREAVES LANSDOWN PLC
506	GB00B1QH8P22	SPORTS DIRECT INTERNATIONAL PLC
507	DE000SYM9999	SYMRISE AG
508	GB00B1VYCH82	THOMAS COOK GROUP PLC
509	GB00B1ZBKY84	MONEYSUPERMARKET.COM GROUP PLC
510	GB00B1CRLC47	MONDI PLC
511	FR0010533075	GETLINK
512	SE0007871645	KINDRED GROUP PLC
513	IE00B1RR8406	SMURFIT KAPPA GROUP PLC
514	FR0010451203	REXEL S.A.
515	ES0140609019	CAIXABANK, S.A.
516	GB00B53P2009	JUPITER FUND MANAGEMENT PUBLIC LIMITED COMPANY
517	KYG7091M1096	PHOENIX GROUP HOLDINGS
518	GB00B2QPKJ12	FRESNILLO PLC
519	JE00BD9WR069	UBM PLC
520	FR0010613471	SUEZ SA
521	GB00B39J2M42	UNITED UTILITIES GROUP PLC
522	CH0043238366	ARYZTA AG
523	JE00BYVQYS01	IWG PLC
524	SE0007074281	HEXPOL AB
525	CH0102484968	JULIUS BAER GRUPPE AG
526	DE0007472060	WIRECARD AG
527	FR0011594233	SFR GROUP SA
528	GB00BDZT6P94	MERLIN ENTERTAINMENTS PLC
529	DE000ENAG999	E.ON SE
530	NL0011333752	ALTICE NV
531	DK0060542181	ISS AS
532	GB00BKX5CN86	JUST EAT PLC
533	LU1072616219	B&M EUROPEAN VALUE RETAIL SA

534	NL0006294274	EURONEXT NV
535	GB00BMSKPJ95	AA PLC
536	BE0974276082	ONTEX GROUP NV
537	NL0010773842	NN GROUP NV
538	DE000ZAL1111	ZALANDO SE
539	GB00BRS65X63	INDIVIOR PLC
540	ES0105046009	AENA SME SA
541	GB00BVYVFW23	AUTO TRADER GROUP PLC
542	CH0267291224	SUNRISE COMMUNICATIONS GROUP AG
543	ES0105025003	MERLIN PROPERTIES SOCIMI SA
544	ES0105066007	CELLNEX TELECOM SA
545	DE0006062144	COVESTRO AG
546	GB00BYYK2V80	WORLDPAY GROUP PLC
547	NL0011585146	FERRARI NV
548	IT0003796171	POSTE ITALIANE SPA
549	ES0111845014	ABERTIS INFRAESTRUCTURAS
550	GB0033986497	ITV PLC
551	GB00BMJ6DW54	INFORMA PLC
552	LU0156801721	TENARIS S.A.
553	NO0010031479	DNB ASA
554	SE0000936478	INTRUM JUSTITIA AB
555	FR0006174348	BUREAU VERITAS SA
556	FR0000184798	ORPEA SA
557	SE0001662230	HUSQVARNA
558	AT0000937503	VOEST-ALPINE AG
559	ES0152503035	MEDIASET ESPANA COMUNICACION SA
560	AT0000A18XM4	AMS AG
561	GB00B0N8QD54	BRITVIC PLC
562	GB00B1VNSX38	DRAX GROUP PLC
563	DE000A0D9PT0	MTU AERO ENGINES AG
564	GB00B2PDGW16	WH SMITH PLC
565	GB00B19NLV48	EXPERIAN PLC
566	FR0010313833	ARKEMA SA
567	BMG5361W1047	LANCASHIRE HOLDINGS LTD
568	BMG4593F1389	HISCOX PLC
569	GB00B5KKT968	CABLE & WIRELESS COMMUNICATIONS PLC
570	GB00B4YCDF59	TALKTALK TELECOM GROUP PLC
571	GB00B62G9D36	CAPITAL & COUNTIES PROPERTIES PLC
572	ES0109067019	AMADEUS IT GROUP SA
573	DK0060252690	PANDORA A/S
574	FR0010908533	EDENRED S.A
575	GB00B3MBS747	OCADO GROUP PLC
576	NL0010545661	CNH INDUSTRIAL NV
577	ES0177542018	INTERNATIONAL CONSOLIDATED AIRLINES GROUP SA
578	JE00B4T3BW64	GLENCORE PLC
579	NL0009739424	TNT EXPRESS NV
580	ES0126775032	DISTRIBUIDORA INTERNACIONAL DE ALIMENTACION SA
581	ES0113307062	BANKIA SAU
582	CH0126881561	SWISS RE AG
583	GB00BY9D0Y18	DIRECT LINE INSURANCE GROUP PLC
584	CH0126673539	DKSH HOLDING AG
585	DE000A1J5RX9	TELEFONICA DEUTSCHLAND HOLDING AG
586	NL0010558797	OCI NV
587	CH0198251305	COCA COLA HBC AG
588	BE0974268972	BPOST SA
589	DE000LED4000	OSRAM LICHT AG
590	DE000KGX8881	KION GROUP AG
591	DE000EVNK013	EVONIK INDUSTRIES AG
592	DE000LEG1110	LEG IMMOBILIEN AG
593	DE000A1ML7J1	VONOVIA SE
594	GB00BDVZYZ77	ROYAL MAIL PLC

Appendix III – Number of Companies in Each STOXX Europe 600 Country

ISIN Code	Country Name	Number of Companies	Percent
GB	Great Britain	164	27.61
FR	France	81	13.64
DE	Germany	65	10.94
CH	Switzerland	49	8.25
SE	Sweden	41	6.9
NL	Netherlands	35	5.89
ES	Spain	31	5.22
IT	Italy	26	4.38
DK	Denmark	20	3.37
FI	Finland	15	2.53
BE	Belgium	14	2.36
IE	Ireland	10	1.68
NO	Norway	10	1.68
AT	Austria	7	1.18
JE	Jersey	6	1.01
LU	Luxembourg	6	1.01
GR	Greece	4	0.67
PT	Portugal	4	0.67
BM	Bermuda	2	0.34
CZ	Czech Republic	2	0.34
IM	Isle of Man	1	0.17
KY	Cayman Islands	1	0.17
Total		594	100

Notes: This table represents the number of companies which are listed at the STOXX Europe 600 index in April 2016 for each country. All companies are assigned to a country based on the first two alphabetic characters of a company's International Securities Identification Number (ISIN). These two alphabetic characters indicate the issuing country of a company's securities. Jersey and the Isle of Man is a British Crown dependency, Bermuda and the Cayman Islands are British Overseas Territory. The securities of companies from these countries are all traded at the London Stock Exchange and are therefore listed at the STOXX Europe 600 index.

Appendix IV – Categorical Diversity Index

Gender Diversity – Percentage of Female Directors				
Mean	0.2590026			
St. Dev.	0.1116678			
Gender Score	**Categories**	**Number of Companies**	**Percent**	**Cum.**
0	$X \leq 0.1473348$	97	16.33	16.33
1	$0.1473348 < X \leq 0.3706704$	400	67.34	83.67
2	$X > 0.3706704$	97	16.33	100.00
Total		594	100.00	

Nationality Diversity – Percentage of Nationalities				
Mean	0.2903935			
St. Dev.	0.1533917			
Nationality Score	**Categories**	**Number of Companies**	**Percent**	**Cum.**
0	$X \leq 0.1370018$	84	16.97	16.97
1	$0.1370018 < X \leq 0.4437852$	326	65.86	82.83
2	$X > 0.4437852$	85	17.17	100.00
Total		495	100.00	

Age Diversity – Coefficient of Variation of Age				
Mean	0.1357729			
St. Dev.	0.0397577			
Age Score	**Categories**	**Number of Companies**	**Percent**	**Cum.**
0	$X \leq 0.0960152$	70	12.28	12.28
1	$0.0960152 < X <= 0.1755306$	425	74.56	86.84
2	$X > 0.1755306$	75	13.16	100.00
Total		570	100.00	

Appendix V – Distribution of Demographic Board Diversity Variables

Figure 2: Distribution of Females relative to the Board Size

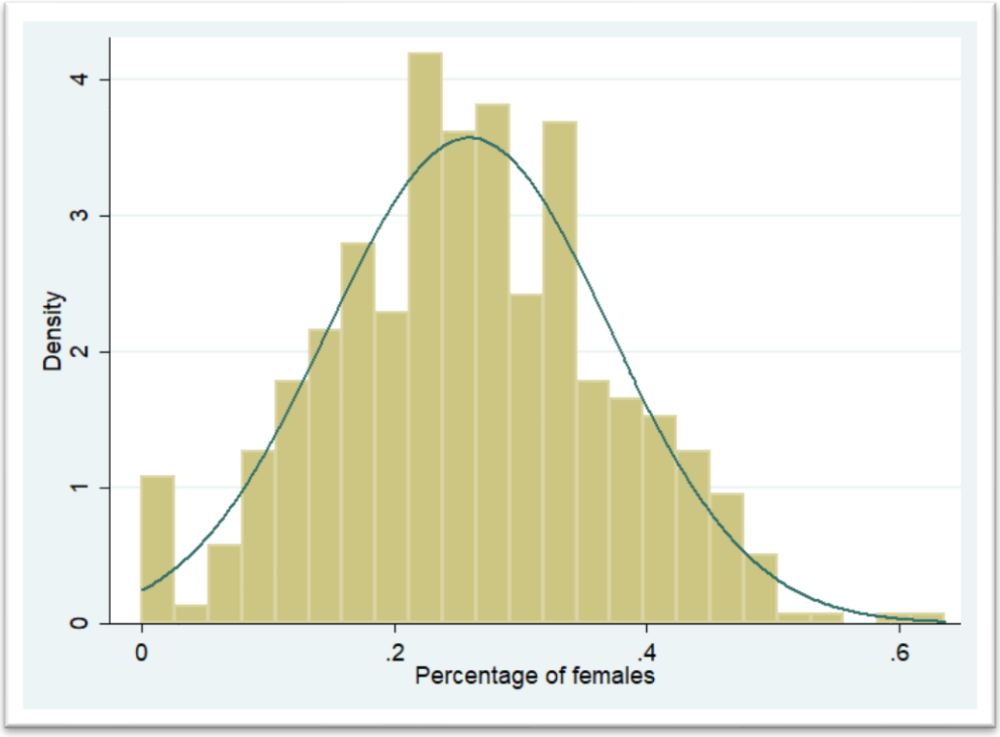


Figure 3: Distribution of the Number of Nationalities in the Board of Directors

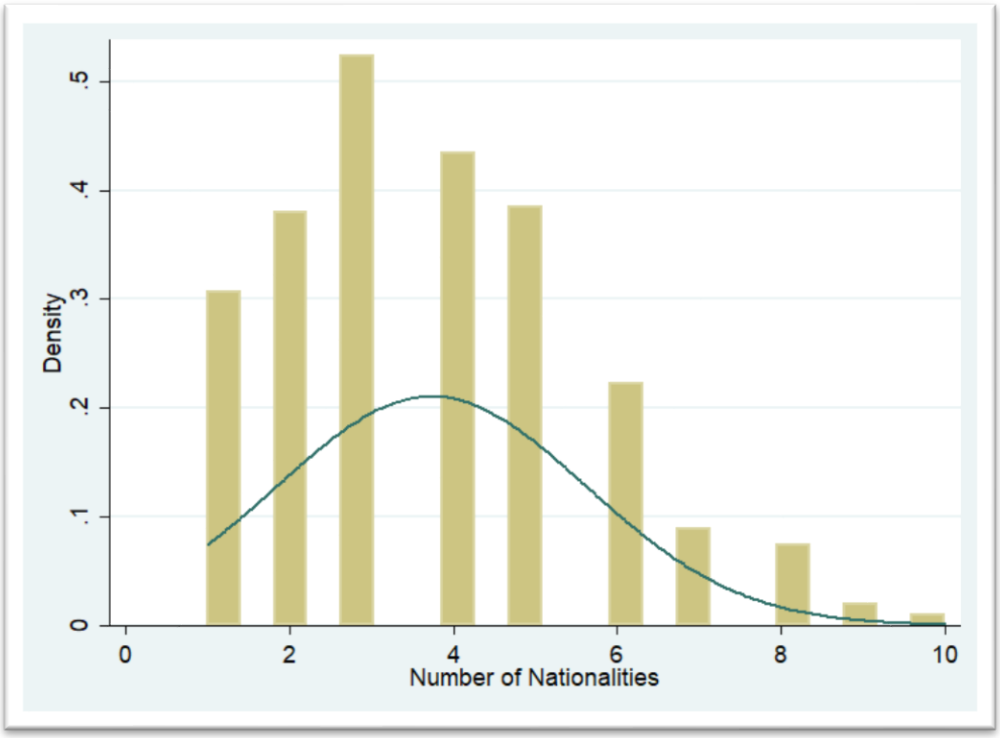
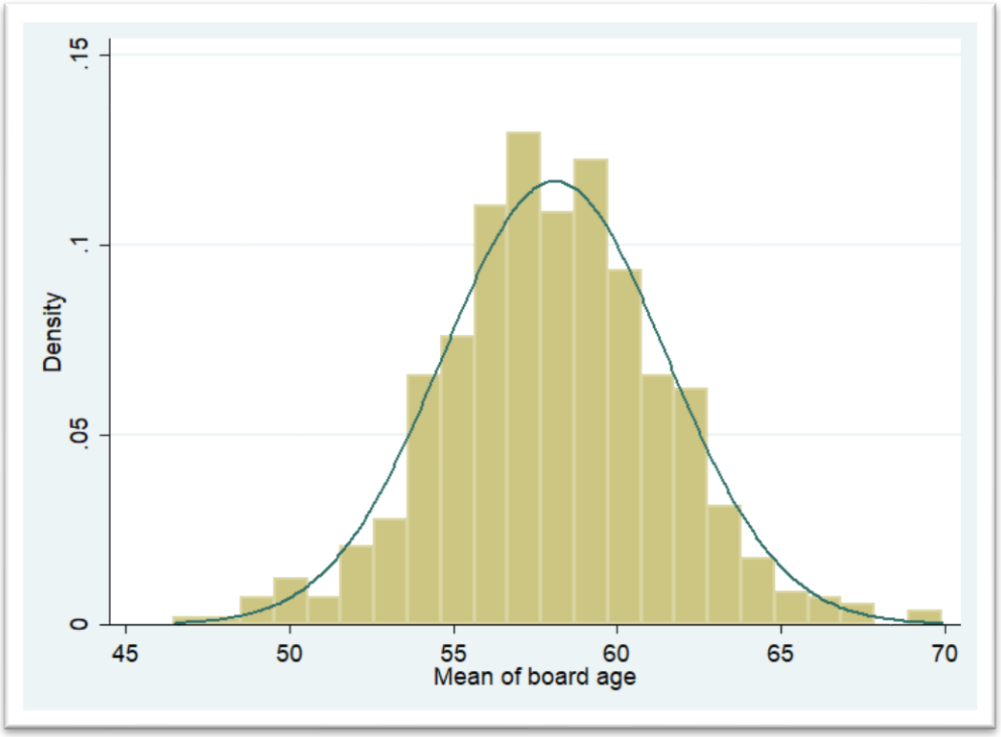


Figure 4: Distribution of the Mean of Board Age

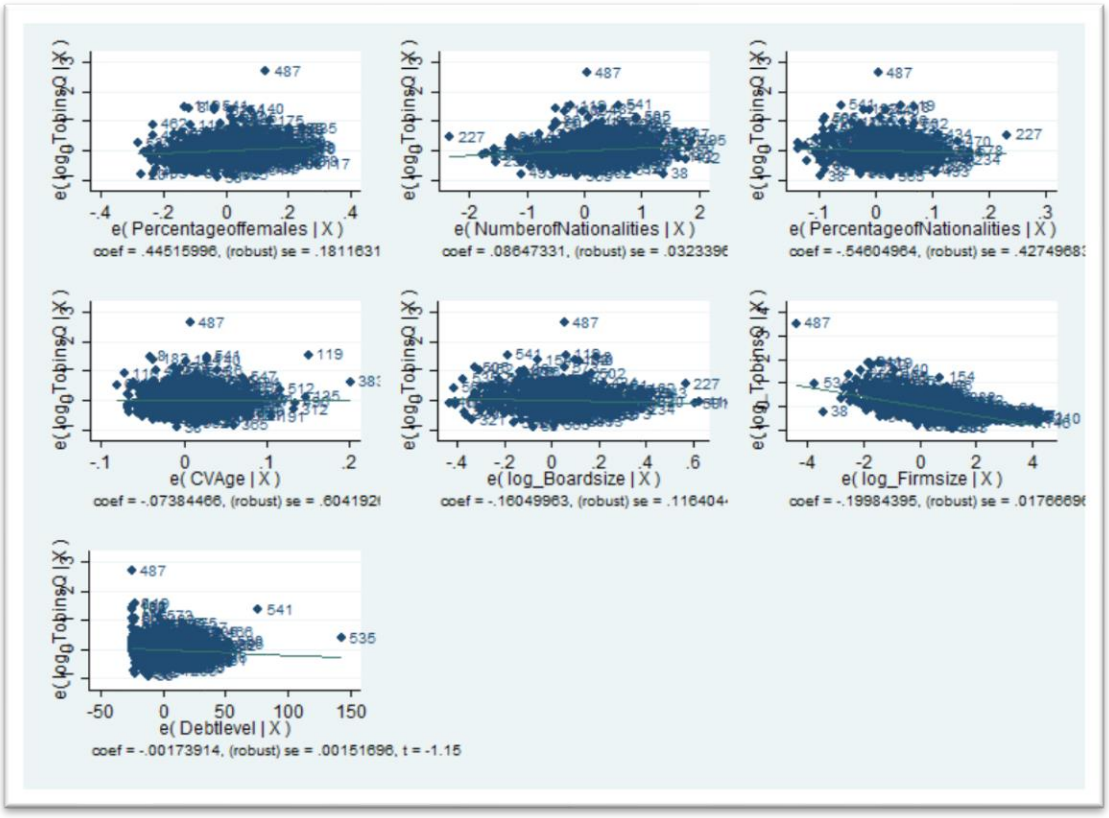


Appendix VI – Descriptive Statistic for Industries

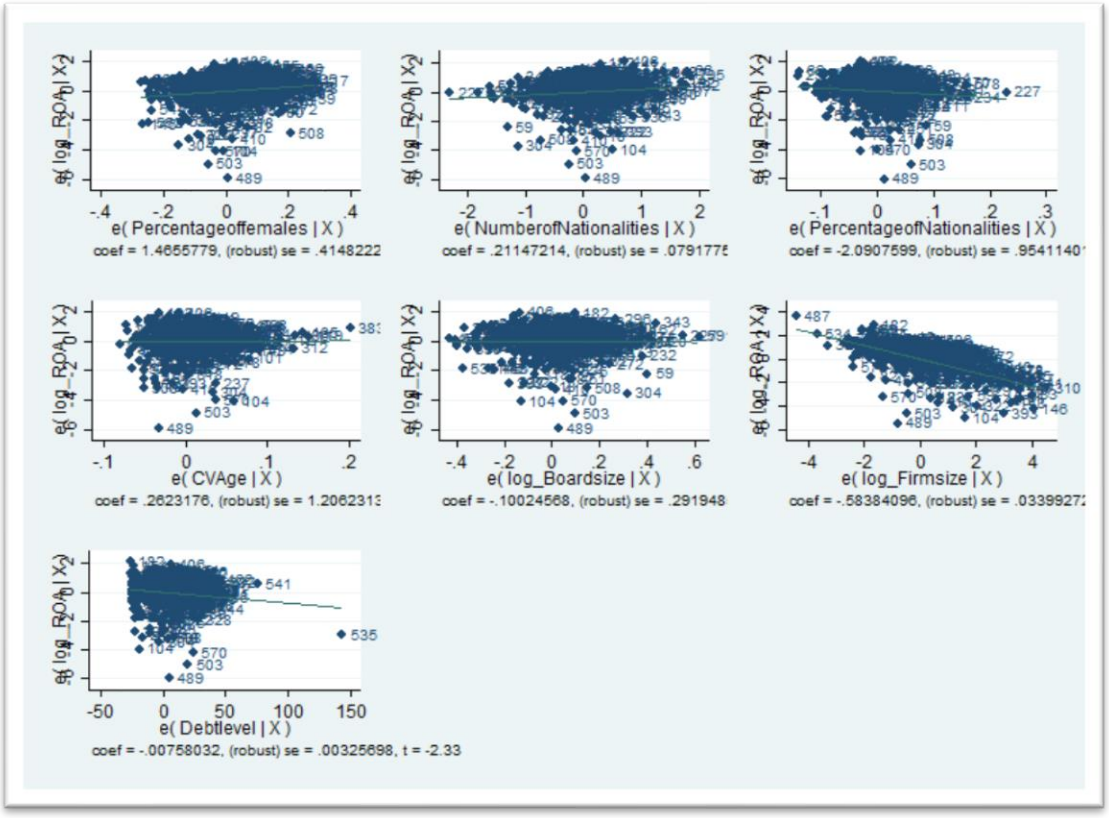
General Industry Classification	Industry Code	Number of Companies	Percent	Cum.
Industrial	1	399	67.17	67.17
Utility	2	49	8.25	75.42
Transportation	3	18	3.03	78.45
Bank/Savings & Loan	4	47	7.91	86.36
Insurance	5	36	6.06	92.42
Other Financials	6	45	7.58	100.00
Total		594	100.00	

Appendix VII – Graphical Analysis of Outliers

Graph 1: Plotted Regression Outcome for Tobin's Q



Graph 2: Plotted Regression Outcome for ROA



Appendix VIII – VIF Test for Multicollinearity

Variable	VIF	1/VIF
Firm	1.73	0.578874
Board	1.60	0.624877
Industry	1.23	0.813145
Nat. (%)	1.18	0.849060
Age	1.06	0.942904
Females	1.03	0.969646
Debt	1.01	0.987275
Mean VIF	**1.26**	

Notes: The test was conducted using the logarithm of ROA as dependent variable and the transformed independent and control variables. The number of nationalities was left out as this would increase the correlation with the percentage of nationalities. There is no need to test the correlation between these two variables as they are not tested in the same regression analysis. In addition, both diversity indices were left out as those were constructed using the separate diversity variables. When conducting a VIF test with Tobin's Q as the dependent variable and the same independent and control variables as above, the mean VIF is similar of 1.27. A VIF > 10 or a 1/VIF < 0.10 indicates multicollinearity.

Appendix IX – Robustness Test Outcomes

Gender Diversity 2015 - Percentage of Female Directors

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Females 2015	0.0931***	0.0953***	0.0673**	0.0765**
	(0.0324)	(0.0322)	(0.0335)	(0.0346)
Board	0.0544	0.0765**	0.00429	0.0349
	(0.0369)	(0.0381)	(0.0344)	(0.0353)
Firm	-0.641***	-0.719***	-0.523***	-0.631***
	(0.0406)	(0.0390)	(0.0539)	(0.0476)
Debt	-0.0699**	-0.0567	-0.138***	-0.115***
	(0.0346)	(0.0351)	(0.0382)	(0.0390)
Industry	YES***	NO	YES***	NO
N	531	531	578	578
adj. R^2	0.461	0.438	0.428	0.380

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. The variable Females 2015 (gender diversity) is one year lagged and thus measured in 2015. All other variables are measured in the base year 2016.
*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Nationality Diversity 2015 - Percentage of Nationalities

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Nat. (%) 2015	-0.0214	0.00187	0.106***	0.132***
	(0.0532)	(0.0535)	(0.0406)	(0.0401)
Board	0.113***	0.144***	0.0488	0.0853*
	(0.0412)	(0.0418)	(0.0473)	(0.0461)
Firm	-0.649***	-0.720***	-0.537***	-0.629***
	(0.0448)	(0.0441)	(0.0626)	(0.0550)
Debt	-0.0858**	-0.0715*	-0.147***	-0.124***
	(0.0393)	(0.0400)	(0.0457)	(0.0458)
Industry	YES***	NO	YES***	NO
N	441	441	479	479
adj. R^2	0.443	0.425	0.407	0.374

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. The variable Nat. (%) 2015 (nationality diversity in percentage) is one year lagged and thus measured in 2015. All other variables are measured in the base year 2016. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Nationality Diversity 2015- Number of Nationalities

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Nat. (#) 2015	0.0422	0.0665	0.130***	0.160***
	(0.0474)	(0.0480)	(0.0401)	(0.0394)
Board	0.117***	0.134***	-0.00759	0.0142
	(0.0400)	(0.0411)	(0.0417)	(0.0415)
Firm	-0.667***	-0.735***	-0.556***	-0.649***
	(0.0442)	(0.0439)	(0.0645)	(0.0563)
Debt	-0.0849**	-0.0708*	-0.143***	-0.120***
	(0.0398)	(0.0405)	(0.0453)	(0.0453)
Industry	YES***	NO	YES***	NO
N	441	441	479	479
adj. R^2	0.444	0.429	0.412	0.382

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. The variable Nat. (#) 2015 (nationality diversity in numbers) is one year lagged and thus measured in 2015. All other variables are measured in the base year 2016. *, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.

Age Diversity 2015 - Coefficient of Variation of Age

	(1)	(2)	(3)	(4)
Dependent Variable	ROA	ROA	Q	Q
Age 2015	-0.00885	-0.0105	-0.0325	-0.0447
	(0.0363)	(0.0365)	(0.0328)	(0.0349)
Board	0.0586	0.0818**	0.0220	0.0577
	(0.0364)	(0.0381)	(0.0374)	(0.0386)
Firm	-0.630***	-0.707***	-0.522***	-0.631***
	(0.0400)	(0.0395)	(0.0539)	(0.0475)
Debt	-0.0744**	-0.0616*	-0.134***	-0.111***
	(0.0369)	(0.0373)	(0.0403)	(0.0409)
Industry	YES***	NO	YES***	NO
N	511	511	554	554
adj. R^2	0.453	0.431	0.419	0.370

Notes: The first number in each cell is the standardised regression coefficient. The values in parentheses are the robust standard errors which are used to calculate the t-statistics. *N* indicates the number of observations. Regression model (1) and (3) are controlled for industry effects indicated by 'YES'. Regression model (2) and (4) are not controlled for industry effects indicated by 'NO'. The variable Age 2015 (age diversity) is one year lagged and thus measured in 2015. All other variables are measured in the base year 2016.
*, **, *** indicate significance at the 10%, 5% and 1% levels, respectively.