UNIVERSITY OF TWENTE.

The impact of board characteristics on firm's financial performance: Evidence from the Netherlands.

MSc BA thesis, Financial Management

Enschede, 02-07-2018

Ruben Rouwenhorst
S1885596
R.Rouwenhorst@student.utwente.nl
06-31386724

First supervisor: Dr. X. Huang
Second supervisor: Prof. Dr. R. Kabir

Acknowledgements

This thesis is the final part of my master study Business Administration with the specialization track Financial Management at the University of Twente. I would like to thank some people for their support and help during this process of writing the master thesis.

First of all I would like to thank both my supervisors Prof. Dr. R. Kabir and Dr. X. Huang of the department Finance & Accounting at the University of Twente. I would like to thank them for their motivation, expertise, guidance and support throughout this process. I am grateful that my supervisors gave me the opportunity to express my own ideas and that they steered me into the right direction by giving valuable comments whenever I needed it. Besides my supervisors I would like to thank my parents, brother and girlfriend for their unconditional support and encouragement during my years of the study.

Thank you.

Ruben Rouwenhorst.
May, 2018

Abstract

This study examines the impact of board characteristics for 78 Dutch listed firms on the Euronext Amsterdam during the period 2014 till 2016. The Netherlands provides an interesting institutional setting because of their two-tier board structure. The studied board characteristics are board size, gender diversity, age diversity, nationality diversity and board meetings. Data on these independent variables are gathered from annual reports and the ORBIS database. We find that the frequency of board meetings has a negative influence on firm performance. There is no significant relationship between board size, gender diversity, age diversity and nationality diversity with firms financial performance. This study contributes to the literature because there are not many studies conducted regarding board characteristics in the Netherlands. So, these results show some new insights into the impact of board characteristics on firm performance in the Netherlands.

Keywords: Board characteristics, board size, gender diversity, age diversity, nationality diversity, board meetings, firm financial performance, the Netherlands.

Table of contents

List of tables

1. Introduction

The first part of this thesis is the introduction, which consists of the rise and importance of corporate governance and the feature which will be studied, the board characteristics. After the description of the subject of this thesis, a research question will be formulated.

1.1 Background information

Corporate governance is a concept which is mainly developed during the last couple of decades and has become important in economics and business. Corporate governance deals with the behaviour of firms and comprises the set of mechanisms through which firms operate, it is basically the system that directs and controls companies (Kabir, 2016). Corporate governance benefits firms through greater access to financing, lower cost of capital, better firm performance and a more favourable treatment of all stakeholders (Claessens & Yurtoglu, 2013).

The rise of corporate governance in the Netherlands started after the case of Ahold, Enron and Parmalat, companies which produced misleading financial statements at the end of 1990 and the early years of 2000 (Trouw, 2008). To prevent these scandals from happening again in the future, the Netherlands conducted a special code and implemented this on 1 January 2004. This code was called 'Tabaksblat' and has as goal to improve the corporate governance of listed companies in the Netherlands. This must be achieved through transparency of the financial statements and more responsibility towards the board of directors. Furthermore it was important to restore the faith of the shareholders after the impact of the scandals, in order to do so they got more power and better protection (Trouw, 2008). Since 2004 the corporate governance code is improved and adjusted in 2008 and again at the end of 2016.

According to Claessens & Yurtoglu (2013) corporate governance is splitted into three areas; legal, economic and social, these three parts have both internal and external features. In total there are six different mechanisms. The internal mechanisms are firm-oriented while the external mechanism are market-oriented. The internal mechanisms will be studied rather than the external mechanisms, because companies have more influence on their internal mechanisms than their external mechanisms. For instance, every company has a different view on certain internal mechanisms like remuneriation policy, ownership strucure and board structure and deal with it differently. Examples of internal legal mechanisms are shareholders meeting and works council. The internal economic mechanisms are ownership structure, executive compensation and board characteristics. Different committees as audit committees or remuneriation committees form the internal social mechanisms. This thesis will be focussing on one internal feature; the internal economic governance mechanism. The reason for this is that the internal economic governance has a lot of influence on a company, for instance on policy and strategy. The internal economic governance mechanisms consists of three features; the ownership structure, the executive compensation and the board

characteristics. The ownership structure and executive compensation will not be studied during this thesis. It has been proven that ownership structure effects firm performance, mainly when insiders(family or managers) are the owners instead of outsiders (Maury, 2006) (Li, Moshirian, Nguyen, & Tan, 2007) (Bauguess, Moeller, Schlingemann, & Zutter, 2009). Ownership structure is not a mechanism that can be changed overnight and it is not a feature which is easy to reform. It also does not have as many features to study as, for instance, board characteristics and therefore is not examined in this thesis. Executive compensation is a mechanism which definitely has the power to influence the firm performance, but this is a vague conclusion. With the recent financial crisis (2008) still not completely behind us it is a sensitive topic. The bonus system was partially accountable for creating this crisis by influencing firm performence on the short-term but not on the long-term. Because of the doubts of the effects of executive compensation this mechanism will not be studied during this thesis.

1.2 Situation & Research question

This thesis focusses only on the board characteristics and their relationship with firm performance in the Netherlands. The main reason for this is the importance of the board of directors for the company. For example, the board of directors formulate the strategy of the company and can appoint, monitor and fire a CEO. Another role of the board consists of protecting and acting in the interest of shareholders, the board also has to design strategies to coop with business ethics, corporate governance and corporate social responsibility. The board has a key role in a business strategy and thus influences a firm financial performances, therefore the research question will be:

What is the impact of board characteristics on financial performance of firms in the Netherlands?

The goal of this study is to examine three board characteristics; type, size and composition and to find out if they positively or negatively influence Dutch firm performances. These three characteristics are chosen because they are usually the common and well-known board characteristics. The type of the board refers to one-tier board (unitary) or two-tier board (duality). The size of the board can be defined by a small board with a low amount of members or a large board with a high amount of members. The composition of the board has more features, for example diversity and independence. The study contributes to the literature, because a lot of these studies have been done but not much in the Netherlands.

From previous studies it can be concluded that corporate governance differs per country (Claessens & Yurtoglu, 2013; Bhatt & Bhatt, 2017), it is influenced for instance by a country´s economic and financial environment as well as the institutional environment. This fact makes it worthwhile to investigate the effects of board characteristics in the Netherlands, because they can differ from the results of other countries. The goal of this study is to help new ventures in the Netherlands choose wisely before appointing members of the board of

directors; and by helping investors to keep the effects of the board of characteristics on firm financial performance in mind while investing.

1.3 Study structure

The structure of this thesis consists of six chapters and is as follows. The next part discusses the relevant theories and empirical evidence related to board characteristics. Furthermore are hypotheses formulated which will be tested during this research. The third chapter is the methodology part which includes the variables used in this study as well as the research method to test the hypotheses. Part four describes the sample size, the used data and the way the data is gathered. The fifth part shows the relevant results of this study, whereas the sixth part gives conclusions about the hypotheses and the research question. The study ends with a discussion about the done research, limitations of the study and guidance for future studies.

2. Literature review

The second part of this thesis contains the theoretical framework and the literature review. The theoretical framework describes the existing theories regarding board characteristics and the features belonging to them (type, size and composition). During the literature review results of other board characteristics studies will be described and analysed. Based on the theoretical framework and the literature review hypotheses will be formulated.

2.1 Theoretical framework

In this paragraph different theories which influence corporate governance are described. Thereafter these theories are applied to the board characteristics; board type, board size, board composition and board meetings.

2.1.1 Underlying theories of Corporate Governance

There are different theories regarding corporate governance to explain the relationship between shareholders and the board of directors. In this thesis five theories will be used and therefore discussed, these are the agency theory, the stewardship theory, the resource-based theory, the stakeholder theory and the theory of human capital.

Agency theory

This theory discusses the selfishness of the managers and is concerned with aligning the interests of owners/shareholders and managers. It is based on the premise that there is an inherent conflict between the interests of a firms owners and its management (Jensen & Meckling, 1976; Nicholson & Kiel, 2007). Datta, Musteen, & Herrmann (2009) state this is because of the managers pursue strategies that benefit their own personal goals and interests rather than those of shareholders.

The task of corporate boards is to align the interests of managers and shareholders, thus it is logical that a board must be formed by external and independent members. If this is not the case the interests of managers and shareholders stays different, because the managers are then represented in the board. A consequence of this is that the monitoring of the managers stays low which results in high agency costs and low corporate performances. If the board is formed by external and independent directors there are two broad approaches available to deal with the agency theory. One involves greater oversight and monitoring of firm management, the decisions they make and their implementation (Datta, Musteen, & Herrmann, 2009). A second approach to mitigate agency problems involves the use of incentive mechanisms in the form of, for instance, equity ownership and compensation structures (Datta, Musteen, & Herrmann, 2009). This kind of incentives should be valuable for the long-term, which will let the managers act in a better interest of the shareholders because both parties will have the goal of value maximalization.

Stewardship theory

Opposite to the agency theory there is the stewardship theory. This theory argues that managers are naturally trustworthy and act in the best interest of the shareholders by themselves (Donaldson & Davis, 1991). They suggest that inside/dependent directors spend their working lives in the company, so they have better understanding of the businesses than outside directors and thus make superior decisions. As mentioned at the agency part it is the task of the board of directors to align the interests of managers and shareholders. So, it is logical that a board of directors should be formed by inside directors because they are naturally motivated to create value for the company instead of benefiting themselves. Furthermore, inside directors understand the businesses and have high access to information, which results in high quality decision making and in a good corporate performance (Nicholson & Kiel, 2007).

Resource-dependency theory

In contrast to the agency theory and stewardship theory the resource-dependency theory is not about the monitoring task of the board. The resource-dependency theory states that a firm´s behaviours and strategies are influenced by the availability of asset and resources (Datta, Musteen, & Herrmann, 2009). According to Pugliese, Minichelli, & Zattoni (2014) the resource-dependency theory refers to the access a board of directors have to external resources which otherwise would not be available for the company. The resource-dependency theory basically means that the board is a potentially important resource for the corporation, especially in its links with the external environment (Nicholson & Kiel, 2007).

A board of directors is an important aspect for the company because they have access to external resources. Access to external resources are for instance access to financing, information, suppliers, customers and other significant stakeholders (Nicholson & Kiel, 2007). If the resource-dependency theory is followed, a higher corporate performance is expected when the board have a high access to external resources. The other way around, there would be a decrease in the performance of a company which have a board with low access to external resources.

Stakeholder theory

The stakeholder theory states that the board not only has to achieve the goal of the shareholders which is value maximalization, but during this process also should maximize the value of other stakeholders (Philips, Freeman, & Wicks, 2003). Stakeholders are parties which are closely involved at the company and critical to the success of it. Stakeholders can be divided into primary and secondary stakeholders or/and in internal stakeholders and external stakeholders. Primary stakeholders are legally connected with a corporation for instance employees, customers and suppliers. Secondary stakeholders are not legally affiliated with the company for instance the general public, business groups and the media. Internal stakeholders are employees, managers and shareholders. External stakeholders are suppliers, customers and competitors.

Stakeholders have the power to change the profitability of the corporation because they stand close to the company so it is critical to keep them satisfied. It is difficult to keep all the stakeholders satisfied at the same time because they all have different goals. Employees want high wages, customers want low product prices, shareholders want value maximalization and so on. For the board of directors there are different strategies to deal with the goals of the stakeholders for example arms-length approach, which is based on bargaining power or fairness approach, based on honesty (Bridoux & Stoelhorst, 2014).

Theory of human capital

The theory of human capital is mostly in line with the resource-dependency theory, because this theory also supports diversity in a company regarding employees and boards. The theory of human capital involves the power of humans, stating that every employee of a company has his own specific knowledge, expertise and skill (Becker, 1975). This fits with the resource-dependency theory because employees do not only bring specific knowledge, expertise and skill, but also access to external resources and assets. Every human-being is unique and this also gets reflected in the workplace where every employee is different and contributes to the company in his or her own way (Ahmadi, Nakaa, & Abdelfettah, 2017).

If the theory of human capital is applied to board characteristics it results in a preference for a large and diverse board. A large board is preferred because every member has his own knowledge, expertise and skill. Having a large board means there are a lot of different members and thus a lot of different skills. This is also the case with the composition of the board where a more diverse board will result in more different skills of the board members.

2.1.2 Board characteristics

Before this study can be conducted it is important to describe the different features of a board and applying the existing theories to them. After this is done the empirical findings on the board features will be discussed. The most common board characteristics are; board size, board composition and board type. However, in this study board meetings is a feature that is also included.

Board size

Board size refers to the amount of members in a board of directors and differs for each company. It is not required to have a specific amount of members in a board, although for the Netherlands it is legally defined to have at least three members in the supervisory board. Comparing a large board with a small board there are advantages and disadvantages for both. A large board has a lot of members which can complicate the communication and slow down the decision-making process (Guest, 2009). However, a large board has more members which should result in more expertise, knowledge and higher access to external resources (Ahmadi, Nakaa, & Abdelfettah, 2017). An advantage of a small board is that communication goes faster and better, which results in quicker solving issues (Guest, 2009). A disadvantage of a small board can be that they have less skill because of lack of board members.

There are different theories about board size and the way they influence a firms financial performance. The first theory is the agency theory which prefers a small board, because it states that a high size board motivates the domination and authority of the members in a board which results in more conflicts (Ahmadi, Nakaa, & Abdelfettah, 2017). Opposite to the agency theory there is the resource-dependency theory. This theory is based on the access of the board to external resources for the company. When there are more board members present the access to external resources should be higher because every board member has his own availability of assets and resources. Also the theory of human capital supports a large board, because every board member has his own expertise and skill (Ahmadi, Nakaa, & Abdelfettah, 2017). The more board members are present the more expertise and skill a board has.

Board composition
The second feature that will be described is board composition, which consists of gender diversity, age diversity, and nationality diversity.

Gender diversity refers to the presence of a female in the board of directors. In the earlier years it was common that only men were members of the board of directors, but this changed in the last few decades when more and more females became part of boards. An advantage of having females in boards is that females can improve communication within the board and provide other insights than the male board members because they can have other views on situations (Lückerath-Rovers, 2013).

Age diversity refers to the distribution of age regarding the board members of a company. Different ages in a board of directors can lead to different views regarding situations and strategies, it is for instance possible that the younger members are less conservative and implement more innovative strategies than older members (Darmadi, 2011). Having a mix of different ages may result in adapting different views which results in more effectiveness regarding for instance solving arising issues.

Nationality diversity means that there are different nationalities present on the board of directors. Having different nationalities indirectly also means having different cultures on the board. This can result in difficult communication or easily misunderstanding each other (Honing, 2012). The other way around it can also bring different views into the board of directors and it increases the access to external resources, assets and international markets (Estélyi & Nisar, 2016).

A theory regarding board composition is the theory of human capital. According to the theory of human capital it is important that a board is diverse, regarding all diversity features. A board needs to be diversified because every board member has his own knowledge, expertise and skill and therefore contributes to the firm performance (Ahmadi, Nakaa, & Abdelfettah, 2017). Furthermore a more diverse board considers different

perspectives (Lückerath-Rovers, 2013). The theory of human capital links with the resource-dependency theory. If every board member is diversified there will be better access to external resources. For instance, if a board has multiple nationalities, the access to foreign resources should be easier.

Board independence

Although this feature is not studied because of the Dutch institutional setting which prefers a two-tier board, it is important to describe and understand the concept of board independence. A two-tier board means there is a distinction between internal and external boards. Internal board members form the management board, while external members represent the supervisory board. Internal versus external board membership refers to the presence of executive directors and non-executive directors in the board of directors. Executive directors are managers who are working in the company also called insiders, non-executive directors are managers who are not having a relationship with the company also called outsiders. It is important to have insiders on the board of directors because insiders have better knowledge about the company and the day-to-day businesses. However, it can be that insiders only want to benefit themselves instead of acting in the best interest of shareholders. Therefore it is important to have outsiders on the board because they have an objective vision regarding the company and act in the best interest of shareholders. For example, outsiders are keeping balance regarding bonuses for managers, they prevent that insiders set low targets for managers to easily get a big bonus themselves.

For the internal versus external board members there are also different theories. The agency theory supports having outsiders on the board of directors because insiders will not act in the best interest of shareholders but only want to benefit themselves. Having outsiders on the board makes sure the inside directors are monitored. Opposite to this theory there is the stewardship theory which supports having insiders on the board. It states that insiders have better knowledge about the company and business and therefore can make better strategic decisions than outsiders.

Board meetings

Board meetings is the frequency of physical meetings held by the board of directors on an annual basis. A board of directors have a specified amount of regular meetings, however additional meetings can be scheduled. Having a lot of board meetings has as advantage that board members stay constantly aware of a firms day-to-day operations which makes it easier to notice and solve arising issues. Furthermore does having multiple meetings increases the decision-making process because there is no need to wait a long time for another meeting. On the other hand, having a lot of meetings can be a disadvantage because there are a lot of issues to discuss.

Having regular meetings helps to stay constantly aware of a firms day-to-day operations which makes it easier to address any arising issue in a timely and effective manner. Quickly solving arising issues can be a signal for stakeholders to trust the company and their

decision-making process. So, the stakeholder theory can be supported with regular board meetings. Not only do regular meetings solve issues earlier but it also reduces agency costs by intensifying the monitoring activities of the board through regular meetings (Al-Daoud, Saidin, & Abidin, 2016).

2.2 Empirical findings

This part contains the earlier studies done regarding the board characteristics; board size, board composition and board meetings. In this part there is chosen to search for studies done in France, US, UK and the Netherlands. France is chosen because it also has the two-tier board. The UK is chosen because they have a one-tier board and to see if there are differences between these types of board. The US is chosen to see if the results are similar or different with the results in the European countries. The Netherlands is chosen because this thesis is going about the Netherlands and thus it is interesting to see the results of earlier studies done in the Netherlands. For some countries there were no appropriate studies found regarding some characteristics and that is why not always all countries are mentioned by each characteristic. During this study it will become clear which of the characteristics of the board of directors are related with increasing or decreasing firm financial performances and if these are in line with previous studies.

2.2.1 Board size

An earlier research conducted in the United States showed that a small board size has a positive influence on the market valuation and financial ratio's of a company (Yermack, 1996). Yermack (1996) did his study based on the believes of Jensen (1993) who stated that 'when boards get beyond seven or eight people they are less likely to function effectively and are easier for the CEO to control'. Yermack (1996) concluded, based on his own study, that companies with small boards have a higher market valuation, but also have better financial ratios. He argues that a smaller board of directors has more effectiveness because large boards would for instance have a slower decision-making process and are more likely to be less risk-taking.

An example of a later study about the board of directors which supports the theory that large boards decrease a firm´s financial performance is the study of Guest (2009). Guest studied the effect of board size for 2746 listed firms in the UK and concluded that a large board has a negative effect on profitability, financial performances and share returns. He argues that a large board has no effectiveniss because of poor communication and weak decision-making.

Another vision regarding board size is that a large board has more expertise, greater management oversight and access to a wider rang of resources (Ahmadi, Nakaa, & Abdelfettah, 2017). Although the researches suggested these arguments they found no positive or negative relation between board size and firm performance for the CAC 40 listed companies in France.

There is not a lot of recent evidence from the Netherlands because board size is a sporadic studied subject in this country. However, Postma, Ees, & Sterken (2003) did a study in the Netherlands about the board size and financial performance. They seperated the management board and supervisory board and conducted analyses for both of them. They did not find any relatioship between the size of the management board and the financial performances of Dutch firms. They expected this result because back then the averaged size of the management board was small (3 members). However, they concluded that the size of the supervisory board did have a negative relationship with firm performance. This implied that they find support for inefficiencies in Dutch supervisory board, which is in line with the study of Yermack (1996).

2.2.2 Board composition
In this part previous studies about gender diversity, age diversity and nationality diversity are mentioned.

Gender diversity
The resource-dependency theory and the theory of human capital about gender diversity and firm performance gets supported in the United States. Conyon & He (2017) examined the effect of gender diversity on boards for 3000 US firms and showed that the presence of women on the board has a positive effect on firm performance.

Opposite to the positive relationship found in the US, Shehata, Salhin, & El-Helaly (2017) found a negative relationship between gender diversity and firm performance. They used a large sample of almost 35.000 SMEs in the United Kingdom during 2005 to 2013. Their results showed a significant negative relationship between nationality diversity and firm performance. They state that a possible explanation for the findings could be their used sample, consisting out of SMEs, where the most previous studies have been about larger companies.

The study of Ahmadi, Nakaa, & Abdelfettah (2017) conducted in France for companies listed on the CAC 40. They concluded in line with Conyon & He (2017) and opposite to Shehata, Salhin, & El-Helaly(2017) that board gender diversity is positively related to firm financial performance.

Not only abroad do these findings about a positive relation hold up, but also in the Netherlands. A research done in the Netherlands by Lückerath-Rovers (2013) investigates the financial performance of 99 Dutch listed companies with and without women on the board. This study shows that firms in the Netherlands with women on the boards perform better (ROE is significantly higher) than those without woman. She suggests that the results may also support the notion that companies with women on their boards have a better connection with the relevant stakeholders at all levels of the company, which improves the company's reputation. This argument states that gender diversity is in line with the earlier mentioned stakeholder theory.

In the Dutch code of corporate governance it is mentioned that diversity of a board is of great importance. It is even noted in this code that the board should strive for diversity considering for instance gender and age (Bootsma & Biesheuvel, 2012). The Dutch government went a step further than this code and made it legally required to have a diversified board regarding to gender in the Netherlands. This law (Artikel 2:166 Burgerlijk Wetboek) called 'Wettelijk streefcijfer mannen en vrouwen in bestuur ondernemingen' was introduced in the Netherlands in April 2017 and states that a supervisory board needs to have at least 30% of females in a board and at least 30% of males in a board (Rijksoverheid, 2017).

A study of Lückerath-Rovers (2017) in the Netherlands contained the gender diversity. This sample of this study consists 85 sample companies listed on the Euronext Amsterdam and showed us that 79% of the companies have female directors. Notable is that of these companies only 14% have female directors on the management board and 79% have female directors on the supervisory board. This result implies that it is not worth to investigate gender diversity for the management board, but only for the supervisory board.

Age diversity
Age diversity is a less studied topic and was not available for all of the chosen countries. Instead of the chosen countries some studies done in other countries are described to examine the effect of age diversity on firm performance.

A study done in the UK related to age diversity is done by Shehata, Salhin, & El-Helaly (2017). They found a negative relationship in the UK between age diversity and firm performance. This result is equivalent to their results regarding the nationality diversity and firm performance. So also in this case could the used sample, consisting out of SMEs be a possible explanation for the findings.

A study of Lückerath-Rovers (2008) in the Netherlands also contained a part about the age diversity. It represented the age diversity through classification of the ages (50-55,55-60,60-65 etc.) and showed that all the ages were well represented. In her study of 2017 she showed the averages ages of the boards and the ages of the male members as well as the female members were approximately 7 years lower than the male and female members of the supervisory board. It will be interesting to see if her diversity showed in 2008 is still present and if it has a relationship with firm performance.

In contrast to the negative relationship found in the study done in the UK by Shehata, Salhin, & El-Helaly (2017) other studies find a positive relationship. That age-diversity has a positive influence on firm performance gets supported by the study of Ferrero-ferrero, Fernandez-Izquerdo, & Munoz-Torres (2012). This study has tested the effects of each type of age diversity on corporate performance using a sample of 205 European listed firms for the year 2009. The results reveal that age diversity has a positive impact on corporate performance

and suggests to increase board age variety to adapt different views and make more effective decisions in board of directors.

More evidence supporting the positive relationship comes from Indonesia. Darmadi (2011) examined the relationship between age diversity of board members and financial performances of 169 firms listed on the Indonesia Stock Exchange (IDX). He concluded that the proportion of young members is positively related to market performance, providing evidence that young people in the boardrooms are associated with improved financial performance. Reasons they give is that younger managers are more likely to participate in innovative strategies leading to firm growth. Furthermore can age-diverse boards bring more resources to the firm and increase the efficiency of its operations, supporting the resource-dependency theory.

Nationality diversity

Not only age diversity and but also nationality diversity is a less studied subject area. In line with the age diversity also here will other studies be used to examine the effect of this board characteristic.

A study done in the US concluded that nationality diversity has a positive influence on the financial performance of a firm (Erhardt, Werbel, & Shrader, 2003). They studied 127 large US companies over a five year period and found out that the effect of nationality diversity was positively significant for the ROA.

Estélyi & Nisar (2016) conducted a study to investigate the relationship between nationality diversity and firm performance. They used a dataset of corporate boards for all UK based listed firms over a ten-year period. Their research concluded that nationality diversity is positively related to a firm's international market operations as well as their operating performance. This can be caused because firms with diverse nationality boards have a bigger chance of successfully making inroads into other countries' product and customer markets which will stimulate the firm performance.

Another study conducted in the United Kingdom, Germany and the Netherlands also states a positive relationship between nationality diversity and firm performance. However, this relationship only hold up for stock returns and not for the companies´ financial ratios. The relationship is even stronger when the cultural distance between the board members is low. This research conducted by Honing (2012) consisted of 277 listed MNEs spread over Britain, Germany and the Netherlands.

Miletkov, Poulsen, & Wintoki (2012) investigated the characteristics of companies that have foreign directors and concluded that foreign directors can affect firm value through their advising and monitoring functions. They also noted that foreign directors are more likely to be associated with firms that have more foreign operations and an international shareholder base. Their study contained a huge sample of over 60.000 companies non-US companies worldwide.

Although some studies find a positive effect of nationality diversity on firm performances there are also studies which find no relationship between both variables. Darmadi (2011) who found evidence in Indonesia for the positive relationship of age diversity with firm performance did not found any relationship between nationality diversity and firm performance.

2.2.3 Board meetings

For this feature of board characteristics it was very difficult to find articles in the chosen countries, this can be caused because board meetings is an upcoming subject area. Some studies are done in other countries and these studies found out that the more meetings a board has the better the firm's financial performances are.

An example of a paper with this findings is the study of Vafeas (1999) who concluded that the frequency of board meetings not only increases the day-to-day financial performance of a firm, but also positively influences the firm value. He conducted his research by selecting data from the 307 biggest firms in the Forbes compensation survey.

A later research which was done for all firms which were listed on the Amman Stock Exchange and were operating in the industry and service sector also concluded that the frequency of board meetings influences a firms financial performance. The study argued that through meetings, board members determine operational issues through discussing and engaging with each other. Having a high frequency of board meetings enhances the decision making process, and consequently the performance of the firms (Al-Daoud, Saidin, & Abidin, 2016).

Chou, Chung, & Yin (2013) whom investigated all listed companies in Taiwan went a step further and showed that high attendence of directors during board meetings resulted in a higher firm performance, while attendancy of representatives instead of the directors leads to a lower firm performance.

2.3 Dutch institutional environment

Before formulating the hypotheses, it is important to understand the Dutch institutional environment regarding board type and the internal versus external board members. Most of the countries worldwide boards are commonly one-tier, except for a few countries like the Netherlands, France and China.

2.3.1 Two-tier board

A two tier board consists of a supervisory board and a management board. Although it is common to have a two-tier board it is also allowed to have a one-tier board in the Netherlands since 1 January 2013 when the law of 'Wet bestuur en toezicht' was introduced. For Dutch companies this means that they no longer need to have a management board (internal directors) and a supervisory board(external directors), but that they can have one board. The Dutch government introduced this law mainly because they wanted to attract and lure international businesses to the Netherlands (Governance University, 2017). It is not

possible to investigate the relationship between the type of board and a firm´s financial performance, because after the introduction of the law only eleven companies listed on Euronext Amsterdam have switched into a one-tier board which is not enough for a credible sample. The features and differences between a one-tier board and two-tier board will be explained below.

The two-tier board is the most common board in the Netherlands and consists of a management board (in Dutch Raad van Bestuur) and a supervisory board (Raad van Commessarissen). A management board has members whom are insiders/executives and a supervisory board which is formed by outsiders/non-executives, it is not possible to be part of both of the boards at the same time. The main task of the management board is to direct the company in a proper way and run the day-to-day business by making decisions. They control the top managers, set goals for the company and develop strategies to reach these goals. Furthermore has the management board a legal requirement (Artikel 24 Wet op de Ondernemingsraden) to meet with the works council at least twice a year to discuss the made choices regarding business operations (Overheid, 2017). The most important task of the supervisory board is to control the management board. They can appoint and fire members of the management board based on the performances and goals of the management board. In figure 1 there are some obligatory conditions for the supervisory board and management board in a two-tier board in the Netherlands.

Figure 1, Conditions supervisory & management board in the Netherlands (Maassen & Van Den Bosch, 1999)

Supervisory Board

– Presence	Obligatory
– Nomination of directors	By the supervisory board. The shareholders' meeting, the works council and the management board have rights to propose candidates. The shareholders' meeting and the works council have rights to reject appointments
– Appointment of directors	By the supervisory board (co-optation)
– Number of directors	Minimum of three non-executives
– Term of membership	Four Years
– Maximum age	72 years
– Composition	Independent of management. Non-executive directors only
– Role	Supervise management and approval of major decisions. Give advice to management

Management Board

– presence	Obligatory
– Nomination, appointment and dismissal	By the supervisory board. The shareholders' meeting must be notified or consulted when managing directors are dismissed. Works council can give advice
– Number of directors	One or more executive directors
– Composition	Executive directors only

An enormous pro of this type of board is the independency of the supervisory board, because according to the agency theory, the management board will act in the best interest of themselves. The management board is dependent because the members are executives of the company and thus will not direct the company in the best interests of the

shareholders. Having an independent board which controls the management board will reduce these agency costs by aligning the interests of the managers and the shareholders.

A disadvantage of this type of board is that because of the separation of the two boards some processes are very time consuming. For instance the decision-making process will slow down because of the different agendas of the boards, also the bureaucracy rises because of the two agendas. Furthermore it is possible that although the members of a supervisory should be independent they are not in practice. Looking to one of the causes of the recent financial crisis it is questionable when a director is really independent. Luckily in the Netherlands there are some criteria that must be met before you are qualified 'not dependent' and can be a member in the supervisory board.

2.3.2 One-tier board

Since 1 January 2013 it is legally possible to have a one-tier board in the Netherlands. A one-tier board is logically a type of board where only one board represents the firm instead of two. It is possible that a one-tier board only consists of insiders, completely consists out of outsiders or is mixed by insiders and outsiders. Advantages of a one-tier board are that the relationship between the directing and controlling board members is better and that there is a faster exchange of information (Lückerath-Rovers & Smits, 2010). Furthermore are the controlling directors involved during the process instead of controlling afterwards which is the case at the two-tier model (Lückerath-Rovers & Smits, 2010). Opposite to the two-tier board which represents the agency theory, the one-tier board is backed by the stewardship theory. This theory prefers insiders in the board because of the better access to information and their understanding of the businesses. Although the types of board have their own advantages and disadvantages, no evidence is found that one type of board is better than another (Lückerath-Rovers & Smits, 2010).

2.4 Hypotheses

In this part of the thesis hypotheses are developed for board size, gender diversity, age diversity, nationality diversity and board meetings. The hypotheses are based on the theory and empirical findings described in the literature review.

2.4.1 Board size

Based on the theory it is difficult to predict the effects of small and large boards on firm performance. The agency theory pleads for a small board because a large board motivates the domination and authority of the members in a board, which results in more conflicts. While the resource-dependency theory and the theory of human capital prefer a large board to have more expertise, skills and access to external resources.

However, based on the review of previous studies it is expected that a small board results in better financial performance. An earlier study of Lipton & Lorsch (1992) stated that a board of directors should be limited to ten people with a preference of eight or nine. Jensen (1993) supported this and even argued that if boards get beyond seven or eight people they lose their effectiveness. The results of the study of Yermack (1996) supported these studies and

concluded that firms with smaller board of directors have a higher market valuation and better financial ratio's. An example of a study done in the United Kingdom a couple of years later about the board of directors, which also supports the theory that large boards decrease a firms financial performance is the study of Guest (2009). He concluded that a larger board has a poor communication and weak decision-making. All, Jensen (1993), Yermack (1996) and Guest claim that a smaller board has a higher effectiveness

Ahmadi, Nakaa, & Abdelfettah (2017) tried to defend the resource-dependency by hypothesing that a large board has a positive influence on firm performance, because a large board has more expertise, greater management oversight and access to a wider rang of resource. They tested this hypothesis but had to reject it based on their findings.

Because the empirical evidence supports the theory for a small board and the theories do not prefer a specific board size, the following hypothesis is formulated.
H1. A large board has a negative impact on a firms financial performance.

Board composition & firm performance
The board composition consists of gender diversity, age diversity and nationality diversity. Each of these three will have his own hypothesis because the empirical findings are different for each of them. However, the theoretical part reflects all of the diversity parts and will be described below.

The theories that fit board composition all prefer more diversity in boards. The theory of human capital says that a board needs to be diversified because every board member has his own knowledge, expertise and skill and therefore contributes to the firm performance. Furthermore does a more diverse boards will consider different perspectives. The resource-dependency theory also supports a diverse board because different types of board members will all have access to different exclusive resources which will increase the access to external resources for the company and thus eventually a firm's financial performances. It can be concluded that based on the existing theories regarding corporate governance, diversity should increase a firm's financial performances.

2.4.2 Gender diversity
The first hypothesis part of the board composition is the gender diversity and firm performance. As mentioned before the resource-dependency theory and the theory of human capital state that gender diversity in a board increases financial performances. These theories prefer gender diversity because having males and females lead to multiple and different views regarding situations than having only males in the board. Furthermore do females may have better acces to certain resources and have different knowledge, expertise and skill than males, for instance females communicat better (Lückerath-Rovers, 2013).

Recently a lot of studies worldwide are conducted regarding gender diversity and they almost all have the same outcome; gender diversity has a positive impact on firm

performance. This positive influences gets supported, for example in France by Ahmadi, Nakaa, & Abdelfettah (2017) and the United States, Conyon & He (2017). This result also holds up for the Netherlands where the study of Lückerath-Rovers (2013) investigated the financial performance of 99 Dutch listed companies with and without women on the board. This study showed that firms in the Netherlands with women on the boards perform better (ROE is significantly higher) than those without woman.

The empirical evidence of the positive influence regarding gender diversity on firm financial performance is overwhelming. This in combination with the theory that also supports gender diversity, obviously results in the next hypothesis:
H2a. Gender diversity has a positive impact on firm financial performance.

2.4.3 Age diversity
The theory of human capital and the resource-dependency theory support age diversity because a board with age diversity has better access to external resources and is more likely to adapt different views which should result in a higher firm performance. Besided support of these theories there is also empircal evidence supporting age diversity. There is evidence from Indonesia that supports the resource-dependency theory regarding age diversity and firm performance. Darmadi (2011) states that age-diverse boards bring more resources to the firm and increase the efficiency of its operations and that younger managers are more likely to participate in innovative strategies which leads to firm growth. Ferrero-Ferrero, Fernandez-Izquerdo, & Munoz-Torres (2012) studied the age diversity and firm performance in Europe and also concluded that age diversity has a positive impact on corporate performance. They argued that a board with age variety is more likely to adapt different views and can make more effective decisions as a result of this.

Opposite to these findings is the study of Shehata, Salhin, & El-Helaly (2017) which concluded that age diversity results in a negative financial performance, but a possible explanation for these remarkable findings could be because of their used sample (SMEs).

Based on the theory of human capital and resource-dependency theory and the empirical evidence the following hypothesis is formulated:
H2b. Age diversity has a positive impact on firm financial performance.

2.4.4 Nationality diversity
According to the resource-dependency theory, nationality diversity has a positive influence on firm performance. The reason for this is that foreign directors normally have higher access to foreign resources than directors from other countries. Another reason is that foreign directors have first-hand knowledge of foreign markets, which enables them to develop a network of foreign contacts (Masulis, Wang, & Xie, 2012).

Estélyi & Nisar (2016) concluded that nationality diversity is positively related to a firm's international market operations as well as their operating performance. They argued that firms with diverse nationality boards have a bigger chance of successfully make inroads into

other countries' product and customer markets. Miletkov, Poulsen, & Wintoki (2012) state that foreign directors can affect firm value through their advising and monitoring functions. A study done in Britain, Germany and the Netherlands showed that the positive relationship is even stronger when the cultural distance between the board members is low (Honing, 2012).

H2c. Nationality diversity has a positive impact on firm financial performance.

2.4.5 Board meetings
A higher frequency of board meetings positively influences the firm performance. The first theoretical argument is that regular board meetings prevent unnecessary agency costs because of the intensifying monitoring activities. Furthermore does the stakeholder-theory support regular board meetings, because (arising) issues regarding any stakeholder of the company can be quickly noticed and solved, preventing stakeholder issues.

One of the first studies which concluded that the frequency of board meetings positively increases the day-to-day financial performance of a firm and increased the firm value was the research of Vafeas (1999). Al-Daoud, Saidin, & Abidin (2016) argued that through meetings, board members determine operational issues through discussing and engaging with each other. They concluded that having a high frequency of board meetings enhances the decision making process and therefore the performance of the firms.

The theory supports having a high frequency of board meetings and also the empirical evidence claims a high frequency of board meetings is better, stating that through more board meetings the firm can better take care of issues.

H3. The frequency of board meetings positively influences a firm financial performance.

3. Methodology

In this chapter the research method will be described and discussed. Furthermore the variables used in this study are explained and robustness tests are described.

3.1 Research method

Before conducting a multivariate analysis it is important to run an univariate analysis and a descriptive analysis to make sure the dataset is clean. An univariate analysis is done to check for normality, linearity and homoscedasticity which are assumptions for regression. The descriptive analysis gives an overview of the dataset and shows, for instance, the mean, median minimum and maximum of each variable. It is useful to conduct a descriptive analysis because it can detect interesting and strange outcomes of particular numbers, called extreme values or outliers. These extreme numbers should be controlled because outliers can influence the results of the study. If outliers are present in this study a Winsorization will be used to handle these extreme values.

After these analyses are done it is of great importance to assess the correlation of the independent variables, because a high correlation can imply multicollinearity. For a regression analysis it is assumed that there is no multicollinearity between the independent variables. A correlation analysis is done using a Pearson's correlation. It is possible that the Pearson's correlation shows an either high positive or negative correlation, which is when the correlation is bigger than 0.8 or lower than -0.8. If this is the case a variance inflation factor(VIF) can be used to test for multicollinearity.

The multivariate data analysis can be conducted if the previous analyses show no complications and it is proven that the dataset is clean. A multivariate analysis comprises all statistical methods that simultaneously analyse multiple measurements on each individual or object under investigation (Henseler, 2017). This obviously fits this research because the goal is to test the hypotheses and explain the relationships between the chosen variables. This study has a dependence research objective, which means the goal is to find a relationship between an independent variable and a dependent variable. If a relationship between 1 independent variable and 1 dependent variable is examined a single regression analysis is appropriate, however in this study there are several independent variables. Having several independent variables means that a multiple regression analysis should be performed. There are different forms of multiple regression analysis. Three different forms of regression analysis will be explained in this section namely, probit regression, logistic regression and linear regression.

The form of multiple regression mainly depends on the distribution of the dependent variables. Probit regression is used if the dependent variables are dichotomous. A dichotomous variable is a variable that can take only 2 values(for instance 0 or 1). Logistic regression is used when the dependent variables are categorical, which means the variables can only be a fixed number of values(for instance (10,20,50 or 100). Linear regression is used when the dependent variables are continuous and thus can take any value possible.

3.2 OLS Method

For this study it is not appropriate to conduct a probit regression or a logistic regression, because a probit regression fits a dichotomous dependent variable and a logistic regression is suitable for a nominal dependent variable. In this study the dependent variables(ROE, ROA and STR) are metric variables meaning they can take any value they want to, thus a multiple linear regression analysis should be done. The most common form of multiple linear regression is ordinary least squared regression (further referred to as OLS). This type of regression is also used in comparable studies regarding the influence of board characteristics and firm performance (Ahmadi, Nakaa, & Abdelfettah, 2017; Lückerath-Rovers M, 2013; Darmadi, 2011; Guest, 2009;Miletkov, Poulsen, & Wintoki, 2012; and Yermack, 1996). Advantages of OLS are that the method is easy in use and the results are clearly displayed so they can be interpret and analysed easily (Henseler, 2017). Some disadvantages of OLS are the possible influence of outliers, the probability of multicollinearity among variables and normality problems. All hypotheses will be tested separately in the regression model to examine their influence on firm performance. There is a distinction between the management board and supervisory board. So, if a variable, for instance nationality diversity or age diversity is present for the management board as well as the supervisory board it will be tested for both boards separately. The firm size will be measured by total assets, while the leverage will be measured based on assets. The market capitalization variable and leverage based on equity variable are used for robustness. The year dummy and industry dummy will be included in every test. The OLS model for testing the hypotheses is as follows;

$$\text{Perform}_{xt} = \alpha + \beta_1 \text{Size}_{xt} + \beta_2 \text{Gender}_{xt} + \beta_3 \text{Age}_{xt} + \beta_4 \text{Nationality}_{xt} + \beta_5 \text{Bmeet}_{xt} + \beta_6 \text{Fsize}_{xt} + \beta_7 \text{Fage}_{xt} + \beta_8 \text{Flvg}_{xt} + \beta_9 \text{Year} + \beta_{10} \text{Industry} + \varepsilon_{xt}$$

Where; Perform_{xt} = (ROE_{xt}, ROA_{xt}, STR_{xt})

ROE_{xt}=	Return on equity of firm X in year t
ROA_{xt}=	Return on assets of firm X in year t
STR_{xt}=	Stock returns of firm X in year t
α=	Constant
Bsize_{xt}=	Board size of supervisory board/management board of firm X in year t
Gender_{xt}=	Gender diversity of supervisory board of firm X in year t
Age_{xt}=	Age diversity of supervisory board/management board of firm X in year t
Nationality_{xt}=	Nationality diversity of supervisory board/management board of firm X in year t
Bmeet_{xt}=	Board meetings of supervisory board/management board of firm X in year t
Fsize_{xt}=	Firm size of firm X in year t
Fage_{xt}=	Firm age of firm X in year t
Flvg_{xt}=	Firm leverage of firm X in year t
Year=	Year dummies
Industry=	Industry dummies
ε_{xt}=	Error term of firm X in year t

3.3 Variables

The definition of all variables included in this study are displayed in table 1 below. Sometimes multiple definitions/variables are used to measure the same construct in order to get more robust results.

Table 1: Definitions of variables.

Dependent variables	Definition	Source
Return on equity_Ni(%)	(Net income / Shareholder's equity) * 100	Lückerath-Rovers (2013)
Return on equity_Ebit(%)	(Net income before interest and tax / Shareholder's equity) * 100	Lückerath-Rovers (2013)
Return on assets_Ni(%)	(Net income / Total assets) * 100	Lückerath-Rovers (2013)
Return on assets_Ebit(%)	(Net income before interest and tax / total assets) * 100	Lückerath-Rovers (2013)
Stock returns(%)	((Stock price end of year – Stock price begin of year + dividend) / Stock price beginning of year) *100	Darmadi (2011)
Independent variables		
Board size_Sb	Number of directors on supervisory board	Ahmadi, Nakaa, & Abdelfettah (2017)
Board size_Mb	Number of directors on management board	Ahmadi, Nakaa, & Abdelfettah (2017)
Gender diversity(%)	(Amount of women members on the supervisory board / total members of supervisory board) * 100	Ahmadi, Nakaa, & Abdelfettah (2017)
Age diversity_Sb(%)	The percentage of different age classes on supervisory board. Measured by (present classes / total classes) * 100. (Classification of ages are <50, 50-55, 55-60, 60-65 65-70 and >70)	Lückerath-Rovers (2008)
Age diversity_Mb(%)	The percentage of different age classes on management board. Measured by (present classes / total classes) * 100. (Classification of ages are <50, 50-55, 55-60, 60-65 65-70 and >70)	Lückerath-Rovers (2008)
Nationality diversity_Sb(%)	(Members of the supervisory board with no Dutch nationality / total amount of members) * 100	Miletkov, Poulsen, & Wintoki (2012)
Nationality diversity_Mb(%)	(Members of the management board with no Dutch nationality / total amount of members) * 100	Miletkov, Poulsen, & Wintoki (2012)
Board meetings	Amount of physical board meetings in a year of the supervisory board	Al-Daoud, Saidin, & Abidin (2016)
Control variables		
Firm size_Ta	Book value of total assets	Miletkov, Poulsen, & Wintoki (2012)
Firm size_Mc	Market capitalization(amount of shares * price of shares)	Yermack (1996)
Firm age	Years of existence	Ahmadi, Nakaa, & Abdelfettah (2017)
Firm leverage_A(%)	((Short-term debt + long-term debt) / total assets) * 100	Ahmadi, Nakaa, & Abdelfettah (2017)
Firm leverage_E	(Short-term debt + long-term debt) / equity	Shukeri, Shin, & Shaari (2012)
Year	Year dummies	Wissink (2017)
Industry	Industry dummies	Wissink (2017)

The dependent variables are the firm's financial performances, which are measured by ROE, ROA and stock returns. It is common to use the ROE and ROA for measuring firm performance in this kind of studies, however it is possible that the firms used in the sample have different accounting methods (Essa, 2016). This will affect the valuation of the assets and make the results less reliable. There is chosen to include stock returns as additional financial performance variable, knowing that for this study all firms are listed.

3.4 Robustness tests

As mentioned in the previous paragraph the first robustness test is done by using multiple definitions/variables measuring the same construct. By having multiple variables measuring the same construct the findings will be more valid. In this study there are multiple variables for the financial accounting based dependent variables and the control variables size and leverage. Furthermore a regression analysis with board independence instead of management board size and supervisory board size will be done to test robustness. A second robustness test will be done by performing regression analyses without variables which are highly correlated with other variables. This is done to increase the validity and reliability of the results by excluding the possibility that correlated variables influence the outcome of the regression results. Also the results for each year separately will be analysed. The reason for this is to ensure that the results are not influenced by a strong relationship between variables for a particular year. The third and last robustness test involves the use of an analysis with the averaged data of the variables. This is done to eliminate the possibility that the outcomes are affected by extreme cases.

4. Sample and data

This chapter describes the used sample during this study and the way the data is obtained for all variables and firms.

4.1 Sample

Euronext is a stock exchange consisting out of several exchanges operating in five countries, United Kingdom, Portugal, France, Belgium and the Netherlands. This study contains Dutch listed companies on Euronext Amsterdam and thus only Euronext Amsterdam is used. In the beginning of 2018 there were 129 companies listed on Euronext Amsterdam (Euronext, 2018). This study excludes financial companies because they normally have a high leverage compared to other companies, this would bias the results and thus this sample is limited to non-financial companies. A consequence of excluding these companies is that there are 27 companies less in the sample size, which goes from 129 companies to 102 companies. These remaining 102 firms are including 17 foreign companies and these should also be abstracted, this results in a sample of 85 companies. Unfortunately there are some companies with too much missing data, for example because they went public in 2016 or 2017. In total there are 7 companies with too much missing data which results in a final total sample size of 78 companies, this total sample size can be found in appendix A.

The industry classification for the Dutch listed firms is based on the United States Standard Industrial Classification (US SIC). The US SIC contains eleven different industries based on the first 3 digits of a company's SIC code. The eleven industries are ranging from Agriculture to Public Administration to Manufacturing and thus are very different. It is important to have substantial companies in an industry when controlling for industry effects, however this sample size is not large enough to classify each firm in their original industry. To solve this problem four categories are used in this sample namely, construction, manufacturing, other services and services. The companies are divided into their operating industries in table 2.

Table 2: Sample distributed by industry (Orbis, 2018).

Industry	Number	Percentage
Construction	9	11,5%
Manufacturing	39	50%
Other services	14	18%
Services	16	20,5%
Total	78	100%

As shown in table 2 the manufacturing industry is dominating the sample, it is important that the overall results are not only the results of the manufacturing industry but of all industries. To check this, the results of the regression will be controlled for industry. The firms will be studied from 2014 till 2016. The study starts in 2014 because the financial crisis was almost completely over by then. Just as with the industry it is important that specific years do not influence the outcomes and therefore the results also will be controlled for years.

4.2 Data collection

All the firms will be studied on the independent as well as the dependent variables based on annual numbers. In this study the quantitative data will be secondary data, because all the needed data is available and this saves time and money. The independent variables are the board characteristics; board size, gender diversity, age diversity, nationality diversity and board meetings. The information of the independent variables can be found in the annual reports of the companies. The dependent variable is firm financial performance and will be represented by return on equity (ROE), return on assets (ROA) and the stock returns. The ROE, ROA and stock returns are calculated based on the data found in Orbis. The control variables are firm age, firm size and firm leverage. These variables are chosen because they are a common predictor for a firms financial performance. The control variables can be found in the database of Orbis and in the annual reports of the listed companies.

5. Results

In this chapter the results of the study are presented. First the descriptive statistics of the variables included in this study are shown. After this the correlation coefficient between the variables are examined using a correlation matrix. In the third section the results of the regression analyses are presented and discussed. Finally robustness tests are performed and described.

5.1 Descriptive statistics

In table 3 the descriptive statistics of the variables included in this study are displayed. Starting with the dependent variables which are accounting-based measurements, ROE and ROA, there are 227 observations. For the ROE net income the mean is 4.7%, while the median is 9.8% which means the variable is skewed to the left. This also applies to the other three accounting-based measures, ROE_Ebit has a mean of 7.3% and a median of 12.2%, ROA net income has a mean of 2.8% and a median of 4.2%, while ROA_Ebit has a mean of 4% and a median of 5.4%. For the ROE as well as the ROA the EBIT variables have a higher mean and median, this is because the numerator is frequently higher for these variables. Although all the variables have negative as well as positive values(see minimum and maximum) the mean and median are above zero, which means on average that Dutch listed companies have positive financial performances. The results for the net income of the ROE and ROA are comparable with previous studies done in the Netherlands. For instance, with the study of Boerkamp (2016) who studied Dutch listed firms on Euronext Amsterdam for the period 2012 till 2014. For the ROE net income she reported a mean of 5.2% a median of 7.2% and a standard deviation of 17.9 and for the ROA the mean was 2.6%, the median 2.3% and the standard deviation 7.2. This gives small evidence that the average ROE and ROA did not change dramatically between 2012-2014 and 2014-2016. The market based measure of firm performance is stock return. This variable also has a positive mean and median, supporting the earlier described positive financial performance variables. A difference with the other financial performance variables is that this variable is right skewed because the mean is higher than the median. On average Dutch companies have a stock return of 8.9% while the median is 5%. These numbers are slightly higher than the mean of 6.9% and median of 3.5 % found by Kemerink (2018) who studied Dutch listed firms on Euronext Amsterdam for the year 2015. This indicates that the stock return in 2014 or 2016 was higher than in 2015.

The independent variables consist out of variables regarding the management board and the supervisory board. For the management board the smallest observation is 228, while the biggest observation is 234. The average management board consists of 2.51 members with a minimum of 1 board member and a maximum of 7 board members. This is in line with the study of Kemerink (2018) who reported a management board size with a mean of 2.76 a minimum of 1 and a maximum of 7.
Based on the minimum and median of zero it can be concluded that there are a lot of companies with no nationality diversity on the management board. Although at least 50% of

the companies has no nationality diversity the average diversity is still 17.2%. Looking to the maximum it can be concluded that no management board consists of only foreigners. The age diversity has a mean of 26.9% and a median of 33.3% with a minimum of 0 and maximum of 83.3%. This shows us that there is at least 1 company without age diversity and that no company has all the six age classification represented in the management board. For the management board it can be concluded that the diversity is low, but this could be explained by the small size of the management board.

Looking at the variables of the supervisory board it is notable that their numbers for all variables are higher than for the management board. The average size of a supervisory board is 4.99 members with a minimum of 1 board member and a maximum of 14 board members(Ahold Delhaize). This shows us that a supervisory board is almost twice as big as a management board which has a mean of 2.51 and a maximum of 7 board members. The board size is in line with the board size of 5.45 members for Dutch listed firms in 2015 with a minimum of 1 and maximum of 11 board members (Kemerink, 2018). The gender diversity tells us that on average 17.3% of the supervisory board is represented by women, this is lower than the requirement of 30% stated by the Dutch government. Although it is lower than required it is higher than in the period 2012 till 2014 where on average 13% of the supervisory board consisted out of women (Wissink, 2017). Also the median and maximum are higher compared to that period, 20% versus 14% and 66.7% versus 43%. Based on these numbers it can be concluded that the gender diversity is rising, however there are still companies with a minimum of 0 and thus no gender diversity. The means and medians of the supervisory board are for both the nationality diversity and age diversity reasonably higher than for the management board. The nationality diversity has a mean of 27.4% with a median of 25% and the age diversity has a mean of 47.5% with a mean of 50%. Looking to the diversity variables of the supervisory board the mean and median are pretty close to each other which tells us these variables are just slightly skewed. For the age diversity Heineken was the only company to have all the six age classes represented in their board. The Dutch listed companies have on average 6.85 board meetings a year and every board meets at least once a year. The most meetings were held by the board of De Telegraaf with 15 meetings in one year.

The leverage asset variable shows that on average a firm's assets are for 59.6% financed out of debt, which is comparable with the 61% in the period 2012-2014 (Wissink, 2017). The leverage equity variable shows that on average a firm has been financed with 1,64 times more debt than equity, which is quite lower than the 3.06 times in 2015 (Kemerink, 2018) indicating that in 2014 or 2016 the equities of the companies raised compared to their debts. Both medians are a bit lower which means the data is skewed to the right. Notable about these variables is the minimum of the leverage equity variable which is less than zero. This can be explained by negative equity of companies, for instance Post NL which had a negative equity in 2014, 2015 and 2016 and Altice which equity was negative in 2016. However, looking at their numbers they do not behave different than the other firms in the

sample which is the reason they are not excluded. Finally, The mean for the book value of total assets is €6.434 million while the median is €0.820 million, the mean for the market capitalization is €5.744 billion while the median is €0.670 billion. For both of the size variables the median is much lower than the mean(almost ten times), which results in highly right skewed data. Furthermore both variables have high variance, for the assets it ranges from €0.010 million till €42.380 million and for the market capitalization the range is €0.006 billion till €40.260 billion. Because of the highly right skewed data and the high variance the two size variables will be transformed into natural logarithm variables before entering the regression analyses. Two examples of companies with small assets are Nedsense Enterprises and Novisource. They do not have a lot of assets because they are both operating in the services industry. Nedsense Enterprise offers software solutions and services to dealers and manufacturers. Novisource offers their services to help companies to be competitive. When looking at the variable age it becomes clear that firms are on average 61.10 years incorporated. The standard deviation is 41 and the it ranges between 3 and 192, which means this variable has a high variance. As with the size variables also the age variable will be transformed into a natural logarithm variable because of the high variance. A few companies are incorporated for a very long time, for instance Lucas Bols and Porceleyne. Lucas Bols is a company which produces, distributes and sells alcoholic beverages. Porceleyne is a company which produces Delftware. Although their age variable has a high value their dependent and independent variables show no deviation in comparison to companies with a lower value of the age variable.

Table 3: Descriptive statistics all variables.

Variable	N	Mean	Median	Std. Dev.	Minimum	Maximum
Dependent variable						
ROE_Ni	227	0.047	0.098	0.184	-0.473	0.277
ROE_Ebit	227	0.073	0.122	0.198	-0.455	0.351
ROA_Ni	227	0.028	0.042	0.071	-0.149	0.150
ROA_Ebit	227	0.040	0.054	0.079	-0.153	0.178
STR	212	0.089	0.050	0.281	-0.355	0.664
Independent variable						
MB_Size	228	2.51	2.000	1.163	1	7
MB_Natdiv	228	0.172	0.000	0.233	0	0.667
MB_Agediv	234	0.269	0.333	0.203	0	0.833
SB_Size	226	4.99	4.50	2.257	1	14
SB_Gendiv	226	0.173	0.200	0.159	0	0.667
SB_Natdiv	226	0.274	0.250	0.281	0	0.900
SB_Agediv	234	0.475	0.500	0.230	0	1
Bmeet	226	6.85	7.000	2.160	1	15
Control Variable						
LVG_A	234	0.569	0.554	0.171	0.255	0.879
LVG_E	231	1.636	1.196	1.291	-0.010	5.160
Fage	234	61.10	41.00	51.352	3	192
Fsize_Ta(mln)	233	6.434	0.820	12.001	0.010	42.380
Fsize_Mc(bln)	211	5.744	0.670	10.926	0.006	40.260

Notes: Descriptive statistics for each variable included in this study after conducting a 90% Winsorization. Based on this table the Fage and Fsize variables will be transformed into natural logarithm variables before entering the regression analyses. The definitions of variables can be found in table 1.

5.2 Correlation analysis

The correlation analysis is done through a Pearson's correlation matrix, which is displayed in table 4 . As showed in the table the accounting-based dependent variables are highly correlated with each other at the 0.01 level, with a correlation of at least .875. Besides the accounting-based variables also the market-based variable correlates with all the other dependent variables at the 0.01 level. Furthermore has the stock return a negative significant relationship with both leverage variables and the book value of total assets(size) variable. This indicates that firms with lower debts and a lot of valuable assets have better stock performances than firms with high debts and less valuable assets.

For the accounting-based variables there is no significant correlation with the management board variables, indicating that the management board does not have a big influence on firm performance. The correlations of the accounting-based variables with the management board are positive for the size and nationality diversity and negative for the age diversity. This states that a large management board with different nationalities and not a lot of age diversity contributes to the firm performance, but as mentioned before the correlations are statistically insignificant. However, for the supervisory board all the variables except the nationality diversity have statistically significant correlation with the firm performance variables. The size of the supervisory board has a positive significant correlation at the 0.01 level with ROE (r=.237), ROE_Ebit (r=.230) and ROA (r=.175), and a positive significant correlation at the 0.05 level with ROA_Ebit (r=.159). This result and the result of the management board are contrary to the first hypothesis which stated that a large board has a negative influence on firm performance. This can be explained by the resource-dependency theory and the theory of human capital which state that a large board has more expertise, knowledge, skill and higher access to external resources. Hypothesis 2a states that gender diversity has a positive influence on firm financial performance, this hypothesis gets supported by the supervisory board with statistically significant correlations. Gender diversity correlates positively with ROE (r=.231**), ROE_Ebit (.226**), ROA (.193**) and ROA_Ebit (.168*). Hypothesis 2b gets rejected by the insignificant results of the management board, because the age diversity of the management board has a negative correlation with firm performance where a positive relationship was expected. However, the results of the age diversity for the supervisory board are opposite to those of the management board. All the accounting-based measures have a positive significant relationship with the age diversity of the supervisory board at the 0.01 level, ROE (r=.266), ROE_Ebit (r=.288), ROA(r=.212), ROA_Ebit(r=.243). This result is showing full support for hypothesis 2b. The last hypothesis regarding the diversity states that nationality diversity has a positive relationship on firm performance. The results of the management board, although statistically insignificant, is consistent with this hypothesis. Also the results of the supervisory board are not convincing, showing an insignificant low positive correlation for ROE, ROE_Ebit and ROA, and even a negative insignificant correlation for ROA_Ebit. The third and last hypothesis expects that a high frequency of board meetings increases a firm financial performance. The results of the Pearson correlations show a contrary relationship

than expected, because board meetings negatively correlates with all the accounting-based variables ROE (r=-.144*), ROE_Ebit (r=.138*), ROA (r=-.148*) and ROA_Ebit (r=-.142). A reason for this could be that having a lot of meetings is inefficient and expensive. The costs of board meetings for the Netherlands is over 25 billion a year, excluding overhead costs like travel expenses (Trouw, 2006). A board meeting is democratic which means every member can express themselves, which could lead to multiple divided parties in the board. Having multiple divided parties can result into inefficiency for instance conflicts and a slower decision-making process which eventually decreases a firm's performance. Furthermore, the accounting-based dependent financial performance variables correlate positively with firm age, positively statistically significant with the control variables of firm size and negatively statistically significant with the leverage control variables. These are expected correlations because a mature firm with low debt, a lot of valuable assets and a high market capitalization usually has a better firm performance than a start-up firm with high debt, a few assets and a small market capitalization.

The correlations of the independent variables with the dependent variables are already mentioned, but the independent variables also correlate with each other. For instance, the management board size has a statistically significant positive correlation with both age diversity (r=.297**) as nationality diversity (r=.200**). The supervisory board size has the same pattern and also positively correlates at the 0.01 level with all the diversity variables for the supervisory board, gender (r=.372), age (r=.704) and nationality (r=.634). All these relationships between size and diversity are explainable, because when there are more board members there is a higher chance of having diversity on your board. Besides influencing the diversity variables, the management board size and supervisory board size also positively influence each other(r=.292**). Notable is that the frequency of board meetings does not have a statistically significant relationship with another independent variable. Another remarkable relationship is the statistically significant positive relationship between the size of the management board and the age diversity in the supervisory board with a correlation of .256 at the 0.01 level.

The independent variables also correlate with the control variables, in fact all the independent variables have a positive significant relationship with the market capitalization variable. Also all the independent variables except board meetings have a positive significant relationship at the 0.01 level with the other size variable, book value of total assets. This indicates that a big and large firm has a need of larger boards, which leads to more diversity. Furthermore it could be that large firms deals with more issues and thus have a need of more board meetings. The firm age only has a correlation with the gender diversity for the supervisory board, meaning that mature firms have a larger probability of having a female in their board. Both of the leverage variables have a positive significant correlations at the 0.05 level with age diversity for the management board and the size of the supervisory board. In addition, the leverage(equity based) correlates positively with the age diversity of the supervisory board at a statistical significant level of 0.05. These significant correlations of the

leverage variables state that firms with high age diversity on their boards and/or with a large supervisory board have more debt than firms who have low age diversity on their boards and/or have a small supervisory board. The control variables obviously correlate among each other. The size variables are highly positive correlated on a 0.01 level just as the leverage variables. Based on these high correlations between the size variables (r=.865***) and the leverage variables (r=.805***) there will be additional analysis with just one of the two size and leverage variables to control for multicollinearity. The leverage variables also have a statistically significant positive correlation with the market capitalization variable. Furthermore does the firm age have a negative statistically significant correlation with the size variables, indicating that mature firms have high valuable assets and a large market capitalization.

Finally, some independent variables show moderate or high correlation among each other which could be a sign of multicollinearity. If multicollinearity is presence between independent variables the regression results become less reliable. To measure and test if there is multicollinearity a variable inflation factor(VIF) is conducted(result of VIF can be found in appendix B). As can be seen in appendix B the VIF of the included independent variables is lower than 10 and thus according to the VIF there is no multicollinearity in this study. Although the VIF shows us that there is no multicollinearity it is good to control this for highly correlated independent variables.

Table 4: Pearson's correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) ROE_Ni	1																	
(2) ROE_Ebit	.969**	1																
(3) ROA_Ni	.926**	.902**	1															
(4) ROA_Ebit	.875**	.902**	.957**	1														
(5) STR	.309**	.311**	.305**	.299**	1													
(6) MB_Size	.027	.037	.033	.046	-.018	1												
(7) MB_Natdiv	.074	.072	.047	.067	.061	.200**	1											
(8) MB_Agediv	-.046	-.073	-.088	-.114	.020	.297**	.079	1										
(9) SB_Size	.237**	.230**	.175**	.159*	-.093	.292**	.262**	.205**	1									
(10) SB_Gendiv	.231**	.226**	.193**	.168*	.046	.040	.033	.023	.372**	1								
(11) SB_Natdiv	.071	.056	.040	-.001	.020	.058	.292**	.215**	.634**	.225**	1							
(12) SB_Agediv	.266**	.288**	.212**	.243**	-.035	.256**	.115	.125	.704**	.366**	.440**	1						
(13) Bmeet	-.144*	-.138*	-.148*	-.142*	-.042	-.002	.089	-.067	.048	-.062	-.034	-.090	1					
(14) LVG_A	-.134*	-.127	-.243**	-.254**	-.283**	.026	.099	.146*	.152*	-.002	.117	.041	.101	1				
(15) LVG_E	-.215**	-.218**	-.238**	-.255**	-.293**	.027	.069	.145*	.142*	-.027	.162*	.006	.069	.805**	1			
(16) Fage*	.113	.090	.090	.081	.104	.077	.009	-.015	.050	.277**	-.016	.067	-.050	-.161*	-.132*	1		
(17) Fsize_Mc*	.310**	.301**	.241**	.212**	.052	.338**	.257**	.210**	.667**	.329**	.508**	.457**	.155*	.202**	.138*	.165*	1	
(18) Fsize_Ta*	.441**	.448**	.386**	.374**	.158*	.429**	.320**	.192**	.681**	.294**	.541**	.532**	-.009	.006	-.109	.171*	.865**	1

Notes: * Log transformed variable. Variable definitions are described in table 1. ** Correlation is significant at the 0.01 level. * Correlation is significant at the 0.05 level.

5.3 Regression analyses

In this part of the thesis, the results for the independent variables and the outcome of the hypotheses are described. The results of the OLS regression model which tests all hypotheses separately can be found in table 5, the full model can be found in table 6. Additional regression analyses are done to increase validity and reliability, these results are included in this chapter and can be found at the appendices. The regression analyses are performed for all dependent variables, however only the results for ROE_Ni, ROA_Ebit and STR are showed. The ROE_Ebit and ROA_Ni variables are highly correlated with the other accounting based variables and show the same results. Although the regression analyses are performed for all dependent variables, including these two variables in the tables would be unnecessary.

5.3.1 Board size

The first hypothesis predicts a negative relationship between board size and firm financial performance. Table 5 as well as table 6 show us that the results of the management board size are negative and statistically significant for the ROE and ROA variables. In table 5 the size of the management is a negative statistically significant variable for the two accounting-based financial measures at the 0.01 level. The size of the management board negatively influences the ROE_Ni (b= -.029*** t= -2.776) and ROA_Ebit (b= -.010*** t= -2.209). Also in table 6 the management board size has a negative statistically significant influences at the 0.01 level for the accounting-based variables. Opposite to the accounting-based variables, the size of the management board has no influence on the stock return. Based on the results for the accounting-based variables there is evidence that a small management board contributes more to a firms financial performance than a large management board. However, the size of the management board has a high and statistical correlation with the firm size variables. In table 8 there is a regression analysis conducted without the firm size variables and it shows us that the management board size becomes an insignificant variable. This indicates that the size of the management board is heavily influenced by the size of the firm. Also the regression analysis with the averaged data of the variables in table 10 shows no relationship between management board size and firm financial performance. Furthermore, it seems that the size of the management board is influenced by a strong relationship for one year, because it was only negative statistically significant in the year 2016 and it has no relationship with firm performance in the years 2014 and 2015.

As can be seen in table 5 and table 6 the results for the size of the supervisory board are different than the results for the size of the management board. The size of the supervisory board does not have an influence on the accounting-based measures, but for the stock return the supervisory board size has a statistically negative influence. A possible explanation for the insignificant results of the supervisory board size regarding the accounting-based variables are the firm size control variables. The size of the supervisory board has a high and statistical correlation with the firm size variables. As showed in table 8, where a regression analysis is performed without the firm size variables, the supervisory

board size becomes a statistical significant variable. This indicates that the size of the supervisory board is inferior to the size of the firm. For instance, if a firm has a lot of total assets they probably have a large supervisory board, but they have high financial performances because of the large firm size rather than having a large supervisory board. Conducting the robustness tests for the supervisory board show us that the size of the supervisory board has no influence on firm financial performance in 2014, 2015 and 2016. Also when the averaged data of the variables is taken the supervisory board size has no relationship with the dependent variables.

An extra test regarding the management board size and supervisory board size is done by the variable board independence. Table 9 shows us that board independence has a statistical significant influence on the accounting-based dependent variables if the firm size variable is included. This statistical significant influence disappears for the ROA_Ebit variable and is only significant at the 0.1 level for the ROE_Ni if the firm size control variable is excluded. The results of the regression analysis with the averaged variables are in line with the earlier results and show only a statistical significant influence at the 0.1 level for the ROE_Ni variable and no influence on the other dependent variables. This result partly confirms that having independent managers rather than dependent managers contribute to firm financial performance. It is indicating that the size of the supervisory board should be larger than the size of the management board, but is like the management board size and supervisory board size heavily influenced by the firm size control variable.

Based on the results of the original model for the size of the management board the first hypothesis should obviously be confirmed. However, the results of the original model do not hold up if robustness tests are performed. The statistical influence disappears if the book value of total assets is removed from the model, indicating that the management board size is heavily influenced by this variable. Also performing a regression with averaged data of the variables show no influence of the management board size on firm financial performance. In line with the results for the management board size, also the results for supervisory board size are not robust. If robustness tests are performed the relationship for the supervisory board size with the stock return disappears, stating that the size of the supervisory board has no influence on the firm financial performance. Based on the regression analyses and especially the robustness tests the first hypothesis is not confirmed.

5.3.2 Gender diversity

Hypothesis 2a states that gender diversity has an positive influence on firm financial performance. As can be seen in table 5 gender diversity is significantly positive for ROE_Ni at the 0.1 level, but it is not influencing the other dependent variables. In table 6 gender diversity has no influence on any dependent variable. In table 8 the gender diversity has a statistical significant influence on the accounting-based variables. This result indicates that gender diversity is influenced by the size of the firm.

Also when performing the robustness tests there is no convincing evidence of a relationship between gender diversity and firm performance. The results of the gender diversity are dominated by insignificance, so it can be concluded that gender diversity has no relationship with firm performance. Therefore hypothesis 2a can not be confirmed.

5.3.3 Age diversity

Hypothesis 2b predicts a positive relationship between age diversity and firm financial performance. Age diversity is an independent variable which has no statistical significant influence on the dependent variables in table 5 and table 6. These insignificant results apply for the management as well as the supervisory board. Table 8 also shows us that the age diversity of the management board has no influence on the dependent variables. However, the age diversity of the supervisory board has a positive influence on the accounting-based variables. This in line with the supervisory board size and supervisory board gender diversity and means that the age diversity of the supervisory board is heavily influenced by firm size.

Performing the robustness tests do not change the results for the age diversity variables. Therefore there is no evidence of a relationship between age diversity and firm financial performance, thus hypothesis 2b is rejected.

5.3.4 Nationality diversity

Hypothesis 2c expects a positive influence of nationality diversity on firm financial performance. Table 5, table 6 and table 8 show us that nationality diversity is not relevant for the management board. The influence of the nationality diversity for the management board is always insignificant. This is not a surprising result, because as shown at the descriptive statistics, the median of the nationality diversity for the management board is 0. Having just a few observations of firms with nationality diversity in their management board does not lead to significant results and thus it is important to look at the supervisory board for the influence of nationality diversity.

Contrary to the management board, the results of the nationality diversity for the supervisory board are statistically significant. In table 5 the nationality diversity has a negative influence on the ROE_Ni (b= -.108** t= -2.267),
and ROA_Ebit (b= -.065*** t= -3.134). Also table 6 shows us a statistically significant negative relationship between nationality diversity and firm financial performance. For the accounting-based variables the negative relationship is significant at the 0.01 level. However, looking at table 8 the supervisory board nationality is an insignificant variable. This indicates that the nationality diversity of the supervisory board is heavily influenced by the size of the firm. The regression models in table 5, table 6 and table 8 show that nationality diversity has no influence on the stock return.

Performing the robustness tests also show us that the results displayed in table 5 and table 6 are doubtful. Conducting the analyses for each year separately show us that the nationality diversity of the supervisory board is insignificant for all of years for the ROE_Ni and only

statistically significant for the ROA_Ebit for all years at the 0.1 level. In table 10 the regression analysis is performed with the average data and also shows us that the nationality diversity has no influence on firm performance.

Based on the results for the nationality diversity on the supervisory board hypothesis 2b is rejected. Nationality diversity does not have a positive influence on firm performance. This finding is opposite the study of Erhardt, Werbel, & Shrader (2003) and the study of Honing (2012) who both reported a positive influence. A possible reason for the different finding with the study of Erhardt, Werbel, & Shrader (2003) is that their study was based on large US companies, which are more likely to operate globally and thus benefit more from nationality diversity. The study of Honing (2012) found a positive significant relationship between nationality diversity and financial performance, but only for the stock return and not for the accounting-based measures. In this study there was no evidence that supported a negative or positive statistical significant relationship between stock return and nationality diversity.

5.3.5 Board meetings

Hypothesis 3 states that the frequency of board meetings contributes positively to firm financial performance. The regression analysis in table 5 shows that board meetings negatively influence the ROE_Ni (b= -.015*** t= -2.799) and ROA_Ebit (b= -.007*** t= -2.751). The regression analysis in table 6 also shows a negative influence of board meetings on the accounting-based variables. These influences are statistical significant at the 0.05 lever for the ROE_Ebit and ROA_Ebit and at the 0.01 lever for the ROE_Ni and ROA_Ni. The stock return is not influenced by the frequency of board meetings in any of the regression models in table 5 and table 6. In line with table 5 and table 6 also table 8 shows a statistical significant relationship with the accounting-based variables. It has a negative influence on ROE_Ni (b= -.015** t= -2.582) and ROA_Ebit (b= -.005** t= -2.160).

The robustness tests are in line with the original model. In table 10 the regression analysis with the average data shows a negative statistically significant relationship with the two accounting-based measures. Also the regression analysis done for the years separately show a negative influence on ROE_Ni as well as ROA_Ebit in the years 2014 and 2015.

The results for the influence of board meetings on firm financial performance are convincing and opposite to the formulated hypothesis, so obviously the last hypothesis is rejected. It can be concluded that having a high frequency of board meetings decreases the financial performance of a firm. This is contrary to the studies of Vafeas (1999) and Al-Daoud, Saidin, & Abidin (2016) whom found a positive relationship between board meetings and firm performance. A reason for this opposite result could be that firms with a lot of board meetings have more meetings because of divided parties in their board, which leads to inefficiency and a decreasing firm performance.

Master study – The impact of board characteristics on financial performances for Dutch listed firms

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.196** (2.608)	.142*** (4.335)	.375*** (2.916)	.127* (1.758)	.118*** (3.768)	.348*** (2.863)	.128* (1.742)	.116*** (3.643)	.295** (2.406)	.137* (1.801)	.136*** (4.074)	.459*** (3.580)
MB_Size	-.029*** (-2.776)	-.010** (-2.209)	-.013 (-.716)									
MB_Natdiv				-.069 (-1.302)	-.016 (-.694)	.083 (.927)						
MB_Agediv							-.080 (-1.381)	-.054** (-2.155)	.050 (.520)			
SB_Size										-.006 (-.819)	-.005 (-1.618)	-.032*** (-2.669)
SB_Gendiv												
SB_Natdiv												
SB_Agediv												
Bmeet												
LVG_A	-.139* (-1.946)	-.121*** (-3.878)	-.449*** (-3.796)	-.132* (1.799)	-.120*** (-3.759)	-.470*** (-3.924)	-.119 (-1.607)	-.101*** (-3.148)	-.440*** (-3.684)	-.103 (-1.376)	-.108*** (-3.269)	-.348*** (-2.826)
Fage	.012 (.903)	.000 (.082)	.002 (.081)	.013 (.995)	.001 (.135)	-.000 (-.004)	.013 (.987)	.001 (.219)	.007 (.329)	.011 (.830)	.001 (.099)	.002 (.097)
Fsize_Ta	.033*** (6.724)	.012*** (5.676)	.015* (1.729)	.029*** (6.149)	.011*** (5.136)	.009 (1.187)	.030*** (6.620)	.012*** (6.079)	.013* (1.728)	.029*** (4.619)	.013*** (4.781)	.031*** (2.953)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	206	206	204	206	206	204	208	208	206	204	204	202
Adjusted R²	.217	.187	.091	.193	.169	.092	.207	.193	.085	.168	.165	.112

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Table 5 (continued): OLS regression.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.125* (1.755)	.120*** (3.787)	.341*** (2.775)	.148** (2.054)	.137*** (4.359)	.344*** (2.758)	.077 (.991)	.090*** (2.672)	.401*** (3.149)	.198** (2.600)	.153*** (4.553)	.368*** (2.743)
MB_Size												
MB_Natdiv												
MB_Agediv												
SB_Size												
SB_Gendiv	.145* (1.888)	.033 (.981)	-.018 (-.139)									
SB_Natdiv				-.108** (-2.267)	-.065*** (-3.134)	-.009 (-.111)						
SB_Agediv							.067 (1.098)	.026 (.997)	-.205** (-2.038)			
Bmeet										-.015*** (-2.799)	-.007*** (-2.751)	-.005 (-.488)
LVG_A	-.136* (-1.885)	-.125*** (-3.903)	-.443*** (-3.673)	-.096 (-1.335)	-.107*** (-3.386)	-.442*** (-3.644)	-.146** (-2.002)	-.117*** (-3.674)	-.402*** (-3.425)	-.100 (-1.403)	-.111*** (-3.509)	-.438*** (-3.636)
Fage*	.003 (.228)	-.001 (-.233)	.002 (.104)	.008 (.620)	-.001 (-.231)	.001 (.057)	.015 (1.126)	.002 (.415)	.006 (.282)	.013 (1.041)	.002 (.269)	.002 (.096)
Fsize_Ta*	.023*** (5.100)	.010*** (4.690)	.012 (1.472)	.032*** (6.028)	.014*** (6.010)	.012 (1.289)	.026*** (4.871)	.010*** (4.306)	.024*** (2.713)	.025*** (5.665)	.010*** (5.091)	.011 (1.463)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	204	204	202	204	204	202	208	208	206	204	204	202
Adjusted R²	.180	.157	.079	.186	.194	.079	.204	.178	.103	.197	.185	.080

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Table 6: OLS regression full model.

Variable	ROE_Ni	ROE_Ebit	ROA_Ni	ROA_Ebit	STR
Intercept	.332***	.357***	.195***	.200***	.334*
	(3.188)	(3.233)	(4.826)	(4.496)	(1.823)
MB_Size	-.035***	-.036***	-.013***	-.014***	-.017
	(-3.171)	(-3.150)	(-2.985)	(-3.095)	(-.869)
MB_Natdiv	-.020	-.015	-.008	.001	.070
	(-.403)	(-.285)	(-.385)	(.063)	(.764)
MB_Agediv	-.019	-.044	-.021	-.030	.071
	(-.327)	(-.719)	(-.950)	(-1.238)	(.711)
SB_Size	.003	-.003	.000	-.001	-.024
	(.285)	(-.312)	(-.033)	(-.367)	(-1.467)
SB_Gendiv	.121	.133	.035	.027	.085
	(1.559)	(1.627)	(1.172)	(.826)	(.627)
SB_Natdiv	-.175***	-.192***	-.062***	-.081***	.129
	(-3.009)	(-3.108)	(-2.800)	(-3.333)	(1.269)
SB_Agediv	.011	.081	.002	.038	-.161
	(.158)	(1.060)	(.087)	(1.243)	(-1.279)
Bmeet	-.015***	-.014**	-.006***	-.006**	-.003
	(-2.840)	(-2.497)	(-2.777)	(-2.550)	(-.288)
LVG_A	-.007	.015	-.090*	-.084	.011
	(-.050)	(.099)	(-1.766)	(-1.501)	(.048)
Fage*	-.001	-.006	-.003	-.002	.007
	(-.064)	(-.409)	(-.500)	(-.431)	(.275)
Fsize_Ta*	.034***	.041***	.017***	.021***	.051**
	(3.171)	(3.636)	(3.978)	(4.533)	(2.550)
Year dummy	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes
N	203	203	203	203	200
Adjusted R²	.254	.265	.255	.269	.196

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

6. Conclusions

This chapter contains a conclusion of the study. Firstly, conclusion are drawn and discussed based on the results of the study. Secondly the limitations of this research and recommendations for future research are described.

6.1 Conclusion

This study has investigated the influence of several board characteristics on firms financial performances. This relationship is tested by performing an ordinary least square regression, using a sample of 78 Dutch companies listed on Euronext Amsterdam for the period 2014 till 2016. The Netherlands provide an interesting institutional setting, because they have a two-tier board structure, consisting out of a management board and a supervisory board. This means that the influences of the board characteristics are sometimes different for the management board and the supervisory board. The key finding of this paper is that a high frequency of board meetings decreases firm financial performances.

Implications of the findings are summarized as follows. The first hypothesis is not confirmed by the supervisory board, because the results are dominated by insignificance. Opposite to the supervisory board, the results of the management board are statistically significant at the 0.01 level for the accounting-based dependent variables in the original models. However, conducting robustness tests show us that the size of the management board is heavily influenced by the firm size variable. Also conducting an analysis with averaged data of the variables show us no relationship between the management board size and firm financial performance. The results do not support the first hypothesis that a large board has a negative influence on firms financial performances.

There was no convincing evidence to support hypothesis 2a, predicting that gender diversity increases financial performance. Gender diversity is heavily influenced by the firm size variable and therefore it is not possible to accept this hypothesis. In addition, no support has been found to confirm hypothesis 2b which predicts that age diversity has a positive influence on firm financial performance. The management board as well as the supervisory board age diversity show no relationship with the firm financial performance.

Hypothesis 2c states that nationality diversity has a positive influence on firms financial performance. However, the results of the original model show a statistical significant negative influence of nationality diversity for the supervisory board. Although the results of the original model are showing a negative influence this is not holding up while performing robustness tests. The relationship for the management board is not interesting because the most companies have no nationality diversity on the management board. These findings show no relationship between nationality diversity and firm financial performance and therefore hypothesis 2c can not be confirmed. This rejects the theory of human capital which prefers a nationality diverse board to have better access to foreign resources.

Another contrary finding regarding the expectations is the negative influence of the frequencies of board meetings on firm financial performance. Hypothesis 3 states that a high frequency of board meetings increases the firm performance, but the analyses showed a negative relationship at the 0.01 level for the accounting-based models. The negative relationships holds when robustness tests are performed, so it can be concluded that a company with a higher frequency of board meetings have a decreasing financial performance. This could be explained by having multiple divided parties on the board which results into inefficiency for instance conflicts and a slower decision-making process which eventually decreases a firm's performance. Although having too many meetings is not contributing to firm performance this study is not arguing the fact that having regular board meetings helps the firm to stay constantly aware of the day-to-day operations which helps the board members to early notice and quickly solve arising issues (Al-Daoud, Saidin, & Abidin, 2016).

In conclusion, the answer on the research question is that the frequency of board meetings has a negative impact on a firms financial performance, while board size, gender diversity, age diversity and nationality diversity have no impact on a firms financial performance.

6.2 Limitations & Recommendations

This study contains some relevant results, however there are some limitations subjected to this study. First of all the chosen companies are all listed and non-financial companies, so it is hard to generalize the results for non-listed and financial companies in the Netherlands. It is hard to generalize these results for non-listed companies because they are not mandatory to have a supervisory board. For financial companies it is difficult because they behave different than non-financial companies. Furthermore, the sample consists of only Dutch companies, which limits the possibility to generalize the results worldwide. The reason for the lack of generalizability is the different institutional settings of countries. The Netherlands have a two-tier board, which is different compared to the one-tier board applied in the most countries. A final limitation is that all the data is gathered manually, which makes it a possibility that some cases are entered incorrectly. However, the sample size should be big enough to correct a wrongly entered case.

A recommendation for future studies is the amount of total observations. In this study there were 203 observations, because of missing data the initially 234 observations got reduced. This is not a small sample, but for the generalizability more firm-year observations could increase reliability, validity, generalizability and even find new relationships between board characteristics and firm performance. Another recommendation is to investigate additional board characteristics as well, for instance the influence of remuneration policy for the board and firm performance or the influence of the educational background of the board members on firm performance. It is worthwhile to investigate the remuneration policy because as mentioned in the introduction this could have negative effects on firm performances and lead to scandals. The other way around it could have a positive influence because members work harder and put more effort into the company. It is also interesting to examine the

educational background, it is for instance possible that higher educated members positively influence the firm performance because they have more knowledge. A final recommendation for a future study is to include multiple models instead of only the OLS regression used in this study. Using different models like structural equation model or other regression models improves the validity and consistency of the results.

References

Ahmadi, A., Nakaa, N., & Abdelfettah, B. (2017). Chief Executive Officer attributes, board structures, gender diversity and firm performance among French CAC 40 listed firms. *Research in International Business and Finance*, 44, 218-226

Al-Daoud, K., Saidin, S., & Abidin, S. (2016). Board meeting and firm performance: Evidence from the Amman stock exchange. *Corporate Board: Role, Duties and Composition, 12(2)*, 6-11.

Bauguess, S., Moeller, S., Schlingemann, F., & Zutter, C. (2009). Ownership structure and target returns. *Journal of Corporate Finance, 15(1)*, 48-65.

Becker, G. (1975). Human Capital: A theoretical and empirical analysis,with special reference to education. *National bureau of Economic Research New York*, 0-22.

Bhatt, P., & Bhatt, R. (2017) Corporate governance and firm performance in Malaysia. *Corporate Governance*, 17(5) 896-912.

Boerkamp, E. (2016). *Ownership concentration, ownership identity and firm performance: An empirical analysis of Dutch listed firms.* Enschede: University of Twente.

Bootsma, B., & Biesheuvel, J. (2012). Diversiteit in raden van commissarissen: de stand van zaken bij Nederlandse beursvennootschappen. *Maandblad voor Accountancy en Bedrijfseconomie, 86(4)*.

Bridoux, F., & Stoelhorst, J. (2014). Microfoundations for stakeholder theory: Managing stakeholders with heterogeneous motives. *Strategic Management Journal, 35(1)*, 107-125.

Chou, H., Chung, H., & Yin, X. (2013). Attendance of board meetings and company performance: Evidence from Taiwan. *Journal of Banking & Finance, 37(11)*, 4157-4171.

Claessens, S., & Yurtoglu, B. (2013). Corporate governance in emerging markets: A survey. *Emerging Markets Review, 15*, 1-33.

Cucinelli, D. (2013). The impact of board diversity on operating performance and firm risk: Evidence from the Italian market. *Corporate ownership and control*.

Darmadi, S. (2011). Board diversity and firm performance: The Indonesian evidence. *Corporate Ownership and Control, 9(1 F)*, 524-539.

Datta, D., Musteen, M., & Herrmann, P. (2009). Board characteristics, managerial incentives, and the choice between foreign acquisitions and international joint ventures. *Journal of Management, 35(4)*, 928-953.

Donaldson, L., & Davis, J. (1991). Stewardship theory or agency theory: CEO governance and shareholder returns,. *Australian Journal of Management, 16(1)*, 49-64.

Duru, A., Lyengar, R., & Zampelli, E. (2016). The dynamic relationship between CEO duality and firm performance: The moderating role of board independence. *Journal of business research*.

Eelderink, G. (2014). *Effect of ownership structure on firm performance.* Enschede: University of Twente. Retrieved from essay.utwente.nl.

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

Essa, S. (2016). *Accounting & Finance.* Retrieved from blackboard.utwente.nl: https://blackboard.utwente.nl/webapps/blackboard/execute/modulepage/view?course_id=_21967_1&cmp_tab_id=_77443_1&mode=view

Estélyi, K., & Nisar, T. (2016). Diverse boards: Why do firms get foreign nationals on their boards? *Journal of Corporate Finance, 39*, 174-192.

Euronext. (2018, January). *Aandelen amsterdam*. Retrieved from AEX: https://www.aex.nl/koersen/aandelen-amsterdam

Ferrero-Ferrero, i., Fernandez-Izquerdo, A., & Munoz-Torres, J. (2012). Age diversity in the boardroom: Measures and implications. *International Conference of Modeling and Simulation in Engineering, Economics, and Management*, (pp. 134-143). New York.

Fooladi, M. (2012). Board Characteristics and Firm Performance. *Journal of modern accounting and auditing*.

Frijns, B., Dodd, O., & Cimerova, H. (2016). The impact of cultural diversity in corporate boards on firm performance. *Journal of Corporate Finance*(41), 521-541.

Governance University. (2017). One-tier board. "Onbekend maakt onbemind". *Governance University*.

Guest, P. (2009). The impact of board size on firm performance: evidence from the UK. *European Journal of Finance* 15(4), 385-404.

Henseler, J. (2017). *Regression Analysis.* Retrieved from blackboard.utwente.nl: https://blackboard.utwente.nl/bbcswebdav/pid-1041792-dt-content-rid-2532402_2/courses/2016-201500082-2B/05_TL_Regression.pdf

Honing, S. (2012). *Does Diversity in Executive Boards Make a Difference? Nationality Diversity and Firm Performance in German, Dutch and British Multinational Enterprises.* Amsterdam: Amsterdam Business School.

Jensen, M. (1993). The modern industrial revolution, exit, and the failure of internal control. *Journal of Finance, 48(3)*, 831-880.

Jensen, M., & Meckling, W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure,. *Journal of Financial Economics, 3(4)*, 305-360.

Kabir, R. (2016). Finance and Corporate Governance. *Governance mechanisms*. Enschede: University of Twente.

Kemerink, W. (2018). *The moderating role of ownership and board structure in the effect of corporate social responsibility on firm performance.* Enschede: University of Twente.

Li, D., Moshirian, F., Nguyen, P., & Tan, L. (2007). Managerial ownership and firm performance: Evidence from China's privatizations. *Research in International Business and Finance, 21(3)*, 396-413.

Lipton, M., & Lorsch, J. (1992). A modest proposal for improved corporate governance. *Business Lawyer, 48(1)*, 59-77.

Lückerath-Rovers, & Smits, E. (2010). Onafhankelijke commissarissen en de relatie met performance in one-tier en two-tier bestuur. *Maandblad voor Accountancy en Bedrijfseconomie, 84(3)*.

Lückerath-Rovers, M. (2008). *De Nederlandse 'Female Board Index' 2007.* Erasmus Instituut Toezicht en Compliance.

Lückerath-Rovers, M. (2011). *The Dutch Female Board Index 2011.* Erasmus Instituut Toezicht & Compliance.

Lückerath-Rovers, M. (2013). Women on board and firm performance. *Journal of Management & Governance, 17(2)*, 491-509.

Lückerath-Rovers, M. (2017). *The Dutch Female Board Index 2017.* Erasmus Instituut Toezicht & Compliance.

Maassen, G., & Van Den Bosch, F. (1999). On the supposed independence of two-tier boards: Formal structure and reality in the Netherlands. *Corporate Governance, 7(1)*, 31-37.

Masulis, R., Wang, C., & Xie, F. (2012). Globalizing the boardroom—The effects of foreign directors on corporate governance and firm performance. *Journal of Accounting and Economics, 53*(3), 527-554.

Maury, B. (2006). Family ownership and firm performance: Empirical evidence from Western European corporations. *Journal of Corporate Finance, 12(2)*, 321-341.

Miletkov, M., Poulsen, A., & Wintoki, B. (2012). Foreign independent directors and the quality of legal institutions. *Journal of International Business Studies, 48(2)*, 267-292.

Nicholson, G., & Kiel, G. (2007). Can directors impact performance? A case-based test of three theories of corporate governance. *Corporate Governance, 15(4)*, 585-608.

O'Connell, V., & Cramer, N. (2010). The relationship between firm performance and board characteristics in Ireland. *European Management Journal* 28(5), 387-399.

Orbis. (2018). *Segmentation, industry & country*. Retrieved from Orbis.com: https://orbis-bvdinfo-com.ezproxy2.utwente.nl/version-201827/Segmentation.Report.serv?_CID=680&context=OJDLER98A9J9TO5

Overheid. (2017, September 1). *Wet op de ondernemingsraden.* Retrieved from wetten.overheid.nl: http://wetten.overheid.nl/BWBR0002747/2017-09-01

Philips, R., Freeman, E., & Wicks, A. (2003). What Stakeholder Theory Is not. *Business Ethics Quarterly, 13*(4), 479-502.

Postma, T., Ees, H., & Sterken, E. (2003). Board characteristics and corporate performance in the Netherlands. *Eastern Economic Journal, 29(1)*, 41-58.

Pugliese, A., Minichelli, A., & Zattoni, A. (2014). Integrating agency and resource dependence theory: Firm profitability, industry regulation, and board task performance. *Journal of Business Research, 67(6)*, 1189-1200.

Rijksoverheid. (2017, March 24). *Wettelijk streefcijfer mannen en vrouwen in bestuur ondernemingen van kracht.* Retrieved from rijksoverheid.nl: https://www.rijksoverheid.nl/actueel/nieuws/2017/03/24/wettelijk-streefcijfer-mannen-en-vrouwen-in-bestuur-ondernemingen-van-kracht

Shehata, N., Salhin, A., & El-Helaly, M. (2017). Board diversity and firm performance: evidence from the U.K. SMEs. *Applied Economics, 49(48)*, 4817-4832.

Shukeri, S., Shin, O., & Shaari, M. (2012). Does board of director's characteristics affect firm performance? Evidence from Malaysian public listed companies. *International Business Research, 5(9)*.

Trouw. (2006, September 16). We vergaderen ons suf. Dat kost veel tijd en geld. Kan het niet wat minder? *Trouw*.

Trouw. (2008, december 11). Code Tabaksblat is meer dan formaliteit. *Trouw*.

Vafeas, N. (1999). Board meeting frequency and firm performance. *Journal of financial economics* 53(1), 113-142.

Wissink, S. (2017). *Determinants of corporate social responsibility for Dutch listed firms.* Enschede: University of Twente.

Yermack, D. (1996). Higher market valuation of companies with a small board of directors. *Journal of Financial Economics, 40(2)*, 185-211.

Yu, L., Wie, Z., & Xie, F. (2014). Do women directors improve firm performance in China? *Journal of corporate finance*.

Appendices

Appendix A – Total sample

The sample consists of all Dutch companies, excluding financial companies listed on Euronext Amsterdam.

Table 7: List of sampled firms

Aalberts Industries	FNG NV	Philips Kon.
Accell Group	ForFarmers	Philips Light
Altice NV	Fugro	Porceleyne
Ahold Del Haize	Gemalto	PostNL
Ajax Amsterdam	Grandvision	Kardan
Akzo Nobel	Heijmans	Randstad
AMG	Heineken	Refresco
Amsterdam Commodities	Heineken Holding	RELX
AND International	Holland Colours	Roodmicro
Arcadis	Hydratec	Royal Shell
ASM International	ICT Group	Kon. Boskalis Westminster
ASML Holding	IEX Group	SBM Offshore
BAM Group	IMCD	SIF Holding
Batenburg Techniek	Kendrion	Sligro Food
BE Semiconductors	Kiadis	Snowworld
Beter Bed	KPN Kon.	Stern Group
Brill Kon.	Lavide	Telegraaf
Brunel International	Lucas Bols	TIE Kinetix
Bever Holding	Nedap	TKH Group
Corbion	Nedsense Enter	TomTom
CTAC	Neways Electric	Unilever NV
DOC Data	Novisource	Volkerwessels
DPA Group	OCI	VOPAK
DSM Kon.	Oranjewoud	Wessanen
Esperite	Ordina	Wolters Kluwer
Groothandelsgebouwen NV	Pharming group	Value8

Appendix B – VIF

The VIF results of all the five dependent variables are showed below, as mentioned in the thesis there is no multicollinearity present in the data for the independent variables.

Model		Collinearity Statistics	
		Tolerance	VIF
1	MB_Size	,776	1,288
	MB_Natdiv	,868	1,152
	MB_Agediv	,854	1,171
	SB_Size	,327	3,055
	SB_Gendiv	,837	1,194
	SB_Natdiv	,531	1,885
	SB_Agediv	,474	2,110
	Bmeet	,943	1,060

a. Dependent Variable: ROE_Ni

Model		Collinearity Statistics	
		Tolerance	VIF
1	MB_Size	,776	1,288
	MB_Natdiv	,868	1,152
	MB_Agediv	,854	1,171
	SB_Size	,327	3,055
	SB_Gendiv	,837	1,194
	SB_Natdiv	,531	1,885
	SB_Agediv	,474	2,110
	Bmeet	,943	1,060

a. Dependent Variable: ROE_Ebit

Model		Collinearity Statistics	
		Tolerance	VIF
1	MB_Size	,778	1,285
	MB_Natdiv	,850	1,176
	MB_Agediv	,855	1,169
	SB_Size	,329	3,035
	SB_Gendiv	,835	1,197
	SB_Natdiv	,540	1,852
	SB_Agediv	,467	2,140
	Bmeet	,928	1,077

a. Dependent Variable: ROA_Ni

Model		Collinearity Statistics	
		Tolerance	VIF
1	MB_Size	,778	1,285
	MB_Natdiv	,850	1,176
	MB_Agediv	,855	1,169
	SB_Size	,329	3,035
	SB_Gendiv	,835	1,197
	SB_Natdiv	,540	1,852
	SB_Agediv	,467	2,140
	Bmeet	,928	1,077

a. Dependent Variable: ROA_Ebit

Model		Collinearity Statistics	
		Tolerance	VIF
1	MB_Size	,783	1,277
	MB_Natdiv	,859	1,164
	MB_Agediv	,848	1,180
	SB_Size	,313	3,190
	SB_Gendiv	,831	1,203
	SB_Natdiv	,504	1,983
	SB_Agediv	,483	2,071
	Bmeet	,940	1,064

a. Dependent Variable: STR

Appendix C – OLS regression without firm size variables

Table 8: OLS regression without firm size variables.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.079	.105***	.353***	.093	.114***	.361***	.044	.087***	.279**	.026	.090***	.364***
	(1.001)	(3.179)	(2.857)	(1.218)	(3.591)	(3.012)	(.577)	(2.663)	(2.330)	(.351)	(2.816)	(2.983)
MB_Size	.006	.004	-.001									
	(.551)	(.869)	(-.057)									
MB_Natdiv				.053	.030	.117						
				(.990)	(1.354)	(1.388)						
MB_Agediv							-.005	-.025	.108			
							(-.080)	(-.960)	(1.168)			
SB_Size										.019***	.007***	-.007
										(3.661)	(3.022)	(-.813)
SB_Gendiv												
SB_Natdiv												
SB_Agediv												
Bmeet												
LVG_A	-.183**	-.146***	-.489***	-.192**	-.152***	-.509***	-.147*	-.116***	-.484***	-.202***	-.156***	-.459***
	(-2.362)	(-4.542)	(-4.191)	(-2.462)	(-4.692)	(-4.352)	(-1.863)	(-3.473)	(-4.129)	(-2.670)	(-4.830)	(-3.807)
Fage*	.021	.003	.005	.020	.003	-0.001	.028**	.007	.012	.014	.001	.006
	(1.001)	(.540)	(.210)	(1.441)	(.437)	(-.002)	(1.979)	(1.151)	(.556)	(1.078)	(.247)	(.274)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	221	221	210	221	221	210	227	221	212	219	219	208
Adjusted R²	.031	.076	.087	.034	.081	.096	.024	.052	.084	.082	.105	.082

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Master study – The impact of board characteristics on financial performances for Dutch listed firms

Table 8 (continued): OLS regression without firm size variables.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.089 (1.216)	.113*** (3.567)	.354*** (2.922)	.069 (.921)	.108*** (3.376)	.344*** (2.846)	-.039 (-.514)	.047 (1.430)	.320*** (2.637)	.157* (1.951)	.140*** (4.034)	.357*** (2.697)
MB_Size												
MB_Natdiv												
MB_Agediv												
SB_Size												
SB_Gendiv	.238*** (3.074)	.082** (2.464)	.070 (.556)									
SB_Natdiv				.045 (1.030)	.007 (.356)	.030 (.439)						
SB_Agediv							.216*** (4.246)	.086*** (3.988)	-.056 (-.662)			
Bmeet										-.015** (-2.582)	-.005** (-2.160)	-.001 (-.159)
LVG_A	-.164** (-2.187)	-.143*** (-4.462)	-.486*** (-4.101)	-.162** (-2.087)	-.142*** (-4.316)	-.486*** (-4.085)	-.168** (-2.259)	-.125*** (-3.935)	-.456*** (-3.900)	-.127* (-1.671)	-.133*** (-4.106)	-.477*** (-4.028)
Fage*	.007 (.483)	-.001 (-.191)	.000 (-.015)	.019 (1.424)	.003 (.544)	.003 (.145)	.025* (1.842)	.006 (1.048)	.013 (.583)	.022 (1.624)	.004 (.679)	.004 (.173)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	219	219	208	219	219	208	227	227	212	219	219	208
Adjusted R²	.066	.092	.081	.029	.066	.080	.098	.113	.080	.054	.086	.080

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Appendix D – OLS regression board independence

The regression analysis for the board independence is displayed below, the last 3 columns are the outcomes for the regression analysis based on the averaged data for the variables.

Table 9: OLS regression board independence.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	,002 (,025)	,093** (2,126)	,442*** (2,641)	-,140 (-1,380)	,038 (,861)	,397** (2,436)	,035 (,236)	,119* (1,702)	,239 (1,500)
MB_Natdiv									
MB_Agediv									
SB_Gendiv									
SB_Natdiv									
SB_Agediv									
Bmeet									
Bindep	,002* (1,669)	,000 (,844)	-,002 (-,880)	,003*** (3,063)	,001** (2,359)	-,001 (-,442)	,003* (1,728)	,001 (,901)	,001 (,340)
LVG_A	-,132* (-1,828)	-,124*** (-3,877)	-,432*** (-3,590)	-,161** (-2,147)	-,142*** (-4,439)	-,474*** (-4,004)	-,267** (-2,381)	-,188*** (-3,589)	-,402*** (-3,383)
Fage*	,010 (,777)	,000 (,035)	,002 (,094)	,018 (1,339)	,003 (,457)	,004 (,193)	-,003 (-,163)	-,004 (-,523)	,009 (,548)
Fsize_Ta*	,024*** (5,196)	,010*** (4,755)	,013 (1,629)				,023*** (3,244)	,009*** (2,718)	,010 (1,299)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes			
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	204	204	202	219	219	208	78	78	78
Adjusted R²	.177	.156	.083	.065	.090	.080	.185	.172	.123

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. Board independence is measured by dividing the amount of members in the supervisory board with the total amount of members in the management board and supervisory board. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Appendix E – OLS regression averaged data of variables

Table 10: OLS regression averaged data of variables.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.256**	.174***	.271**	.228**	.165***	.263**	.251**	.178***	.250**	.178	.157***	.292**
	(2.305)	(3.412)	(2.345)	(2.200)	(3.476)	(2.484)	(2.406)	(3.738)	(2.324)	(1.511)	(2.893)	(2.375)
MB_Size	-.010	-.003	.003									
	(-.657)	(-.421)	(.182)									
MB_Natdiv				.003	.008	.155						
				(.030)	(.166)	(1.450)						
MB_Agediv							-.104	-.056	.133			
							(-1.101)	(-1.305)	(1.360)			
SB_Size										.008	.001	-.002
										(.854)	(.321)	(-.218)
SB_Gendiv												
SB_Natdiv												
SB_Agediv												
Bmeet												
LVG_A	-.296**	-.195***	-.406***	-.292**	-.195***	-.437***	-.278**	-.187***	-.424***	-.285**	-.193***	-.409***
	(-2.608)	(-3.733)	(-3.430)	(-2.529)	(-3.682)	(-3.697)	(-2.456)	(-3.596)	(-3.614)	(-2.519)	(-3.685)	(-3.457)
Fage*	-.003	-.004	.009	-.003	-.004	.011	-.003	-.004	.010	-.001	-.004	.009
	(-.153)	(-.517)	(.547)	(-.155)	(-.508)	(.643)	(-.183)	(-.555)	(.585)	(-.076)	(-.487)	(.525)
Fsize_Ta*	.028***	.010***	.010	.027***	.010***	.007	.028***	.011***	.008	.021**	.009**	.012
	(3.737)	(2.986)	(1.272)	(3.519)	(2.809)	(.891)	(3.919)	(3.277)	(1.129)	(2.255)	(2.065)	(1.219)
Year dummy												
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	78	78	78	78	78	78	78	78	78	78	78	78
Adjusted R²	.157	.165	.122	.152	.163	.146	.165	.182	.143	.160	.164	.122

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level.

Table 10 (continued): OLS regression with averaged data of variables.

Variable	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR	ROE_Ni	ROA_Ebit	STR
Intercept	.214**	.162***	.278**	.258**	.187***	.250**	.156	.138**	.288**	.343***	.212***	.265**
	(2.103)	(3.432)	(2.590)	(2.394)	(3.809)	(2.232)	(1.344)	(2.570)	(.021)	(2.934)	(3.929)	(2.130)
MB_Size												
MB_Natdiv												
MB_Agediv												
SB_Size												
SB_Gendiv	.197	.058	.013									
	(1.630)	(1.030)	(.099)									
SB_Natdiv				-.065	-.046	.061						
				(-.891)	(-1.378)	(.814)						
SB_Agediv							.117	.047	-.014			
							(1.284)	(1.106)	(.880)			
Bmeet										-.017*	-.007*	.002
										(-1.926)	(-1.669)	(.231)
LVG_A	-.285**	-.192***	-.407***	-.299**	-.199***	-.400***	-.272**	-.186***	-.410***	-.287**	-.192***	-.408***
	(-2.551)	(-3.698)	(-3.444)	(-2.636)	(-3.849)	(-3.394)	(-2.393)	(-3.555)	(.001)	(-2.592)	(-3.748)	(-3.454)
Fage*	-.009	-.006	.009	-.005	-.005	.011	-.002	-.004	.009	-.004	-.004	.010
	(-.516)	(-.737)	(.512)	(-.280)	(-.712)	(.658)	(-.099)	(-.471)	(.591)	(-.241)	(-.598)	(.557)
Fsize_Ta*	.023***	.009**	.010	.031***	.013***	.007	.021**	.008**	.011	.030***	.011***	.010
	(3.035)	(2.530)	(1.316)	(3.655)	(3.335)	(.782)	(2.602)	(2.071)	(.194)	(4.157)	(3.377)	(1.351)
Year dummy												
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	78	78	78	78	78	78	78	78	78	78	78	78
Adjusted R²	.181	.175	.121	.161	.184	.129	.170	.177	.122	.193	.194	.122

Notes: Table reports the unstandardized coefficients. Figures in parentheses represent the t-statistics. * Log transformed variable. Variable definitions are described in table 1. *** Correlation is significant at the 0.01 level. ** Correlation is significant at the 0.05 level. * Correlation is significant at the 0.1 level