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Board diversity and financial firm performance in Dutch listed firms.

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Preface

After completing two studies, MBO (ROC van Twente) and HBO (Saxion Hogeschool Enschede), I did not feel quite ready for a full-time job. In addition, I had the feeling of missing knowledge and experiences on a scientific level. For this reason I started with the premaster, and afterwards with the master. After completing all the courses and projects, the scientific knowledge was there, but still the experience was missing. This was about to come through writing the master thesis. In the five months it took me to write the thesis, I spend a lot of hours in the University Library. Looking back, the time really flies and I definitely think the master brought my knowledge to a next level. I am looking forward to get a job in financial management, and hopefully become a Chief Financial Officer at some moment in time.

For now I would like to thank my first supervisor Prof. Dr. R. Kabir for his critical advice and support during the last five months. Due to his advice I was able to finish writing my master thesis within the predetermined time schedule. Secondly, I would like to thank my family, girlfriend, and friends for supporting me throughout my whole educational career, and in specific the master (thesis).

Lastly I would like to thank you for having interest in reading this master thesis; hopefully you will enjoy reading it.

Enschede, July 16th 2012.

Mees N.J. van Overveld, BEc

Nederlandse samenvatting

Diversiteit in de directiekamer is een van de meest besproken onderwerpen in corporate governance van deze tijd. In de Verenigde Staten illustreren veel organisaties dat diversiteit in de directiekamer kan leiden tot hogere financiële prestaties (Carter et al., 2003). Om deze reden wordt er veel onderzoek gedaan naar de relatie tussen diversiteit in de directiekamer en financiële prestaties. Sommige landen in de wereld, hoofdzakelijk in Europa, hebben zelfs quota gesteld voor geslachtsdiversiteit in de directiekamer (Vermeeren, 2012).

Deze studie onderzoek de relatie tussen diversiteit in de directiekamer, gemeten in geslachtssamenstelling en leeftijdspreiding, en de financiële prestatie meters return on assets en Tobin's Q. De relatie is getest op data uit 2010 van 95 Nederlandse organisaties, beursgenoteerd aan Euronext Amsterdam. Voor het controleren van de robuustheid van de resultaten en de contributie naar schaars Europees bewijs, is deze studie bilateraal opgesteld. In de data analyses wordt allereerst data gebruikt van alle directeuren per organisatie, bestaande uit de raad van commissarissen en raad van bestuur (afgekort als BOD). Door niet-uitvoerende activiteiten van de raad van commissarissen, is het tweede deel van de data analyse gebaseerd op data van alleen de raad van bestuur (afgekort als BOM).

Van de 95 Nederlandse beursgenoteerde organisaties, zitten er 713 directeuren in de steekproef. Het gemiddeld aantal leden in BOD is 7.4 met een minimum van 3 directieleden en een maximum van 15 directieleden. Het gemiddeld percentage van vrouwen vertegenwoordigd in de BOD is slechts 6.3%. Daarbij komt kijken dat slechts 38% van de organisaties in de steekproef op zijn minst een vrouw in de BOD heeft. Deze resultaten komen overeen met de studie van Lückerath-Rovers (2010). Voor de BOM in de steekproef ligt het percentage van vrouwen vertegenwoordiging zelfs nog lager, 5%, met slechts 16% van alle organisaties in de steekproef met op zijn minst een vrouw in de BOM. De gemiddelde leeftijd van leden van de BOD is 57 jaar (geboortejaar 1953). De range in jaren is 18, waarbij de jongste directeur 46 jaar is en de oudste directeur 64. De gemiddelde leeftijd van de BOM valt iets lager uit, 52 jaar oud.

De resultaten van de Pearson Correlation Coefficient Matrix en de ordinary least squares regression analyses bewijzen dat, in overeenkomst met voorgaande Europese studies, er geen significante relatie bestaat tussen de variabelen van directiekamer diversiteit en financiële prestaties. Dit betekent dat beide hypotheses geen support vinden in de resultaten. Hierdoor worden beide hypotheses afgewezen.

Ondanks de onsignificante resultaten tussen de afhankelijke en onafhankelijke variabelen in de steekproef, was het onderzoek naar deze relatie de moeite waard, al dan niet voor het toevoegen van schaars Europees en Nederlands bewijs.

Management summary

Board diversity is among the most significant corporate governance issues faced today (Milliken and Martins, 1996). Many firms in the USA are beginning to exemplify that diversity in board of directors leads to higher firm performance (Carter et al., 2003); therefore scholars have begun to investigate the relation between diversity in board of directors and firm performance. Some countries around the world, and in specific Europe, have even introduced mandatory quotas for female directors (Vermeeren, 2012).

This study examines the relationship between board diversity, in terms of gender composition and age dispersion, and the financial firm performance measures return on assets and Tobin's Q. The relationship is tested with data from 2010 of 95 Dutch firms, listed on Euronext Amsterdam.
For the contribution to scarce European evidence, this study is bilateral. In the data analyses, first data is used of all the directors, meaning supervisory board plus the management board (abbreviated as BOD). Due to non-executive activities of the supervisory board, the second part of the data analysis uses data of the board of management only (abbreviated as BOM).

From the 95 Dutch listed firms, there are 713 directors in the sample. The average number of board members in the BOD is 7.4 with a minimum of 3 board members and a maximum boardroom of 15 directors. The average percentage of female representation in the BOD is remarkably low with only 6.3%. In addition, only 38% of the sample firms have at least one woman in the BOD. These results are in line with the study of Lückerath-Rovers (2010). For the BOM in the Dutch listed firms, the percentage of female representation is even lower, 5%, with only 16% of the sample firms having at least one woman in the BOM.
The average age of all the directors, BOD, is 57 (birth year 1953). The range in years is 18 years, with the youngest director in the sample of 46 years old and the oldest director of 64 years old. Looking to the average age of executive directors, BOM, this number is somewhat lower, 52 years old.

The results from the Pearson Correlation Coefficient Matrix and the ordinar least squares regression analyses provide evidence that, in line with prior European studies (e.g. Marinova et al., 2010; Randoy et al., 2006), there is no significant relationship between the variables of board diversity and the financial firm performance measures. Sequentially, hypothesis 1 and 2 did not find any support in the results; therefore, both hypotheses are rejected.

Despite the insignificance between the independent and dependent variables for this sample, in order to complement the scarce European and Dutch evidence, it was worth it to investigate this relationship.

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1 Introduction

The introduction starts with the motive, description of the research problem and the central research question. Secondly, the relevance of the study, research objectives and the research structure is given. Lastly, personal learning objectives and the remainder of this report is placed.

1.1 Motive

The thesis in front of you is mainly put together based on the interest for financial matters and entrepreneurship. For years entrepreneurship attracts me. The reason is that there are entrepreneurs in my immediate environment who are successful and full of joy of their business. Their enthusiasm positively triggers me. All of these entrepreneurs have different characteristics and are mixed in terms of gender and age. This setting raised my interest, to investigate if, and to what extent, board diversity influence financial firm performance.

In recent years, the growing area of research on board diversity has been restricted to data from the USA (Hyland and Marcellino, 2002), with, in general, absence of evidence on Dutch companies (exceptions include Marinova et al., 2010; Van Ees et al., 2008). Therefore I decided to investigate and empirically test the relationship between board diversity and financial firm performance in the Netherlands.

1.2 Research problem

Board diversity is among the most significant corporate governance issues faced today (Milliken and Martins, 1996). Many firms in the United States of America are beginning to exemplify that diversity in board of directors leads to higher firm performance (Carter et al., 2003), therefore scholars have begun to investigate the relation between diversity in board of directors and firm performance. Some countries around the world, and in specific Europe, have even introduced mandatory quotas for female directors (Vermeeren, 2012). In some studies researchers found that racial and gender diversity in the board of directors has a positive influence on firm performance (Erhardt et al., 2003; Carter et al., 2003). Despite these outcomes, other studies (e.g. Adams and Ferreira, 2009) found a negative relationship between gender diversity and firm performance. Although the mixed results from studies all over the world, diversity of board membership is still considered desirable for two important reasons. First, previous studies suggests that diversity of groups increases discussion, group performance and the ability of exchanging ideas (Van Knippenberg et al., 2004; Schippers et al., 2003). Secondly, gender diversity, board size and dispersion of age all relate to board decision-making processes which eventually affect financial firm performance (Bohren and Strom, 2007). Board diversity is defined as the variety inherent in the board's composition, and it can be measured in several dimensions; gender, age, nationality, educational background, ethnicity, industrial experience and organizational membership (Campbell and Minguez-Vera, 2007). Other previous studies on diversity typically describes two general distinctions; demographic (observable) diversity like gender and age, and cognitive (non-observable) diversity as knowledge, education and values (Milliken and Martins, 1996; Petersen, 2000; Timmerman, 2000).

The focus of this study is on the relationship between board diversity and financial firm performance in Dutch firms. Consequently an important research question becomes:

> *"Does board diversity influence financial firm performance in Dutch firms?"*

1.3 Relevance of the study

In the fall of 2008 the global financial crisis started and had a huge impact, as known nowadays, on organizations (Blanchard et al., 2010). Due to the fact that we're in the aftermath of the global financial crisis at the moment, most research on board diversity with a Dutch sample is conducted prior to the crisis. For example, Marinova et al (2010) investigated the relationship of gender diversity on financial performance in Dutch firms observed in 2007. Our research' value added in comparison to preliminary research on the relationship between board diversity and firm performance in The Netherlands is based on a sample of firms measured in the aftermath of the global financial crisis, in 2010. A second reason for investigating the relationship between board diversity and financial firm performance in Dutch firms is the lack of empirical evidence on Dutch samples.

1.4 Research framework

A method to put the research question in context is a research framework. This research framework gives me a handhold during the conduction of this research, and keep me focused on the main variables to investigate if there is a relationship between board diversity and financial firm performance.
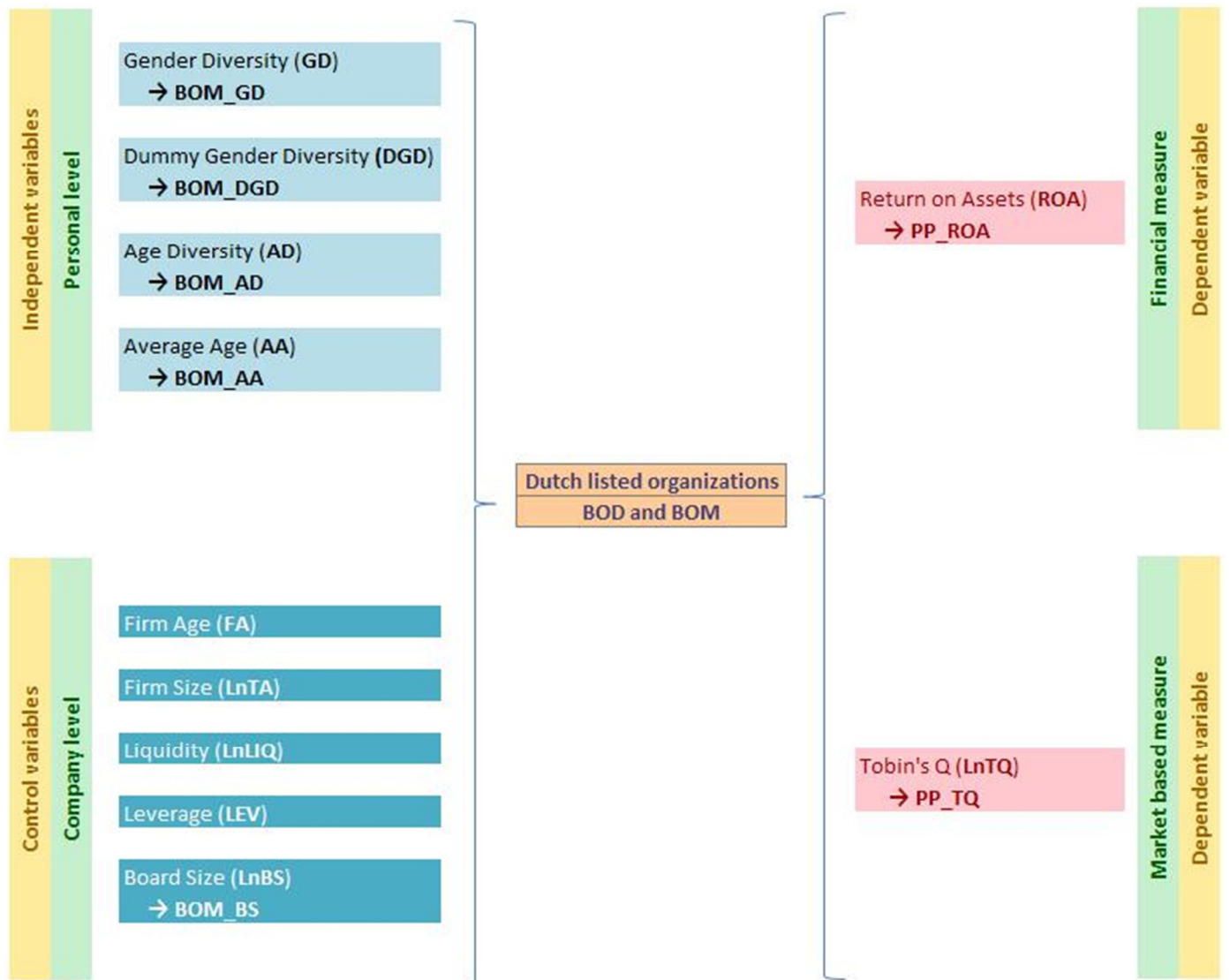
Figure 1: Research framework measured in board of directors and board of management

1.5 Research structure

In general research projects are based on the same principles and structure. The structure can be displayed systematically like a 'hourglass' (see figure 2)[1]. This research also follows the structure of the 'hourglass', starting with the broad area of interest, namely effects of directors on financial performances. In fact this idea way to broad and has to narrow down in order to reasonably study within the timeframe. According to previous empirical evidence and demarcation purposes the research question and hypotheses are set up. This is the narrowest point in this research, referring to the hourglass. From this point the hourglass will become broader, due to data collection and the measurement of the research question and hypotheses. This will result in initial conclusions about the relation between board diversity and financial firm performance. Lastly, at the bottom of the hourglass, the research question can be generalized based on the results to relating settings/contexts.
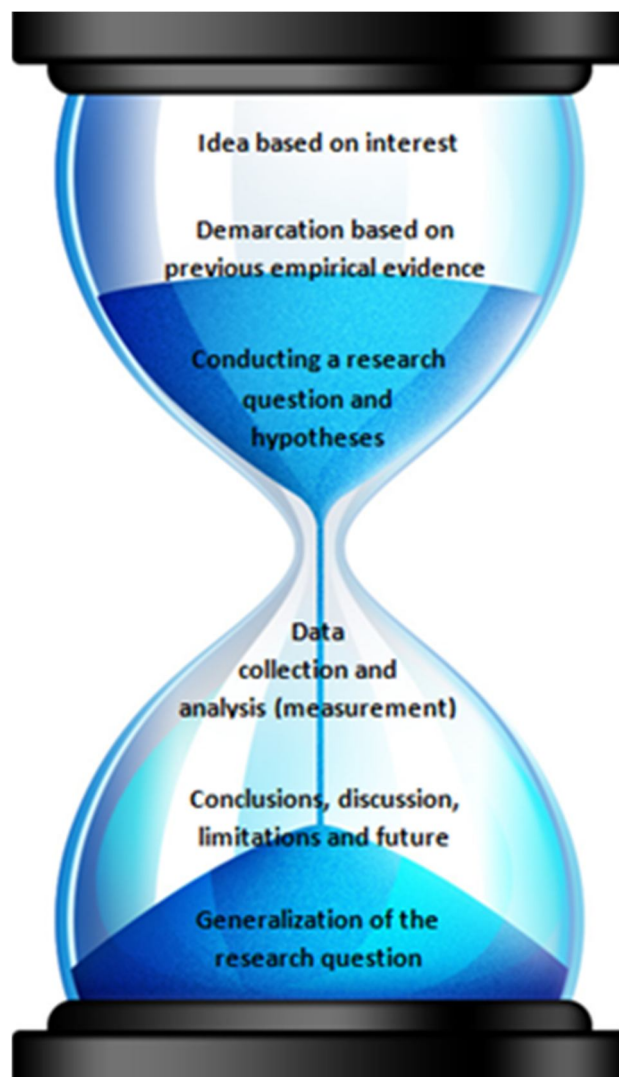
Figure 2: Research structure

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[1] Source: http://www.socialresearchmethods.net/kb/strucres.php

1.6   Research objectives

The purpose of this empirical analysis is to explore the relationship between board diversity and the financial performance of Dutch firms. In investigating this relationship, I try to understand if board diversity, measured in gender and age, has any effect on financial performances.

1.7   Personal learning objectives

For personal evaluation purposes I have set up three learning objectives, prior to the actual start of conducting research and writing the master thesis. Based on elaborating these objectives, it is possible to reflect on it after completing the master thesis project. The three learning objectives, which are described in more detail hereafter, are conducting scientific research, gain knowledge for future jobs, and graduate before the summer of 2012.

Conducting scientific research

Despite preliminary educational programs and the researches during these programs, for instance internships, I never elaborated a scientific research. Writing the master thesis for Master Business Administration allows me to do a scientific literature review, collecting data, testing the data set, making a comparison between the outcomes and the literature, and draw conclusions, a discussion, recommendations and finally limitations of the study.

Learn the effects of board diversity on financial firm performance in Dutch firms, in order to gain knowledge for future jobs.

In the future I would like to become, referring to the motive of this research, Chief Financial Officer (CFO) or Chief Executive Officer (CEO) within a multinational, and I am convinced that this research topic can help me to develop valuable knowledge, and to some extent insight, for these future jobs.

Graduate before the summer of 2012

My personal timeframe allows me to work on my master thesis for 20 to 22 weeks, starting on February 6th 2012. There are several reasons for this timeframe. First, I do not want to be eligible for study delay, with its well-known penalty. Secondly, I'm convinced that a tight schedule helps me to motivate and work in discipline to finish my master thesis within 20 to 22 weeks.

1.8   Report structure

The remainder of the master thesis is organized as follows. In the first section, a review of prior literature is described, in order to examine the relationship between board diversity and financial firm performance. In this section relevant literature and their key theories will be linked to the research question based on hypotheses and the concept of board diversity, financial firm performance and previous evidence is discussed. The second section gives the outline of the research method, how the intended research question will be tackled, and provides a summary of what kind of data is used and what the important sources are. The following section entails the actual data analysis, key findings and a comparison with the literature. Section five provides the conclusion of the research. In section six, a discussion of the key findings, recommendations for future research and limitations of this study are given. Finally all references and appendices are presented at the end of this report.

2   Literature review

In order to investigate and reveal previous discovered empirical evidence in the relation between board diversity and financial firm performance, prior research has to be analyzed. This chapter described the review of prior studies.

2.1   Literature search methodology

By analyzing scientific articles it is necessary to expose previous discovered empirical evidence in different settings. This will enlarge the probability that the empirical evidence can be generalized. There are many ways and sources to collect relevant literature in order to conduct research. To be certain in selecting useful scientific articles for this study, the following criteria are used.

Source

To collect relevant scientific articles based on topics of board diversity in relation to firm performance Web of Science, Google Scholar, and Scopus.com were used. Second sources used for the search of relevant scientific articles are websites from journals. These websites allow the user to apply filters and search on key words. Besides scientific articles from diverse journals found through previous mentioned websites, a set of financial and economical books are used to expand the already collected literature. Lastly, to abreast with the latest news and developments in the corporate governance and financial world, articles from newspapers were frequently checked and used. To minimize important articles missed my attention I used Lexis Nexis to search for recent articles which falls within my theoretical framework.

Key words

In minimizing any bias of missing relevant scientific literature, the following key words where used via the search engine of the previous mentioned sources: board diversity / heterogeneity / gender diversity / age diversity / financial firm performance / firm performance / age dispersion / corporate governance / board governance / female representation in boards / corporate boards / *vrouwen aan de top* / *leeftijdspreiding*.

Criteria

Several criteria were determined if a scientific article, provided through the search engine, are useful for this study. First of all the year of publication, due to the raising interest of board diversity in relation to firm performance in the last two decades, year of publication is not a major issue in this context. A second criterion is articles published through journals based on financial topics (e.g. Academy of Management Journal, European Journal of Finance, Strategic Management Journal). In the advanced search engines it was possible to put a filter with a journal name on. Lastly, a citation analysis revealed the relevance of the particular article. Scientific articles which are cited often, were found to be useful.

2.1.1   Literature search results

Following the above mentioned search methodology, a large list of scientific articles found to be useful for this study. Articles which found to be less interesting were excluded, based on reading and criticizing abstracts. In addition, some financial and economical books provided useful information to enhance the literature review. Furthermore, articles from newspapers and information on the internet where used. Ultimately, ninety-two scientific articles and eight books provided the foundation for the literature review, amplified by scientific articles, and newspaper articles. The literature indicates that existing empirical work from previous studies on the relationship between board diversity and firm performance has produced mixed results (e.g. Terjesen et al., 2009). A result of the literature review also indicates a lack of empirical evidence based on Dutch corporations.

2.2 Board diversity and financial firm performance

A corporation, as a legal entity, is owned by the shareholders who hold its shares of stock. Shares of stock carry voting rights, and shareholders vote at an annual meeting to elect the firm's directors. Directors include key corporate personnel and outsiders who are typically successful private businesspeople or executives of other major corporations. Megginson et al (2007) stated that between countries like the USA, Western Europe and Asia, financial systems differ fundamentally, even though the majority of the economic powers are capitalistic democracies. Hillier et al (2010) confirm this argument and state that, in general, there are two types of board structures worldwide. A single-tier (unitary) board structure, wherein the shareholders control the firm's direction, activities and policies and elect the board of directors. These directors select, in turn, top management who are responsible for the day-to-day running of the firm. This type of board structure is mainly used in the USA, UK, Spain, Portugal, Sweden, and Italy. The two-tier board structure, have another layer between the owners of a firm and the board of directors. This layer is called the supervisory board, which may consist of major shareholders, trade union representatives, and creditors. For example Germany, The Netherlands, and Denmark use this type of board structure. In order to cope with international differences between prior studies like the one and two-tier board structure, and to be able to generalize and compare results, the analyses of the study is bilateral. First the relationship between board diversity and financial firm performance is tested, following Marinova et al (2010), based on data of the supervisory board and board of management together (BOD). Secondly, the relationship is tested based on data of the board of management (BOM).

The board of management is responsible for decision-making in daily management. The supervisory board is responsible for supervising corporate policies of the board of management, with the emphasis on identifying structures that align the interests of managers and stakeholders. The quality of their roles of decision-making and supervision can be affected due to gender composition, dispersion of age or other factors within the board of directors, and affect financial firm performances (Campbell and Minguez-Vera, 2007). In other words, the composition of boards is of vital importance in corporate governance. Due to the vital importance, many firms in the United States of America (one-tier board structures) are beginning to exemplify that diversity in board of directors leads to higher firm performance (Carter et al., 2003); therefore researchers around the world have begun to investigate the relation between diversity in board of directors and firm performance in one and two-tier board structures. Diagrams in the appendix underline the rise of interest in board diversity in de last decades.

2.2.1 Theoretical approaches

In prior research, board diversity and financial firm performance is approximated in different theoretical approaches.

Agency theory (AT)

In finance and economics the most frequent theoretical framework used by investigators, in order to understand if there is a link between board diversity and financial firm performance, is the agency theory (e.g. Carter et al., 2010). A board's role in the agency theory is to resolve agency problems between the management and stakeholders. Hence, managers act as *agents* of the owners who have hired them and given them decision-making authority (Megginson et al, 2007). An explanation of agency problems is stated by Megginson et al (2007) who argues that the existence of a corporate governance function is of overarching importance to the modern corporation. Desired management

results from a corporate governance system that hires and promotes qualified, honest people, and structures employees' financial incentives to motivate them to maximize firm value. But it is extremely difficult in practice to create an optimal corporate governance system, not least because the incentives of stockholders, managers, and other stakeholders often conflict. Agency theory simply does not provide a strong support concerning the relationship between board diversity and financial firm performance, and on the other hand, agency theory does not rule out any possibility of a relationship (Carter et al., 2010).

Human capital theory (HCT)

Becker (1964) addresses the role of an individual's level of education, experience, and skills that can be used in benefit of a firm. In addition Terjesen et al (2009) argue that directors have unique human capital. According to their study, the results suggest that women directors are equally qualified in comparison to male directors in terms of important qualities and competencies like education, but women tend to have less experience as business experts. Due to diverse and unique human capital, human capital theory suggests that board diversity will affect board performance, which could lead either positive or negative financial firm performance.

Resource dependence theory (RDT)

Pfeffer and Salancik (1978) suggest that resource dependence theory is based on the idea that environments deliver scarce resources and organizations are depending on these limited resources for survival. In order to ensure their own continuity, firms must develop ways to exploit these resources, which are also being sought by other firms. Instead of looking only at firm level, Hillman et al (2000) argue that every single director has different characteristics which will provide different beneficial resources to the firm. This will result in a firm with a more diverse board who provide more valuable resources, which eventually should lead to better firm performance. Within the resource dependence theory, gender and age provide different resources. A fifty years old female director may bring different resources to the firm in comparison to a male counterpart which is sixty-five years old.

Social psychological theory (SPT)

A fourth theory which discusses the relationship between board diversity and financial firm performance is social psychological theory. Westphal and Milton (2000) argue that this concept is derived from social impact theory, which states that individuals with majority status can exert a disproportionate amount of influence in group decisions. This predicts that diverse directors will not necessarily influence the board as a result of the internal group dynamics. Another suggestion is that demographic differences lower social cohesion between groups and individuals (Westphal and Milton, 2000). Prior evidence suggests that group dynamics can have either a positive or negative influence on financial firm performance.

In summary, human capital theory and resource dependence theory does not specifically predict a relationship between board diversity and financial firm performance, but they are highly suggestive of a positive relationship (Carter et al, 2010). In addition, social psychology theory suggests that diverse directors may not have an influence on board decisions, and eventually on financial firm performance, due to internal group dynamics. Contrary, agency theory simply does not provide a strong support concerning the relationship between board diversity and financial firm performance, but it does not rule out any possibility of a relationship (Carter et al., 2010).

2.2.2   Diversity characteristics

Board diversity is defined as the variety inherent in the board's composition, and it can be measured in numerous dimensions like; gender, age, nationality, educational background, ethnicity, industrial experience and organizational membership (Campbell and Minguez-Vera, 2007). Other previous studies on diversity typically describes two general distinctions; demographic (observable) diversity like gender and age, and cognitive (non-observable) diversity as knowledge, education and values (Milliken and Martins, 1996; Petersen, 2000; Timmerman, 2000). The predominant diversity characteristic in the examined articles is gender diversity. Agrawal and Knoeber (2001) argue that female directors with board positions bring along different benefits and resources, like their collaborative skills. Another demographic diversity characteristic who has raised interest last decade is director's age (e.g. Waelchli and Zeller, 2012; Rhodes, 2004; Randoy et al., 2006). They argue that the life expectancy has been increasing for decades, so as the average age of the labor population. In addition the pool of directors will become more diverse in age.

2.2.3   Theoretical discussions

According to Carter et al (2003) some advantages of board diversity include the promotion of a better understanding of the market place, increased capabilities of effective problem solving, and enhancing creativity and innovation. This statement is supported by Arfken et al (2004), who suggest that diverse boards have more effective relationships in a global sense, and it will increase the independency of boards due to the diverse members asking questions that would not come from directors with more traditional backgrounds. In line with resource dependence theory, Agrawal and Knoeber (2001) argue that outside directors with political and legal backgrounds, are more likely to be on boards of firms that do business with governmental firms or have to deal with governmental regulations. They argue that female directors and ethnic minorities with board positions bring along different benefits and resources. According to an article from 'The Business Times Singapore' (Khoo, 2012), gender diversity is the most visible diversity characteristic in the boardroom. But the issue of board diversity goes way beyond gender, for example business background, ethnicity or culture, industry expertise and age, and even governance experts. Therefore, boards who strive for diversity need to reflect the whole breadth of their stakeholders and their business environment. One of the arguments is the diversity in viewpoints. If people come from the same network, whether or not have a different functional background, the board may end up having similar viewpoints. A counterargument is that gender diversity in the boardroom makes 'good business sense' due to a better reflection of the firm's employees, shareholders, and eventually customers.

Stiles (2001) suggest a positive performance impact of diversity through a boost of access to critical resources, in alignment with the resource dependence theory. Following this argument, Hoffman and Maier (1961) suggest that best performing teams have members that represent the variation in gender, ethnicity and dispersion of age. In other words, team diversity enhances an overall problem-solving capability, which aligns the group dynamics in the social psychology theory. Hillman et al. (2002, p. 749) argue that 'race and gender are often considered proxies of different perspectives individuals bring to organizations'. Therefore human capital in diverse boards, that is been brought to the firm, should lead to aberrant and idiosyncratic views and backgrounds.

2.2.3.1 International circumstances

The reason why Singh and Vinnicombe (2004) investigating director's characteristics, qualifications and affiliations is that they believe that, in order to manage diversity on corporate boards it is imperative to understand these factors that directors bring to the boardroom. In addition they argue that it is important to take national circumstances into account, before research results from other countries can be generalized. For example Van Veen and Elbertsen (2008) examined whether the level of nationality diversity can be explained by structural differences in governance regimes. According to Randoy et al (2006) nationality diversity in board of directors have potential advantages like the increased stock of available qualified candidates for board seats. A second advantage is due to their different backgrounds, foreign directors can add valuable and diverse expertise which domestic directors do not have. In contradiction of the advantages, foreign directors may be less informed about domestic affairs which can lower a director's effectiveness. Another important disadvantage is changing the board language to fit foreign directors which can be very costly.

A second example is the mergers and acquisitions. Originally, the USA, the UK, and Canada have undertaken the majority of mergers and acquisitions (M&A's) in comparison to other developed countries, but this is rapidly changing. About one-third of M&A's worldwide now involves European firms. Differences between countries is also confirmed by Daft (2010), who states that management values and organizational norms of international corporations tend to vary depending on the corporation's country of origin, just like social and cultural values differ between countries. Organizational norms and values are influenced by the values in the larger national culture, and, in turn influence the organization's structural approach and the ways managers coordinate and control an international corporation. Researchers are attempting to understand how national value systems influence management and organizations in general.

2.2.3.2 Gender diversity

Several studies enhance the subject of the addition of female directors to boardrooms. In this context, it can be argued what percentage of female directors is favorable? Esther Mirjam Sent suggest having an answer on this question. She argues, in an article in 'Algemeen Dagblad' (Boelsma, 2012), that an organization with at least 30 percent females in the boardroom, does not encounter typical obstacles and barriers in dominant male cultures. Mrs. Sent states that female directors can be themselves and do not have to act like a man in organizations with at least 30 percent of females in the board. Within such organizations there is room for typical feministic characteristics like empathy. As an example, she uses the dilemma between cats and dogs. If a cat would like to life between dogs, the cat can adapt to its new environment and becomes a strange dog. But if the cat keeps acting like a cat, the cat becomes the maverick in the group. In other words: the cat can never do it right. Mrs. Sent also argues that in times of crises, people feel the need of female leaders. Research reveals that women operate more cautiously and are better predictors of risk in unstable times.

2.2.3.3 Age diversity

Besides the major issues of female representation in the boardroom, there is also a lack in age diversity. The average perception of corporate board members is that they are well educated, experienced in their field, mature, male, and middle-aged (see figure 3). This rusted perception is slowly changing over time due to active fostering of age diversity, with in mind the different perspectives of these diverse age groups.

Figure 3: Average age employed labor force and employment rates in The Netherlands (CBS).

According to Houle (1990) age dispersion is divided into three categories with each their own characteristics and functions. The younger groups are driven by energy to succeed and plan ahead for the upcoming future, whereas the middle groups are mainly focused on responsibilities in corporations and society. Within the older groups, members provide experience, valuable resources, wisdom, and in most of the cases a broad network. This statement of age dispersion is underlined by the resource dependence theory and human capital theory. In prior literature (e.g. Huse and Rindova, 2001) arguments state that boards representing the different types of stakeholders, diversity in directors' age is assisting in the process of creating different perspectives, views and ultimately consensus. A firm may, for example, attract their customers in different age groups due to the variety of products and services, provided by the firm. In order to represent the spread of interests of these customers due to age dispersion, boards need to have directors from different age groups to enhance a variety of perspectives (Huse and Rindova, 2001)

2.2.3.4   Quotas

In facing the pressure to improve gender diversity in executive ranks, some countries around the world, and in specific Europe, have introduced mandatory quota for female directors (Vermeeren, 2012). Others are requiring companies to report on their strategies to improve board diversity in the annual reports. According to the report from the European Commission about gender equality (Kratsa-Tsagaropoulou, 2011), a legislation is set up that the board of management in European firms have to exist out of at least 30 per cent women in 2015, and 40 per cent in 2020. If they don't meet the target standard, a written justification is necessary in their annual report. One of the advantages, according to Prof. Dr. Lückerath-Rovers, is the mandatory transparency of the new legislation.

The legislation of the European Commission for women in top functions is indirectly related to the phenomenon 'the old boys' network'. According to Sheridan & Milgate (2005), male directors argue a shortcoming of female senior executives and therefore rely on their 'old boys' network', whilst female directors argue a lack of access to male-oriented networks.

According to Rose (2007) Scandinavian countries have a significant interest in increasing the number of women on corporate boards. Norway adopted a legislation that requires 40 per cent of the directors for a firm to be female. Also Spain recently passed legislation requiring a minimum percentage for female directors (Adams and Ferreira, 2009). They also suggest that diversity increases board effectiveness and even recommends that more females have to be included on boards.

Not only in Europe, but also other parts of the world countries are considering quotes to ensure an increase in board diversity. An article in the Canadian 'The Globe and Mail' (McFarland, 2012) concludes that women's representation on public company boards in Canada has stagnated at only ten percent, despite years of advocacy, and publicity. Catalyst wants to have a quote or legislation for Canadian companies to commit to enlarge the company's female representation ratio in the boardroom up to 25% by 2017 (Postmedia, 2012). Catalyst even prepared a helpful list of board-ready women, in case companies try to circumvent the 25% and argue they can't find qualified female board members. In the 500 companies, women comprise only 14.5 percent of the director seats, marginally increase in comparison from 14 percent in the last study two years ago. According to Catalyst's senior vice-president of global operations, Deborah Gillis said that the news in this census is particularly disappointing because the pace of change is so slow.

In a recent article in 'The Western Mail', the author, Rhodri Evans (Evans, 2012), states that the former Labor minister and ex-chairman of Standard Charter in the UK recommended that companies in the FTSE 100 should have 25% female board membership by the end of 2015. In reaction prior to the publication of the article, Prof. Susan Vinnicombe said: "*The past 12 months have seen a significant amount of global activity around diversifying boards. After a decade of incremental increases in the UK, we are pleased to be reporting improvements that are more substantive*". In addition Prof. Vinnicombe argues that if the momentum continues, the actual ratio of 30% women on UK boards in less than four years could be achieved.

The New Zealand Herald published an article (Herald, 2012) that tried to look beyond the boys club to fill the boardroom. Within the largest companies of New Zealand, there is a lack of diversity in terms of gender, ethnicity and age. New Zealand boards are predominantly governed by aging white men. In 2011 only 9.3 percent of the board seats from the top 100 largest companies had females in the boardroom. In accordance with the global shift to legislation or quota for the increase of female representation ratios, New Zealand is planning to set new requirements in 2012, which will force companies to make their strategies public, in annual reports, how they try to reach diverse boardrooms.

2.2.4 The evidence on board diversity and financial firm performance

Researchers around the world have begun to investigate the relation between diversity in board of directors and firm performance. In examining the literature and empirical evidence, it became clear that the outcomes are mixed due to the research settings and focus on different types of board characteristics. The main examined board characteristics are given below.

2.2.4.1 Gender

Prior research suggests an increase on diversity, especially by gender. For example, Bilimoria (2000) find that despite the number of female board members is increasing slightly, few companies actively recruit females. Mattis (2000) reports that the number of women as board members is increasing, but the changes are small. Hillman et al. (2002) states that one of the most important trends in corporate boards in the United States of America over the past twenty years is the shift toward the inclusion of women in boards of directors. According to the study of Catalyst (1995) 97 of the top 100 US firms had at least one female board member. Daily et al (1999) stated that women, from a sample of US firms, have increasingly assumed seats of boards of directors. Despite assuming seats in the BOD, women did not have in BOM positions. Notwithstanding the difference in average number of women in board of directors in the USA and Europe, the average number of women in European BOD's has increased in the last decade from 5% to 8.4%, as investigated by Heidrick and Struggles (2007) see figure 4.

Women in the boardroom by country

2001 European average	5.0%
2003 European average	6.1%
2005 European average	7.3%
2007 European average	8.4%
Portugal	0.7%
Italy	2.3%
Spain	3.1%
Belgium	5.3%
Switzerland	7.2%
France	7.5%
Netherlands	9.0%
Germany	12.4%
UK	15.2%
Sweden	21.3%

Figure 4: Women in the boardroom by European country in 2007 (Heidrick & Struggles, 2007).

In a recent comprehensive survey that investigated existing empirical work on the relationship between female representation at the top of the corporate boards and firm performance, Terjesen et al (2009) argue that previous studies has produced mixed results. Hiring a female CEO is, according

to Lee and James's (2007) study, related with a negative stock price. In contradiction, Carter et al (2003, 2008) provided evidence that board gender diversity is positively related with financial firm performance. In supporting this statement, Hillman et al (2007) argue that the benefits of gender diversity outweigh the costs, because of the non routine nature of the problems faced by corporate boards. In addition, Brammer et al. (2007) find significant cross sector variation in female representation across business industries. This result is empirically substantiated by Peterson and Philpot (2007), Hillman et al. (2002), and Peterson et al. (2007), which all argue the idea that female directors and ethnic minorities have different functions on the board. For example, Hillman et al. (2002) find that African-American females which have director seats are less likely to be business experts than their African-American male counterparts. Besides, male and female African-American directors are less likely to be business experts than Caucasian female directors, and Caucasian male directors are more likely to be business experts. In other words, their study reveals that in the US business experts are predominantly Caucasian males.

2.2.4.1.1 Behavioral differences between men and women

Some researchers find evidence women to be less hierarchical and more cooperative and collaborative than their male counterparts (e.g. Helgesen, 1990; Book, 2000). In addition, Eagly and Johnson (1990) provide evidence that in organizational settings, women tend to manage in a more democratic way. As Dezso and Ross (2012, p. 4) mentioned in their scholar "These behaviors are set colloquially by Michael Landel, CEO of Sodexo":

> "Women like power, but they like to share it. They like to be more collaborative."

Daily and Dalton (2003) confirm that this behavior enhances the sharing of task-relevant information, which is according to Van Knippenberg et al (2004) of great importance to the positive effects of diversity. If women posses a senior managerial position, they tend to focus more on the development and mentoring of their subordinates, encouraging them to reach their full potential and rewarding them for good performance, in contradiction with their male counterparts (Eagly et al., 2003). Thereby, in light of human capital theory and social psychology theory, women are expected to have a better understanding of customer behavior, customer needs, and company opportunities in achieving those needs (Brennan & McCafferty, 1997). Hillman et al (2002) stated that women directors are more likely to have backgrounds outside the business area, have higher educational degrees, and become more quickly a member of other boards compared to males. Another important factor is that gender is a demographic type of diversity which sends signals to the public (Tsui et al., 1992), what can influence a firm's reputation. A paper which draws upon group effectiveness and gender differences, to shed some light on whether and how women make a difference to board effectiveness in strategic and operational control, is conducted by Nielsen and Huse (2010). The results, from a survey of 201 Norwegian firms, suggest that the ratio of women directors is positively related with board strategic control. Besides that, the positive effects of women directors on board effectiveness are mediated through increased board development activities and through decreased level of conflict. Overall, the results suggest that while women directors do not perform operational control tasks better or worse than men, they bring specific advantages to board decision-making when it comes to board strategic tasks, which is aligned in the human capital theory.

2.2.4.1.2 Attaining a board position through family ties

According to the study of Ruigrok et al (2007), women directors are more likely to be affiliated to a BOM through family ties. As family members, they do not need to bring in-depth business

understanding or an advanced educational degree. This is also confirmed by Sheridan and Milgate (2005). In exploring men' and women' views on the crucial factors in attaining a board position, Sheridan and Milgate (2005) use a sample of the Australian Stock Exchange. Men and women having the same views in most of the cases; importance of a strong track record, a good understanding of business principles and business contacts in gaining board positions are identified by both groups. Women also highlighted the be (2004) argue that senior women do not easily gain access to the boardroom, where an importance of high visibility and family contacts to account for their entrance in BOM's. It seems that, in confirmation with Singh and Vinnicombe (2004), women's competence has to be widely acknowledged in the public domain or through family connections before boards will be prepared to 'risk' having a woman in the boardroom. Singh and Vinnicomelite group of predominantly male directors maintain their power. After examining the backgrounds of women who have succeeded in a BOM, Singh and Vinnicombe (2004) find that these women have an outstanding career capital, and bring social capital to the network of directors through interlocking directorships, contacts from previous employment, and voluntary work. Some titled women were found to be wives of prominent males, by evidence of social relationships within powerful networks. Singh and Vinnicombe argue that "for women to access elite positions, women need to show that they can contribute beyond the current job description to the wider network" (2004, p.486).

2.2.4.1.3 Gender and firm performance

Campbell and Minguez-Vera (2007) investigated gender diversity in the boardroom and firm financial performance using panel data analysis and find that gender diversity has a positive effect on firm value for their sample of firms in Spain. The researchers provide evidence that the direction of causality in their sample is from board gender to firm performance and not the other way around. The positive relationship observed between gender diversity and firm value is due to the presence of female directors affecting firm performance rather than the opposite. The data from the study of Carter et al. (2008) also supports this specific direction of causality. Their study provides evidence that gender diversity affects financial firm performance through rather different channels; audit, executive compensation and director nomination. Shrader et al. (1997) examined financial firm performance, measured in two accounting measures of financial value (e.g. ROA and ROE), with female representation at the middle- and pre-retirement management, and in the BOD for large firms. In general, they reported a positive link between female representation in management positions and financial firm performance. Their explanation for the positive relationship is through the suggestion that these companies were recruiting from a larger talent pool, and ultimately recruiting better qualified applicants regardless of gender. From a study of Canadian firms, Burke (2000a) found significant correlation coefficients between gender diversity and financial firm performance. Adams and Ferreira (2009) find that boards with a higher female representation devote more effort to monitoring managers. Besides this, they find a negative relationship between the proportion of women on the BOM and financial firm performance, measured in Tobin's Q, in an analysis with a sample of US firms. In a study of Danish firms from Smith et al (2006), no statistically significant relationship between gender diversity and financial firm performance was found. This result is been confirmed by the study of Rose (2007). Farrel and Hersch (2005) investigate the representation of female directors in the BOM of US firms. They find no evidence that the addition of females to boards have any effect on financial firm performance. In a somewhat older study, Zahra and Stanton (1988) test the relationship between female directors and financial firm performance,

measured in several accounting measures of financial value (e.g. ROE and EPS). They also find no statistically significant relationship.

One of the few studies who focus on Dutch firms is Marinova et al. (2010), who examined the relationship between board gender diversity on firm performance, based on evidence from the Netherlands and Denmark. According to their two-stage least-squares estimation and the use of Tobin's Q as a measure of performance, they found no effect of board gender diversity on firm performance within both countries.

2.2.4.2   Age

Gilpatrick's (2000) research revealed that most BOM's consist of middle to retirement aged members. Another aspect is that they have previously served as executives in the same industry, but in other corporations. In a more specific research, Waelchli & Zeller (2012) investigated, using a sample of unlisted Swiss firms, if chairmen of the board' (COB) age influence financial firm performance. They find a negative relationship. Their data provide evidence that, on average, a decline of 12% in performance will occur if the COB age increases by one standard deviation (10 years). According to the researchers, the main driver for this negative relationship is deterioration of COB's cognitive abilities, which corroborates the human capital theory. This suggests that the BOM needs to exist out of young directors, which lowers board diversity. The negative effect of directors' aging on financial firm performance is confirmed by Rhodes' (2004) study. Rhodes (2004) argues that executive functions seem to be particularly prone to aging effects. Randoy et al. (2006) find no significant diversity effect of age on stock market performance or on return on assets (ROA) within the 500 largest companies in Denmark, Norway and Sweden.

2.2.4.3   Nationality

Notwithstanding the evidence of advantages and disadvantages of heterogeneous groups, Dowling & Aribi (2012) reveals that the individual characteristics, like nationality, of just one director can influence corporate decision making, and eventually financial firm performance. Van Veen and Elbertsen (2008) examined, with sample data of UK, Germany and the Netherlands, the level of nationality diversity of a corporate board as a dependent factor on the governance regime of the country of origin of the company. As a result of global economic forces, the study shows an increase in the diversity of nationalities on corporate boards. It seems that the nationality diversity within the three countries shows substantial differences. Germany shows the lowest proportion of foreigners in corporate boards, UK an intermediate proportion, and the Netherlands the top position. The data analysis demonstrate differences in pace of absorption of foreigners on the corporate boards. A major part of these differences is determined to governance regime features of the company's country of origin. Also the position of different stakeholders and the variety in institutionalized recruitment procedures seem to determine the structural opportunities for foreigners. In alignment with human capital theory, a foreign board member can bring different skills and capabilities to the boardroom, but does not necessarily have to affect performance.

2.2.4.4   Board size

A variable which is not a diversity characteristic but may indirectly affect board diversity is board size. The increase in the number of directors provides an expansion in pool of expertise and therefore larger boards are likely to have more knowledge and skills, according to Van den Berghe and Levrau (2004). In contradiction, Yermack (1996) states that small boards are more effective than large boards, due to poorer communication and decision making which are features of larger groups.

Cheng (2008) investigated the relation between board size and the variability of corporate performance. Cheng examined and provided evidence that corporate performance and value become less variable as a firm's board of directors grows larger. The sample used came from 1,252 US firms covered in the Investor Responsibility Research Center's (IRRC) data set over the period 1996-2004. Cheng provided, once again, evidence that it takes more compromises for larger boards to reach consensus, and as a result, the decisions of larger boards tend to be less extreme, leading to less extreme corporate performance. The overall conclusion suggests that board size adversely affects the variability of corporate performance and value. Also Bennedsen et al (2008) tried to find characteristics on 'optimal' board size. They acknowledged that the relation between board size and financial firm performance is linked with various other characteristics like age, and firm size.

2.2.4.5 Network

Another which is not a diversity characteristic but may indirectly affect board diversity is the network of the board members. According to the study of Kim (2005), board network density and board members' elite school networks enhances firm performance. The two board characteristics which influence the board's ability as monitors, advisors and boundary spanners, are, according to Kim (2005), board network density and board external social capital. By using a generalized least square (GLS) regression estimation, the author find evidence that board network density will have a positive effect on firm performance, due to enhancing communication and knowledge-sharing among board members. Board external social capital, measured in board members' elite school networks, have a less extreme positive effect on firm performance. Kim (2005) concludes that, in order to keep varied information, external links, and monitoring functions along with behavioral integration and communication among board members, organizations must maintaining a moderate level of board network density and a high level of board external networks. This confirms the thought behind the resource dependence theory that individuals can bring different resources to the firm, for example through the individual's network.

2.2.4.6 Miscellaneous diversity

Erhardt et al. (2003) emphasized their study on the relationship between gender diversity and financial firm performance. Their sample of 127 large US companies, tested through correlation and regression analyses, indicate that board demographic diversity is positively associated with financial firm performance. In another context, Ararat et al (2010) examined the impact of gender diversity on the financial performance of the ISE-100 index firms which trades in the Istanbul Stock Exchange in Turkey. Ararat et al (2010) found a positive relationship between gender diversity and performance. Their overall conclusion of the study suggest that diverse boards are better monitors, mitigating agency conflict and enhancing firm performance. Miller and Triana (2009) investigated this relationship through the use of two mediators; firm reputation and innovation. In their sample of *Fortune 500* firms, they found a positive relationship between gender diversity and financial firm performance. From a social psychology theory view, Van Ees et al. (2008) focused on what directors do and what the drivers behind this behavior are. In their study of effective board behavior in The Netherlands, they found a positive relationship between the use of knowledge and conflict, on the one hand and the monitoring role, on the other.

In view of social psychology theory, Tyge Payne et al (2009) examined board effectiveness and identified five attributes of high-performing teams – knowledge, information, power, incentives and opportunities. The researchers argue that these attributes will promote board effectiveness, which in

turn influence financial firm performance. The results suggest that group attributes, including higher levels of knowledge, availability of company information from external sources, time spent on relevant activities, and sufficient power, contribute to effective board functioning, which in turn is positively related to financial firm performance. Consistent with these findings, Anderson et al (2011) examines the potential costs and benefits of firms constituting a heterogeneous pool of directors relative to more homogeneous boards. By developing an index that includes six dimensions for individual directors (education, ethnicity, experience, profession, gender, and age), the analysis indicates that board heterogeneity is positively correlated with firm performance. Their overall conclusion indicates that greater heterogeneity may not necessarily improve board efficacy, which is in contradiction with Hoffman and Maier (1961).

Despite studies which find positive or negative relationships between board diversity and firm performance, some studies find no relationship. For example Randoy et al. (2006) find no significant diversity effect of gender, age, and nationality on stock market performance or on return on assets (ROA) within the 500 largest companies in Denmark, Norway and Sweden. Siciliano (1996) examined the relationship between board diversity, measured in occupation, gender and age, and financial firm performance in two-hundred-forty YMCA firms in the US. The study reveals that diversity in any form had no impact on operating efficiency in this sample of organizations. In line with this result, Wan and Ong (2005) argue that prior research on board diversity and firm performance does not reveal a conclusive relationship. A reason for this is, according to the authors, lack of research on board processes, mainly caused by the difficulty of gaining access to boards. The results of their study suggest that board diversity does not affect board processes, while board processes is related to board performance. Board diversity is unlikely to have a universal impact on performance because there are too many intervening processes to expect a strong direct relation. Wan and Ong argue that "the impact of board structure on firm performance may not be a one-to-one effect" (2005, p.285).

Based on the availability of information, the lack of empirical evidence on Dutch firms, and demarcation purposes, this study focuses on gender and age diversity in board of directors (BOD and BOM) in relation to financial firm performance in Dutch firms.

2.3 Conclusion literature review

Board diversity is among the most significant corporate governance issues faced today. Globally, researchers have investigated the relation and influences of board diversity on financial firm performance. These studies on diversity typically describes two general distinctions; demographic (observable) diversity like gender and age, and cognitive (non-observable) diversity as knowledge, education and values (Milliken and Martins, 1996; Petersen, 2000; Timmerman, 2000). The predominant variable investigated in these studies is gender, mainly specified as a percentage of female representation in BOM. Prior results suggest a slightly increase in female representation in BOM in developed countries. Despite this positive sound, the increase of female representation moves in a very slow pace.

Just a few studies investigate the effects of board age diversity on firm performance. Prior results suggest a predominant negative relationship between chairman of the board's age and financial firm performance. In addition, the Dutch Central Statistical Office states that the Dutch employed labor population is aging (see figure 3).

In examining the literature and empirical evidence, it became clear that the outcomes are mixed due to the research settings and focus on different types of board characteristics. The differences in research settings are point of importance to take into account. Singh and Vinnicome (2004) argue, in examining the relationship between board diversity and firm performance, it is important to take national circumstances into account (e.g. one- and two-tier board structures), before research results from other countries can be generalized. For example, Megginson et al (2007) stated that between countries like the USA, Western Europe and Asia, financial systems differ fundamentally, even though the majority of the economic powers are capitalistic democracies.

Despite the fact that prior research provides mixed evidence, one of the comprehensive arguments in encouraging board diversity is the suggestion that a more diverse board may take decisions in a wider range of alternatives. Jackson (1992) suggest that heterogeneous management teams are better capable to generate creative ideas, and are therefore linked to more innovative organizations. Thereby, as investigated by several researchers (e.g. Hoffman and Maier, 1961), heterogeneous groups have diverse points of view and knowledge, leading to decisions of higher quality and considering more comprehensive set of solutions.

In recent years, the growing area of research on board diversity has been restricted to data from the USA (Hyland and Marcellino, 2002), with, in general, absence of evidence on Dutch companies (exceptions include Marinova et al., 2010; Van Ees et al., 2008). Therefore, research on this particular topic in a Dutch context needs some additional attention. As a result of investigating this relationship, it is imperative to better understand the effects of corporate governance structure on financial performances and ultimately finding a perfect balance, whether or not it even exists, between the latter variables.

2.4 Hypotheses

Based on the literature review and prior evidence, two hypotheses have been set up for testing the relationship between board diversity and financial firm performances in Dutch firms.

2.4.1 Gender diversity

Nielsen and Huse (2010) provide evidence that the ratio of women directors is positively related with board strategic control, and indirectly to financial firm performance. One of their arguments for this result is the positive effect of women directors on board effectiveness through the decreased level of conflict. This result supports the theory of Helgesen (1990) who state that women are less hierarchical, more cooperative and collaborative than their male counterparts. This suggests that women in the BOM, with their strong need to reach consensus, to be better solvers of agency problems. Thereby, in light of human capital theory and social psychology theory, women are expected to have a better understanding of customer behavior, customer needs, and company opportunities in achieving those needs (Brennan & McCafferty, 1997). This suggests that the skills and knowledge of women to be essential for the BOM, in order to enhance financial firm performance. In line with the resource dependence theory, Agrawal and Knoeber (2001) argue that female directors with board positions bring along different benefits and resources, like their collaborative skills. Thereby, in view of social psychology theory in group dynamics, heterogeneous groups have diverse point of views and knowledge. This leads to decisions of higher quality and considering more comprehensive set of solutions, and ultimately to enhancing financial firm performance (Hoffman and Maier, 1961). From a human capital theory perspective, Hillman et al (2002) stated that women directors are more likely to have backgrounds outside the business area, and have higher educational degrees. Furthermore, Singh and Vinnicombe (2004) find that women directors have an outstanding career capital, and bring social capital to the network of directors, through interlocking directorships, contacts from previous employment, and voluntary work. Based on the argument that women tend to have an outstanding career capital and have higher educational degrees, heterogeneous BOM's seem to make decisions of higher quality than homogeneous BOM's.

Women are expected to have a better understanding of customer behavior and needs, higher educational degrees and are more cooperative and collaborative than their male counterparts. These skills may positively relate to decision quality. Confirming this statement, Agrawal and Knoeber (2001) argue heterogeneous groups have diverse point of views and knowledge, leading to decisions of higher quality and considering more comprehensive set of solutions. As mentioned before, decision making of higher quality enhances financial firm performance (Hoffman and Maier, 1961). Also, following Dezso & Ross (2012), I expect women in BOM's does not only improve quality of decision-making, but also enhance the motivation and commitment of women throughout the firm to encourage behaviors within the more feminine leader style.

In sum, the inclusion of women in a director's position should improve individual and group performance in the firm and indirectly improve financial firm performance. Therefore, I expect and hypothesize that the inclusion of women in boards has a positive effect on financial firm performance in Dutch firms.

Hypothesis 1: Board gender diversity is positively related to financial firm performance in Dutch firms.

2.4.2 Age diversity

Most of the studies investigating the relationship between board diversity and firm performance focus on demographic diversity, in specific gender. Less pronounced is the effect of board age diversity on firm performance (e.g. Waelchli & Zeller, 2012; Randoy et al., 2006; Carter et al., 2010; Siciliano, 1996). Main effects of their research points out that the average age of a BOD/BOM is negatively related to financial firm performances, suggesting that if the average age within a boardroom increases, the financial firm performances will decrease. One of the main drivers behind this negative relation is the deterioration of cognitive abilities (Waelchli & Zeller, 2012).

In prior literature (e.g. Huse and Rindova, 2001) arguments state that boards must represent the different types of stakeholders. Diversity in directors' age is assisting in the process of creating different perspectives, views and ultimately consensus. A firm may, for example, attract their customers in different age groups due to the variety of products and services, provided by the firm. In order to represent the spread of interests of these customers due to age dispersion, boards need to have directors from different age groups to enhance a variety of perspectives (Huse and Rindova, 2001). In view of the human capital theory and the resource dependence theory, Houle (1990) argues that age dispersion in board of directors is divided into three categories, young, middle and older board members, with each their own characteristics and functions, and access to valuable resources. Rhodes (2004) argues that executive functions seem to be particularly prone to aging effects. In confirmation, Gilpatrick's (2000) research provides evidence that most board rooms consist of middle to retirement aged members. In alignment with the statement of Gilpatrick (2000) and the findings of Lückerath-Rovers (2010), Dutch listed firms represent mainly middle and older board members in the BOD and BOM, leading to a lack of knowledge and skills from the younger director groups which may have an effect on financial firm performance. Thereby, if age diversity exists in the BOD (or BOM), the skills, experiences, and knowledge from the older directors can be learned to the younger directors. In this setting, skills, experiences and knowledge stay within the firm and are therefore not lost after the retirement of an older director. A loss of skills, experiences, and knowledge may be related to a decrease in decision quality.
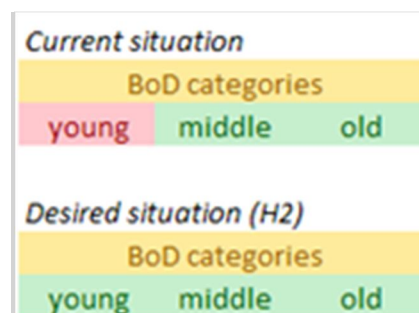
Figure 5: Board of director' categories (Houle, 1990)

This suggests that age diversity has two advantages. First, the representation of three age groups (see the desired situation in figure 5), with in general all the skills and resources available from every age group. Secondly, heterogeneous groups have diverse point of views and knowledge. This leads to decisions of higher quality and considering more comprehensive set of solutions, and ultimately to enhancing financial firm performance (Hoffman and Maier, 1961). Therefore I suggest that if age diversity increases the financial firm performance will increase.

Hypothesis 2: Board age diversity is positively related to financial firm performance in Dutch firms.

3 Methodology

This chapter discusses the methodology which is used to test the hypotheses and to answer the research question. The study tests the hypotheses regarding the effect of female representation and age dispersion in board of directors on financial firm performance in 95 Dutch listed firms, using correlation and regression analyses.

3.1 Quantitative analyses

In this study, I test the hypotheses regarding the influence of female representation and age dispersion in the board of directors and board of management on financial firm performance of Dutch listed firms (see figure 9), while controlling for idiosyncratic factors that may influence firm performance simultaneously.
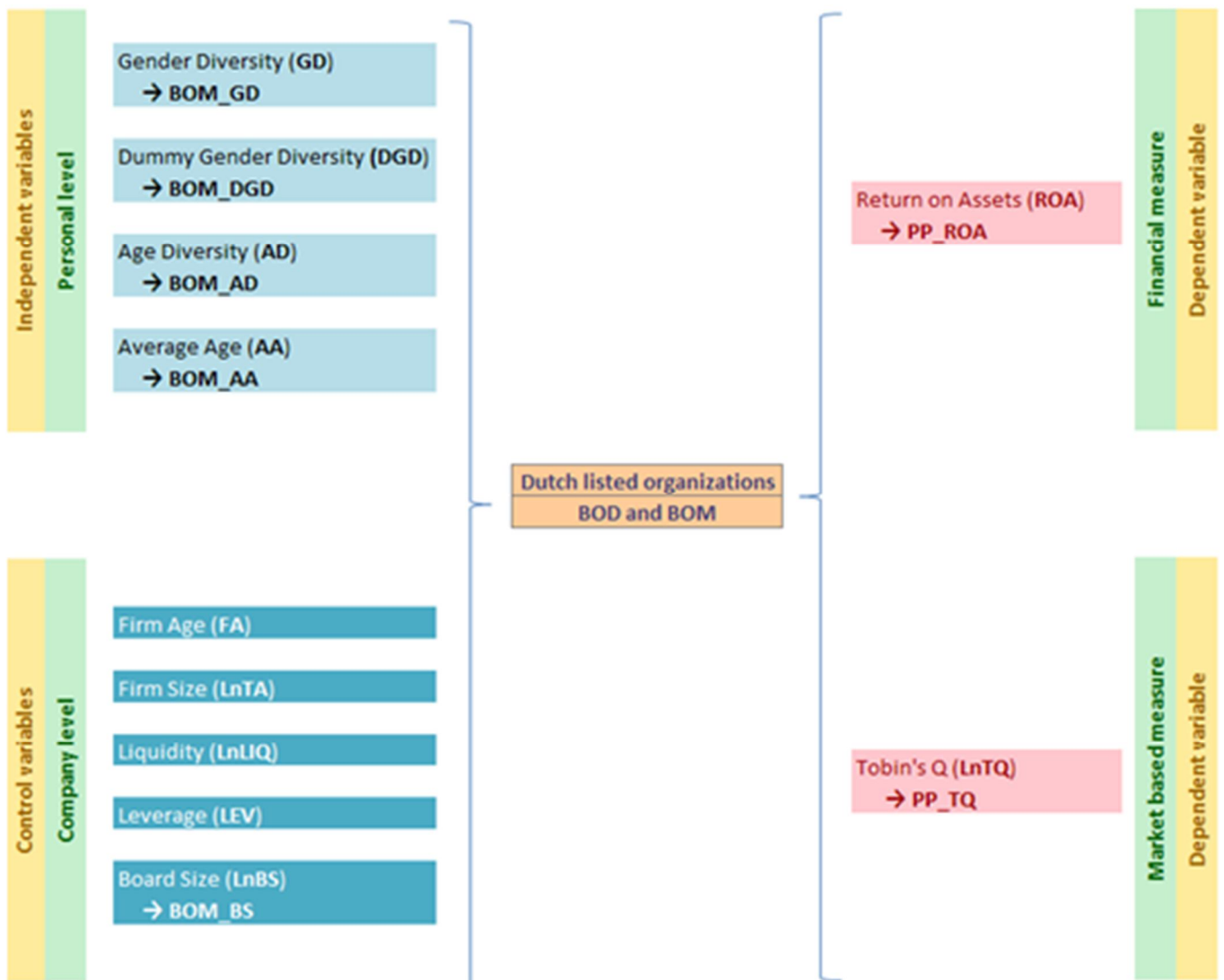
Figure 6: Research framework measured in board of directors and board of management

3.1.1 Methods used in prior research

Prior research on the relationship between board diversity and financial firm performance were found to have some similarities and differences in use of research methods. In general, most of the articles studied, use Pearson Correlation Coefficients in order to reveal any correlation between the variables board diversity and financial firm performance.

The main differences in research methods can be assigned to what form of linear relation best predicts the dependent variable from the values of the independent variable. For example Erhardt et al (2003), used a hierarchical regression analyses. This type of regression analysis examines to what extent regression coefficients vary across different subpopulations. The hierarchical regression method is not applicable for this study due to the lack of data from another context. This study is restricted to Dutch listed firms in the specific year 2010 and for this reason not comparable with different subpopulations through, for example geographic regions or other years of observation. Other researchers use panel data regression (Rose, 2007). This type of method is particularly used for data samples to test effects within a time period, for example the relationship between board diversity and financial firm performance in the period of 2005 to 2010. Due to the restriction of data for only one year of observations, 2010, the cross-sectional regression analysis does not satisfy. Ordinary Least Square (OLS) regression analyses is another frequently used analysis (e.g. Dezso and Ross, 2012; Adams and Ferreira, 2004; Waelchli and Zeller, 2012; Ararat et al., 2010; Tyge Payne et al., 2009). Through the use of an equation, the researchers try to explain the effects of the independent variable(s) on the dependent variable(s). The main target of a regression analysis is to determine the values of the parameters that minimize the sum of the squared residuals for the observations. Known as a 'least squares' regression fit (Chumney & Simpson, 2006). Some other researchers doubt the usefulness of OLS, through possible correlation between the error terms of the dependent and independent variables (e.g. Marinova et al., 2010; Carter et al., 2003). In the first stage, an instrument variable is created to replace the problematic variable. The second stage use the predicted values from stage one, to compute an OLS for the response of interest (Angrist & Imbens, 1995).

3.1.2 Method

The regression method I use for this study, in line with prior research (e.g. Dezso and Ross, 2012; Adams and Ferreira, 2004; Waelchli and Zeller, 2012; Ararat et al., 2010; Tyge Payne et al., 2009), is Ordinary Least Squares regression analyses. After controlling for the autocorrelation of the error terms between the dependent and independent variables, using Durbin-Watson test, it turned out that the error terms are not correlating with each other. The Durbin-Watson statistic have range values from zero to 4. Values near 2 indicate that there is no autocorrelation; values towards zero indicate positive autocorrelation; values towards 4 indicate negative autocorrelation (Montgomery et al., 2001). In controlling the Durbin-Watson statistic, it turned out that the statistics are around the value 2. For this reason I use OLS instead of 2SLS for the data analysis.

3.1.3 Model

In answering the question if board diversity influence financial firm performance, I examine the strength of the linear relation between the independent and dependent variables by calculating the Pearson Correlation Coefficient Matrix, which is, as mentioned before, consistent with prior research. In order to determine the nature of the relation between board diversity and financial firm performance I use OLS in the following regression model (see figure 10).

Regression Model

Performance$_{2010}$	$= \beta_0 + \beta_1 BoardDiversity_{2010} + \sum \beta x_{2010} + \varepsilon$	(1)

Figure 7: Regression model.

wherein *Performance* is the financial firm performance measure which entails Return on Assets (ROA) and Tobin's Q (LnTQ) for 2010. *Board Diversity* is measured in two different variables, Gender Diversity (GD and BOM_GD), and Age Diversity (AD and BOM_AD). The vector X includes all the control variables.

3.1.4 Robustness check of results

In order to check the robustness of results, this study repeats the regression analysis using a dummy gender variable to see if at least the presence of a woman in the boardroom is influential on financial firm performance in comparison to female representation in percentage. Thereby, instead of using only Siciliano's (1996) age diversity scale, this study uses a second age variable, average age of the BOD (and BOM). In using both 'robustness' variables, it is possible to test if the results show any significant differences in the relationship between board diversity and financial firm performance. For this reason the regression analyses exists of two parts. The first regression analysis uses the independent variables gender diversity and age diversity in scale. The second regression analysis uses dummy gender diversity and average age.

3.1.5 Results interpretation

To interpret the results from the data analysis, both gender diversity and age diversity hypotheses will be accepted if the results show significant positive coefficients, stating that board diversity positively influences financial firm performance. As long as the results of the analysis show a negative coefficient or no relation between board diversity and financial firm performance, the hypotheses have to be rejected.

4 Data

This chapter describes the data which is used for the analyses in order to test the relationship between board diversity and financial firm performance. First the research sample and the criteria are described. Secondly, a list of the variables used for the analyses is given.

4.1 Research sample

Data is crucial for this study to investigate the relationship between board diversity and financial firm performance in Dutch firms. In order to ensure that the sample is representative for the population, and data biases had less change to occur, firms for the sample had to meet the following criteria: All (active) Dutch listed firms in 2010 with known values of total assets measured in the year-end book value, current ratio as a measure of liquidity, return on assets in the year-end book value for 2009 and 2010, firm's year of incorporation, board size measured in quantity of board members, gender composition of the boards measured in quantity of male and female board members, age dispersion in the boards, working capital, long term liabilities, quantity of shares outstanding, and the share's market prices at January and December 2010.

4.1.1 Data collection and sources

The source used in this study for gender composition, age dispersion of top management and financial firm performance in Dutch firms is REACH database[2], which contains financial and nonfinancial data of 1.8 million firms and organizations in the Netherlands. Within REACH database, the user is allowed to apply a filter on the dataset. The filter for this study is based on the required information mentioned above. REACH database provided 104 Dutch listed firms (see table 1) which meet the required sampling criteria. Despite the integrity of REACH database, some organizations had missing data. The data on board structure in quantity of (female) board members and director's birth year were missing. In order to complete the dataset, the missing data is manually collected from annual reports and public internet sites, like Company.info[3] and managementscope.nl[4]. Company.info was mainly used for the annual reports which entail data about the board structure. Managementscope.nl was the most important source for director's birth year.

For demarcation purposes, availability of director's board information, and to complete the master thesis within the time schedule this study focuses on the 104 Dutch listed firms, and disregards unlisted Dutch firms from the sample. The Dutch firms for this sample are listed on Euronext Amsterdam in 2010.

Table 1: Filter and search results from REACH database

	Search result
1. Listed companies	189
2. Total assets: All companies with a known value, 2010	171
3. Current ratio: All companies with a known value, 2010	160
4. Return on total assets (%): All companies with a known value, 2010	147
5. Year of incorporation: on and after 01/01/1800 up to and including 01/12/2010	145
6. Stocks: All companies with a known value, 2010	141
7. Long term liabilities: All companies with a known value, 2010	129
8. Working capital: All companies with a known value, 2010	104
TOTAL	**104**

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[2] http://www.bvdep.com/nl/REACH.html
[3] http://www.company.info/
[4] http://www.managementscope.nl/

4.1.2   Board of Management

As mentioned before, Dutch firms use the two-tier corporate board structure, implying a supervisory board and a board of management. Using variables based on both the supervisory board and board of management may cause misleading outcomes. For example, if there is a woman in the supervisory board, she does not have to have a significant influence on financial firm performances, due to commitment of only being present at meetings every quarter. If a women is part of the board of management, her commitment and influence is much larger due to her executive activities. In order to see if there are any differences between BOD and BOM, I chose to use variables based on all the board members (executives and non executives, specified as board of directors and abbreviated as BOD) *and* variables based on the executives only, namely board of management (abbreviated as BOM). This entails that the analyses will be two folded, based on BOD and BOM.

4.1.3   Outliers

The data collection provides a lot of information. According to the sample of 104 Dutch listed firms, the data is checked on 'outliers' with extreme values which could lead to biased outcomes. The detection of outliers is performed through the use of scatter plots and the explore function in PASW (SPSS). According to the results, there is only one major 'outlier' in the variables which is excluded from the sample. Amsterdam Molecular Therapeutics, a medical research and development firm, is excluded due to an extreme value of ROA of about minus 85, which is more than four standard deviations from the mean. Excluding records with extreme values of more than three standard deviations from the mean is consistent with prior studies (e.g. Tyge Payne et al., 2009; Erhardt et al., 2003; Marinova et al., 2010).

4.1.4   Excluded firms

Banks, insurance- and investment firms are excluded from the sample due to their specific accounting, which cause difficulties for the calculation of Tobin's Q. This is in line with prior studies (e.g. Marinova et al., 2010). In total eight firms are excluded from the sample. Subsequently, the thinned sample exists of 95 Dutch firms listed on the Euronext Amsterdam.

4.2 Variables

For testing the relationship between board diversity and financial firm performances in Dutch listed firms, three types of variables are determined. Independent variables, dependent variables, and control variables. In order to make a clear distinction between BOD and BOM variables, only the BOM variables are indicated with the abbreviation of board of management (e.g. BOM_GD, BOM_DGD). The other variables (e.g. GD, DGD), which are using BOD data, do not have a board type abbreviation.

4.2.1 Independent variables

In this study, board diversity is measured in four variables. Starting with gender diversity and dummy gender diversity, followed by age diversity and average age.

4.2.1.1 Gender diversity (GD)

The first variable is gender and is determined through the percentage of women in board of directors by dividing the number of women in the board of directors by the total number of directors in the board. (e.g. Carter et al., 2003; Erhardt et al., 2003; Marinova et al., 2010; Rose, 2007).

For the data analysis it is imperative the variables are normally distributed. The reason for controlling the normality of variables is due to the presumption of a regression analysis that every variable has to be normally distributed (Huizingh, 2006, p. 283). The independent variable gender does not look normal, with a skewness of **1.241** (skewness graphs are displayed in the appendix). But according to Mallows et al (1991) a distribution is still normal if the distance between the mean and median is within a range of one standard deviation. With a standard deviation of 8.993 for GD, the distance between the mean (6.255) and median (0.000) is less than one standard deviation and therefore normally distributed.

4.2.1.1.1 BOM_GD

In testing the normality for the board of management gender diversity, BOM_GD does not seem to be normally distributed (skewness: **2.643**). As a second check of normality, the distance between the mean (4.517) and median (0.000) is less than one standard deviation (12.136) and is therefore normally distributed. For this reason I chose to use the absolute values of BOM_GD in the analysis of board of management.

4.2.1.2 Dummy Gender Diversity (DGD)

In order to control for robustness of the results I will use also a dummy gender variable for this research. This method is in line with prior studies (e.g. Rose, 2007; Dezso & Ross, 2012; Marinova et al., 2010; Campbell & Minguez-Vera, 2007). I use a dummy variable with the following scores; a value of 0 entails that there are no women on the board, 1 stand for at least one woman on board. Controlling for normality, the dummy variable gender has a lower skewness (**0.507**). Similar to GD, the standard deviation of DGD is 0.488, and have a smaller distance between the mean (0.38) and median (0.000), DGD is normally distributed.

4.2.1.2.1 BOM_DGD

In testing the normality of the variable board of management dummy gender diversity, BOM_DGD does not seem to be normally distributed (skewness: **2.147**). As a second check of normality, the distance between the mean (0.140) and median (0.000) is less than one standard deviation (0.346) and is therefore normally distributed. For this reason I chose to use the absolute values of BOM_DGD in the analysis of board of management.

4.2.1.3 Age Diversity (AD)

The second board diversity variable is age measured in dispersion of age of all board members. Following Siciliano (1996), this variable is divided into five categories; under 20, 20-35, 36-50, 51-65 and over 65. The data collection provides information of the total percentages in each age category. Through this data, the diversity scale is calculated as follows (see figure 7); from each category, the highest percentage of any of the sub groupings was subtracted from 100 (a higher score represents greater diversity) and multiplied by the total number of categories with any amount of representation (Siciliano, 1996).

Age category	Company distribution of board members in %		Diversity score
	Company A	Company B	
until 20	5%	-	A = [100 - 40] x 5 = 300
20-35	10%	20%	B = [100 - 60] x 4 = 160
36-50	35%	15%	
51-65	40%	60%	**Conclusion**
above 65	10%	5%	The board of directors of company A is more diversified,
	100%	100%	in comparison to the board of directors of company B.

Figure 8: Calculation of the age diversity scale (Siciliano, 1996)

In testing the normality, the independent variable age is normally distributed (skewness: **0.317**) and can therefore be used for the regression analysis. As a second check of normality, the distance between the mean (99.920) and median (100.000) is less than one standard deviation (47.178) and therefore normally distributed.

4.2.1.3.1 BOM_AD

In testing the normality, BOM_AD is almost normally distributed (skewness: **0.099**). As a second check of normality, the distance between the mean (53.000) and median (67.000) is less than one standard deviation (45.548) and therefore normally distributed. For this reason I chose to use the absolute values of BOM_AD in the analysis of board of management.

4.2.1.4 Average Age (AA)

Due to the limited evidence on the relationship between age diversity and financial firm performance, I chose to use the average age of the boardroom for robustness check of results (e.g. Marinova et al., 2010; Waelchli & Zeller, 2012; Carter et al., 2010). It is measured as the average age of the directors in a boardroom of a firm. For this variable I investigate if an increase of average age is related to financial firm performance. In testing the normality, average age is normally distributed (skewness: **-0.404**). As a second check of normality, the distance between the mean (57.030) and median (58.000) is less than one standard deviation (4.122) and therefore normally distributed. Due to the normal distribution, the absolute numbers of average age are sufficient to use in the regression. For this reason I use the absolute numbers of average age, and not the natural logarithm.

4.2.1.4.1 BOM_AA

In testing the normality, BOM_AA is almost normally distributed (skewness: **0.515**). As a second check of normality, the distance between the mean (52.340) and median (52.000) is less than one standard deviation (5.138) and therefore normally distributed. For this reason I chose to use the absolute values of BOM_AA in the analysis of board of management.

4.2.2 Dependent variables

In previous studies, researchers use different estimation methods to measure organizational performance. Erhardt et al (2003) use return on investment (ROI, net income divided by invested

capital) and return on assets (ROA, net income divided by total assets) as performance measures in a five-year interval for control purposes. By randomly selecting some firms from the sample and checked for the firm's ROI, it turned out that ROI does not apply as a consistent performance measure due to the differences in investments in capital. Some firms made capital investments, while other firms did not perform any investment at all.

Another measure, which is less pronounced in prior research (e.g. Waelchli & Zeller, 2012; Baysinger & Butler, 1985), is return on equity (ROE, net income divided by book value of equity). Due to limited evidence and comparability purposes on the use of ROE as a performance measure, I chose to omit ROE and focus on more frequently used performance measures. By far the most used performance measures are ROA (Randoy et al., 2006; Kim, 2005; Payne et al., 2009) and Tobin's Q (e.g. Dezso & Ross, 2012; Rose, 2007; Marinova et al., 2010; Campbell & Minguez-Vera, 2008). To control and perform robustness checks, many researchers use both ROA and Tobin's Q in combination (e.g. Carter et al., 2010; Jackling & Johl, 2009; Adams & Ferreira, 2004; Ararat et al., 2010; Cheng, 2008). I chose to use the latter two performance measures for this study to aid comparison of the results with prior studies.

4.2.2.1 Return on Assets (ROA)

ROA indicates a firm's ability to produce revenues in excess of actual expenses from a given portfolio of assets measured as historical amortized costs (Carter et al., 2010). In alignment with prior studies which investigated the relationship between board diversity and financial firm performance, ROA is estimated through annual net income divided by the book value of total assets at the end of the year (e.g. Carter et al., 2007 and 2010; Campbell & Minguez-Vera, 2007; Erhardt et al., 2003; Jackling & Johl, 2009). ROA can also be calculated by net operating income divided by total assets, but this method is less pronounced in prior research on the relationship between board diversity and financial firm performance. For this reason, and comparability purposes I chose to use ROA based on annual net income. According to Megginson et al (2007), profitability ratios are among the most closely watched and widely quoted financial ratios. They argue that return on assets (ROA) measures management's overall effectiveness through using firm's assets to generate returns for common stockholders. While controlling for normality, it seems that the dependent variable ROA is skewed to the left (**-1.703**), and therefore not normally distributed. Record 60 (Amsterdam Molecular Therapeutics) is an extreme outlier of almost 4 standard deviations from the mean. If the outlier is eliminated, skewness will decrease to *0.863*. If I chose to take the natural logarithm[5] of ROA, the skewness will increase again to -1.787. Therefore, as mentioned before, Amsterdam Molecular Therapeutics[6] will be eliminated in order to create a distribution which is almost normal. As a second check of normality, the distance between the mean (5.079) and median (5.560) is less than one standard deviation (11.892) and therefore normally distributed.

4.2.2.2 Tobin's Q (LnTQ)

In financial and economic literature the general idea is that better firms create more economic value from a given portfolio of assets. Tobin's Q is, according to Chung & Pruitt (1994), a forward-looking measure that captures the value of a firm as a whole and implicitly includes the expected value of a firm's future cash flows, which are capitalized in the market value of a firm's assets. Tobin's Q is calculated through the sum of market value of equity plus book value of total debt divided by the

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[5] http://home.wxs.nl/~cbon/personal/reken/logaritme.html
[6] http://www.amtbiopharma.com/uploads/financials/amt-ar-2010_36.pdf

book value of the assets (Chung & Pruitt, 1994, p.71). Prior studies also use the Chung & Pruitt estimation (e.g. Marinova et al., 2010; Campbell & Minguez-Vera, 2007; Rose, 2007; Dezso & Ross, 2012; Jackling & Johl, 2009). The interpretation of this measure is, if Tobin's Q is greater than one, the firm is expected by investors to be able to create more value by using available resources effectively. Contrary, firms with a Tobin's Q ratio of less than one are associated with poor utilization of available resources (Campbell & Minguez-Vera, 2007). Observations in the sample data of Tobin's Q have extreme values and cause a major skewness of **3.258**. In order to control for skewness, I used the natural logarithm. After this adjustment, skewness will decrease to a more 'perfect' number of **–0.733**. In alignment with prior studies (e.g. Dezso & Ross, 2012) I will use the natural logarithm of Tobin's Q for the data analysis. As a second check of normality, the distance between the mean (-0.086) and median (0.010) is less than one standard deviation (0.616) and therefore normally distributed.

4.2.3   Control variables

In testing the relationship between board diversity and financial firm performance some other idiosyncratic factors may influence the independent or dependent variables and indirectly the relationship. To control for biases and to implement robustness of results, it is imperative to include control variables to see if the relation still holds. Prior studies have used different control variables like director's tenure (Ruigrok et al., 2007) and independency of directors (e.g. Marinova et al., 2010; Carter et al., 2010). Also some studies use industry types as control variables (e.g. Erhardt et al., 2003; Marinova et al., 2010; Kang et al., 2007). According to the study of Luckerath-Rover (2010) the main industry type the Dutch listed firms operating in, are '1000 industrials', with 31% of all companies. Followed by industry types '8000 Financials' and '9000 Technology', with 13% and 16% respectively. Due to the limited sample of only 103 Dutch listed firms and the fact that the top three industry types already take 60% for their account, I chose to disregard industry type as a control variable.

4.2.3.1   Firm age (FA)

Firm age, the firm's total years of incorporation until 2010, is proved to be an influential factor in testing the relationship between board diversity and financial firm performance. Prior research stated (e.g. Dezso & Ross, 2012; Jackling & Johl, 2009) that older firms are more stable and, to some extent, familiar with misfortunes. Their experiences allow the firms to better cope with uncertain circumstances. These abilities can be related to financial firm performance, and therefore I chose to use firm age as a control variable. In controlling the normal distribution of firm age, it seems that variable firm age is skewed to the right (**1.021**), and therefore not normally distributed. In the data there are two 'outliers', Wolters Kluwer N.V. has been incorporated since 1836 (174 years old) and LyondellBasell Industries N.V. has been started only since 2009 (only 1 year incorporated). To decrease skewness, I calculated the natural logarithm of the firm age data. The results of the natural logarithm report a slight increase of skewness (**-1.107**). For this reason I chose to use the absolute data of firm age as a control variable firm age, instead of the natural logarithm. As a second check of normality, the distance between the mean (45.000) and median (26.000) is less than one standard deviation (41.331) and therefore normally distributed.

4.2.3.2   Firm size (LnTA)

The control variable which is most commonly used in prior research on the relationship between board diversity and financial firm performance is firm size, measured in book value of the year-end

total assets (e.g. Carter et al., 2007 and 2010; Waelchli & Zeller, 2012; Campbell & Minguez-Vera, 2007; Erhardt et al., 2003; Dezso & Ross, 2012). Firstly, larger firms are more in the public eye and in some cases have to act as role models. In addition, these firms are under more societal pressure for board diversity (e.g. Marinova et al., 2010; Adams and Ferreira, 2004). Secondly, firm size is expected to affect labor productivity through a larger scale of operations and organizational settings (Koch and McGrath, 1996). Therefore firm size is expected to have a positive impact on financial firm performance and board diversity. In alignment with prior studies (e.g. Hitt et al., 1997; Baysinger and Hoskisson, 1989), firm size measured in book value of year-end total assets as control variable is used in this study. For controlling the normality of the control variable size, it seems that variable size is extremely skewed to the right (**4.962**), and therefore not normally distributed. Record 77 (EADS N.V.) is an extreme outlier of almost 6 standard deviations from the mean. If EADS N.V. is eliminated, skewness will decrease to 3.164 which is still extreme. Therefore I used the natural logarithm of the control variable size including EADS N.V. After this adjustment, the skewness will decrease to a more 'perfect' number of **0.020**. Excluding EADS N.V. the skewness will become -0.027 and is therefore 'less' normally distributed. For this reason I chose to include EADS N.V. in the natural logarithm of control variable size. As a second check of normality, the distance between the mean (13.262) and median (13.319) is less than one standard deviation (2.288) and therefore normally distributed.

4.2.3.3   Liquidity (LnLIQ)
Besides firm size and firm age, prior studies find that also liquidity has an effect on board diversity and financial firm performance (e.g. Dezso & Ross, 2012; Jackling & Johl, 2009; Hitt et al., 1997; Baysinger and Hoskisson, 1989; Miller & Triana, 2009). Liquidity, measured as a ratio of current assets to current liabilities (Miller & Triana, 2009), is directly related to financial firm performance. Also liquidity is expected to affect, even though indirectly, board diversity due to rising conflicts and a lack of trust in bad economic conditions. Therefore, this study controlled for liquidity (Miller and Triana, 2009). The control variable Liquidity is skewed to the right (**4.927**), and therefore not normally distributed. Due to the extreme value of skewness, I will use the natural logarithm of the control variable liquidity. After this adjustment, skewness will decrease to a less extreme number of **0.043**. As a second check of normality, the distance between the mean (0.237) and median (0.239) is less than one standard deviation (0.518) and therefore normally distributed.

4.2.3.4   Leverage (LEV)
A factor which may also influence one of the variables is leverage. Leverage is the use of borrowed money in order to increase profit opportunities, and can therefore be related to one of the dependent variables. In line with prior research, leverage is calculated through the book value of debt divided by total assets (e.g. Campbell & Minguez Vera, 2008; Dezso & Ross, 2012; Waelchli & Zeller, 2012). Leverage equal to 1 means that the firm's assets are fully financed by debt. In testing the normality, leverage is normally distributed (skewness: **0.269**) and can therefore be used for the regression analysis. As a second check of normality, the distance between the mean (0.549) and median (0.540) is zero and therefore less than one standard deviation (0.172) and therefore normally distributed.

4.2.3.5   Board size (LnBS)
Given prominent failures of large companies (e.g. Enron), board size raised a lot of attention. According to Van den Berghe & Levrau (2004), expanding the number of directors is directly related to an increased pool of expertise and skills, therefore larger boards suppose to have more

knowledge, experiences, and in alignment with the resource dependence theory posses' valuable resources. Following prior research (e.g. Jackling & Johl, 2009; Marinova et al., 2010; Carter et al., 2010; Jackling & Johl, 2009) I chose to include board size as a control variable. In testing the normality, board size is almost normally distributed (skewness: **0.536**). Using the natural logarithm of board size, skewness decreases to a more normal number of **-0.257**, and is therefore used for the data analysis. As a second check of normality, the distance between the mean (1.922) and median (1.946) is less than one standard deviation (0.410) and therefore normally distributed.

4.2.3.5.1   BOM_BS

In testing the normality, board size is almost normally distributed (skewness: **0.982**). As a second check of normality, the distance between the mean (2.640) and median (2.000) is less than one standard deviation (1.312) and therefore normally distributed. For this reason I chose to use the absolute values of board size in the analysis of board of management.

4.2.3.6   Prior performance variables

In line with prior research (e.g. Jackling & Johl, 2009; Dezso & Ross, 2012; Carter et al., 2010), I chose to use control variables of prior performance in the regression equations. The reason for using prior performance variables is because I expect that the influence of board diversity on financial firm performance occurs over time (Carter et al., 2010). The control variables prior performance will be executed as PP_ROA and PP_TQ.

In testing the normality, PP_ROA is almost normally distributed (skewness: **-0.495**). As a second check of normality, the distance between the mean (2.701) and median (2.010) is less than one standard deviation (10.675) and therefore normally distributed. For this reason I chose to use the absolute values of PP_ROA in the analysis of board of management.

In testing the normality, PP_TQ does not look normally distributed (skewness: **2.433**). As a second check of normality, the distance between the mean (1.403) and median (0.990) is less than one standard deviation (1.307) and therefore normally distributed. For this reason I chose to use the absolute values of PP_TQ in the analysis of board of management.

Following the adjustments made in the normality check and the above mentioned arguments, I will use the following variables for the data analysis (see figure 8):

Variables	Definitions
1. Gender diversity (**GD**)	*Independent variable (%):* Number of female directors on the board divided by the total number of directors on the board (multiplied by 100).
1.1 BOM_GD	*Idem for the board of management.*
2. Dummy Gender (**DGD**)	*Independent variable (0/1):* 0 stands for no women on board, 1 stands for at least one woman on the board of directors.
2.1 BOM_DGD	*Idem for the board of management.*
3. Age diversity (**AD**)	*Independent variable:* Accoding to Siciliano (1996) director's age is divided into five categories and displayed in percentages. The age diversity scale is calculated as follows: from each category, the highest percentage of any subgroup was subtracted from 100 and multiplied by the total number of represented categories.
3.1 BOM_AD	*Idem for the board of management.*
4. Average Age (**AA**)	*Independent variable:* the average age of the directors in a boardroom of a firm. Calculated as the sum of all ages divided by the quantity of board members.
4.1 BOM_AA	*Idem for the board of management.*
5. Return on Assets (**ROA**)	*Dependent variable:* Annual net income divided by the book value of total assets at the end of the year 2010.
5.1 PP_ROA	*Previous performance ROA, idem calculation for the year 2009.*
6. Tobin's Q (**LnTQ**)	*Dependent variable:* Natural logarithm of sum of market value of equity plus book value of total debt divided by the book value of the assets (Chung and Pruitt, 1994).
6.1 PP_TQ	*Previous performance TQ, idem calculation for the year 2009.*
7. Firm Age (**FA**)	*Control variable:* Firm's years of incorporation (1 to 174 years).
8. Firm Size (**LnTA**)	*Control variable:* Natural logarithm of the book value of year-end total assets.
9. Liquidity (**LnLIQ**)	*Control variable:* Natural logarithm of the ratio of current assets to current liabilities which measures whether or not a firm has enough resources to pay its debt over the next 12 months.
10. Leverage (**LEV**)	*Control variable:* The firm's leverage, calculated as the book value of debt divided by total assets.
11. Board size (**LnBS**)	*Control variable:* Natural logarithm of the total number of members on the board of directors.
11.1 BOM_BS	*The total number of members on the board of management.*

Figure 9: Variable definitions, in accordance with prior research studies.

5 Results

This chapter entails the descriptive statistics and the hypotheses test. Through performing a Pearson Correlation Coefficient Matrix, the variables were tested to reveal any relationship. In order to test the hypotheses, a regression analysis is performed. Robustness checks are implemented in the analyses to be certain that the relations will hold.

5.1 Descriptive statistics

Table 1 provides the descriptive statistics for all the variables which are used in this study. From the 95 Dutch listed firms, there are 713 directors in the sample. The average number of directors in the boardroom is 7.4 with a minimum of 3 board members and a maximum boardroom of 15 directors.

Table 2: Descriptive statistics

Variables	Minimum	Q1	Median	Q3	Maximum	Mean	St.Dev
1. GD (%)	0	0	0	12.500	36.400	6.255	8.994
1.1 BOM_GD (%)	0	0	0	0	50	4.517	12.136
2. DGD (1/0)	0	0	0	1	1	0.380	0.488
2.1 BOM_DGD (1/0)	0	0	0	0	1	0.140	0.346
3. AD	0	67	100	136	200	99.920	47.178
3.1 BOM_AD	0	0	67	100	180	53.000	45.548
4. AA	46	54	58	60	64	57.030	4.122
4.1 BOM_AA	41	49	52	55	69	52.340	5.138
5. ROA	-34.270	0.350	5.560	9.840	65.440	5.079	11.892
5.1 PP_ROA	-37.910	-2.280	2.010	8.040	29.320	2.701	10.675
6. LnTQ	-2.040	-0.401	0.010	0.215	1.440	-0.086	0.616
(TQ)	(0.130)	(0.670)	(1.010)	(1.240)	(4.210)	(1.087)	(0.674)
6.1 PP_TQ	0.110	0.660	0.990	1.560	6.960	1.403	1.307
7. FA	1	13	26	81	174	45	41.331
8. LnTA	8.410	11.470	13.319	14.956	18.240	13.262	2.287
(TA in mln)	(4.471)	(95828)	(608710)	(3128723)	(83187000)	(4524067)	(1.105E7)
9. LnLIQ	-1.470	-0.366	0.239	0.576	1.66	0.237	0.518
(LIQ)	(0.230)	(0.830)	(1.270)	(1.780)	(5.280)	(1.451)	(0.828)
10. LEV	0.110	0.450	0.540	0.630	1.000	0.549	0.172
11. LnBS	1.100	1.609	1.946	2.197	2.710	1.922	0.409
(BS)	(3.000)	(5.000)	(7.000)	(9.000)	(15.000)	(7.400)	(2.908)
11.1 BOM_BS	1.000	2.000	2.000	3.000	7.000	2.640	1.312

Cursive text in parentheses shows absolute numbers of the variables were the natural logarithm is used.

The average percentage of female representation in the BOD is remarkably low with only 6.3% and a standard deviation of almost 9%. In addition, only 38% of the sample firms have at least one woman in the BOD. These results are in line with the study of Lückerath-Rovers (2010). An annual study of the female representation in Dutch listed firms.

For the BOM in the Dutch listed firms, the percentage of female representation is even lower, almost 5%, with only 14% of the sample firms having at least one woman in the boardroom. In addition, the maximum percentage beween BOD (36.4%, Koninklijke Ahold NV) and BOM (50%, BE Semiconductor Industries NV) reveal a difference of almost 15%.

Mean age diversity points out to be quite different; AD for the BOD is 99.920, stating that there is any existence of age dispersion throughout the supervisory and management board, especially for AND International Publishers NV with a ratio of 200. In addition, the BOM reflects a mean age diversity ratio of only 53.000, suggesting that the range in ages is smaller within the BOM. Table 2 reveals that the average age of the BOD is 57 (birth year 1953). The range in years is 18 years, with

the youngest director in the sample of 46 years old and the oldest director of 64 years old (not displayed in table 2). According to Marinova et al (2010) the average age of directors in their Dutch listed firm sample (*N*=102) is 59.754 in 2007, meaning a slight decrease in average director' age in the past three years. Looking to the average age of the BOM, this number is somewhat lower, 52 years old.

The performance measure ROA has a relatively high average of 5.079, with a standard deviation of 11.5. Meaning the average Dutch listed firms perform well, especially Fornix Biosciences NV with a ROA of 65.44. In comparison to the average ROA of the previous year (2009), ROA in 2009 is much lower with an average of 2.701. The second performance measure Tobin's Q reveals a positive average of 1.087 and a range of 0.130 till 4.210. An average Tobin's Q of 1.087 suggests the market value of the firm is greater than the book value of the assets.

The results of firm age point out that the oldest firm in the sample originates from 1836 (Wolters Kluwer NV) and TomTom N.V. is only a couple of years incorporated, which entails a range of 173 years. The average amount of years a firm is incorporation in the sample is 45 years. Of all the variables, firm size is the variable with the largest range, from € 4.4 million to € 83 billion and an average of € 4.5 billion. The largest firm in the sample, in terms of total assets, is EADS NV, a global leader in aerospace, defense and related services.

In addition, table 2 reveals that current ratio as a measure of firm's liquidity has an acceptable mean of 1.451, ranging from 0.230 till 5.280. These statistics are in line with prior research of Dutch listed firms (e.g. Marinova et al., 2010; Lückerath-Rovers, 2010).

Of all the firms in the sample, Spyker NV is the only firms which is totally financed by debt and have therefore a leverage of 1.00. As mentioned before, the average number of directors in the BOD is 7.4 with a minimum of 3 board members and a maximum boardroom of 15 directors. These outcomes are in line with prior research, like Marinova et al. (2010). Following the data for the BOM, it appears that the average number of executive directors is 2.640, suggesting that on average the BOM consist of less members than the BOD.

5.1.1 Conclusion descriptive statistics

In alignment with the results of Marinova et al. (2010), the average number of BOD is 7.4 (7.255). Contrary, Tobin's Q shows a difference between the data of Marinova et al. (2010) of Dutch listed firms in 2007 (2.139) and our results with a mean value Tobin's Q of 1.087. This suggests that the average Tobin's Q in Dutch listed firms is decreased in the past three years. Another remarkable difference between BOD and BOM is age diversity, stating that the range of ages in BOM is smaller than the range of ages in BOD. In general it can be stated that the outcomes are in alignment with prior research on Dutch listed firms (e.g. Marinova et al., 2010; Lückerath-Rovers, 2010).

5.2 Correlation analysis BOD

The Pearson Correlation Matrix in table 3, following the layout of Jackling and Johl (2009), suggest that gender diversity and dummy gender diversity are significant and positively related to firm age. In addition, FA reflects to be highly significant to GD, DGD, and AA. Suggesting the older a firm, there appears to be more diversity in terms of gender and age. Controlling for firm age, it points out that FA is highly significant with LnTQ, suggesting that older firms have on average a lower LnTQ. This result is in line with the findings of Marinova et al (2010). They argue that older firms may be related to a weakened ability over time of firms to compete in a turbulent environment.

Table 3 also provides evidence that firm size and board size are correlated with gender and dummy gender diversity, which is in line with prior research (e.g. Jackling & Johl, 2009; Dezso & Ross, 2012). This correlation could be explained due to the idea that, on average, larger firms have more employees and therefore the need of more directors in order to ensure the firm's continuity and stability. Thereby, LnBS is positively significant to LnTQ. Suggesting that if board size increases, LnTQ will also increase. This may be explained by the idea of Hoffman & Maier (1961) that diverse groups have a larger scale of views, knowledge and experiences.

One of the remarkable results is the significant and negative correlation between ROA and AA. This suggests that an increase of the average age within BOD will lead to a lower ROA. This result is in line with the findings of Waelchli & Zeller (2012), who found a negative significant relation between age of the chairman and firm performance. The main driver behind this result is, according to the authors, deterioration of cognitive abilities and motivation.

Table 3 also provides evidence that the average age within the BOD is highly significant related to firm age. Apparently, older firms have directors appointed to the BOD with a higher age on average in comparison to younger firms.

Table 3: Pearson Correlation Coefficients Matrix BOD

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. GD	1												
2. DGD	0,895**	1											
3. AD	0,084	0,081	1										
4. AA	0,021	0,015	-0,071	1									
5. ROA	-0,024	-0,016	-0,136	-0,176*	1								
6. LnTQ	0,053	0,023	-0,104	0,039	0,453**	1							
7. FA	0,284**	0,214*	-0,125	0,311**	0,000	-0,261**	1						
8. LnTA	0,305**	0,338**	0,015	0,127	0,007	0,103	0,171*	1					
9. LnLIQ	-0,117	-0,094	0,102	0,164	0,337**	0,376**	-0,141	-0,087	1				
10. LEV	0,062	0,031	0,090	-0,008	-0,266**	-0,191	0,026	0,266**	-0,554**	1			
11. LnBS	0,409**	0,485**	0,143	0,013	-0,032	0,219*	0,078	0,776**	-0,101	0,219*	1		
12. PP_ROA	-0,168	-0,144	0,154	-0,057	-0,025	-0,064	0,104	-0,114	-0,023	-0,030	-0,087	1	
13. PP_TQ	0,142	0,142	-0,022	0,113	0,194*	0,102	-0,042	0,207*	0,000	0,091	0,234*	0,013	1

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

It is not surprising that ROA and LnTQ' correlation is positive and highly significant, which could be explained that more profitable firms are more likely to have a higher firm value. According to the results, a firm's leverage (LEV) is negative and significant correlated with ROA, suggesting a lower ratio of leverage if ROA will increase, and vice versa. Based on the calculation of leverage, it is a clear significant correlation. A sound firm with high performance ratios has on average a lower value of debt in comparison to total assets of the firm. These findings are consistent with prior research (e.g. Dezso & Ross, 2012; Jackling & Johl, 2009; Waelchli & Zeller, 2012). The positive and significant

correlation between LnLIQ and both ROA and LnTQ can be explained by the reason that all three variables calculate the soundness of the firm. If a firm is well performing, which is explained in ratios like ROA and LnTQ, it is suggested that the firm's ability to pay off its debt in the upcoming 12 months is sound. For this reason the latter significant correlation is not surprising.

Based on the information in the correlation matrix, the coefficients provide evidence that there is no significant positive relationship at the 0.01 and 0.05 levels (1-tailed) between board diversity and the two performance measures ROA and Tobin's Q. This entails that, in alignment with previous European studies like Marinova et al (2010) and Randoy et al (2006), diversity in gender or age within BOD does not influence financial firm performance significantly. Therefore both hypothesis 1 and 2, suggesting that board diversity in BOD have a positive influence on financial firm performance, does not find any support in this sample through the use of Pearson Correlation Coefficients.

5.3 Correlation analysis BOM

In executing the Pearson Correlation Coefficients Matrix for BOM (see table 4), the results show that there are differences in comparison with the results of BOD. The significant and positive correlations for BOD between the control variables FA, LnTA, and LnBS with gender and dummy gender diversity do not exist for the BOM data. Obviously, firm age, firm size and board size do not have any significant effect on gender diversity. These results cannot be compared with the findings of Marinova et al (2010), due to their use of the total sum of all directors (BOD).

The positive significant coefficient between LnTA and BOM_AD suggests that larger firms represent BOM's which have greater age diversity. Similar results were found by Siciliano (1996) in a study of US firms. Due to the insignificance between the latter two variables for the BOD data set, it points out that firm size is only an influential factor on age diversity for the BOM. In addition, LEV is also highly significant with BOM_AD, providing evidence that age diversity positively influences leverage. This statement does not find any support in the BOD data set.

Table 4: Pearson Correlation Coefficients Matrix BOM

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. BOM_GD	1												
2. BOM_DGD	0,940**	1											
3. BOM_AD	0,139	0,143	1										
4. BOM_AA	-0,051	-0,032	-0,088	1									
5. ROA	-0,045	-0,048	-0,110	0,050	1								
6. LnTQ	-0,032	-0,012	-0,077	-0,124	0,453**	1							
7. FA	0,046	0,056	-0,054	0,133	0,000	-0,261**	1						
8. LnTA	0,057	0,135	0,328**	0,173*	0,007	0,103	0,171*	1					
9. LnLIQ	-0,024	-0,111	-0,078	-0,036	0,337**	0,376**	-0,141	-0,087	1				
10. LEV	0,011	0,042	0,186*	0,160	-0,266**	-0,191*	0,026	0,266**	-0,554**	1			
11. BOM_BS	0,111	0,250**	0,296**	0,039	0,011	0,138	-0,051	0,524**	-0,143	0,156	1		
12. PP_ROA	-0,123	-0,144	-0,093	-0,006	-0,025	-0,064	0,104	-0,114	-0,023	-0,030	0,015	1	
13. PP_TQ	0,153	0,191*	0,096	0,176*	0,194*	0,102	-0,042	0,207*	0,000	0,091	0,353**	0,013	1

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

In contrast to BOD, data of BOM reveal that board size is positive and significantly related to dummy gender diversity and age diversity. This correlation could be explained due to the idea that, on average, larger boards have more directors and therefore the change of enlarging the diversity.

One of the major differences between BOD and BOM is the correlation between ROA and the average age of the BOD/BOM. This correlation is significant for the BOD but insignificant for the board of managers. Obviously, a higher average age within the board of managers does not influence ROA significantly. This may suggest that, following the arguments of Waelchli & Zeller (2012), the deterioration of cognitive abilities and motivation is not present within the BOM. This does not necessarily mean that directors in the BOM have a stronger motivation to enhance ROA, it is only an indication.

According to the data set of BOM, the coefficients provide evidence that there is no significant positive relationship at the 0.01 and 0.05 level (1-tailed) between board diversity and the two performance measures ROA and Tobin's Q. Similar to BOD, the data of BOM does not support both hypotheses.

5.3.1 Multicollinearity

In model (1), a strong correlation between the independent variables can exist, called multicollinearity. If this exists, the effect of the dependent variable will be arbitrary (Grewal et al., 2004). Both independent variables declare the same variance of the dependent variable. In fact multicollinearity influences the standard errors, which causes variables to be wrongly statistically (in)significant. According to Grewal et al (2004) a researcher is able to detect any multicollinearity between the variables using the 'Variance Inflation Factor' (VIF). VIF actually measure to what extent the variance of the estimated coefficient is increased. If there is no correlation between the independent variables, all the VIF's will be equal to 1. According to Myers (1990) and Kutner & Nachtsheim (2004) a VIF value of 10 and above indicate multicollinearity and is a serious cause of concern. In performing the multicollinearity test with VIF values, it points out that the independent variables have VIF values around 1 (output not included). Following Myers (1990) and Kutner & Nachtsheim (2004), the cutoff value is a VIF value of 10, this entails that there is no existence of multicollinearity.

5.4 Regression analysis

In order to test the hypotheses, an ordinary least squares regression analysis is performed. The regression analysis is divided into two separate analyses. The first analysis comprises ROA and LnTQ, respectively, tested with data of the BOD. The second analysis comprises ROA and LnTQ, respectively, tested with data of the BOM.

5.4.1 OLS using BOD data

In the first step the control variables are put into the analysis, with the dependent variable ROA. Secondly the diversity variables GD and AD are added to the analysis (see table 5, column 1). Apparently, in column 1, no control variable is highly significant at the 0.01 level. LnLIQ is positive and significantly related to ROA at the 0.05 level. This result could be explained that both variables calculate the soundness of a firm. If a firm is well performing, it is suggested that the firm's ability to pay off its debt in the upcoming 12 months is sound (Miller & Triana, 2009).

Table 5: OLS Regression analysis based on BOD data testing GD and AD

OLS REGRESSION ANALYSIS *DGD and AA*

Dependent variables	ROA	LnTQ
constant	6,954	-0,385
	(0,394)	(0,309)
FA	0,003	-0,004**
	(0,933)	(0,008)
LnTA	0,376	-0,038
	(0,665)	(0,339)
LnLIQ	7,043*	0,480**
	(0,016)	(0,000)
LEV	-6,742	0,028
	(0,445)	(0,946)
LnBS	-0,584	0,585*
	(0,906)	(0,013)
PP_ROA	0,130	
	(0,910)	
PP_LnTQ		0,006
		(0,888)
GD	0,023	0,005
	(0,884)	(0,461)
AD	-0,040	-0,003
	(0,141)	(0,053)
N	95	95
Adj. R²	0,073	0,256

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Significance is shown in parentheses.

Hypothesis 1 predicts that gender diversity influences financial firm performance (ROA) positively. Column 1 tests hypothesis 1 by adding gender diversity to the regression. Based on the results from

column 1 in table 5, hypothesis 1 does not find any support for BOD. In case the coefficients were significant, ROA would be 2.3% higher with female representation. For example, if the average percentage of female representation in a boardroom grows from 6.255% to 12%, ROA with an average of 5.079 would become 5.196 in roughly the midpoint of this dataset. Similar to GD, the age diversity variable is added in column 1. Hypothesis 2 predicts that diversity of age positively influences financial firm performance (ROA). The results suggest that age diversity is negative, but insignificantly related to ROA. ROA would be 4% higher if AD would decrease. For example, if the average AD (99.920) would decrease by 4% to 95.920, mean ROA would increase from 5.079 to 5.282. In this sample of 95 Dutch listed firms, gender and age diversity does not influence ROA significantly, and therefore hypothesis 1 and 2 does not find any support based on the accounting measure of performance.

In column 2 from table 5, LnTQ is used as dependent variable in order to test the hypotheses with the gender and age diversity variables. Apparently, in comparison to ROA, the control variables FA and LnBS become significant. FA is negative and significantly related to LnTQ, suggesting LnTQ to be higher for younger firms. This result is also found by Marinova et al. (2010).

Column 2 also indicates that LnTQ is positively correlated with LnBS and Liquidity. Despite the unknown direction of causality, this may reflect that firms could improve their Tobin's Q, and their liquidity, by increasing the number of board members. This result supports the theory of Van den Berghe & Levrau (2004), who argues that increasing the boardroom provides an increased pool of expertise, and eventually firm performance.

For the gender diversity variable, the results in column 2 suggest that GD does not influence LnTQ significantly. TQ[7] would be 0.5% higher with female representation. For example, if the average percentage of female representation in a boardroom grows from 6.255% to 12%, TQ with an average of 1.087 would become 1.092 in roughly the midpoint of this dataset.

For the age diversity variable, column 2 reports a negative but statistically insignificant relationship between age diversity and LnTQ. TQ would be 0.3% higher if AD would decrease. For example, if the average AD (99.920) would decrease by 0.3% to 99.620, mean TQ would increase from 5.079 to 5.094. In line with the results of the accounting based performance measure ROA, the market based performance measure LnTQ does not seems to be significantly related to board diversity. This entails that in this sample of BOD data from 95 Dutch listed firms, no support exists for hypothesis 1 and 2 which states that board diversity positively influences financial firm performance.

5.4.2 OLS using BOM data

The following regression analysis (see table 6) is similar to the previous one; the main difference is the use of data. For this analysis the data set of the board of managers is used.

In the first step the control variables are put into the analysis, with ROA as the dependent variable. Secondly the diversity variables BOM_GD and BOM_AD are added to the analysis (see table 6, column 1). Obviously, for BOM data no control variable is highly significant at the 0.01 level. Similar to the regression analysis in table 5 with BOD data, LnLIQ is positive and significantly related to ROA at the 0.05 level. A sounder firm is supposed to more liquid assets to pay off debts (Miller & Triana, 2009). Based on the results from column 1 in table 6, gender and age diversity for BOM seems to be negative, but again statistically insignificant related to ROA. For this reason hypothesis 1 and 2 does

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[7] Due to the use of natural logarithm for Tobin's Q, the coefficients from the independent variables should be interpreted as approximate percentage changes in the underlying dependent variables (Dezso & Ross, 2012).

not find any support for the board of management data. Obviously, the results suggest that there is no difference between BOD and BOM data, testing board diversity on the accounting based performance measure ROA.

In column 2 from table 6, LnTQ is used as dependent variable in order to test the hypotheses with the gender and age diversity variables from the board of management. Similar to the results from table 5, firm age becomes, in contrast with ROA, statistically significant related to LnTQ. As mentioned before, the negative and significant relation suggests LnTQ to be higher for younger firms (Marinova et al., 2010).

Table 6: OLS regression analysis based on BOM data testing BOM_GD and BOM_AD

OLS REGRESSION ANALYSIS BOM_DGD and BOM_AA		
Dependent variables	**ROA**	**LnTQ**
constant	4,134	-0,596
	(0,608)	(0,125)
FA	0,012	-0,004*
	(0,703)	(0,018)
LnTA	0,221	0,042
	(0,744)	(0,199)
LnLIQ	6,532*	0,412**
	(0,024)	(0,004)
LEV	-8,005	-0,110
	(0,361)	(0,796)
BOM_BS	0,771	0,063
	(0,491)	(0,265)
PP_ROA	-0,041	
	(0,719)	
PP_LnTQ		0,016
		(0,745)
BOM_GD	-0,041	-0,001
	(0,684)	(0,830)
BOM_AD	-0,026	-0,002
	(0,357)	(0,150)
N	95	95
Adj. R^2	0,062	0,178

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Significance is shown in parentheses.

For the gender diversity variable BOM_GD, the results in column 2 suggest that BOM_GD does not influence LnTQ significantly. According to the age diversity variable BOM_AD, column 2 reports a negative but statistically insignificant relationship between age diversity and LnTQ. Following the insignificant results of both diversity variables, hypothesis 1 and 2 find, once again, no support in this sample for the board of management. Obviously, in contrast with my predictions, there appears to be no statistical significant difference between the data of BOD and BOM in testing board diversity on financial firm performance.

5.4.3 Robustness check of results

In line with prior research (Dezso & Ross, 2012) I would like to test if the results of the main regression analyses are consistent, robust and provide reliable outcomes. In the main regression analyses gender diversity is used as a percentage of women present for the BOD and BOM data. Due the fact that some firms in our data sample have a BOD (and BOM) with more than one woman, I chose to use a dummy gender diversity variable in order to check the robustness of results. As well as for the age diversity variable, instead of using only the age diversity scale (Siciliano, 1990), the robustness of results is checked through the use of a variable which is defined as the average age of the directors in the BOD (and BOM). Similar to the main regression analyses, I split up the analysis in use of BOD/BOM data.

5.4.3.1 OLS robustness check using BOD data

Through the use of the other two diversity variables DGD and AA, I repeated the regression analysis from table 5. The DGD and AA columns in table 7 reports an excerpt of the results (complete results are attached in the appendix), in comparison to the regression analysis results of GD and AD from table 5.

Table 7: Excerpt of the regression analyses to reveal the differences between GD, DGD, and AD, AA

	GD	DGD	AD	AA
ROA	0,023 (0,884)	0,107 (0,971)	-0,040 (0,141)	0,375 (0,240)
LnTQ	0,005 (0,461)	-0,062 (0,654)	-0,003 (0,053)	0,010 (0,533)

Table 7 clearly indicates that the result from GD on ROA (0.023) is consistent and robust, due to the almost similar results of DGD (0.107). In using LnTQ as the dependent variable, DGD appears to be, in contrast with GD (0.005), negatively related to LnTQ (-0.062). Due to the minor difference (DG to LnTQ is almost zero) and the insignificant relation of both variables, I accept and believe that the results are consistent and robust. In the yellow and purple part, AA appears to be positive related to ROA (LnTQ) which is in contrast to the results of AD. Due to the insignificance of the variables I accept and believe that the results are consistent and robust, meaning that the results from table 5 reflect reliable information.

5.4.3.2 OLS robustness check using BOM data

I repeated the regression analysis from table 6. The BOM_DGD and BOM_AA columns in table 8 reports an excerpt of the results (complete results are attached in the appendix), in comparison to the regression analysis results of BOM_GD and BOM_AD from table 6.

Table 8: Excerpt of the regression analyses to reveal the differences between GD, DGD, and AD, AA

	BOM_GD	BOM_DGD	BOM_AD	BOM_AA
ROA	-0,041 (0,684)	-1,243 (0,733)	-0,026 (0,357)	0,164 (0,494)
LnTQ	-0,001 (0,830)	-0,033 (0,854)	-0,002 (0,150)	-0,014 (0,237)

According to the blue part in table 8, there is a difference between the BOM_GD (-0.041) and BOM_DGD (-1.243) for ROA. Due to the insignificance of both results, I accept and believe that the results are quite similar and therefore consistent and robust. The other three robustness check of results show minor differences and are all insignificantly related to the financial firm performance measures ROA and LnTQ. Therefore, I accept and believe that the results are consistent, robust and reflect reliable information.

5.4.4 Conclusion regression analyses

In general the regression analyses, using BOD and BOM data, show similar results. In contrast with my expectations, the size of a firm does not have any influence on financial firm performance. According to Marinova et al. (2010) and Adams and Ferreira (2004), larger firms are more in the public eye and in some cases have to act as role models. In addition, these firms are under more societal pressure for board diversity. Apparently, these arguments do not find any support in this study.

Looking at board size, this control variable is only in one analysis significantly related to financial firm performance. In table 5 column 2, board size is positive and significantly related to LnTQ, using BOD data. This result suggests that, in order to increase LnTQ, the board size of all directors (BOD) have to be increased. One of the arguments which ratify this result is from theory of Van den Berghe & Levrau (2004), who argues that increasing the boardroom provides an increased pool of expertise, and eventually firm performance.

One of the remarkable results, in both table 5 and 6, is the insignificance of the prior performance variables PP_ROA and PP_LnTQ. As explained in chapter 4.2.3.6 I expected that the influence of board diversity on financial firm performance occurs over time (Carter et al., 2010). Obviously, prior performance is insignificantly related to current performance, suggesting that excellent performance is no guarantee for excellent performance for the upcoming year.

After controlling for robustness of the results in the main regression analyses, it turned out that the results of GD and AD are robust and consistent with DGD and AA in both BOD and BOM data sets. The results are qualitatively unchanged. As a conclusion, the OLS regression analyses provide evidence that, for this sample of 95 Dutch listed firms, board diversity is insignificantly related to the performance measures ROA and Tobin's Q. This implies that both hypothesis 1 and 2, stating that gender and age diversity are positively related to financial firm performance, are not supported in this sample.

5.5 Portfolio analysis

Due to the insignificant relations between the variables of board diversity and financial firm performance, a portfolio analysis may give additional insight. It may be possible that, for example, firms with on average a higher female representation have on average higher financial firm performance. In order to reveal addition insights, both board diversity variables gender and age are split up into three categories; *low*, *medium*, *high*. Afterwards the financial firm performance measures are included, followed by the control variables. For each variable the mean and standard deviation are given, based on the three categories of the given board diversity variable. Besides the split up, the data from BOD and BOM are, similar to previous analysis in this study, separated[8].

5.5.1 Gender diversity

For the gender diversity variable, the three categories entails 0-15% female representation in the category *low*, 16-30% female representation is category *medium*. Category *high* entails all the firms above 30% female representation.

- Table 9 about here –

Table 9 clearly shows that only 2 firms (Nedap NV and Koninklijke Ahold NV) have female representation of above 30% in the BOD. This amount of firms is very low, in comparison to the sample size of 95 firms. Most of the firms appear to be in the lowest category of female representation, at least 77 firms. Based on the mean performance measures ROA and LnTQ, the results suggest that firms with a higher percentage of female representation (above 30%) perform better. The mean ROA in category *high* is 8.64, whilst the mean ROA in category *low* is quite lower, 5.27. A remarkable result, which is in line with prior research, is the mean firm age. Following the results in table 9, it appears to be that older firms are more diverse in terms of gender. Furthermore, no significant differences exist between the three categories. One announcement I have to make; these results should be interpreted with caution due to the small sample size within the categories.

- Table 10 about here –

Similar to table 9, table 10 show the results from the portfolio analysis based on data of BOM for the gender diversity variable. According to the BOM data, it appears that most of the firms are in the lower category. In contrast to the results from table 9, table 10 reveals that the performance measure ROA has a far lower mean for the *high* category. This result may suggest that, in comparison to BOD data, female representation in the board of management is less effective than in BOD in order to enhance financial firm performance. One of the theories which may explain this result is Yermack (1996), who argues that the appointment of women to the board may cause delay in decision-making, and additionally financial firm performance, due to the longer time to reach consensus. For firm size, it appears to be that the largest firms have gender diversity in the *medium* category. In addition, these firms have a lower liquidity and a larger board size in comparison to the other two categories. Again this result may be in line with the theory of Yermack (1996) who also suggest that smaller boards are more effective than large boards, the benefits can be out-weighted by the costs due to poorer communication and decision-making for larger boards. Once again, these results should be interpreted with caution due to the small sample size of only 3 firms in category *medium*.

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[8] In order to save space, the portfolio analyses tables 9 to 12 are attached in the appendix.

5.5.2 Age diversity

To see if there is addition insight based on splitting up the data in categories, age diversity is also divided into three categories. The *low* category entails all the firms with an age diversity scale 0-75. In addition, *medium* category is based on firms with an age diversity scale between 76 and 150. Lastly, category *high* entails all firms with an age diversity scale of above 150.

- Table 11 about here –

According to the results in table 11, it appears to be that only 12 firms have an age diversity scale of above 150. A remarkable result is the suggestion that less diverse BOD's in terms of age, have on average higher firm performance (ROA and LnTQ). This result may suggest that, together with the results from table 9, firms have to have BOD's with a high female representation and board members around the same age. For firm age, the results suggest that age diversity is more likely to exist in firms which are on average younger. This substantiates previous findings of this study in the regression analyses. Furthermore, no significant differences exist between the three categories.

- Table 12 about here –

For the board of management, only one Dutch listed firm (Oranjewoud NV) exceeded the 150 age diversity scale. For this reason that only one firm is in category *high*, no standard deviations for the variables can be provided. Also for this reason, it is not possible to make reliable suggestions and conclusions based on category three. Therefore I compare category *low* and *medium* with each other, and find that in fact there are no significant differences. The only major difference is in means of the prior performance variable ROA. PP_ROA appears to be much higher for the 60 firms in the *low* category (3.85) than for the 34 firms in the *medium* category (0.36). This result may suggest that firms with less diverse BOM's in terms of age performed better than more diverse BOM's in the past. Looking at the current ROA of both categories, no significant difference exists.

5.5.3 Conclusion portfolio analysis

Based on the portfolio analysis some addition insight has been provided. According to the mean performance measures ROA and LnTQ, the results suggest that firms with a higher percentage of female representation in the BOD (above 30%) perform better. This is in line with the arguments for hypothesis 1. Thereby, it appears to be that older firms are more diverse in terms of gender. In contrast the results suggest that age diversity is more likely to exist in firms which are on average younger. These additional insights may suggest that, if firms would like to enhance their financial firm performance, firms have to have BOD's with a high female representation and board members around the same age. As mentioned previously; these results should be interpreted with caution due to the small sample sizes within the categories.

6 Conclusion and discussion

Board diversity is among the most significant corporate governance issues faced today (Milliken & Martins, 1996). Many firms in the USA are beginning to exemplify that diversity in board of directors leads to higher firm performance (Carter et al., 2003), therefore researchers around the world have begun to investigate the relation between diversity in board of directors and firm performance. Prior research has produced mixed results in investigating the relationship between board diversity and financial firm performance. Despite the mixed evidence, one of the comprehensive arguments in encouraging board diversity is the suggestion that a more diverse board may take decisions in a wider range of alternatives (Jackson, 1992). In view of the resource dependence theory, Argrawal & Knoeber (2001) argue that female directors and ethnic minorities with board positions bring along different benefits and resources. In this study, results may suggest that female benefits and resources do not have to be more valuable than those of their male counterparts. Thereby, in view of the social psychology theory, the results may suggest that female representation does not necessarily lead to decisions of higher quality (Hoffman & Maier, 1961). In view of the human capital theory and the resource dependence theory, Houle (1990) argues that age dispersion in board of directors is divided into three categories, young, middle and older board members, with each their own characteristics and functions, and access to valuable resources. The results suggest age diversity does not necessarily have to bring access to more valuable resources, and sequentially higher financial firm performance.

This study examined the relationship between board diversity, in terms of gender composition and age dispersion, and the financial firm performance measures return on assets and Tobin's Q. The relationship is tested with data from 2010 of 95 Dutch firms, listed on Euronext Amsterdam, while controlling for factors which may influences the (in)dependent variables. For the contribution to scarce European evidence, this study is bilateral through the use of BOD and BOM data. In answering the question if board diversity influence financial firm performance, I examine the strength of the linear relation between the independent and dependent variables by calculating the Pearson Correlation Coefficient Matrix, which is, as mentioned before, consistent with prior research. In interpreting the results from the data analysis, both gender diversity and age diversity hypotheses would have been accepted if the results show a significant positive coefficient, stating that board diversity positively influences financial firm performance. Through the use of OLS regression analyses, I was able to see if there is even a relationship between both variables, and whether it is positive or negative. The results clearly provide evidence that, for the Dutch listed sample of 95 firms over 2010, board diversity in BOD and BOM does not influence financial firm performance significantly. After controlling for robustness of the results in the main regression analyses, it turned out that the results of GD and AD are robust and consistent with DGD and AA in both BOD and BOM data sets. The results are qualitatively unchanged. Due to the insignificant relations between the variables of board diversity and financial firm performance a portfolio analysis has been conducted and gives additional insight. These results should be interpreted with caution due to the small sample sizes within the categories.

Based on the data analyses, it can be stated that, in accordance with prior European evidence (e.g. Smith et al., 2006; Rose, 2007; Marinova et al., 2010; Randoy et al., 2006), this study does not find any support for the hypotheses.

6.1 Limitations and future research

The main theoretical model tested in this study represents that board diversity influences financial firm performance. Some prior studies (e.g. Carter et al., 2010; Jackling & Johl, 2009; Marinova et al., 2010) pronounce and argue that the direction of causality may be conversely, suggesting that well performing firms will attract more diverse board members. This may suggest that the variables of board diversity and financial firm performance are jointly endogenous (Hermalin & Weisbach, 2003). This study has not taken endogeneity into account. Future research could take endogeneity into account in order to cope with the limitation of this study. Besides endogeneity, this study uses Dutch listed firms only. This implies that the results should be interpreted with caution due to the small sample (*N*: 95). To cope with the study's limitation and to complement the scarce European and Dutch evidence, future studies may investigate the relationship between board diversity and financial firm performance for Dutch unlisted firms. A third limitation is the use of sample data of one year of observation, 2010. This does not allow any comparison with previous observations. Thereby, the observations of 2010 are in the aftermath of the financial crisis. The results may be less useful, due to the occurrences of extreme conditions in global financial crises (Greenspan et al., 2010). In addition, future studies could include other variables like director's network density, group dynamics, nationality, director qualifications, behavioral differences, or independency of directors.

6.2 Recommendations

Despite the insignificance between the independent and dependent variables for this sample, it is still worth it to further investigate this relationship, especially for complementing the limited European evidence. Following Finkelstein & Hambrink (1996), board structure is unlikely to have an universal impact on financial firm performance, due to many intervening processes. Sequentially, the impact of board structure on financial firm performance may not be a one-to-one relation. In order to represent the population, it is important to enhance diversity. But more importantly, the boards should retain a high level of skill and expertise. Therefore, firms should set a target for board diversity whatever is realistic in view of their (strategic) requirements. In other words, firms should focus on the balance between women and men, rather than the simple fact of the presence of women. This also applies to dispersion of age; experiences, knowledge and skills also have to be determined before appointing a young director. As pronounced by Wan & Ong (2005), while it is important to have diversity of skills, talent and experiences; it is more important to actually apply them.

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Appendices

In order to save space and to preserve overview for the reader, this chapter displays all additional information. The first appendix is an alphabetical list of the used abbreviations is given. Followed by the Ngram Viewer graphs in the next appendix, and with a normality check of some variables. The appendices ends with regression results and the portfolio analyses.

List of abbreviations

The following is an alphabetical list of the abbreviations which are used in this report.

2SLS	Two-Stage Least Square
3SLS	Three-Stage Least Square
AT	Agency Theory
BOD	Board Of Directors
BOM	Board Of Management
CBS	Centraal Bureau voor Statistiek (Central Statistical Office)
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COB	Chairman Of the Board
EPS	Earnings Per Share
FTSE	Financial Times Stock Exchange
GLS	Generalized Least Square
HCT	Human Capital Theory
IRRC	Investor Responsibility Research Center
M&A('s)	Merger & Acquisition(s)
OLS	Ordinary Least Square
RDT	Resource Dependence Theory
ROA	Return On Assets
ROE	Return On Equity
SB	Supervisory Board
SPT	Social Psychology Theory

Google's Ngram Viewer

The diagrams given below show the occurrence of some keywords, mentioned in chapter 2.1, in a corpus of books in the period of 1900-2010. Google's description of the Ngram Viewer: *"Google Books Ngram Viewer displays a graph showing how phrases have occurred in a corpus of books over the selected years."*
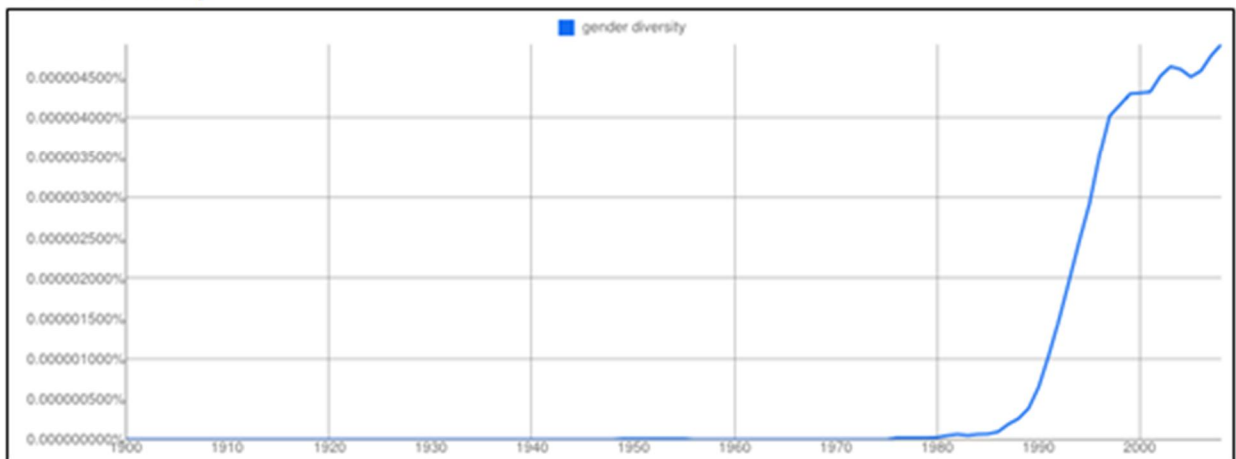
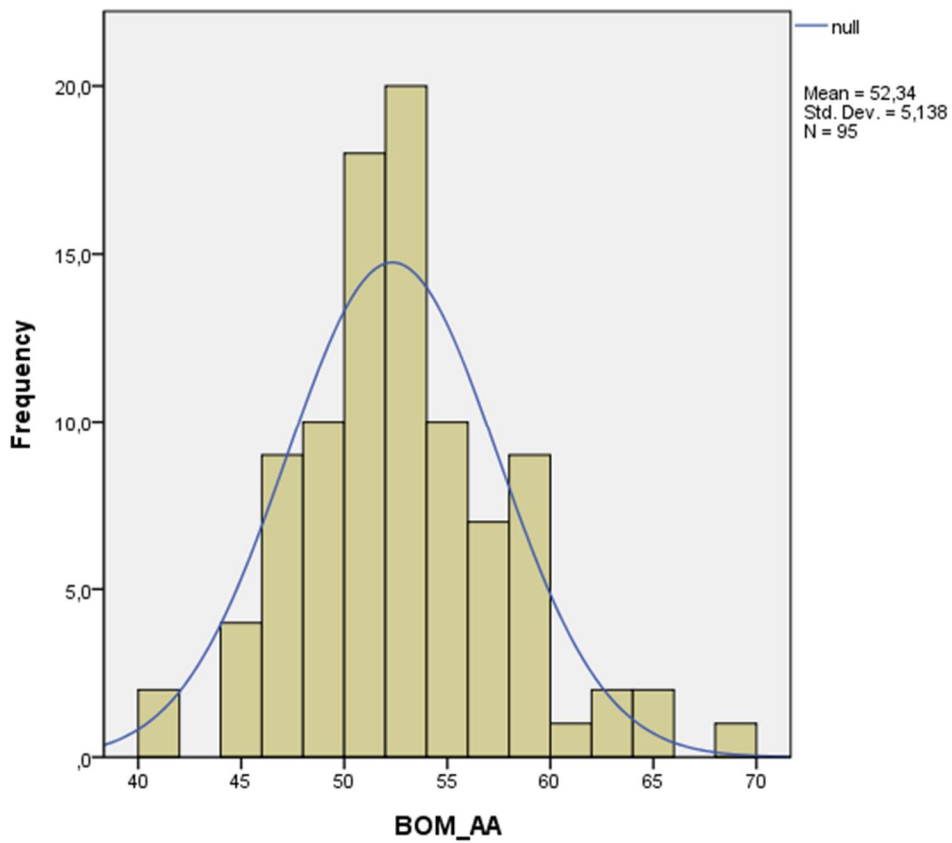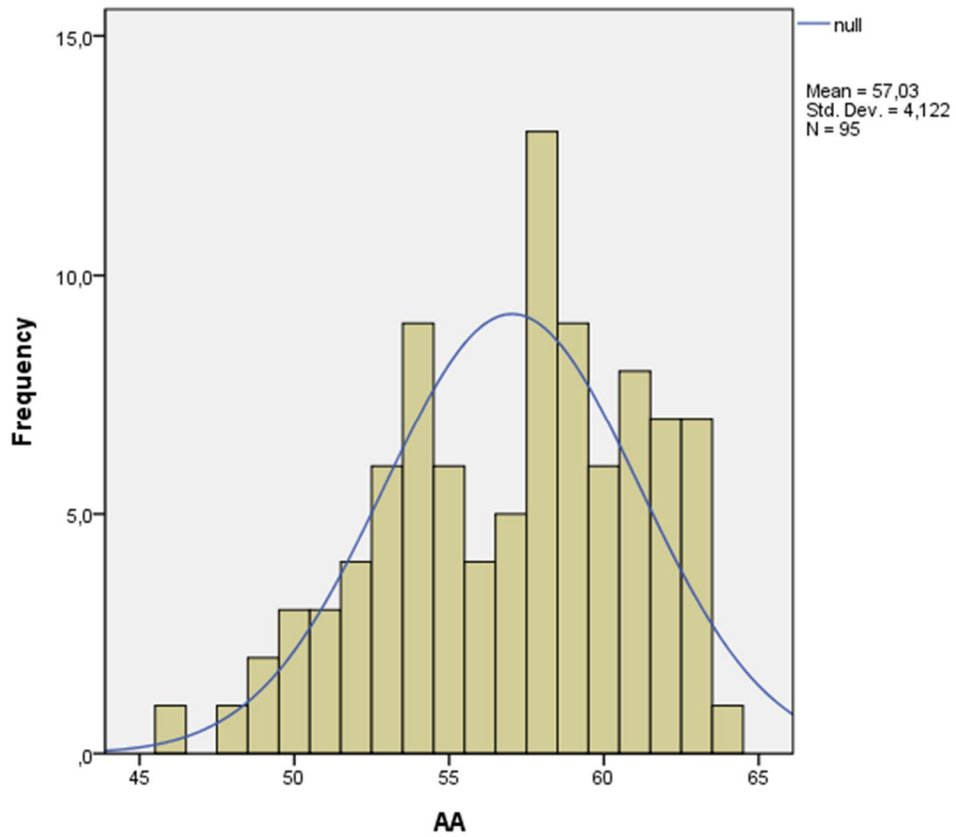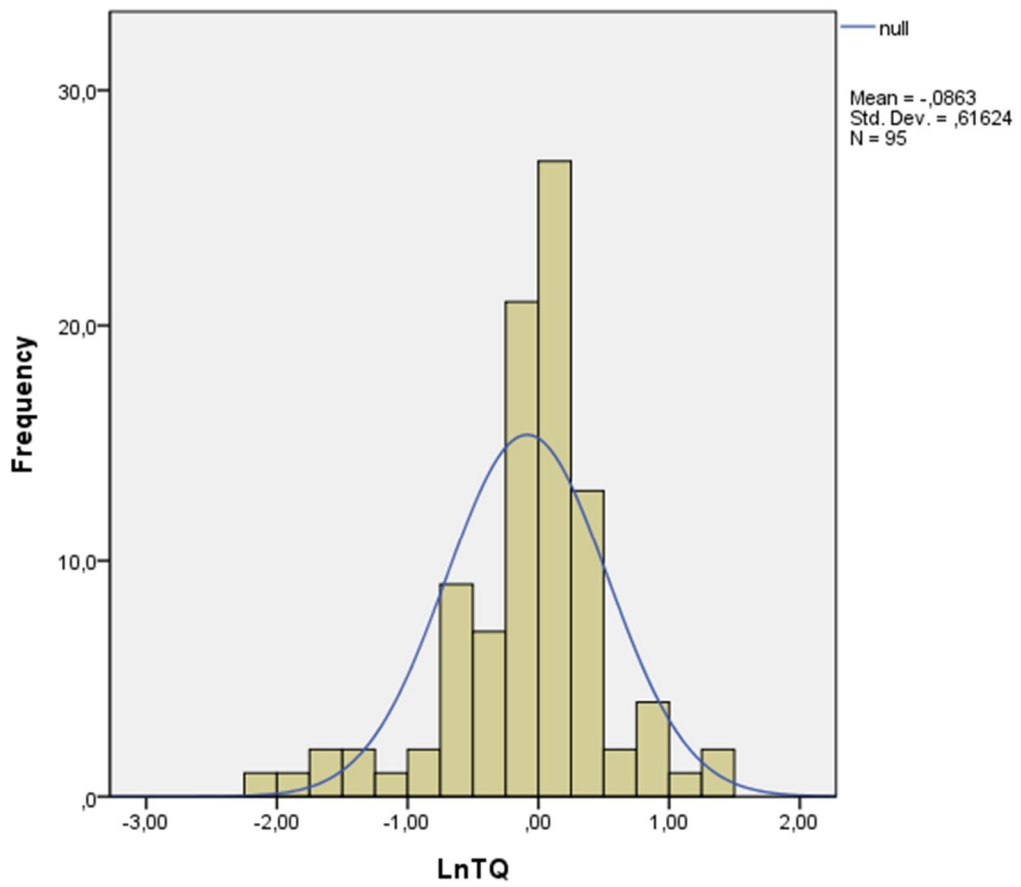**Board diversity:**
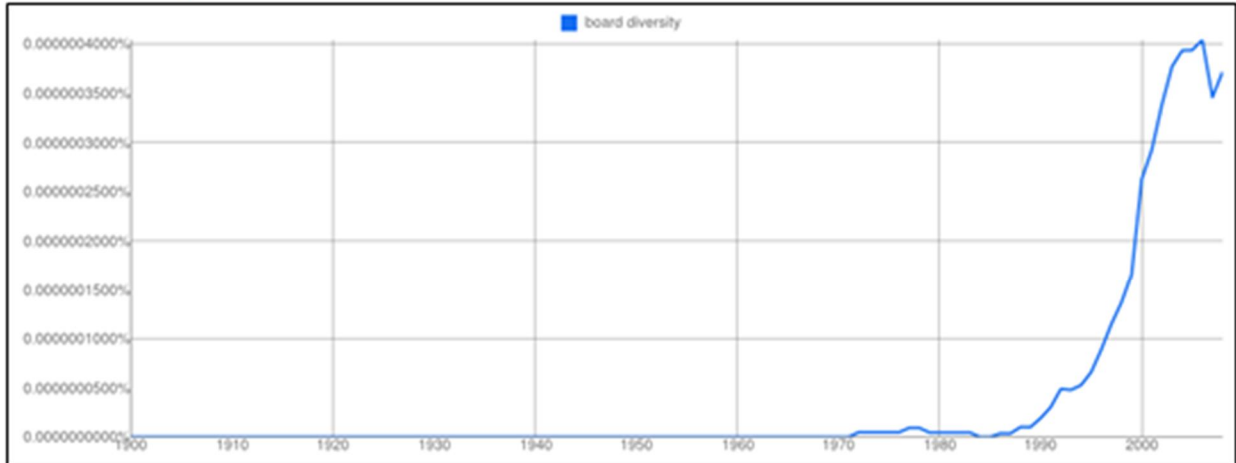
Heterogeneity:

Gender diversity:

Variable check for normal distribution

The graphs given below show output of the normality check of some of the variables, mentioned in chapter 4.2.
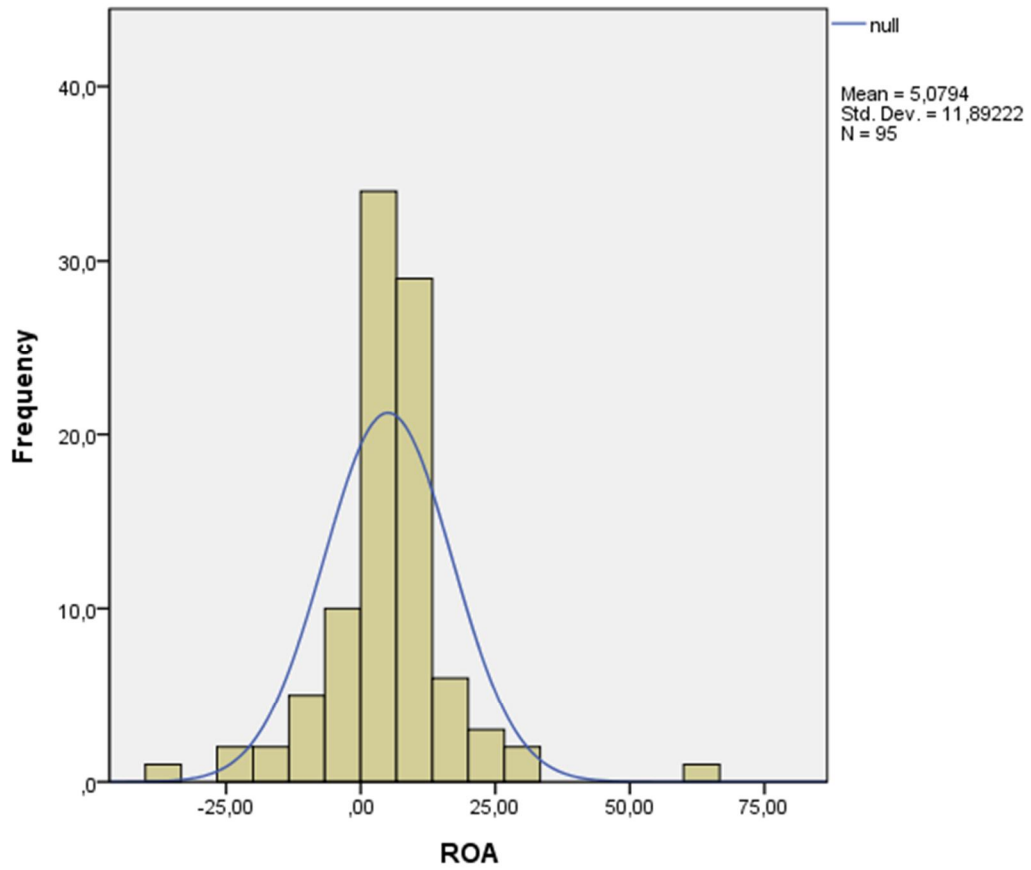
Regression analyses from the robustness check of results

The following regression analyses report the results of the analyses based on dummy gender diversity and average age, used as robustness check of results for the variables gender diversity and age diversity. The first table reports the results with the use of BOD data, the second table used data of BOM.

OLS REGRESSION ANALYSIS *DGD and AA*

Dependent variables	ROA	LnTQ
constant	-15,158	-1,163
	(0,411)	(0,189)
FA	-0,004	-0,003*
	(0,898)	(0,026)
LnTA	0,455	-0,028
	(0,601)	(0,496)
LnLIQ	5,387	0,384**
	(0,066)	(0,007)
LEV	-10,221	-0,223
	(0,246)	(0,595)
LnBS	-1,383	0,572*
	(0,786)	(0,021)
PP_ROA	-0,010	
	(0,933)	
PP_LnTQ		0,014
		(0,753)
DGD	0,107	-0,062
	(0,971)	(0,654)
AA	0,375	0,010
	(0,240)	(0,533)
N	95	95
Adj. R²	0,064	0,204

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Significance is shown in parentheses.

OLS REGRESSION ANALYSIS *BOM_DGD and BOM_AA*

Dependent variables	ROA	LnTQ
constant	-2,491	0,106
	(0,853)	(0,872)
FA	0,012	-0,003*
	(0,707)	(0,037)
LnTA	0,056	0,037
	(0,933)	(0,253)
LnLIQ	6,295*	0,416**
	(0,030)	(0,004)
LEV	-9,724	-0,105
	(0,272)	(0,806)
BOM_BS	0,687	0,047
	(0,545)	(0,409)
PP_ROA	-0,035	
	(0,760)	
PP_LnTQ		0,027
		(0,585)
BOM_DGD	-1,243	-0,033
	(0,733)	(0,854)
BOM_AA	0,164	-0,014
	(0,494)	(0,237)
N	95	95
Adj. R²	0,057	0,170

** Correlation is significant at the 0.01 level (1-tailed).

* Correlation is significant at the 0.05 level (1-tailed).

Significance is shown in parentheses.

Portfolio analysis

The tables which are given below show the results from the portfolio analysis. This analysis has been conducted in order to reveal any addition insight in the data set between the variables.

Table 9: Portfolio analysis for gender diversity (GD)

GD	N	ROA Mean	ROA St.dev.	LnTQ Mean	LnTQ St.dev.	FA Mean	FA St.dev.	LnTA Mean	LnTA St.dev.	LnLIQ Mean	LnLIQ St.dev.	LEV Mean	LEV St.dev.	LnBS Mean	LnBS St.dev.	PP_ROA Mean	PP_ROA St.dev.	PP_TQ Mean	PP_TQ St.dev.
Low 0-15%	77	5,27	11,829	-0,09	0,613	38	41,113	12,95	2,275	0,27	0,516	0,54	0,171	1,87	0,407	3,23	10,619	1,30	1,300
Mid 16-30%	16	3,70	11,818	-0,13	0,608	71	40,754	14,65	2,220	0,07	0,511	0,60	0,165	2,17	0,400	0,19	10,689	1,92	1,324
High 30%+	2	8,64	11,621	0,30	0,368	102	41,498	14,07	2,456	0,33	0,392	0,55	0,178	2,09	0,389	2,51	6,717	1,08	0,379

Table 10: Portfolio analysis for gender diversity (BOM_GD)

BOM_GD	N	ROA Mean	ROA St.dev.	LnTQ Mean	LnTQ St.dev.	FA Mean	FA St.dev.	LnTA Mean	LnTA St.dev.	LnLIQ Mean	LnLIQ St.dev.	LEV Mean	LEV St.dev.	BOM_BS Mean	BOM_BS St.dev.	PP_ROA Mean	PP_ROA St.dev.	PP_TQ Mean	PP_TQ St.dev.
Low 0-15%	83	5,36	11,829	-0,08	0,613	44	41,113	13,16	2,275	0,25	0,516	0,55	0,171	3	1,305	3,23	10,619	1,37	1,300
Mid 16-30%	3	5,83	13,761	-0,18	0,646	57	39,950	16,12	2,486	-0,37	0,544	0,64	0,172	5	1,446	-5,05	10,027	2,41	1,733
High 30%+	9	2,28	12,013	-0,07	0,615	53	41,199	13,28	2,227	0,29	0,504	0,55	0,164	3	1,286	0,38	10,420	1,41	1,344

Table 11: Portfolio analysis for age diversity (AD)

AD	N	ROA Mean	ROA St.dev.	LnTQ Mean	LnTQ St.dev.	FA Mean	FA St.dev.	LnTA Mean	LnTA St.dev.	LnLIQ Mean	LnLIQ St.dev.	LEV Mean	LEV St.dev.	LnBS Mean	LnBS St.dev.	PP_ROA Mean	PP_ROA St.dev.	PP_TQ Mean	PP_TQ St.dev.
Low 0-75	34	8,36	11,886	0,01	0,602	51	41,153	13,15	2,279	0,18	0,515	0,54	0,170	1,81	0,409	2,22	10,537	1,33	1,306
Mid 76-150	49	2,68	11,813	-0,17	0,612	46	38,871	13,42	2,216	0,24	0,509	0,55	0,166	2,00	0,400	1,49	10,536	1,47	1,329
High 150+	12	5,49	12,575	-0,03	0,631	23	39,136	12,96	2,289	0,39	0,527	0,58	0,176	1,91	0,411	9,01	10,757	1,34	1,341

Table 12: Portfolio analysis for age diversity (BOM_AD)

BOM_AD	N	ROA Mean	ROA St.dev.	LnTQ Mean	LnTQ St.dev.	FA Mean	FA St.dev.	LnTA Mean	LnTA St.dev.	LnLIQ Mean	LnLIQ St.dev.	LEV Mean	LEV St.dev.	BOM_BS Mean	BOM_BS St.dev.	PP_ROA Mean	PP_ROA St.dev.	PP_TQ Mean	PP_TQ St.dev.
Low 0-75	60	5,21	11,829	-0,02	0,613	46	41,113	12,97	2,275	0,24	0,516	0,54	0,171	3	1,305	3,85	10,619	1,33	1,300
Mid 76-150	34	4,81	11,872	-0,21	0,612	44	38,645	13,73	2,217	0,23	0,509	0,57	0,166	3	1,292	0,36	10,730	1,53	1,327
High 150+	1	6,43	-	-0,11	-	16	-	14,68	-	0,10	-	0,65	-	5	-	13,28	-	1,49	-