Radboud Universiteit Nijmegen

The Effect of Gender Diversity and Quotas on the Performance of Banks: A Comparison Within Europe

Master Thesis

Abstract

The role of women has changed significantly over the past decades. This led to a reduction of the household role and an increase in labour participation of women. However, the majority of management boards are still dominated by men. As a result, many European countries have introduced a gender quota law to stimulate, and sometimes force, companies to appoint women to their management boards. This raises the question what the effect of gender diversity on the performance of companies is and how quotas affect this relationship. From a theoretical point of view, multiple theories predict a positive effect on performance if the gender diversity level increases. The risk averse and more controlling nature of women, a more diverse human capital and a reduction of the influence of group thinking are arguments drawn from these theories that expect a positive effect of gender diversity on performance. Other theories suggest that a negative effect also could occur and state that a higher level of gender diversity can also create a slower decision making process, increasing tension, lack of trust between board members and a higher frequency of conflicts. This paper examines the effect of gender diversity and quotas in management boards on the performance of European banks. The goal of this research is to create more insight in the effect that a higher level of gender diversity has and if different quota policies influence this relationship. The main findings of this paper show that a higher level of gender diversity in management boards of European banks has a negative effect on performance. The analyses show that the presence of women is not necessarily negative, but that the effect becomes negative if this leads to an increase in gender diversity. The results show that quotas do not significantly affect this relationship.

Author:	Jeffrey van den Dries
Student number:	s4848241
Supervisor:	Dr. K. (Katarzyna) Burzynska
Date of publication:	22-06-2018
Place of publication:	Nijmegen, the Netherlands

Radboud University Nijmegen
Nijmegen School of Management
Master Economics
Specialization: Corporate Finance & Control

Keywords: Gender Diversity, Financial Performance, Management board, Banks, Quota

Content

1. Introduction

The role of women in the economy has changed significantly over the past decades and is continuously evolving. This change caused a reduction of the family role of women and an increase in labour participation (Thornton, Alwin, & Camburn, 1983). The change in the role of women also leads to a setting in which women and men should have equal opportunities in the labour market. However, there is still a significant observable difference in the percentage of men and women that occupy academic and high management positions. For example, of all senior economists in Europe and the U.S., over 80% is male (D'Urbino, 2017). Additionally, according to the Credit Suisse Research Institute (2015), men occupied more than 85% of the high managerial positions in the 2005-2011 period. They base their results on a research conducted on more than three thousand businesses in a variety of sectors and countries (Iacoviello, Mazzei, & Riccardi, 2015). When assessing the banking sector, Quack and Hancke (1997) found that the percentage of women that occupied (high) managerial positions decreases if the managerial level increases. They conclude that women represented 50% of the total employees in the banking sector, but that just 16% of the high-level managerial positions were occupied by women.

As a result of the skewed distribution of men and women on high managerial levels, several countries imposed or are considering a quota on the presence of women in management boards. Among these countries are: Norway, Iceland, Spain, France, Germany, Italy, The Netherlands and Belgium (Ahern & Dittmar, 2012; Iacoviello et al., 2015; CED, 2012). The first country that introduced a quota on management composition was Norway. They imposed a quota in which they demanded at least 40% of the top management to be female for all publicly traded firms by January of 2008 (Ahern & Dittmar, 2012). Shortly after, France, Iceland and Spain imposed also a 40% quota on top management boards for all publicly traded companies, even though they do not impose significant sanctions like Norway does if the quota is not met (Iacoviello et al., 2015). Italy followed the Norwegian example and established a mandatory quota in top decision making positions for listed Italian companies in 2011, followed by applying the quota on state-owned companies in 2013. The quota was set for 33% of the top management and was required to be reached by 2015 (Rosselli, 2014). Belgium applied the same quota percentage as Italy, implying that 33% of the management boards of state-owned and publicly listed companies would consist of women. The boards of state-owned companies were given one year to comply, while the listed companies were allowed a 5 to 8 year term to fulfil the quota requirement (Mateos de Cabo, Gimeno, & Nieto, 2012). Germany implemented a law in 2015 that, starting from 2016, the 108 largest German companies who were listed at the stock exchange will reserve 30% of the board of directors' seats for women. If no woman gets appointed, the seats will stay vacant. Additionally, an estimated 3,500 smaller German

businesses are obligated to publish their gender equality goals over the upcoming years. These smaller firms face less strict gender regulation obligations than the 108 largest firms, but are also forced to contribute to more gender equal boards by the implied regulation (Connolly, 2014). The Netherlands followed the German example and imposed a 30% quota for publicly traded firms. In contrast to Germany, the quota does not come with any consequences if the 30% is not met. The article in the Dutch law book that describes the quota states that companies 'must strive' for at least 30% of female directors and supervisory directors (Overheid.nl, 2015). Even though different policies are implemented, these quotas are all constructed to stimulate the presence of women in the top management of companies and to reduce the skewness of the gender diversity distribution of their country.

As a response to these imposed quotas in Europe, the Committee for Economic Development (CED) wrote a report in which they express their concerns regarding the backlog of the U.S. in increasing gender diversity in management boards (2012). The CED states that the U.S. was always able to use its cultural diversity as a comparative advantage and that Europe is currently shifting the comparative advantage towards them, due to the increased opportunities that are created for women. Finally, they state that the U.S. will need 'all available talent' to be successful in the competitive global market in the future.

It is remarkable that several countries find it necessary to force companies to appoint females into their top management and that subsequently, the CED (2012) expresses their concerns regarding this development and the shift of comparative advantage that this might cause. The question that arises in this matter is: "Why are women so underrepresented in top management boards?". When assessing this question from an economic theoretical point of view, discrimination based on gender does not exist. According to Neoclassical theory, firms have no incentive to discriminate based on race or gender. The overall goal of firms is to improve performance. This implies that firms will objectively judge individuals based on capacity and quality and that race or gender of the individual is irrelevant (Weetman, 2017; Grant & Brue, 2012; Ferber & Nelson, 1993). The neoclassical point of view on this matter would lead to the conclusion that men are considered more appropriate for top management positions and therefore currently dominate management boards, assuming that companies do not let their board composition choices depend on something else than performance related arguments. In contrast to this neoclassical point of view, many studies endorse the positive effect that a heterogeneous group composition has in comparison to a homogeneous group composition. They found that members of heterogeneous groups complement each other due to different backgrounds, culture, knowledge, experiences and behaviour of each individual. This results in enhancing the quality of the board, group discussion and as a result, the

final performance (Chen et al., 2017; Phillips, 2014). The latter could imply that even if the neoclassical point of view would be accurate and men are individually more suitable for top management positions than women, the addition of women to a board might create diversity advantages that could improve the final performance. Besides these positive effects of heterogeneous groups found by several studies, some argue that group diversity also can lead to disadvantages. They argue that group diversity can cause rougher discussion, discomfort, lack of trust, higher conflict frequency and slower decision making (Trittin & Schoeneborn, 2017; Phillips, 2014; Iacoviello et al., 2015).

The changing role of women in economics, the social discussion regarding diversity and the scientific pros and cons regarding the effect of diversity on performance led to much scientific research regarding gender diversity in boards. However, very few of these studies specifically focus on board composition regarding gender diversity in the banking sector and the effect on performance. Mateos de Cabo et al. (2012) also recognize this matter and suggest that the banking sector is less often subject of gender diversity research in top management. Several reasons contribute to this matter. First, the number of stakeholders of banks is composed differently than that of non-financial firms. In addition to investors and depositors, regulators have a strong interest in the performance of banks. Second, banks are regulated and strongly monitored since their performance influences the overall economy significantly. As a result, the board of a financial firm has a different governance role than boards have in non-financial firms. Despite these differences, the importance of the governance role of the top management in financial firms is considered to be at least as important as the governance role of non-financial firms (de Andres & Vallelado, 2008; Díaz Díaz B., 2018; Hagendorff & Keasey, 2012; Becht, Bolton, & Röell, 2011; Garcia-Meca, Garcia-Sanchez, & Martinez-Ferrero, 2015).

The consequence of these differences is that results from gender diversity studies of non-financial firms are not automatically applicable to financial firms and vice versa (Adams. & Mehran, 2003; Díaz Díaz B., 2018). This is also the reason why research often excludes financial firms in their sample and why less research on banks is conducted. This becomes also clear in the gender diversity topic regarding bank management boards, in which just a few researches are conducted. Richard (2000) examined the relationship between racial diversity, business strategy and the performance of banks, Hagendorff & Keasey (2012) assessed how board diversity effects the market performance of acquisitions in the banking industry in the U.S and Mateos de Cabo et al. (2012) conducted specific research to board diversity of European banks. They examined how organizational characteristics could, positively, influence the presence of women in the top management of banks in Europe. The research conducted by Pathan & Faff (2013), Dwyer et al. (2003) and Garcia-Meca et al. (2015)

focussed more specifically on gender diversity and bank performance. Pathan & Faff (2013) examined the effect of gender diversity in the management board of banks on performance in the U.S. in the 1997-2011 period. Dwyer et al. (2003) studied the effect of gender diversity in the higher and lower managerial levels of banks in the 1996-1998 period in a non-specified geographical region ("The sample frame for this study consisted of 535 banks that had responded to an earlier questionnaire for a separate study 6 months earlier." (Dwyer et al., 2003, p. 1013)). The research of Garcia-Meca et al. (2015) was twofold. Besides examining the effect of gender diversity in management board of banks, they also assessed the influence of nationality of board members. The sample consisted of banks in nine different countries, from North-America and Europe, over a 2004-2010 period. The research did not assess the influence of quotas on gender diversity, since none of the countries in the data sample implemented a gender diversity quota at the 2004-2010 timeframe (European Parliament, 2012).

In addition to the mentioned studies of the effect of gender diversity in banks by Richard (2000), Hagendorff & Keasey (2012), Mateos de Cabo et al. (2012), Pathan & Faff (2013), Dwyer et al. (2003) and Garcia-Meca et al. (2015), this research attempts to extend the current knowledge by researching the relationship between gender diversity in the top management of European banks and performance. To examine this relationship, the formulated research question is: What is the effect of gender diversity and quotas in the top management on the performance of European banks?

The effect of gender diversity on performance is examined by assessing the board composition of 158 European banks from 26 different countries over a 2006 – 2016 period and to relate this to the performance. Gender diversity is included in the analyses by creating three different diversity measures. The effect of quotas is taking into account by assigning banks to quota dummies, in which four different categories are created with an ascending level of quota strictness. The category to which a bank is assigned depends on the quota policy of the country in which it is located and the year in which the quota policy is introduced. A Fixed effects regression (Ordinary Least Squares) is used to conduct the analyses. The results show a significant and negative relationship between gender diversity and performance. The effect of quotas was only significant if gender diversity was expressed as a dummy, in which at least one woman was present at the board or no women were present at the board, and if the quota policy was strict. The overall effect of this interaction effect turned out to be negative in relation to performance.

This research addresses several aspects that are still unobserved in the mentioned previous studies. First, the geographical sample will be from banks in Europe. Most research focusses on gender diversity in non-financial firms or firms in just a single country (Campbell & Minguez-Vera,

2008; Carter, D'Souza, Simkins, & Simpson, 2010; Iacoviello et al., 2015; Ahern & Dittmar, 2012; Hagendorff & Keasey, 2012; Richard, 2000; Dwyer et al., 2003; Pathan & Faff, 2013) or across countries in different continents (Garcia-Meca et al., 2015). Second, there will be assessed if the relationship between gender diversity and banks differs in countries that imply quotas and countries that do not imply quotas. Previous research regarding quotas focused on the domestic effect of the quota on the performance of non-financial firms (Campbell & Minguez-Vera, 2008; Iacoviello et al., 2015; Ahern & Dittmar, 2012).

From a practical point of view, the attempt of this study to create more insight into the effect of gender diversity in the top management of banks can be valuable in determining the criteria for the future selection procedure of board members. Additionally, if the study finds a significant difference in the effect of gender diversity between countries with different quota policies, the results might be interesting for policymakers that consider diversity quotas or policy makers that are looking to improve their current gender quota policy.

The upcoming chapters are structured as follows: Chapter 2 will describe the theoretical framework for this study, in which hypotheses are formulated. Chapter 3 will explain which data has been used and will discuss the research method. Chapter 4 will present and discuss the results. Finally, Chapter 5 will finish with the conclusion, limitations and suggestions for future research.

2. Theoretical framework

This chapter will start with a discussion about the differences between the governance role of management boards of financial firms and non-financial firms. Since studies often focus on one of these two groups, it is important to assess how the governance role of the management board differs between these type of firms. Second, four different theories drawn from Alm & Winberg (2016), Mateos de Cabo et al. (2012) and Carter et al. (2010) will be used to assess the possible impact of gender diversity on performance in the top management of banks. Even though all papers admit that it is difficult to fully capture the effect of board diversity on financial performance, they all use these four theories, drawn from organization, social psychology and economic theory, to discuss the nature of the relation between financial performance and board diversity. These theories are: agency theory, resource dependence theory, social psychology and human capital theory. They will be used to examine the possible effect of gender diversity in top management of firms. Even though it is not the purpose to test a specific theory, it is useful to set out a theoretical framework with the use of these theories to understand the scientific background and to formulate proper hypotheses.

2.1 Governance

The management board fulfils an important role in the governance of a firm. It functions as an instrument for shareholders to control managers and ensures the company is governed at their interest. The most important functions of the top management are monitoring and advising (De Haan & Vlahu, 2012). By monitoring, the board controls the managers to make sure that their behaviour is in line with the interest of shareholders. As an advisor, the top management provides knowledge, opinions and direction to strategically direct managers into the direction that is considered to maximize shareholders value (De Haan & Vlahu, 2012).

In evaluating the role of the top management in financial and non-financial firms, some significant differences can be observed due to the difference in characteristics of both. First, financial firms differ from non-financial firms due to the presence of additional stakeholders. Besides investors and depositors, regulators are an important element in the existence of banks and come along with different challenges and characteristics. The depositors provide funds for the banks to conduct business. The difference with funders for non-financial institutions is that depositors do not monitor and assess the banks in the same way that funders of non-financial institutions would. This lack of monitoring leads to a situation in which banks have the incentive to take more than the appropriate risk in their investments in an attempt to bring in more revenues. If the investments fail, the depositors would bear a substantial part of the costs. To protect depositors for these risks, governments protect them, to some extent, with the depositor-insurance system. However, this

strengthens the incentive for banks to take even more risk, since the depositors do not bear the risk of losing the investment and do not require an adequate risk premium for their investment (De Haan & Vlahu, 2012; de Andres & Vallelado, 2008). Therefore, besides the role of the regulators to secure the funds of depositors with the depositor-insurance system, they also serve an important role in securing the health global economy. Financial firms differ on this aspect from non-financial firms, since the failure of financial firms can have serious consequences for the global economy due to their role as financial intermediary and unique position in the payment system (De Haan & Vlahu, 2012; de Andres & Vallelado, 2008). This once again strengthens the risk appetite of banks, since they know that they play a key role in the global economy and in case of default, there is a significant chance that the government will intervene and prevent bankruptcy. The combination of the lower monitoring incentive of depositors, the depositor-insurance system and the knowledge that governments are likely to prevent bankruptcy in case of financial distress leads to a situation in which a management board is willing to take more excessive risk, while monitoring does not necessarily prevent them from being able to take excessive risk. The latter could be seen in the financial crisis of 2007, were banks used 'shadow banking' to escape the regulatory oversight and enabled themselves to take excessive risk while being strictly monitored (Becht, Bolton, & Röell, 2011). These differences distinguish the role of the top management of a financial institution significantly from the role of the top management of a non-financial institution.

Besides the risk appetite difference between financial and non-financial firms, the characteristics of the activities of financial firms come along with different risks than for non-financial firms. The first notable difference is the leverage. Banks are always highly leveraged due to the characteristics of their business, while non-financial firms are usually less extremely leveraged. This high leverage increases chances of bankruptcy in case of distress (De Haan & Vlahu, 2012). Secondly, a crucial function that banks perform is the maturity transformation, creating a liquidity risk. This is due to the very liquid nature of the majority of the funds provided by depositors and the often illiquid and long maturity nature of investments (Becht, Bolton, & Röell, 2011).

To summarize, the governance role of the top management board in banks differs from that of non-financial firms due to presence of more stakeholders, the different risk appetite, the nature of business and the important role in the global economy (Boscia, Stefanelli, & Ventura, 2018). Therefore, the conclusion is that financial and non-financial firms differ in the governance role of the management but, despite the regulation, the top management of banks still functions as an important governance mechanism that plays a key role in the actual financial performance (de Andres & Vallelado, 2008; Díaz Díaz B., 2018; Hagendorff & Keasey, 2012; Becht, Bolton, & Röell, 2011; Garcia-Meca et al., 2015).

2.2 Resource dependence theory

The resource dependence theory is developed by Pfeffer & Salancik (2003) and has become one of the mainstream management and organizational theories. The resource dependence theory considers that firms operate in an open system. By operating, the firm needs to acquire and exchange resources in order to continue its business. The resource dependence theory is specifically concerned with the effect of external resources on organizational behaviour. Firms attempt to reduce the influence of these external resources and often try to counter this with controlling the counterparty (Hillman, Withers, & Collins, 2009).

Previous research studied how the composition of a board relates to the resource dependence theory. Hillman et al. (2009) states that boards need to create a board composition in which they match their board resources with the requirements of the firm. Pfeffer and Salanic (2003) describe four potential contributions that the top management can make: knowlegde in the form of advice (1), access to channels between the firm and contingencies in the environment (2), a network that provides access to resources (3) and creating legitimacy in the environment in which the firm operates (4). Mateos de Cabo et al. (2012) discuss these contributions further and state that a boards network can provide access to capital, interbusiness connections and, in case of industry regulation like the banking industry, to industry supervisors. Booth & Deli (1999) illustrate the effect of board composition and the influence of individual board members in their study, with the finding that the presence of a commercial banker in the top management board relates positively to the amount of total debt of a firm. This can be explained by the presence of this commercial banker and that this provides expertise and connections to the bank debt market. Furthermore, Agrawal & Knoeber (2000) examined that outside directors who have political and legal experience are more likely to be on boards of firms that face government or industry regulation, like the banking industry. Due to their experience, they master the skill of dealing with regulators and maintaining a proper relationship. Finally, Carter et al. (2010) state that female directors bring different capabilities and resources, since gender diversity comes along with different backgrounds and qualities. This enables them to address problems with a different information set and network.

The expectation is that according to the resource dependence theory, the presence of gender diversity in the top management is expected to have a positive effect on the performance of the firm. The effect of gender diversity in the top management could contribute to increasing the unique information set that the management board possesses. The different knowlegde, diverse perspective and network access will lead to less dependence and influence of outside sources and increase the overall skillset of the board to deal with managerial challenges in the best possible way.

2.3 Human capital theory

The human capital theory refers to the aggregate knowledge, competences and the personal skillset of an individual that enables him or her to add economic value to a company. It states that the performance of a company will be affected by board diversity, since the increasing diversity will create more unique human capital. This unique human capital will positively influence the board and company's performance. The human capital theory can be considered a complementation of the resource dependence theory in that it is also concerned about the influence of education, experience and skill of individual board members (Carter et al., 2010).

When assessing the skill of a board member, each individual has a personal set of tools and mechanisms that enables him or her to use in a variety of situations and settings. Some of these tools can be taught and some of these tools are set by birth. When assessing men and women and the tools and mechanisms that they are born with, a notable pattern with differences was found by previous studies. One of these differences is risk appetite. It is proven that women are significantly more risk averse than men, even in situations in which they are aware that taking risk would eventually be in their favour (Byrnes, Miller, & Schafer, 1999; Jianakoplos & Bernasek, 1998). Another difference is the difference in attitude towards competition. Overall, women tend to shy away from competition, while men endorse competition and even show that they perform better in a competitive setting (Niederle & Vesterlund, 2011). This contradictory behaviour between men and women will contribute to a top management with a higher level of heterogeneity. According to the human capital theory, this should increase the boards overall ability to increase the performance of the company.

In practice, many companies hardly appoint female members in the top management. An often made assumption of selectors of board members is that women lack the required human capital to be considered a suitable candidate to become a board member (Mateos de Cabo et al., 2012). However, evidence regarding the human capital level of women show the contrary. Women seem to be at least as high educated as men in most industrialized countries (Pekkarinen, 2012). Singh, Terjesen & Vinnicombe (2008) conducted a research to human capital dimensions on new directors of the FTSE stock exchange in the U.K. They found that women dominate men in number of MBA degrees and international experience. Furthermore, women were more likely to have expierence as member of a board of directors of smaller firms than men. On the other hand, men were more likely to have more corporate board and CEO experience than women (Terjesen, Sealy, & Singh, 2009). Based on these results, women and man can be considered at least equally capable.

The human capital theory states that a more diverse board would probably have a positive influence on financial performance, since it creates a more unique set of human capital quality.

However, women are often still not selected as a board member. Due to the skewed distribution of male and female board members, the expectation is that top managements could add more unique human capital by increasing the gender diversity of the board. Therefore, the expectation is that the general effect of increasing gender diversity in top management boards on financial performance is positive due to the addition of unique human capital to the top management.

2.4 Agency theory

The agency theory is a theory that defines the conflicts of interest between managers and shareholders that might occur in firms where shareholders equity is held (Jensen & Meckling, 1976). The conflict of interest consists of managerial actions that might differ from maximizing shareholders value due to the separation of ownership (shareholders) and control (managers). Managers might work insufficient and pursue own preferences or otherwise fail to maximize shareholders value (Berger & Bonaccorsi di Patti, 2006). This conflict of interest possibly increases when it is difficult or expensive to monitor the managers' actions. Eventually, this could lead to agency costs, which is the sum of bonding cost, monitoring cost and residual losses and will affect the financial performance of the firm negatively (Kumar, 2003; Jensen & Meckling, 1976; Eisenhardt, 1989).

In order to mitigate agency cost, measures need to be applied to align and control the interest of managers with shareholders. Corporate governance plays a crucial role in creating and applying these control measures. These control measures can be divided into internal governance mechanisms and external mechanisms. Internal mechanisms consist of the board of directors who monitor, hire, fire and compensate managers in such a way that they maximize shareholders value. All of the control is thus with the board of directors. Besides having the firing and appointing control of agents, the board also decides how to compensate managers in such a way that they experience the need of maximizing firm value (Lazzaretti, Godoi, Camilo & Marcon., 2013; Jensen & Fama, 1983; Denis & McConnell, 2003). External mechanisms consist of market mechanisms, like the takeover market. If the internal control mechanisms fail and the gap between the firm's actual and potential value is significant, outsiders will experience an incentive to get control of the firm. This market threat provides the top management incentives to prevent the market value from declining (Denis & McConnell, 2003).

Summarizing the above, agency cost negatively influences firm value and the top management plays an important role in the controlling these agency cost. According to Hillman and Dalziel (2003), a board needs to have an appropriate composition of experience and quality to be capable of examining business strategies and making the right organizational decisions (Dwyer et al., 2003). Carter, Simkins & Simpson (2003) suggest that a more gender diverse board might be better in

monitoring managers. They state that a more diverse board increases the independence of the board and this would positively influence the monitoring capability (Mateos de Cabo et al., 2012). Based on these findings, the conclusion can be drawn that according to the agency theory, increasing the gender diversity in boards will lead to an improvement in decision making and monitoring capacity. This improvement is expected to reduce agency costs and will therefore have a positive effect on financial performance.

2.5 Social psychology theory

The social psychology theory focusses specifically on the group dynamics of the board. The theory holds that in a group composition, the group that represents the majority of the group potentially influences the decision making process to a disproportional extent. As a result, the minority of the group will have little or no influence in the decision making process and board diversity might not have any significant effect (Westphal & Milton, 2000). The explanation for this behaviour could be that homogeneous groups are composed in a way that they like to search for ways to build trust, possibly by looking for others that match their opinions and behaviour. As a consequence, people from outside these homogeneous groups are considered a threat (Mateos de Cabo et al., 2012).

Other researches debate the social psychology theory and the effect that this might have on the group dynamics. Some studies find that minority group members stimulate diverse thinking and that this leads to more creative and efficient solutions (Westphal & Milton, 2000). Phillips (2014) supports this view and states that diversity increases the innovative capacity of a board. Chen, Leung & Goergen (2017) state that gender diversity enhances the group discussion, since women tend to be more vocal than men. This results in more competitive interactions and as a result, the decision making process is less likely to be affect by the effect of group thinking. Contrarily to Chen et al. (2017), Campbell & Minguez Vera (2008) argue that the competitive interactions and diversity of opinions leads to a more time consuming and less efficient decision making process. Other studies conclude that the group dynamics will decrease due to the increasing tension, contradiction, conflict, lack of trust and less cohesion (Phillips, 2014; Trittin & Schoeneborn, 2017; Iacoviello et al., 2015; Dwyer, Richard, & Chadwick, 2003; Carter et al., 2010; Mateos de Cabo et al., 2012).

Drawing a conclusion on the possible effect of the social psychology theory on firm performance is difficult, since previous research shows mixed results. More efficient solutions, innovative capacity and a reducing influence of group thinking could have a positive effect on financial performance. On the other hand, delaying decision making process, decreasing efficiency, increasing tension, conflict and lack of trust would most likely effect financial performance negatively. In summary, the social psychology theory and results from previous studies suggest that

board diversity can have a positive and negative effect on the group dynamics of top management and therefore can lead to either a positive or negative effect on financial performance.

Three of the four described theories support the expectation that increasing gender diversity in the top management of banks will positively influence the performane of banks. The social psychology theory suggests either a positive or negative effect can be expected, while the agency theory, human capital theory and resource dependence theory all expect a positive effect on performance. Based on these theories, the overall effect of gender diversity is expected to be positively related with financial performance. The formulated hypothesis 1 is:

Hypothesis 1: Gender diversity has a positive effect on the financial performance of banks

2.6 Quotas

In an attempt to increase the representation of women in the top management of firms, several countries in Europe imposed a quota in which companies are 'stimulated' to increase the gender diversity in the top management. Among these counties are: Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Norway, Spain, Switzerland and The Netherlands (European Parliament, 2012; Prat & Mueller, 2016). The policy regarding gender diversity differs significantly among these countries. The difference can be separated in: time of implementation, the required gender diversity percentage and the presence and type of sanctions if quotas are not met. These differences lead to four different type of quota policy categories: countries with no gender quota (1), countries with a gender quota without sanctions (2), countries with a gender quota with soft sanctions (3) and countries with a gender quota and strict sanctions (4). Appendix A summarizes the countries with a gender quota, which countries belong to which category and which policy is conducted.

Regarding the presence of women in top management boards, only countries with strict quotas and sanctions show a significant increase and this turns out to be an effective and fast instrument. The soft quota countries show some increase in female participation, but the increase is much smaller and the progress is going much slower (European Parliament, 2012; Labelle, Francoeur, & Lakhal, 2015). Research regarding the effect of quotas on financial performance show mixed results. The effect of the strict quotas in Norway was negative regarding financial performance of firms on the announcement of the gender quota law, but also in the years after (Ahern & Dittmar, 2012). In Italy, the implementation of the strict gender quota turned out to have no significant positive or negative effect on financial performance Iacoviello et al., 2015. An overall comparison of countries with strict and soft quotas show that countries with strict quotas show a negative

relationship with financial performance, while countries with soft quotas show a significant positive effect of gender diversity on financial performance (Labelle, Francoeur, & Lakhal, 2015). A possible explanation for the different effects of soft and strict quotas is that women in countries with strict quotas might be pressured to attend at a management board, while they do not personally favour or are not specifically suited for this position. The acceleration in demand for female board members creates a shortage of women suitable to fulfil the function of board member (Casey, Skibnes, & Pringle, 2011). This would reduce the overall quality of the board, while in countries with soft quotas women that are willing and capable are appointed to management boards. Companies are not pressured by authorities in finding female board members, but instead can select members based on competence. By doing so, the female participation might increase at a slower pace but the advantages of increasing gender diversity in top management boards are reflected on financial performance (Labelle, Francoeur, & Lakhal, 2015; Casey, Skibnes, & Pringle, 2011).

Based on this emperical background, the effect of gender quotas is expected to be more positive for countries with no quotas, quotas without sanctions and soft quotas than for countries with strict quotas. Therefore, the formulated hypothesis 2 is:

Hypothesis 2: The positive effect of gender diversity on the financial performance of banks is stronger in countries without strict quotas than in countries with strict quotas

3. Methodology

In this chapter the methodology of this research will be explained. The collected data will be discussed and will be followed up with a description and explanation of the used dependent, independent and control variables. Finally, the used method, endogeneity and robustness checks will be discussed.

3.1 Data

The dataset that will be used for this research originates from BoardEx, Eikon and WorldDataBank, in which BoardEx and Eikon are available at the Radboud University in Nijmegen and the WorldDataBank data is publicly available. In BoardEx, the data regarding the management boards of banks and its members are collected and the management boards of each bank in each year is reconstructed. By starting the collection of data in BoardEx, the available data in BoardEx sets the gross data sample. Subsequently, Eikon is used to collect the financial data for the banks in the data sample and the WorldDataBank database is used to collect the GDP data for each individual country in which the banks are located. The BoardEx data that is used excludes the U.K. The reason that the U.K. is excluded, is because of the significant difference from other continental European countries in their culture, institutional environment and governance. The U.K. can be classified as an Anglo-Saxon system, also called shareholder-orientated system, and the other Western European countries as a stakeholder-orientated system (Kosklu, 2018; Chilosi & Damiani, 2007). The main difference between these systems is that the Anglo-Saxon system is mainly focussed on shareholder value and profitability, whereas the stakeholder orientated systems look after all stakeholders interests and are less concerned about pure profit maximization. These differences lead to different governance styles and might influence the effect of gender diversity on financial performance in a different way (Russo & Perrini, 2010; Chilosi & Damiani, 2007). Data from 2006 until 2016 is used to conduct the analyses. This time span is chosen, since it is the most recent available data in BoardEx and the countries that implemented a quota did so in this specific timeframe. Several steps are conducted to organise and clean the data of BoardEx in order to make it ready for the analyses in STATA. First of all, the banks are selected by filtering the companies that are qualified as being in the 'bank' sector. Secondly, banks without ISIN codes are deleted from the sample, since only listed companies are used in this study. After this first data selection, 166 banks with 1,826 number of observations remain.

After setting the bank sample, the historic and current board members need to be linked to the bank and years in which they were present at the board. Board members are assigned to a full calendar year if an individual worked at least one day in this board in that specific year. However, the BoardEx data turned out to be incomplete for several individual directors. The start or end date of

participation was missing or even both dates were missing. For the latter, the observations were deleted from the sample, since it was unknown if this individual was present at the board in the 2006 – 2016 sample period. For the individuals that missed the start or end date of the board attendance, only year in which the board attendance was known was included in the data sample. After reconstructing the board compositions, 1,565 number of observations remain over 166 banks.

After the boards were reconstructed for each company and each year, there turned out to be some banks with less than four board members in several years. The minimum board size in studies that examined the size of boards in the banking industry ranched between four and six (Andrés-Alonso, Romero-Merino, Santamaría-Mariscal, & Vallelado-González, 2010; de Andres & Vallelado, 2008; Adams & Mehran, 2012; Simpson & Gleason, 1999; Staikouras, Staikouras, & Agoraki, 2007). Eventhough multiple studies regarding the minimum number of board members state that the minimum or optimal number of board members depend on several factors, they often state that a board size between five and eight should be considered appropriate (Wang, Young, & Chfwangaplin; Belkhir, 2009; Margolis, 2011). Since the mentioned bank studies regarding boards in banks always have a minimum number of board members of at least four, this study will also use this as a minimum requirement for including an observation in the sample. After correcting for boards with less than four members, the total BoardEx number of observations that are used for the analyses is 1,347 over 165 banks.

The financial data was gathered by using Eikon, using the data from the first data selection of BoardEx (i.e. 166 banks over the 2006 – 2016 period). Not all financial data could be gathered due to delisting in the 2006 – 2016 period or a lack of data availability. As a result, the number of observations gathered is 1,505 over 161 banks.

The WorldDataBank was assesed to

Country	Frequency	Percentage	Cumulative
Austria	54	4.35	4.35
Belgium	45	3.63	7.98
Cyprus	19	1.53	9.51
Czech Republic	11	0.89	10.39
Denmark	53	4.27	14.67
Faroe Islands	5	0.40	15.07
Finland	16	1.29	16.36
France	93	7.49	23.85
Germany	115	9.27	33.12
Greece	54	4.35	37.47
Hungary	14	1.13	38.60
Iceland	6	0.48	39.08
Italy	188	15.15	54.23
Liechtenstein	19	1.53	55.73
Lithuania	8	0.64	56.41
Luxembourg	8	0.64	57.05
Malta	9	0.73	57.78
Netherlands	44	3.55	61.32
Norway	36	2.90	64.22
Poland	58	4.67	68.90
Portugal	43	3.46	72.36
Ireland	13	1.05	73.41
Romania	10	0.81	74.21
Spain	87	7.01	81.22
Sweden	55	4.43	85.66
Switzerland	178	14.34	100.00
Total	1241	100	

Table 1: Distribution of observations among countries

collect the data for the control variable GDP. For all countries the GDP was collected over the 2006 – 2016 period, except for Faroe Islands and Liechtenstein. For these two countries the last year of GDP could not be collected. This led to missing the GDP-value in 2016 for three banks.

Quota	Frequentie	Percentage	Cummulative
No Quota	884	71.23	71.23
Quota without sanction	31	2.5	73.73
Quota soft sanction	166	13.38	87.11
Quota strict sanction	160	12.89	100

Table 2: Quota allocation

Combining all the data together leads to a number of balanced observations of 1,241 for 158 banks. The allocation of banks among countries can be seen in Table 1. The countries that dominate the data sample are Switzerland, Italy and Germany. This is specifically interesting when assessing the effect of quotas, in which Switzerland and the majority of observations of Germany fit in the dummy for countries without quota. Italy and part of the German data sample fit in the quota for countries with strict sanctions. The overall allocation of quotas is presented in Table 2. This table indicates that the data sample does not contain that many observations of countries that imply a quota. The difference in number of observations is not surprising, since the majority of European countries did not imply a quota and the countries who did imply, did so during the 2006 – 2016 period. Nevertheless, knowing the distribution of observations among quotas is important when assessing the results of the regression analyses.

3.2 Dependent variable

This research studies the effect of gender diversity in the top management on the financial performance of banks. The proxy that is chosen as the measure of performance is Tobin's Q (TOBQ). Tobin's Q is calculated as book value of total assets minus the book value of common equity plus the market value of common equity, divided by the book value of total assets (Garcia-Meca et al., 2015). Many previous studies regarding the effect of gender diversity in the top management on performance also use Tobin's Q as a proxy. The arguments to use Tobin's Q as a proxy for financial performance is that it represents a market indicator to measure performance of the firm as a whole and that it is forward looking instead of backward looking (Ahern & Dittmar, 2012; Dezso & Ross, 2012; Campbell & Minguez-Vera, 2008; Garcia-Meca et al., 2015). Additionally, they state that Tobin's Q accounts for risk and is not influenced by reporting distortions due to tax laws and accounting standards, which accounting based measures like return on assets and return on equity do suffer from (Carter et al., 2010; Alm & Winberg, 2016).

3.3 Independent variables

The first independent variable that is included is gender diversity. This independent variable is measured by using three different proxies; a dummy to measure if a board contains at least one woman (DUMDIVERS) (1), a variable to measure the percentage of women at a board (PERCDIVERS) (2), and a variable to measure the diversity by using the Blau's index (BLAUDIVERS) (3).

The first variable is a dummy, in which banks with at least one female board member get the value of 1 and banks without a female representative in the board gets a value of 0. By including this dummy, the effect between board without gender diversity and boards with gender diversity can be distinguished. The banks without female board members are taken as the reference category.

The second variable measures the percentage of women present at the board and is calculated by dividing the number of women present at the top management board by the total number of board members. This proxy can measure whether the effect of a bigger attendance of women at a board has an influence on the financial performance of a bank.

The third variable measures the presence of gender diversity, in which the maximum value that can be obtained (0.5) represents the maximum level of diversity than can be achieved (50% men and 50% women). It is calculated by $1 - \sum_{i=1}^{n} P_i^2$, in which P_i is the percentage of board members in each category and n is the total amount of board members (Campbell & Minguez-Vera, 2008). The Blau's index is not a common used variable to measure gender diversity in other researches, but fits the theoretical background of the advantages of diversity perfectly. It is not the amount of women or men that is expected to have a positive effect, but the mix of different genders. Therefore, theoretically, a mix of 50% men and 50% women would be optimal in comparison to a board that is dominated solely by males or females.

The second independent variable is a dummy for quotas. A dummy will be made for each of the previously described categories (see Appendix A). This results in a dummy for banks in countries without a quota (QUOTA1), countries with a quota without sanctions (QUOTA2), countries with a quota and soft sanctions (QUOTA3) and countries with a strict quota and sanctions (QUOTA4). With this structure, the effect of quotas can be distinguished. Because several countries implemented quotas during the 2006 – 2016 sample period, countries can be assigned to different dummies throughout the sample period. For example, Germany implemented their gender quota in 2015 (see Appendix A) and therefore German banks will be assigned to QUOTA1 during the 2006-2014 period and in QUOTA4 in the years 2015 and 2016. A country is assigned to a dummy in the year the quota for listed countries is introduced. The distribution of countries among dummies can be found in Appendix B.

3.4 Control variables

The control variables that are used are in line with control variables used in previous studies that examined the effect of gender diversity on financial performance. Since this research is specifically concerned about banks, many control variables used in other studies that control for different industries are not included. The control variables that are included are Firm size (FSIZE), Board size (BSIZE), leverage (LEVER), GDP per capita (GDP) and average board age (ABA).

Firm size is determined by the total assets of a bank and is used to control for the effect of size on performance (Carter et al., 2010; Dwyer et al., 2003).

Board size is measured by the number of board members present at a board (Garcia-Meca et al., 2015; Dwyer et al., 2003). The reason to include board size as a control variable is due to its influence on how the board interacts and performs in general, which is important when assessing the effect of gender diversity in the management board (Hambrick, Chen, & Seung Cho, 1996).

Leverage is important to include as a control variable, since it is important variable in explaining the performance of financial institutions (Staikouras, Staikouras, & Agoraki, 2007). The leverage is calculated by dividing total debt by total assets and is a common used control variable in financial performance related studies (Dezso & Ross, 2012; Dwyer et al., 2003; Garcia-Meca et al., 2015; Staikouras, Staikouras, & Agoraki, 2007).

To control for the difference in economic growth per individual country, GDP added as a control variable. GDP is the sum of gross value that is added by all resident producers, plus product taxes and minus any subisidies that are not included in the value of products (Chughtai, Malik, & Aftab, 2015). The GDP data was collected from the WorlddataBank (2018) website and is expressed in USD.

The average board age is the board control variable that is added. This control variable is added due to the findings of Ahern & Dittmar (2012). They found that the gender quota in Norway had a negative effect on Tobin's Q and led to younger and less experienced boards. This study attempts to examine the effect of gender diversity on financial performance. To control for the effect of younger and less experienced boards on financial performance, possibly due to quotas, this control variable is added. The missing values for the age of directors are solved by adding the mean value of the age of the board in the same year.

3.5 Method

This research contains multiple entities over multiple years and therefore, a panel data research will be conducted. Panel data is a combination of cross sectional and time series data (Hsiao, 2007). A Chow-test is conducted to determine whether a Pooled model can be used. This Chow-test will

indicate whether the regression coefficients are different or similar between banks. Executing the Chow-test led to rejecting the null hypothesis, which means that the regression coefficients are different between banks and that the Pooled model cannot be used (Statisticshowto, 2018).

The next step is to conduct the Hausman-test, to determine whether the Random effects or Fixed effects model can be used. The null hypothesis is that there is no correlation between the unique errors in the model, which would lead to the application of the Random effects model if this hypothesis holds. If rejected, the Fixed effects model is considered the appropriate model. The Hausman test turned out to reject the null hypothesis and led to the conclusion that the Fixed effects model is considered the appropriate regression technique to run the model (Statisticshowto, 2018).

Combining the dependent, independent and control variables in the Fixed effects regression model leads to the empirical model being:

$$TOBQ_{it} = \beta_0 + \beta_1 DIVERSITY_{it} + \beta_2 QUOTA1_{it} + \beta_3 QUOTA2_{it} + \beta_4 QUOTA3_{it} + \beta_5 QUOTA4_{it} + \beta_6 (DIVERSITY_{it} * QUOTA1_{it}) + \beta_7 (DIVERSITY_{it} * QUOTA2_{it}) + \beta_8 (DIVERSITY_{it} * QUOTA3_{it}) + \beta_9 (DIVERSITY_{it} * QUOTA4_{it}) + \beta_{10} FSIZE_{it}\ c\beta_{11} BSIZE_{it} + \beta_{12} LEVER_{it} + \beta_{13} GDP_{it} + \beta_{14} ABA_{it} + \beta_{15} ABE_{it} + \varepsilon_{it}$$

$TOBQ_{it}$: Tobin's Q for bank *i* in year *t*

$DIVERSITY_{it}$:

1. $DUMDIVERS_{it}$: dummy that indicates the presence of at least one female director of bank *i* at time *t* (0 = no female director, 1 = at least one female director), or
2. $PERCDIVERS_{it}$: percentage of female directors attending the board of bank *i* at time *t*, or
3. $BLAUDIVERS_{it}$: diversity index that measures the level of diversity of bank *i* at time *t* (highest value of 0.5 is obtained by maximizing diversity and the lowest value of 0 is obtained in case of no gender diversity)

$QUOTA1_{it}$: Bank *i* located in a country without a quota at time *t*

$QUOTA2_{it}$: Bank *i* located in a country with a quota without sanctions at time *t*

$QUOTA3_{it}$: Bank *i* located in a country with a quota with soft sanctions at time *t*

$QUOTA4_{it}$: Bank *i* located in a country with a quota with strict sanctions at time *t*

$FSIZE_{it}$: Total assets of bank *i* at time *t*

$BSIZE_{it}$: Number of board members of bank *i* at time *t*

$LEVER_{it}$: Leverage of bank *i* at time *t*

GDP_{it}: Gross Domestic Product of a country were bank *i* is located at time *t*

ABA_{it}: Average age of the board members of bank *i* at time *t*

This studies examines the effect of gender diversity and quotas on financial performance. As described, the proxy for financial performance is TOBQ and the diversity measures ($DIVERSITY_{it}$) are DUMDIVERS, PERCDIVERS and BLAUDIVERS. Additionally, the interaction between quotas and board diversity on financial performance will be assessed through interaction terms. By adding this interaction terms, the moderating effect of quotas on de relationship between gender diversity and financial performance can be measured. Finally, the described control variables FSIZE, BSIZE, LEVER, GDP, ABA, and ABE are added.

3.6 Endogeneity

In this research, we expect the independent variable 'diversity' to influence the dependent variables 'performance'. However, it could also be possible that 'performance' influences the level of diversity in the management board due to reversed causality. If these variables influence one another significantly, endogeneity is present in the model. If so, the Fixed effects model cannot be used. Previous studies regarding gender diversity discussed the presence of endogeneity in their model. Campbell & Minguez-Vera (2008) used two-stage least squares (2SLS) to control for possible endogeneity problems, whereas Garcia-Meca et al. (2015) used the generalised method of moments (GMM) to control for endogeneity. Other studies did not discuss and control for endogeneity in assessing the gender diversity and performance relationship (Mateos de Cabo et al., 2012; Dwyer et al., 2003)

In order to test whether our model suffers from endogeneity, first a regression is conducted with the diversity variable as the dependent variable with the other independent and control variables. After this regression, the residuals are stored and included in the original model. If the model is regressed one more time and the residuals are statistically significant, endogeneity is present in the model (www.stata.com, 2018). Executing this technique in all models led to the conclusion that none of the models have endogeneity problems, since none of the residuals are statistically significant with a p-value of 0.05 or smaller (Wooldridge, 2012).

3.7 Robustness

To check whether the findings of the initial model are robust, regressions with different samples and variables are conducted. In the first robustness check, return on assets (ROA) will be used instead of Tobin's Q as the dependent variable. Return on assets is calculated by dividing the annual net income by total assets at the end of the year (Carter et al., 2010). This is in line with the robustness check conducted by a similar research of Garcia-Meca et al. (2015). In contrary to Tobin's Q, ROA is an accounting measure of performance and is backward looking (Carter et al., 2010; Alm & Winberg,

2016; Iacoviello et al., 2015). The use of a market and accounting indicator of performance creates the opportunity to check whether there is a difference noticeable between the effect of gender diversity on the market performance and the accounting performance of a bank. Even though other studies also use ROA as robustness check, it is often found that just Tobin's Q or ROA turned out to be significant. Nevertheless, both variables need to be used since they complement each other in being a market and accounting based measure of financial performance (Garcia-Meca et al., 2015).

A second robustness check is conducted by dealing with the missing director data in two different ways. In the initial data sample, the missing start date or end date of a director was ignored and only the known start or end data was used. In this robustness check the missing start and end dates are not ignored, but an average board attendance of all other directors in the data sample, without missing data, was calculated to estimate the board presence of the directors with missing data. The average board attendance of all directors with known start and end dates turned out to be 4.3 years. As a result, the missing start dates were reconstructed by deducting three calendar years from the known end date and missing end dates were reconstructed by adding three calendar years to the known start date. This resulted in a total number of 1,249 complete observations for 158 banks. Finally, a third data sample is created by using only director data that contained all start and end dates of directors, by removing the data with unknown dates. The latter resulted in a dataset of 1,236 complete observations for 156 banks.

The third robustness check that will be conducted is repeating the regression with Tobin's Q as the dependent variable and the original data sample, but implementing quotas in a different way. First, the regressions will be conducted with just one quota dummy and one interaction effect at the same time. Executing the analyses in this way might provide different results, due to the correlation between quotas. Secondly, instead of running multiple regressions with individual quotas, one quota dummy will be created and included in the regressions. Making one quota variable is possible due to the ascending level of quota strictness in the composed quota categories.

4. Results & Discussion

In this chapter the results of the regressions will be presented. First, the assumptions that need to be fulfilled in order to perform reliable Fixed effects regressions are discussed. Second, the correlation between variables is presented and analysed. Third, the results of the regressions and robustness checks are presented and discussed and the hypotheses will be rejected or not. Finally, the results will be discussed.

4.1 Ordinary Least Squares

In order to perform a reliable Ordinary Least Squares (OLS) regression, several assumptions need to be met (Wooldridge, 2012). First of all, the variables need to be tested for normality. All variables were normally distributed besides Tobin's Q, Board size, Firm size and GDP. These variables were modified by taking the natural logarithm of their original value. After this modification, all variables were normally distributed.

Secondly, each of the independent variables need to have a linear relationship with the dependent variables. By making scatterplots, the relationship can be visualized. The relationship between de dependent and independent variables turned out to be linear.

Thirdly, outliers were modified by using winsorizing. Winsorizing is a technique that limits the extreme values in a dataset to a given interval. This means that the observations with extreme values are not removed from the dataset, but their value is maximized to the lowest and highest value of a given interval., In STATA, the winsorizing command is set with a percentage that sets the interval. The dependent and independent variables are winsorized with 0.6%, i.e. 0.3% on both sides, to prevent extreme values influencing coefficients significantly. Winsorizing with 0.3% on a number of observations leads to limiting five extreme values on the upper and lower side. Based on the scatterplots, limiting this number of extreme values is considered an appropriate way of controlling for extreme values without losing to many valuable observations points.

Finally, models need to be tested for multicollinearity, autocorrelation and heteroscedasticity. None of the models showed signs of multicollinearity. This was tested by conducting a VIF test, in which none of the values become higher than 5. In contrast, the models all had an autocorrelation and heteroscedasticity problem. To control for these violations of OLS assumptions, the regressions were conducted with the addition of the 'cluster(…)' option. By adding this command to the fixed effects regression, the model controls for autocorrelation and heteroscedasticity problems (Hoechle, 2007).

The descriptive statistics of the original sample are presented in Table 3. The Dummy diversity variable shows that in 67.42% of the management boards at least one women was present.

This is significantly higher attendance of at least one women in a board than in previous gender diversity studies of non-financial firms of Dezso & Ross (2012) and Campbell & Minguez-Vera (2008), who had at least one women present in 23.6% and 23.7% of their observations. A possible explanation for this difference can be that these previous studies were concerned about non-financial companies in a time period of 1992 – 2006 (Dezso & Ross, 2012) and 1995 – 2000 (Campbell & Minguez-Vera, 2008). Since this research assesses the 2006 – 2016 period, this can explain the significant difference in percentage.

Variables	count	mean	sd	min	max
Tobin's Q (natural log)	1511	0.0131	0.0854	-0.2845	0.4263
Return on Assets	1511	0.0051	0.0132	-0.0701	0.0576
Dummy diversity	1826	0.6742	0.4688	0	1
Percentage diversity	1565	0.1501	0.1298	0	0.5556
Blau diversity	1565	0.2213	0.1583	0	0.5
No Quota	1826	0.7032	0.4570	0	1
Quota without sanctions	1826	0.0427	0.2023	0	1
Quota with soft sanctions	1826	0.1292	0.3356	0	1
Quota with strict sanctions	1826	0.1249	0.3307	0	1
Dummy diversity * No Quota	1826	0.4655	0.4989	0	1
Dummy diversity * Quota without	1826	0.0131	0.1139	0	1
Dummy diversity * Quota soft	1826	0.0975	0.2967	0	1
Dummy diversity * Quota strict	1826	0.0980	0.2974	0	1
Percentage diversity * No Quota	1826	0.0797	0.1118	0	0.5
Percentage diversity * Quota without	1826	0.0022	0.0197	0	0.2
Percentage diversity * Quota soft	1826	0.0203	0.0692	0	0.4
Percentage diversity * Quota strict	1826	0.0256	0.0894	0	0.5
Blau diversity * No Quota	1826	0.1217	0.1529	0	0.5
Blau diversity * Quota without	1826	0.0036	0.0321	0	0.3
Blau diversity * Quota soft	1826	0.0302	0.0985	0	0.5
Blau diversity * Quota strict	1826	0.0338	0.1107	0	0.5
Board size (natural log)	1347	2.5720	0.4734	1.3863	3.5835
Firm size (natural log)	1511	17.2079	1.8954	12.0141	21.4103
GDP (natural log)	1823	27.1529	1.4214	22.1096	28.9896
Leverage	1505	71.5485	24.1398	0	98.5800
Average Board Age	1557	56.7980	4.8208	43.4286	68.1765

Table 3: Summary statistics

The Percentage diversity mean of this research is 15.01%. This is again significantly higher than the mean of Campbell & Minguez-Vera (2008), who had a mean percentage of female board members of 3.28%, but more in line with the 10% mean attendance of women found in the sample of Garcia-Meca et al. (2015) in their study of gender diversity within management boards of banks in the 2004-2010 period.

The Blau diversity variable has a mean value of 0.2213. This is higher than in Campbell & Minguez-Vera (2008), which can be expected due to the higher value of Dummy diversity in this research as well. The Blau index in the gender diversity study in management boards of banks of

Dwyer et al. (2003) shows a significantly higher Blau diversity of 0.41. The explanation for this difference is most likely due to the difference in research question. Dwyer et al. (2003) examine the gender diversity effect in several managerial levels. They state that in lower management levels, the gender diveristy is much more present and that the diversity decreases as the management level increases. Given this argument, it makes sense that the presence of gender diversity in the data sample of this research is lower.

4.2 Correlation

The correlation matrix of dataset one is presented in Table 4. The correlation values can vary between -1 and +1, in which a minus indicates a negative correlation and a plus a positive correlation. A correlation value of 0 indicates that there is no correlation between variables, whereas a value of 1 means that there is a perfect correlation.

When assessing the correlation between dependent, independent and control variables in Table 4, the maximum correlation value is -0.5930 (between No Quota and Quota with soft sanctions). Even though this value is relatively high, the VIF test showed that there is no multicollinearity in the model and that the OLS assumption regarding correlation are met (Wooldridge, 2012). However, the relatively high level of correlation between 'No Quota' and the other two quota variables 'Quota with soft sanctions' and 'Quota with strict sanctions' can influence the regression results. The robustness check in which quotas are included separately will show if this influences the significance and/or coefficients significantly.

	Tobin's Q (natural log)	Return on Assets	Dummy diversity	Percentage diversity	Blau diversity	No Quota	Quota without sanctions	Quota with soft sanctions	Quota with strict sanctions	Dummy diversity * No Quota	Dummy diversity * Quota without	Dummy diversity * Quota soft	Dummy diversity * Quota strict
Tobin's Q (natural log)	1												
Return on Assets	0.2453	1											
Dummy diversity	0.0393	-0.0733	1										
Percentage diversity	-0.0779	0.0109	0.6024	1									
Blau diversity	-0.0840	-0.0097	0.7286	0.9629	1								
No Quota	0.1864	0.0907	-0.0399	-0.2719	-0.2661	1							
Quota without sanctions	-0.0382	-0.0202	-0.1652	-0.0425	-0.0369	-0.3251	1						
Quota with soft sanctions	-0.1231	-0.0275	0.0658	0.1070	0.1308	-0.5930	-0.0814	1					
Quota with strict sanctions	-0.1103	-0.0856	0.0894	0.2821	0.2471	-0.5814	-0.0798	-0.1455	1				
Dummy diversity * No Quota	0.1857	0.0148	0.6488	0.1825	0.2768	0.6063	-0.1971	-0.3595	-0.3525	1			
Dummy diversity * Quota without	-0.0388	-0.0169	0.0802	0.0310	0.0557	-0.1776	0.5463	-0.0445	-0.0436	-0.1077	1		
Dummy diversity * Quota soft	-0.1400	-0.0323	0.2285	0.1663	0.2025	-0.5058	-0.0694	0.8530	-0.1241	-0.3067	-0.0379	1	
Dummy diversity * Quota strict	-0.0846	-0.0838	0.2292	0.3120	0.2811	-0.5074	-0.0696	-0.1270	0.8728	-0.3077	-0.0380	-0.1083	1
Percentage diversity * No Quota	0.1447	0.0405	0.4962	0.5442	0.5590	0.4637	-0.1508	-0.2750	-0.2696	0.7648	-0.0824	-0.2346	-0.2353
Percentage diversity * Quota without	-0.0369	-0.0158	0.0778	0.0422	0.0676	-0.1723	0.5301	-0.0431	-0.0423	-0.1045	0.9702	-0.0368	-0.0369
Percentage diversity * Quota soft	-0.1524	-0.0181	0.2043	0.2692	0.2876	-0.4522	-0.0621	0.7626	-0.1110	-0.2742	-0.0339	0.8940	-0.0969
Percentage diversity * Quota strict	-0.0753	-0.0369	0.1990	0.4585	0.3788	-0.4406	-0.0605	-0.1103	0.7579	-0.2672	-0.0330	-0.0941	0.8684
Blau diversity * No Quota	0.1575	0.0327	0.5535	0.4743	0.5313	0.5173	-0.1682	-0.3067	-0.3007	0.8531	-0.0919	-0.2617	-0.2625
Blau diversity * Quota without	-0.0374	-0.0159	0.0784	0.0408	0.0661	-0.1736	0.5340	-0.0435	-0.0426	-0.1053	0.9775	-0.0371	-0.0372
Blau diversity * Quota soft	-0.1511	-0.0225	0.2136	0.2488	0.2750	-0.4729	-0.0649	0.7976	-0.1161	-0.2868	-0.0355	0.9349	-0.1013
Blau diversity * Quota strict	-0.0847	-0.0544	0.2124	0.4239	0.3675	-0.4703	-0.0646	-0.1177	0.8090	-0.2852	-0.0353	-0.1004	0.9269
Board size (natural log)	-0.1532	-0.1652	0.2063	-0.1202	-0.0625	-0.0743	0.0118	0.0370	0.0575	0.0742	-0.0090	0.0615	0.0710
Firm size (natural log)	-0.1315	-0.1548	0.2710	0.1300	0.1638	-0.1476	0.0245	0.2215	-0.0351	0.0573	0.0292	0.2677	-0.0028
GDP (natural log)	-0.0840	-0.0745	0.0888	0.0806	0.0955	-0.2647	-0.2081	0.2346	0.2550	-0.1617	0.0229	0.2004	0.2023
Leverage	-0.1647	-0.2704	0.1079	0.0436	0.0382	-0.1079	-0.0534	0.1130	0.0575	0.0043	-0.0314	0.1003	0.0513
Average Board Age	-0.1946	-0.1061	-0.0534	-0.1501	-0.1246	-0.2279	0.0789	0.1707	0.0991	-0.2090	0.0225	0.1661	0.0840

	Percentage diversity * No Quota	Percentage diversity * Quota without	Percentage diversity * Quota soft	Percentage diversity * Quota strict	Blau diversity * No Quota	Blau diversity * Quota without	Blau diversity * Quota soft	Blau diversity * Quota strict	Board size (natural log)	Firm size (natural log)	GDP (natural log)	Leverage	Average Board Age
Percentage diversity * No Quota	1												
Percentage diversity * Quota without	-0.0799	1											
Percentage diversity * Quota soft	-0.2097	-0.0329	1										
Percentage diversity * Quota strict	-0.2043	-0.0321	-0.0841	1									
Blau diversity * No Quota	0.9771	-0.0891	-0.2339	-0.2279	1								
Blau diversity * Quota without	-0.0805	0.9994	-0.0331	-0.0323	-0.0898	1							
Blau diversity * Quota soft	-0.2193	-0.0344	0.9923	-0.0880	-0.2446	-0.0347	1						
Blau diversity * Quota strict	-0.2181	-0.0342	-0.0898	0.9827	-0.2433	-0.0345	-0.0939	1					
Board size (natural log)	-0.1361	-0.0122	0.0673	-0.0399	-0.1009	-0.0118	0.0653	-0.0035	1				
Firm size (natural log)	0.0367	0.0291	0.2310	-0.0283	0.0329	0.0292	0.2412	-0.0176	0.5945	1			
GDP (natural log)	-0.1201	0.0217	0.1925	0.1204	-0.1369	0.0219	0.1973	0.1537	0.1641	0.2238	1		
Leverage	-0.0316	-0.0376	0.0460	0.0611	-0.0414	-0.0371	0.0602	0.0558	0.2320	0.4342	0.1998	1	
Average Board Age	-0.2201	0.0199	0.1296	-0.0374	-0.2288	0.0204	0.1407	0.0038	0.2448	0.3745	0.2419	0.1281	1

Table 4: Correlation matrix

4.3 Results

In order to test the hypothesis of this research, six OLS-regressions are performed. Table 5 contains the regressions for Tobin's Q without interaction effects, whereas Table 6 contains the same regressions with the addition of the interaction effects.

Fixed Effects regression Tobin's Q without interactions effects, dataset 1

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0104		
	(-1.15)		
Quota without sanction	-0.0477***	-0.0457**	-0.0435**
	(-2.68)	(-2.54)	(-2.47)
Quota with soft sanction	-0.00247	0.00150	0.00371
	(-0.19)	(0.11)	(0.28)
Quota with strict sanction	-0.0164	-0.0139	-0.0114
	(-1.19)	(-0.96)	(-0.79)
Board size (natural log)	-0.0124	-0.0147*	-0.0130
	(-1.41)	(-1.67)	(-1.49)
Firm size (natural log)	-0.0409***	-0.0400***	-0.0395***
	(-2.92)	(-2.85)	(-2.83)
GDP (natural log)	-0.106***	-0.108***	-0.109***
	(-3.76)	(-3.83)	(-3.90)
Leverage	0.0000737	0.0000132	-0.0000108
	(0.20)	(0.04)	(-0.03)
Average Board Age	-0.00146	-0.00134	-0.00141
	(-0.87)	(-0.78)	(-0.82)
Percentage diversity		-0.0484	
		(-1.39)	
Blau diversity			-0.0537**
			(-2.08)
Constant	3.723***	3.767***	3.788***
	(5.35)	(5.41)	(5.49)
Observations	1241	1241	1241
Adjusted R-squared	0.151	0.152	0.155

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 5: Fixed effects regression Tobin's Q without interaction effects, dataset 1

The results of Table 5 show that Dummy diversity, Percentage diversity and Blau diversity have a small negative relationship with Tobin's Q. This relationship is non-significant for Dummy diversity (*t = -1.15; p > 0.10)* and Percentage diversity (*t = -1.39; p > 0.10),* whereas Blau diversity shows a significant negative result (*t = -2.08; p < 0.05)*. These results are similar in the regressions including interaction effects in Table 6, where Dummy diversity (*t = -1.34; p > 0.10)* and Percentage

Fixed Effects regression Tobin's Q including interaction effects, dataset 1

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0124		
	(-1.34)		
Quota without sanction	-0.0326	-0.0300	-0.0310
	(-1.24)	(-1.36)	(-1.35)
Quota with soft sanction	0.0412	-0.000113	0.00447
	(0.64)	(-0.00)	(0.12)
Quota with strict sanction	-0.0875***	-0.0294	-0.0316
	(-3.13)	(-1.29)	(-1.18)
Dummy diversity * Quota without	-0.0227		
	(-1.07)		
Dummy diversity * Quota soft	-0.0448		
	(-0.73)		
Dummy diversity * Quota strict	0.0777***		
	(2.67)		
Board size (natural log)	-0.0124	-0.0149	-0.0128
	(-1.48)	(-1.64)	(-1.44)
Firm size (natural log)	-0.0424***	-0.0409***	-0.0403***
	(-3.05)	(-2.90)	(-2.87)
GDP (natural log)	-0.102***	-0.106***	-0.106***
	(-3.65)	(-3.65)	(-3.67)
Leverage	0.000140	0.0000388	0.0000195
	(0.39)	(0.10)	(0.05)
Average Board Age	-0.00126	-0.00132	-0.00135
	(-0.76)	(-0.77)	(-0.79)
Percentage diversity		-0.0661	
		(-1.48)	
Perc divers * Quota without		-0.139	
		(-1.34)	
Perc divers * Quota soft		0.0169	
		(0.16)	
Perc divers * Quota strict		0.0927	
		(1.18)	
Blau diversity			-0.0647**
			(-2.15)
Blau divers * Quota without			-0.0661
			(-0.97)
Blau divers * Quota soft			0.00331
			(0.03)
Blau divers * Quota strict			0.0781
			(1.14)
Constant	3.649***	3.729***	3.727***
	(5.25)	(5.22)	(5.23)
Observations	1241	1241	1241
Adjusted R-squared	0.163	0.154	0.156

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 6: Fixed effects regression Tobin's Q with interaction effects, dataset 1

diversity (*t = -1.48; p > 0.10)* are negative and non-significant, whereas Blau diversity is significant and negative (*t = -2.15; p < 0.05)*. Also the coefficients for Dummy diversity, Percentage diversity and Blau diversity point in the same direction in both tables.

The effect of quotas on Tobin's Q show mixed results in Table 5 and Table 6, in which the dummy for countries without a quota is left out as the baseline. In Table 5, countries with a quota without sanctions show a negative and significant relationship with Tobin's Q for all three diversity variables *(p < 0.01)*. This relationship changes when the interaction terms are added in Table 6, turning the significant relationship with all three diversity variables into non-significant. Furthermore, the effect of a quota with strict sanctions becomes significant and negative in the dummy diversity regression (*t = -3.13; p < 0.01)*. With each of these coefficients of the significant results being negative, indicates that the effect of quotas on Tobin's Q turns out to be negative in comparison to countries without quotas.

The interaction effects in Table 6 between the diversity variables and the quotas also shows a significant result between Dummy diversity and countries with a strict quota (*t = 2.67; p < 0.01)*. However, the coefficient of this interaction effect is positive *(0.0777)*. This result indicates that in countries where quotas are implemented with strict sanctions *(-0.0875)*, the negative coefficient get compensated by the interaction effect. However, still a negative coefficient remains when the coefficients are interpreted together.

The significant control variables in Table 5 and Table 6 are Firm size and GDP *(p < 0.01),* whereas Board size shows a significant result in the regression of Percentage diversity with Tobin's Q in Table 5. Additionally, Leverage and Average board age are non-significant in both tables. The coefficients of the control variables are not surprising, except for GDP. The expectation was that GDP and performance would have a positive relationship.

When assessing the results of Table 5 and Table 6, it becomes clear that they are in contrast with the formulated hypotheses. First of all, in all regressions the effect of gender diversity on Tobin's Q shows a negative relationship, with Blau diversity being statistically significant in both tables. These results indicate a rejection of hypothesis 1. Furthermore, quotas turn out to influence Tobin's Q negatively as well, but without a clear positive or negative trend. The expectation was that the effect of gender diversity on performance becomes less positive (more negative) as the strictness, i.e. higher level of government interference, increases. Since the quota variables and interaction effects just show significant results in part of the quota and interaction variables, no clear trend can be distinguished. Additionally, the significance levels of quotas change when interaction effects are added, having countries without quotas significantly influencing Tobin's Q if no interaction effects are included and changing this into a non-significant relationship when interactions effects are

added. As a result of these findings, hypothesis 2 should also be rejected.

Fixed Effects regression ROA without interaction effects, dataset 1

	(1) ROA dum divers	(2) ROA perc divers	(3) ROA blau divers
Dummy diversity	-0.00236		
	(-1.34)		
Quota without sanction	-0.00368***	-0.00340**	-0.00301**
	(-2.87)	(-2.39)	(-2.12)
Quota with soft sanction	0.00220	0.00274	0.00315
	(0.82)	(1.07)	(1.18)
Quota with strict sanction	-0.00340*	-0.00311*	-0.00265
	(-1.86)	(-1.70)	(-1.46)
Board size (natural log)	-0.00127	-0.00185	-0.00156
	(-0.58)	(-0.82)	(-0.69)
Firm size (natural log)	-0.000417	-0.000330	-0.000228
	(-0.17)	(-0.13)	(-0.09)
GDP (natural log)	-0.00666*	-0.00696*	-0.00713*
	(-1.68)	(-1.77)	(-1.83)
Leverage	-0.000232***	-0.000243***	-0.000247***
	(-2.70)	(-2.72)	(-2.73)
Average Board Age	-0.000473*	-0.000439*	-0.000451*
	(-1.92)	(-1.82)	(-1.85)
Percentage diversity		-0.00816	
		(-1.45)	
Blau diversity			-0.00928*
			(-1.88)
Constant	0.242**	0.249***	0.253***
	(2.60)	(2.70)	(2.77)
Observations	1241	1241	1241
Adjusted R-squared	0.072	0.071	0.074

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 7: Fixed effects regression ROA without interaction effects, dataset 1

4.4 Robustness ROA

Table 7 and Table 8 contain the same regression analyses as previously discussed, but with ROA instead of Tobin's Q as the dependent variable. The three diversity variables also show a negative relationship with ROA, with Dummy diversity (*t = -1.34; p > 0.10)* and Percentage diversity (*t = -1.45; p > 0.10)* being statistically non-significant and Blau diversity being significant (*t = -1.88; p < 0.10)* in the regressions without interaction effects (Table 7).

Table 8 shows similar results with Dummy diversity (*t = -1.28; p > 0.10)* and Percentage diversity (*t = -1.64; p > 0.10)* being non-significant and Blau diversity being significant (*t = -1.84; p < 0.10).* The significance of the gender diversity variables shows a similar pattern between Tobin's Q and ROA, with Blau diversity also having a negative sign in relationship to both dependent variables.

Fixed Effects regression ROA including interaction effects, dataset 1

	(1) ROA dum divers	(2) ROA perc divers	(3) ROA blau divers
Dummy diversity	-0.00252		
	(-1.28)		
Quota without sanction	-0.00433***	-0.00367***	-0.00395***
	(-2.86)	(-3.17)	(-3.13)
Quota with soft sanction	-0.00461	-0.00143	-0.00199
	(-0.95)	(-0.42)	(-0.54)
Quota with strict sanction	-0.000289	-0.00342	-0.00213
	(-0.07)	(-1.28)	(-0.73)
Dummy diversity * Quota without	0.00101		
	(0.52)		
Dummy diversity * Quota soft	0.00713		
	(1.54)		
Dummy diversity * Quota strict	-0.00332		
	(-1.01)		
Board size (natural log)	-0.00124	-0.00199	-0.00164
	(-0.58)	(-0.86)	(-0.73)
Firm size (natural log)	-0.000325	-0.000457	-0.000311
	(-0.13)	(-0.19)	(-0.13)
GDP (natural log)	-0.00670	-0.00628	-0.00652
	(-1.64)	(-1.51)	(-1.57)
Leverage	-0.000235***	-0.000241***	-0.000246***
	(-2.77)	(-2.70)	(-2.73)
Average Board Age	-0.000481*	-0.000424*	-0.000442*
	(-1.95)	(-1.77)	(-1.81)
Percentage diversity		-0.0117	
		(-1.64)	
Perc divers * Quota without		0.00454	
		(0.43)	
Perc divers * Quota soft		0.0196	
		(1.09)	
Perc divers * Quota strict		0.00411	
		(0.43)	
Blau diversity			-0.0112*
			(-1.84)
Blau divers * Quota without			0.00630
			(0.83)
Blau divers * Quota soft			0.0161
			(1.23)
Blau divers * Quota strict			-0.000576
			(-0.07)
Constant	0.243**	0.232**	0.237**
	(2.52)	(2.39)	(2.44)
Observations	1241	1241	1241
Adjusted R-squared	0.072	0.071	0.074

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 8: Fixed effects regression ROA with interaction effects, dataset 1

The effect of quotas on ROA for the regression without interaction effects (Table 7) shows a negative relationship in the Dummy diversity *(-0.00368)*, Percentage diversity *(-0.00816)* and Blau diversity *(-0.00928)* regressions. All three regressions show a significant relationship with ROA, with Dummy diversity *($p < 0.01$)* being more significant than Percentage diversity and Blau diversity *($p < 0.05$).* These significances and signs of coefficients are similar to the results found with Tobin's Q as the dependent variable in Table 5. However, the regressions with ROA also show a significant *($p < 0.10$)* and negative result for countries with quotas and strict sanctions, with Dummy diversity *(-0.00340)* and Percentage diversity *(-0.00311)* as independent variable. When the interaction effects are added in Table 8, the significance of quotas changes again. In the regression of Table 8, the significance of countries without quotas increases *(with all gender diversity variables $p < 0.01$)*. Additionally, the significant influence of quotas with strict sanctions on ROA vanishes. Even though different quotas change by the addition of interaction effects, this same pattern occurs for both Tobin's Q and ROA. Besides changing the significance and coefficients of the quota variables, none of the interaction effects in Table 8 show a significant effect on ROA.

The results of Table 7 and Table 8 confirm the results of the gender diversity variables found with Tobin's Q. In all four regression analyses, Blau diversity turned out to be significantly negatively effecting Tobin's Q *($p < 0.05$ in both Table 5 and Table 6)* and ROA *($p < 0.10$ in both Table 7 and Table 8).* Moreover, the results confirm the findings regarding quotas of the regression analyses with Tobin's Q. The majority of variables show non-significant results, significance levels change by the addition of interaction effects and no clear ascending or descending pattern can be observed due to the lack of significant results. A noticeable difference are the significance levels of quotas in Table 6 and Table 8, in which different quota variables are significant.

4.5 Robustness datasets

In this paragraph the robustness checks will be conducted with the use of two datasets that dealt with missing values in a different way than the original sample. First of all, regression results of the dataset in which an average board attendance is used to deal with unknown data is discussed (dataset 2). Secondly, the regression results of the dataset in which all unknown board data is removed is examined (dataset 3) and both results will be compared with the results from the original data sample (dataset 1). The regression results of Tobin's Q of dataset 2 and dataset 3 are added in Appendix C and Appendix D.

The regression results of dataset 2, with Tobin's Q as dependent variable, confirm the negative relationship of gender diversity and all three gender diversity variables. Dummy diversity is still non-significant with a similar coefficient as in dataset 1, whereas Blau diversity is even more

significant (*t = -3.02; p < 0.01)* with also a stronger and negative coefficient (*-0.0914).* In contrast to dataset 1, Percentage diversity variable shows a significant (*t = -2.45; p < 0.05)* and negative coefficient *(-0.101)* in dataset 2. In the regression analyses of Tobin's Q with interaction effects, similar coefficients and significance can be found for all three gender diversity variables, compared to the regression without interaction effects. Dataset 3 shows results that are in line with the results of dataset 1, having only Blau diversity as the significant *(p < 0.05)* negative *(-0.0543/-0.0633)* gender diversity variable in both the regressions with and without interaction effects.

Dataset 2 shows similar results for the relationship between Tobin's Q and quotas as dataset 1, having significant *(p < 0.05)* negative coefficients for countries with quotas without sanctions, in which the coefficients are varying between -0.0428 and -0.0503, similar as in dataset 1. Adding the interaction effects provides identical results for dataset 1 and dataset 2. Countries with quotas without sanctions lose their significant effect and countries with quotas with strict sanctions become significant *(p < 0.01)* and negative *(-0.0816)*, whereas the interaction effect of Dummy diversity and quotas with strict sanctions show a significant *(p < 0.01)* and positive effect *(0.0777).* Dataset 3 confirms the findings of dataset 1 and dataset 2 in significance and coefficients for quotas and interaction effects.

The robustness checks of dataset 2 and dataset 3 confirm the findings of dataset 1. First of all, Blau diversity turned out to be negative and significant in all datasets, whereas in dataset 2 Percentage diversity was negative and significant as well. Regarding quotas, the regressions showed similar results in all three datasets. Additionally, all three regressions with interaction effects showed only a positive and significant relationship between Dummy diversity and countries with quotas and strict sanctions.

4.6 Robustness quota

The final robustness check will assess whether including quotas separate from each other or as a single variable in the regression analyses will make a difference in the results. The regressions are conducted with the original data sample and Tobin's Q as dependent variable. In Appendix E, the tables with the separate regressions are presented. The results show a similar pattern as the results of the original regression in Table 6. Like in the original results, only countries that imply a quota with strict sanctions and the interaction effect between Dummy diversity and quota with strict sanctions show a significant effect *(p < 0.01)* on Tobin's Q. Additionally, the coefficients also show a similar pattern. The interaction effect has a positive coefficient, but the overall effect on Tobin's Q stays negative. As a result, the conclusion is that this robustness check confirms the previous findings regarding the effect of quotas. The only additional insight that these separate quota regressions

provide, is that Percentage diversity *(p < 0.10)* and Blau diversity *(p < 0.05)* show a significant and negative relationship with Tobin's Q in countries that implied a quota. These results are in line with the results found in dataset 2 of chapter 4.5.

Finally, the same regression is conducted and the separate quota variables are replaced by one quota variable, named Quota. The results of these regressions can be found in Appendix F. The results of Quota show only a significant relationship in the Dummy diversity regression *(p < 0.10)*, whereas none of the interaction effects indicate a significant relationship. The significant relationship between Quota in the Dummy diversity regression is in line with previous findings, in which only quota with strict sanctions in the Dummy diversity regression show a significant negative relationship with Tobin's Q (see Table 6). Similar to the previous regressions in which quotas are included separately, also in these regressions a significant and negative effect is found for Percentage diversity *(p < 0.10)* and Blau diversity *(p < 0.05)* in relationship to Tobin's Q. Furthermore, a significant and negative relationship between Dummy diversity *(p < 0.10)* and Tobin's Q is found is this analysis. With the latter not being a previously seen result in this research, the effect and significance of Percentage diversity and Blau diversity on Tobin's Q was found in dataset 2 and the previous robustness check of this paragraph, that separately included quotas in the regressions.

4.7 Summary of results

The relationship between gender diversity and performance showed a consistent pattern throughout the different regressions and datasets. In all the datasets, Dummy diversity, Percentage diversity and Blau diversity show a negative relationship with the dependent variable. Blau diversity turned out to be significant in every dataset, whereas Percentage diversity only was significant and negative in the robustness checks. As a result, it can be concluded that hypothesis 1 should be rejected, since the relationship between the significant gender diversity variables and the two performance variables show a consistent negative relationship.

The regression analyses show more mixed results regarding the influence of quotas on gender diversity. There turned out to be one significant interaction effect between quotas and gender diversity, whereas the significance level of quota variables changed when interaction effects were added. The interaction between Dummy diversity and countries with quotas and strict sanctions turned out to have a positive relationship with Tobin's Q, even though the combined effect was still negative. The other interaction effects were non-significant and the robustness checks showed inconsistent results. Assessing how these results relate to hypothesis 2 leads to the conclusion that they are somehow contrary to the expected effect. The expected effect was that a higher level of governance influence, i.e. quotas with stricter sanctions, would lead to a less positive

effect of gender diversity on performance. There is no clear decreasing pattern when all interaction effects are assessed and most interaction effects are non-significant. Therefore, the conclusion is that hypothesis 2 should be rejected, based on a lack of clear pattern and a lack of significant interaction effects.

4.8 Discussion

The results of this paper led to the conclusion that both formulated hypothesis should be rejected. When assessing the impact of gender diversity, all three gender diversity variables show a negative relationship with performance, with only Blau diversity being significant constantly. As described in Chapter two, previous research found mixed results for the effect of gender diversity on financial performance, but the majority found a positive relationship (Ahern & Dittmar, 2012; Campbell & Minguez-Vera, 2008; Carter et al., 2010; Dwyer et al., 2003; Dezso & Ross, 2012; Garcia-Meca et al., 2015; Iacoviello et al., 2015; Richard, 2000). To recall, Blau diversity is an indicator that measures the level of diversity, in which its maximum value is reached when the highest possible level of diversity is achieved. This means that if Blau diversity has a negative effect on financial performance, this not necessarily indicates that women influence financial performance negatively, but that creating gender diversity has a negative effect on financial performance in comparison to boards dominated by one gender. This is in contrast with the resource dependence theory, human capital theory and agency theory, while it is in line with the social psychology theory. The latter suggests that an increasing level of gender diversity in management boards can lead to more competitive interactions, less cohesion, lack of trust and time consuming discussions. This could be an explanation of this observed negative relationship of Blau diversity and performance.

The analyses of the impact of quotas on performance led to mixed results. The only significant interaction effect that was found, was between Dummy diversity and countries with quotas and strict sanctions. The coefficients of this interaction effect turned out to be positive in relationship with Tobin's Q. A possible explanation for this result is that in countries with strict sanctions, not appointing women in the management board leads to sanctions that have a direct or indirect negative financial impact. Therefore, in these countries a positive interaction effect makes sense, since this decreases the chance of receiving fines or other sanctions that influences performance negatively. However, assessing the combined effect of coefficients still leads to a negative sign in relationship with Tobin's Q. This interaction effect was the only interaction effect that was found to be consistent in the robustness checks as well. Other quotas and interaction effects showed non-significant results. A possible reason that quotas show inconsistent and non-significant results can be given by the relatively small sample size of this research, the low number of

countries that implemented a quota and the short time in which quotas are implemented. Especially the latter could be an important factor, since the majority of countries with quotas with soft or strict sanctions implemented these quotas after 2011, with a deadline for listed companies often a couple of years after 2011.

The control variables showed a consistent pattern throughout the regressions analyses and between different datasets. The biggest difference in significance and coefficients can be found in the regressions with Tobin's Q and ROA as dependent variables. For Tobin's Q; Firm size, GDP and Board size often were the significant control variables, whereas ROA showed a more significant relationship with Leverage, Average board age and GDP. The relationship between the control variables and dependent variables seems to be in line with other studies. In other studies, Tobin's Q also turns out to have a significant negative relationship with Firm size (Campbell & Minguez-Vera, 2008; Dezso & Ross, 2012) and Board size (Garcia-Meca et al., 2015), whereas ROA also has a significant and negative effect in other studies regarding Leverage (Salim & Yadav, 2012) and Average board age (Owen & Temesvary, 2017; Carter et al., 2010). The only control variable that gave odd coefficients in all regression analyses was GDP. GDP turned out to have a significant and negative effect on Tobin's Q and ROA. This is not an expected coefficient, since a growth in GDP should indicate that the economic environment in which the bank is active is growing.

5. Summary & Conclusion

The changing role of women in the past decades led to an increased labour participation of women. However, management boards are still dominated by men in the majority of countries and industries. In order to increase the presence of female board members in management boards, several countries introduced a gender diversity quota. In these quotas, companies are stimulated, or forced, to realize a gender diversity level in the management board of a given percentage. The sanctions that are imposed if the quota is not met differ per country and can vary from no sanctions to fines and even dissolution.

This study examines what the effect is of the increase in female participation on performance of European banks and what the effect is of the increasing governance interference by the imposed quotas. The research question that was assessed is: "What is the effect of gender diversity and quotas in the top management on the performance of European banks?". From a theoretical point of view; the agency theory, resource dependence theory and human capital theory suggest a positive influence of an increase in gender diversity in management boards, while the social psychology theory suggests that either a positive or negative effect can be expected. Previous studies show in most cases that the influence of an increase in gender diversity is positive, while some studies also find a neutral or negative effect.

Previous literature shows that quotas with strict sanctions is an effective and fast instrument to increase the level of gender diversity in management boards, but that the effect on financial performance is found to be neutral or negative if the quotas are implemented with strict sanctions. If quotas with soft sanctions are implemented, the effect on performance turned out to positive. A reasoning made by studies that suggest the latter is that in countries with strict sanctions, women might become board members while being incapable, purely appointed by companies to fulfil the imposed quota, while in countries with soft quotas companies are stimulated in a more gentle way and can select women based on competence and willingness. Based on the results of previous studies, the expectation is that if quotas get stricter and are imposed with harsh sanctions, the positive effect of gender diversity decreases.

In order to answer the research question, Tobin's Q is chosen as the proxy for bank performance, while the impact of gender diversity is measured with three different independent variables. These three different diversity measures consist of: a variable that measures the presence of at least one women in the management board (Dummy diversity), a variable that measures the percentage of women present at the board (Percentage diversity) and the Blau index (Blau diversity), which is a diversity index that expresses the gender diversity level. Finally, the impact of quotas is measured by adding interaction effects between quotas and diversity, in which quotas are ordered

in: countries without quota, countries with quota without sanctions, countries with quotas and soft sanctions and countries with quotas and strict sanctions.

The results of the regression analyses showed a consistent, significant and negative relationship between performance and Blau diversity. These results contradict the majority of prior research that used similar diversity indicators to assess the impact on performance in financial and non-financial industries (Campbell & Minguez-Vera, 2008; Dezso & Ross, 2012; Garcia-Meca et al., 2015), while they are in line with the results of Ahern & Dittmar (2012). Looking from the theoretical point of view, a significant and negative relationship between Blau diversity and performance implies that the higher the gender diversity in a board, the lower the performance of a company will be. A possible explanation can be given by the social psychology theory, which argues that a more diverse board can lead to slower decision making, rougher interactions, a lack of trust and less cohesion.

The analysis of the impact of quotas on performance led to mixed results. Most quotas and interaction effects were non-significant in relation to Tobin's Q and the significance levels of the variables were inconsistent in robustness checks and when interaction effects were added. Just one interaction effect was found to be significant and constant: Dummy diversity and countries with quotas and strict sanctions. The interaction effect showed a positive relationship, even though the combined coefficients stay negative in relation to Tobin's Q. This result makes sense, since not appointing women in management boards in countries with quotas and strict sanctions can lead to fines or other measures that will have a negative financial impact. The mixed results and lack of significance in the interaction effects can possibly be explained by the small sample size and recent implementation of gender quotas in several European countries, in which the majority of countries set their gender diversity quota deadline for listed companies at the last few years of the data sample period. This leads to a relatively small number of observations in which the quota is fully implemented.

Even though this research attempts to conduct a complete and thorough investigation, some limitations remain. First of all, the BoardEx data that was used to reconstruct the board compositions of each bank in each year contained several missing values. As explained previously, a missing start or end date was dealt with in three different ways. However, a significant number of observations had to be removed when both start and end dates were missing. The consequence is that not all board compositions were reconstructed as they truly were composed. Secondly, as mentioned, many of the countries that impose quotas with soft or strict sanctions just recently introduced them, with the deadline for listed companies often at the end or even past the data sample period of this research. Thirdly, due to time limitations, all banks in the data sample are assumed to be public companies and to be subject to the quota policy for public companies. Ownership structures of banks

are not assessed thoroughly to determine whether the bank was restricted to the often earlier implemented state-owned quota, instead of the public company quota. Fourthly, this research does not regress the lagged diversity variable as has been done by Carter et al. (2010). They state in their study that they use lagged variables in the Fixed effects models, because they hypothesize that the effect of gender diversity in management boards will influence performance over time. Fifthly, this study examined the effect of three different gender diversity variables, while some other studies included more or other diversity variables, like the Shannon index (Campbell & Minguez-Vera, 2008; Garcia-Meca et al., 2015). The Shannon index is calculated by $-\sum_{i-1}^{n} P_i \, lnP_i$, where P_i and n have the same meaning as in the Blau index. The Shannon index differs from the Blau index in that its value can vary between 0 and 0.69 instead of 0 and 0.50. Additionally, it is more sensitive than the Blau index for small changes in diversity, since it is a logarithmic measure (Campbell & Minguez-Vera, 2008). The addition of the Shannon index could have functioned as a robustness check for the significant results found with the Blau index. Finally, it is known that women are not randomly appointed to a management board. However, the complete set of variables that would be required to take this non-random nomination of board members into account is difficult to gather. As a result, this phenomenon is not taken into account in this research.

The suggestions for future research are to examine the impact of quotas on performance when more observation years can be gathered. Furthermore, it could be interesting to conduct a research that investigates the impact of gender quotas in a single country and to compare this with another country with a similar quota policy. By doing so, there can be assessed if cultural, legal or social factors influence the impact of quotas on performance. A possible difference in effect can occur due to the different corporate governance models implemented by companies in different countries, in which some adopted the one-tier, two-tier or even different governance model (Schneider & Chan, 2001). Cultural differences can occur in a variety of levels. It can influence the willingness of women to change the traditional family role and enter the labour market, but also the influence they have while being present in a management board. The latter is influenced by the organizational culture of companies, in which risk taking, flexibility, rules, decision making and hierarchy are differently valued (Dwyer et al., 2003).

References

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 123-142.

Adams, R., & Mehran, H. (2012). Bank Board Structure and Performance: Evidence for Large Bank Holding Companies. *Journal of Financial Intermediation, 21*(2), 243-267.

Adams., R., & Mehran, H. (2003). *Is Corporate Governance Different for Bank Holding Companies.* FRBNY Economic Policy Review .

Agrawal, A., & Charles, R. K. (2000). *Do Some Outside Directors Play a Political Role?* Alabama.

Ahern, K. R., & Dittmar, A. K. (February de 2012). The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation. *The Quarterly Journal of Economics, 1*(1), 137-197.

Alm, M., & Winberg, J. (2016). *How Does Gender Diversity on Corporate Boards Affect the Firm Financial Performance.* Göteborg: Göteborgs University.

Andrés-Alonso, P., Romero-Merino, M., Santamaría-Mariscal, M., & Vallelado-González, E. (2010). In Search of an Optimal Board of Directors for Banks. In: F. Fiordelisi , P. Molyneux, & D. Previati, *New Issues in Financial Institutions Management* (pp. 260-273). London: Palgrave Macmillan.

Becht, M., Bolton, P., & Röell, A. (2011). Why bank governance is different. *Oxford Review of Economic Policy, 27*(3), 437-463.

Belkhir, M. (2009). "Board of directors' size and performance in the banking industry". *International, 5*(2), 201-221.

Berger, A. N., & Bonaccorsi di Patti, E. (2006). Capital structure and firm performance: A new approach to testing agency theroy and an application to the banking industry. *Journal of Banking & Finance, 30*, 1065-1102.

Booth, J. R., & Deli, D. N. (1999). On executives of financial institutions as outside directors. *Journal of Corporate Finance, 5*, 227-250.

Boscia, V., Stefanelli, V., & Ventura, A. (2018). Are There Differences in Boards of Directors Between Banks and Non-financial Firms? Some Evidence from EU Listed Companies. In: B. D. al., *Corporate Governance in Banking and Investor Protection* (pp. 91-106). CSR, Sustainability, Ethics & Governance.

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender Differences in Risk Taking: A Meta-Analysis. *PSYCHOLOGICAL BULLETIN, 125*(3), 367-383.

Campbell, K., & Minguez-Vera, A. (2008). Gender Diversity in the Boardroom and Firm Financial Performance. *Journal of business ethics 83*, 435-51.

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

Carter, D., Simkins, B., & Simpson, W. (2003). Corporate governance, board diversity and firm value. *Financial Review, 38*, 33-53.

Casey, C., Skibnes, R., & Pringle, J. (2011). Gender Equality and Corporate Governance: Policy Strategies in Norway and New Zealand. *Gender, Work and Organization, 18*(6), 613-630.

Catalyst. (2012). *Increasing Gender Diversity on Boards: Current Index of Formal Approaches.* Catalyst.

CED. (2012). *Fulfilling the Promise: How More Women on Corporate Boards Would Make America and American Companies More Competitive.* Washington: COMMITTEE FOR ECONOMIC DEVELOPMENT.

Chen, J., Leung, W. S., & Goergen, M. (April de 2017). The impact of board gender composition on dividends payouy. *Journal of Corporate Finance, 43*, 86-105.

Chilosi, A., & Damiani, M. (2007). *Stakeholders vs. shareholders in corporate governance.* Department of Economics-Univeristy of Pisa and Department of Economics, Finance, and Statistics-University of Perugia.

Chughtai, M., Malik, M., & Aftab, R. (2015). Impact of Major Economic Variables on Economic Growth of Pakistan. *AUDŒ, 11*(2), 94-106.

Connolly, K. (2014, November 26). *Germany backs law demanding at least 30% women in top boardrooms*. Retrieved 03 18, 2018, from www.theguardian.com: https://www.theguardian.com/world/2014/nov/26/germany-women-quotas-frauenquote-boardrooms

de Andres, P., & Vallelado, E. (2008). Corporate governance in banking: The role of the board of directors. *Journal of Banking & Finance*, 2570-2580.

De Haan, J., & Vlahu, R. (2012). *Corporate governance of financial institutions: A survey.* De Nederlandsche Bank; University of Groningen; CESifo Munich.

Denis, D. K., & McConnell, J. (2003). International corporate governance. *Journal of Financial and Quantitative Analysis*, Vol. 38, pp 1-36.

Dezso, C. L., & Ross, D. G. (2012). DOES FEMALE REPRESENTATION IN TOP MANAGEMENT IMPROVE FIRM PERFORMANCE? A PANEL DATA INVESTIGATION. *Strategic Management Journal, 33*, 1072-1089.

Díaz Díaz B., G.-R. R. (2018). Is Corporate Governance Different in Financial Firms than in Non-Financial Firms? Evidence for the Pre- and Post-Crisis Period in Europe. In: I. S. Díaz Díaz B., *CSR, Sustainability, Ethics & Governance* (pp. 37-59). Springer, Cham.

D'Urbino, L. (2017, December 19). *Women and economics.* Retrieved January 4, 2018, from www.economist.com: https://www.economist.com/news/christmas-specials/21732699-professions-problem-women-could-be-problem-economics-itself-women-and

Dwyer, S., Richard, O. C., & Chadwick, K. (2003). Gender diversity in management and firm performance: the influence of growth orientation and organizational culture. *Journal of Business Research , 56*, 1009-1019.

Eisenhardt, K. (1989). Agency Theory: An Assessment and Review. *Academy of Management Review*, 57-74.

European Parliament. (2012). *Gender Quotas in Mangement Boards.*

Ferber, M. A., & Nelson, J. A. (1993). *Beyond Economic Man: Feminist Theory and Economics.* THE UNIVERSITY OF CHICAGO PRESS.

Garcia-Meca, E., Garcia-Sanchez, I., & Martinez-Ferrero, J. (2015). Board diversity and its effects on bank performance: An international analysis. *Journal of Banking & Finance, 53*, 202-214.

Grant, S., & Brue, R. (2012). *The evolution of economic thought.* Cengage learning.

Hagendorff, J., & Keasey, K. (2012). The value of board diversity in banking: evidence from the market for corporate control. *The European Journal of Finance, 18*(1), 41-58.

Hambrick, D. C., Chen, M.-J., & Seung Cho, T. (December de 1996). The influence of top management team heterogeneity on firms competitive moves. *Administrative Science Quarterly, 41*(4).

Hillman, A. J., & Dalziel, T. (2003). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review 28*, 383-396.

Hillman, A. J., Withers, M. C., & Collins, B. J. (2009). Resource Dependence Theory: A Review. *Journal of Management, 35*(6), 1404-1427.

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal, 7*(3), 1-31.

Hsiao, C. (2007). Panel Data Analysis - Advantages and Challenges. *TEST*, 1-22. Retrieved from https://doi.org/10.1007/s11749-007-0046-x

Iacoviello, G., Mazzei, M., & Riccardi, G. (2015). THE GENDER COMPOSITION OF THE BOARD AND FIRM PERFORMANCE. THE ROLE OF REGULATORY MEASURES . *Corporate Ownership & Control, 1*(11), 1385-1395.

Jensen, M. C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, 323-329.

Jensen, M. C., & Fama, E. F. (1983). Seperation of Ownership and Control. *Journal of Law and Economics*, Vol. 26, No. 2, pp. 301-325.

Jensen, M. C., & Meckling, W. H. (October de 1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*(Volume 3, Issue 4), 305-360.

Jianakoplos, N. A., & Bernasek, A. (1998). ARE WOMEN MORE RISK AVERSE. *Economic Inquiry, 36*(4), 620-630.

Kosklu, A. (2018, January 14). *Corporate Governance Systems: Shareholders Versus Stakeholders*. Retrieved from Internationallawoffice.com: http://www.internationallawoffice.com/Newsletters/Company-Commercial/Turkey/Bener-Law-Office/Corporate-Governance-Systems-Shareholders-Versus-Stakeholders

Labelle, R., Francoeur, C., & Lakhal, F. (2015). To Regulate Or Not To Regulate? Early Evidence On The Means Used Around The World To Promote Gender Diversity In The Boardroom. *Gender, Work & Organization , 22*(4), 339-363.

Lazzaretti, K., Godoi, C. K., Camilo, S. P., & Marcon, R. (2013). Gender diversity in the boards of directors of Brazillian businesses. *Gender in management: an international journal*, 94-110.

Lenard, M. J., Yu, B., York, E. A., & Wu, S. (2014). Impact of board diversity on firm risk. *Managerial Finance, 40*(8), 787-803.

Margolis, S. (2011, January 24). *What is the optimal group size for decision-making?* Retrieved May 9, 2018, from sheilamargolis.com: https://sheilamargolis.com/2011/01/24/what-is-the-optimal-group-size-for-decision-making/

Mateos de Cabo, R., Gimeno, R., & Nieto, M. J. (2012). Gender Diversity on European Banks' Boards of Directors. *Journal of Business Ethics*.

Niederle, M., & Vesterlund, L. (2011). Gender and Competition. *Annual Review of Economics*, 601-630.

OED. (2012). *Fulfilling the Promise: How More Women on Corporate Boards Would Make America and American Companies More Competitive.* Washington : COMMITTEE FOR ECONOMIC DEVELOPMENT.

Overheid.nl. (2015). *Burgelijk Wetboek Boek 2*. Retrieved 03 18, 2018, from www.wetten.overheid.nl: http://wetten.overheid.nl/BWBR0003045/2015-01-01

Owen, A., & Temesvary, J. (2017, October 25). *The Performance Effects of Gender Diversity on Bank Boards*. Retrieved from papers.ssrn.com: https://ssrn.com/abstract=2893189 or http://dx.doi.org/10.2139/ssrn.2893189

Pande, R., & Ford, D. (2011). *Gender Quotas and Female Leadership: A Review.* Harvard University. Harvard University.

Pathan, S., & Faff, R. (2013). Does board structure in banks really affect their performance? *Journal of Banking & Finance, 37*, 1573-1589.

Pekkarinen, T. (2012). Gender differences in education. *Nordic Economic Policy Review, 1*.

Pfeffer, J., & Salancik, G. R. (2003). *The external control of organizations: a resource dependence perspective.* Stanford: Stanford University Press.

Phillips, K. (2014). *How Diversity Makes Us Smarter.* Scientific American.

Prat, B., & Mueller, H. (2016). *BOARD-LEVEL GENDER QUOTAS IN THE UK, FRANCE AND GERMANY.* London: Slaughter and May.

Quack, S., & Hancke, B. (1997). Women in decision-making in finance. Brussels: European Commission. -, -.

Richard, O. C. (2000). RACIAL DIVERSITY, BUSINESS STRATEGY, AND FIRM PERFORMANCE: A RESOURCE-BASED VIEW. *Academy of Management Journal, 43*(2), 164-177.

Rosselli, A. (2014). *The Policy on Gender Equality in Italy.* EUROPEAN PARLEMENT.

Russo, A., & Perrini, F. (2010). Investigating Stakeholder Theory and Social Capital: CSR in Large Firms and SMEs. *Journal of Business Ethics, 91*, 207-221.

Salim, M., & Yadav, R. (2012). Capital Structure and Firm Performance: Evidence from. *Social and Behavioral Sciences*(65), 156-166.

Schneider, J., & Chan, S. (2001). *A Comparison of Corporate Governance Systems in Four Countries.* Hong Kong Baptist University: Business Research Centre, School of Business.

Simpson, W., & Gleason, A. (1999). Board structure, ownership, and financial distress in banking firms. *International Review of Economics and Finance, 8*, 281-292.

Singh, V., Terjesen, S., & Vinnicombe, S. (2008). Newly appointed directors in the boardroom: How do women and men differ? *European Management Journal, 26*(1), 48-58.

Staikouras, P., Staikouras, C., & Agoraki, M. (2007). The effect of board size and composition on European bank performance. *Economic Journal of Law and Economics, 23*(1), 1-27.

Statisticshowto. (2018). *Chow Test: Definition and Examples*. Retrieved June 03, 2018, from www.statisticshowto.com: http://www.statisticshowto.com/chow-test/

Statisticshowto. (2018). *What is Hausman Test?* Retrieved June 03, 2018, from www.statisticshowto.com: http://www.statisticshowto.com/hausman-test/

Terjesen, S., Sealy, R., & Singh, V. (2009). Women directors on corporate boards: A review and research agenda. *Corporate governance: an international review, 17*(3), 320-337.

THE WORLD BANK. (2018, May 2). *Databank World Development Indicators*. Retrieved May 16, 2018, from databank.worldbank.org: http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Thornton, A., Alwin, D. F., & Camburn, D. (1983). Causes and Consequences of Sex-Role Attitudes and Attitude Change. *American Sociological Review, 48*(2), 211-227.

Trittin , H., & Schoeneborn, D. (2017). Diversity as Polyphony: Reconceptualizing Diversity Management from a Communication-Centered Perspective. *Journal of business ethics, 144*(2), 305-322.

Wang, Y., Young, A., & Chaplin, S. (2009). IS THERE AN OPTIMAL BOARD SIZE? *Corporate Board Role, Duties & Composition, 5*(1), 6-14.

Weetman, F. (2017). *WHOSE MODEL IS IT ANYWAY? Why Economists Need to Face Up to Reality.*

Westphal, J. D., & Milton, L. P. (2000). How Experience and Network Ties Affect the Influence of Demographic on Corporate Boards. *Administrative Science Quarterly 45(2)*, 366-98.

Wooldridge, J. (2012). *Introductory Econometrics a Modern Approach* (5 ed.). South-Western Cengage Learning.

www.stata.com. (2018). *Stata 5: How do I test endogeneity? How do I perform a Durbin–Wu–Hausman test?* Retrieved May 14, 2018, from www.stata.com: https://www.stata.com/support/faqs/statistics/durbin-wu-hausman-test/

Appendix A: Quotas

Category 1: countries without quotas and sanctions (Catalyst, 2012; European Parliament, 2012; Prat & Mueller, 2016; Pande & Ford, 2011)

Country (introduction year)	Applicability	Quota	Deadline	Sanctions
Austria (2011)	State-owned companies (50%+)	2 phases: - 25% - 35%	2 phases: - 2013 - 2018	-
Denmark (2000)	State-owned companies	30%	2000	-
Finland (2004)	State-owned companies	40%	2005	-
Ireland (2004)	State-owned companies	40%	No deadline	-
Switzerland (2006)	State-owned companies	30%	2011	-
Cyprus	-	-	-	-
Czech Republic	-	-	-	-
Faroe Islands	-	-	-	-
Greece	-	-	-	-
Hungary	-	-	-	-
Liechtenstein	-	-	-	-
Lithuania	-	-	-	-
Malta	-	-	-	-
Poland	-	-	-	-
Portugal	-	-	-	-
Romania	-	-	-	-
Sweden	-	-	-	-

Table 9: Quota category 1

Category 2: countries with quotas without sanctions (Catalyst, 2012; European Parliament, 2012; Prat & Mueller, 2016; Pande & Ford, 2011)

Country (introduction year)	Applicability	Quota	Deadline	Sanctions
Iceland (2006) Iceland (2010)	2 phases: - State-owned - Listed and private companies with 50+ employees	2 phases: - 50% - 40% (also for public owned companies)	2 phases: - 2006 - 2013	-
The Netherlands (2010)	Companies with 250+ employees	30%	2016	Explain in annual report why quota is not met and publish an action plan on how to fulfil the quota in the future
Luxembourg (2009)	-	Board should have an appropriate representation of both genders	-	-

Table 10: Quota category 2

Category 3: countries with quotas with soft sanctions (Catalyst, 2012; European Parliament, 2012; Prat & Mueller, 2016; Pande & Ford, 2011)

Country (introduction year)	Applicability	Quota	Deadline	Sanctions
Belgium (2011)	3 phases: - State-owned companies - Listed companies - Companies with less than 50% of the shares listed	33.33%	3 phases: - 2012 - 2016 - 2018	Temporary loss of financial and non-financial benefits by members of the board
France (2011)	Listed companies with 500+ employees or turnover/asset of 50m+	2 phases: - 20% - 40%	2 phases: - 2013 - 2016	Suspension of attendance fees of board members until quota is met
Spain (2007)	Listed companies with 250+ employees	40%	2015	No sanction but an incentive to potentially get a priority status for government contracts

Table 11: Quota category 3

Category 4: countries with quotas with strict sanctions (Catalyst, 2012; European Parliament, 2012; Prat & Mueller, 2016; Pande & Ford, 2011)

Country (introduction year)	Applicability	Quota	Deadline	Sanctions
Germany (2015)	Listed companies and all companies subject to mandatory co-determination (i.e. companies with more than 1000 employees)	30%	2017	- Empty board seats - Fines
Norway (2003) Norway (2006)	State-owned companies listed companies	40%	2004 2008	- Fines - Possible delisting - Finally a dissolution
Italy (2011)	Listed companies Stated owned companies	2 phases: - 20% - 30%	2 phases: - 2012 - 2015	- Fine - Voiding of actions of the board

Table 12: Quota category 4

Appendix B: Quota allocation

Country	Dummy QUOTA1	Dummy QUOTA2	Dummy QUOTA3	Dummy QUOTA4
Austria	2006 – 2016 [1]			
Belgium	2006 – 2010[2]		2011 – 2016	
Cyprus	2006 – 2016			
Czech Republic	2006 – 2016			
Denmark	2006 – 2016[3]			
Faroe Islands	2006 – 2016			
Finland	2006 – 2016[4]			
France	2006 – 2010[5]		2011 – 2016	
Germany	2006 – 2014[6]			2015 – 2016
Greece	2006 – 2016			
Hungary	2006 – 2016			
Iceland	2006 – 2009[7]	2010 – 2016		
Ireland	2006 – 2016[8]			
Italy	2006 – 2010[9]			2011 – 2016
Liechtenstein	2006 – 2016			
Lithuania	2006 – 2016			
Luxembourg	2006 – 2008[10]	2009 – 2016		
Malta	2006 – 2016			
Norway				2006 – 2016
Poland	2006 – 2016			
Portugal	2006 – 2016			
Romania	2006 – 2016			
Spain	2006		2007– 2016[11]	
Switzerland	2006 – 2016[12]			
Sweden	2006 – 2016			
The Netherlands	2006 – 2009[13]	2010 – 2016		

Table 13: Quotas. QUOTA1 = countries without quotas, QUOTA2 = countries with quotas without sanctions, QUOTA3 = countries with quotas with soft sanctions, QUOTA 4 = countries with quotas with strict sanctions

[1] Only state-owned companies (+50%) have a quota since 2011 (Appendix A)
[2] Quota start in 2011 for listed companies (Appendix A)
[3] Only state-owned companies have a quota (Appendix A)
[4] Only state-owned companies have a quota (Appendix A)
[5] Quota starts in 2011 (Appendix A)
[6] Quota start in 2015 (Appendix A)
[7] Private companies that employ more than 50 people are subject to the quota, starts in 2010 (Appendix A)
[8] Only state-owned companies have a quota (Appendix A)
[9] Quota starts in 2011 (Appendix A)
[10] Quota starts in 2009 (Appendix A)
[11] Quota starts in 2007 (Appendix A)
[12] Only state-owned companies have a quota (Appendix A)
[13] Quota starts in 2010 (Appendix A)

Appendix C: Regression Analyses Robustness, dataset 2

Fixed Effects regression Tobin's Q without interactions effects, dataset 2 (Average board attendance)

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0140		
	(-1.42)		
Quota without sanction	-0.0503**	-0.0451**	-0.0428**
	(-2.52)	(-2.29)	(-2.23)
Quota soft sanction	-0.0202	-0.0101	-0.00849
	(-1.59)	(-0.88)	(-0.75)
Quota strict sanction	-0.0246*	-0.0174	-0.0147
	(-1.78)	(-1.19)	(-1.01)
Board size (natural log)	-0.0230**	-0.0248**	-0.0224**
	(-2.02)	(-2.26)	(-2.08)
Firm size (natural log)	-0.0000108	-0.0000433	-0.0000668
	(-0.03)	(-0.14)	(-0.21)
GDP (natural log)	-0.130***	-0.134***	-0.134***
	(-4.80)	(-5.03)	(-5.08)
Leverage	-0.000466	-0.000562	-0.000579
	(-1.14)	(-1.38)	(-1.43)
Average Board Age	-0.00185	-0.00169	-0.00177
	(-1.09)	(-1.01)	(-1.05)
Percentage diversity		-0.101**	
		(-2.45)	
Blau diversity			-0.0914***
			(-3.02)
Constant	3.768***	3.888***	3.892***
	(5.19)	(5.41)	(5.48)
Observations	1249	1249	1249
Adjusted R-squared	0.112	0.121	0.125

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 14: Fixed effects regression Tobin's Q without interaction effects, dataset 2

Fixed Effects regression Tobin's Q including interaction effects, dataset 2 (Average board attendance)

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0163		
	(-1.60)		
Quota without sanction	-0.0396	-0.0365	-0.0380
	(-1.38)	(-1.52)	(-1.53)
Quota soft sanction	0.0301	0.00864	0.0133
	(0.42)	(0.33)	(0.41)
Quota strict sanction	-0.0816***	-0.0337	-0.0347
	(-2.62)	(-1.39)	(-1.21)
Dummy diversity * Quota without	-0.0155		
	(-0.71)		
Dummy diversity * Quota soft	-0.0516		
	(-0.73)		
Dummy diversity * Quota strict	0.0631**		
	(2.04)		
Board size (natural log)	-0.0225**	-0.0241**	-0.0215*
	(-2.00)	(-2.15)	(-1.95)
Firm size (natural log)	-0.0000356	-0.0000787	-0.000106
	(-0.11)	(-0.24)	(-0.32)
GDP (natural log)	-0.127***	-0.135***	-0.134***
	(-4.73)	(-4.88)	(-4.89)
Leverage	-0.000408	-0.000543	-0.000558
	(-1.04)	(-1.35)	(-1.39)
Average Board Age	-0.00184	-0.00173	-0.00177
	(-1.10)	(-1.04)	(-1.06)
Percentage diversity		-0.108**	
		(-2.25)	
Perc divers * Quota without		-0.0770	
		(-0.74)	
Perc divers * Quota soft		-0.0760	
		(-0.76)	
Perc divers * Quota strict		0.0890	
		(1.06)	
Blau diversity			-0.0966***
			(-2.92)
Blau divers * Quota without			-0.0243
			(-0.35)
Blau divers * Quota soft			-0.0622
			(-0.71)
Blau divers * Quota strict			0.0735
			(1.00)
Constant	3.699***	3.920***	3.898***
	(5.10)	(5.26)	(5.27)
Observations	1249	1249	1249
Adjusted R-squared	0.120	0.123	0.126

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 15: Fixed effects regression Tobin's Q with interaction effects, dataset 2

Appendix D: Regression Analyses Robustness, dataset 3

Fixed Effects regression Tobin's Q without interactions effects, dataset 3 (remove all unknown)

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0118		
	(-1.27)		
Quota without sanction	-0.0474***	-0.0454**	-0.0433**
	(-2.68)	(-2.53)	(-2.46)
Quota soft sanction	-0.000703	0.00332	0.00532
	(-0.05)	(0.23)	(0.38)
Quota strict sanction	-0.0158	-0.0133	-0.0109
	(-1.11)	(-0.91)	(-0.75)
Board size (natural log)	-0.0104	-0.0129	-0.0116
	(-1.18)	(-1.46)	(-1.32)
Firm size (natural log)	-0.0427***	-0.0419***	-0.0413***
	(-2.98)	(-2.91)	(-2.88)
GDP (natural log)	-0.105***	-0.107***	-0.108***
	(-3.70)	(-3.78)	(-3.84)
Leverage (natural log)	0.000125	0.0000618	0.0000389
	(0.33)	(0.16)	(0.10)
Average Board Age	-0.00132	-0.00116	-0.00123
	(-0.77)	(-0.67)	(-0.71)
Percentage diversity		-0.0501	
		(-1.46)	
Blau diversity			-0.0543**
			(-2.11)
Constant	3.710***	3.765***	3.782***
	(5.31)	(5.38)	(5.46)
Observations	1236	1236	1236
Adjusted R-squared	0.150	0.151	0.154

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 16: Fixed effects regression Tobin's Q without interaction effects, dataset 3

Fixed Effects regression Tobin's Q including interaction effects, dataset 3 (remove all unknown)

	(1) TobQ dum divers	(2) TobQ perc divers	(3) TobQ blau divers
Dummy diversity	-0.0136		
	(-1.45)		
Quota without sanction	-0.0328	-0.0295	-0.0306
	(-1.25)	(-1.34)	(-1.33)
Quota soft sanction	0.0730	0.00308	0.00885
	(0.81)	(0.10)	(0.22)
Quota strict sanction	-0.0747**	-0.0269	-0.0285
	(-2.52)	(-1.16)	(-1.05)
Dummy diversity * Quota without	-0.0221		
	(-1.03)		
Dummy diversity * Quota soft	-0.0761		
	(-0.86)		
Dummy diversity * Quota strict	0.0654**		
	(2.16)		
Board size (natural log)	-0.0108	-0.0130	-0.0113
	(-1.27)	(-1.41)	(-1.25)
Firm size (natural log)	-0.0441***	-0.0426***	-0.0421***
	(-3.09)	(-2.95)	(-2.92)
GDP (natural log)	-0.102***	-0.106***	-0.106***
	(-3.62)	(-3.61)	(-3.64)
Leverage (natural log)	0.000187	0.0000829	0.0000639
	(0.51)	(0.22)	(0.17)
Average Board Age	-0.00110	-0.00114	-0.00117
	(-0.65)	(-0.66)	(-0.67)
Percentage diversity		-0.0653	
		(-1.46)	
Perc divers * Quota without		-0.142	
		(-1.35)	
Perc divers * Quota soft		0.00949	
		(0.09)	
Perc divers * Quota strict		0.0812	
		(1.03)	
Blau diversity			-0.0633**
			(-2.06)
Blau divers * Quota without			-0.0684
			(-0.99)
Blau divers * Quota soft			-0.00581
			(-0.06)
Blau divers * Quota strict			0.0681
			(0.99)
Constant	3.648***	3.738***	3.740***
	(5.24)	(5.19)	(5.21)
Observations	1236	1236	1236
Adjusted R-squared	0.162	0.152	0.154

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 17: Fixed effects regression Tobin's Q with interaction effects, dataset 3

Appendix E: Regression Analyses Robustness, quotas separate

Fixed Effects regression Tobin's Q and Dummy diversity including interaction effects quota separate, dataset 1

	(1) No Quota	(2) Quota no sanctions	(3) Quota soft	(4) Quota strict
Dummy diversity	0.0104	-0.0126	-0.0120	-0.0164*
	(0.41)	(-1.44)	(-1.31)	(-1.94)
No quota	0.0358			
	(1.34)			
Dummy diversity * No Quota	-0.0237			
	(-0.89)			
Board size (natural log)	-0.0117	-0.0138	-0.0123	-0.0104
	(-1.35)	(-1.52)	(-1.33)	(-1.22)
Firm size (natural log)	-0.0411***	-0.0430***	-0.0432***	-0.0421***
	(-3.01)	(-3.19)	(-3.16)	(-2.98)
GDP (natural log)	-0.102***	-0.101***	-0.102***	-0.102***
	(-3.81)	(-3.84)	(-3.84)	(-3.72)
Leverage	0.0000784	0.0000936	0.000108	0.000177
	(0.22)	(0.25)	(0.29)	(0.49)
Average Board Age	-0.00151	-0.00141	-0.00159	-0.00142
	(-0.92)	(-0.86)	(-0.98)	(-0.86)
Quota without sanction		-0.0326		
		(-1.25)		
Dummy diversity * Quota without		-0.0230		
		(-1.08)		
Quota with soft sanction			0.0415	
			(0.65)	
Dummy diversity * Quota soft			-0.0456	
			(-0.75)	
Quota with strict sanction				-0.0891***
				(-3.18)
Dummy diversity * Quota strict				0.0802***
				(2.77)
Constant	3.597***	3.640***	3.674***	3.639***
	(5.35)	(5.49)	(5.46)	(5.36)
Observations	1241	1241	1241	1241
Adjusted R-squared	0.149	0.148	0.143	0.156

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 18: Fixed effects regressions Tobin's Q and Dummy diversity, quotas separate

Fixed Effects regression Tobin's Q and Percentage diversity including interaction effects quota separate, dataset 1

	(1) No Quota	(2) Quota no sanctions	(3) Quota soft	(4) Quota strict
Percentage diversity	-0.000140	-0.0562*	-0.0718**	-0.0717**
	(-0.00)	(-1.86)	(-2.08)	(-2.11)
No quota	0.0237			
	(1.54)			
Perc divers * No Quota	-0.0729			
	(-1.14)			
Board size (natural log)	-0.0145	-0.0164*	-0.0148	-0.0134
	(-1.64)	(-1.82)	(-1.61)	(-1.52)
Firm size (natural log)	-0.0410***	-0.0416***	-0.0410***	-0.0405***
	(-2.97)	(-3.05)	(-2.97)	(-2.86)
GDP (natural log)	-0.102***	-0.104***	-0.105***	-0.106***
	(-3.82)	(-3.93)	(-3.83)	(-3.87)
Leverage	0.0000160	0.00000641	0.0000232	0.0000385
	(0.04)	(0.02)	(0.06)	(0.10)
Average Board Age	-0.00138	-0.00130	-0.00143	-0.00149
	(-0.81)	(-0.77)	(-0.86)	(-0.88)
Quota without sanction		-0.0299		
		(-1.37)		
Perc divers * Quota without		-0.150		
		(-1.56)		
Quota with soft sanction			-0.000593	
			(-0.02)	
Perc divers * Quota soft			0.0215	
			(0.21)	
Quota with strict sanction				-0.0299
				(-1.31)
Perc divers * Quota strict				0.0964
				(1.29)
Constant	3.625***	3.700***	3.725***	3.745***
	(5.38)	(5.55)	(5.42)	(5.49)
Observations	1241	1241	1241	1241
Adjusted R-squared	0.150	0.151	0.144	0.149

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 19: Fixed effects regressions Tobin's Q and Percentage diversity, quotas separate

Fixed Effects regression Tobin's Q and Blau diversity including interaction effects quota separate, dataset 1

	(1) No Quota	(2) Quota no sanctions	(3) Quota soft	(4) Quota strict
Blau diversity	-0.0138	-0.0576**	-0.0699***	-0.0696***
	(-0.31)	(-2.57)	(-2.85)	(-2.88)
No quota	0.0235			
	(1.28)			
Blau divers * No Quota	-0.0560			
	(-1.05)			
Board size (natural log)	-0.0125	-0.0144	-0.0124	-0.0114
	(-1.42)	(-1.61)	(-1.36)	(-1.30)
Firm size (natural log)	-0.0403***	-0.0408***	-0.0402***	-0.0401***
	(-2.94)	(-3.01)	(-2.93)	(-2.85)
GDP (natural log)	-0.103***	-0.105***	-0.107***	-0.106***
	(-3.85)	(-4.01)	(-3.93)	(-3.88)
Leverage	-0.00000571	-0.0000224	-0.00000377	0.0000145
	(-0.02)	(-0.06)	(-0.01)	(0.04)
Average Board Age	-0.00145	-0.00138	-0.00153	-0.00152
	(-0.86)	(-0.82)	(-0.92)	(-0.90)
Quota without sanction		-0.0307		
		(-1.36)		
Blau divers * Quota without		-0.0737		
		(-1.15)		
Quota with soft sanction			0.00428	
			(0.12)	
Blau divers * Quota soft			0.00589	
			(0.07)	
Quota with strict sanction				-0.0319
				(-1.19)
Blau divers * Quota strict				0.0810
				(1.21)
Constant	3.631***	3.723***	3.768***	3.728***
	(5.38)	(5.64)	(5.51)	(5.50)
Observations	1241	1241	1241	1241
Adjusted R-squared	0.153	0.154	0.148	0.153

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 20: Fixed effects regressions Tobin's Q and Blau diversity, quotas separate

Appendix F: Regression Analyses Robustness, one quota variable

Fixed Effects regression Tobin's Q and one quota variable including interaction effects, dataset 1

	(1) Dummy diversity	(2) Percentage diversity	(3) Blau diversity
Dummy diversity	-0.0155*		
	(-1.68)		
Quota	-0.0198*	-0.00925	-0.00946
	(-1.75)	(-1.42)	(-1.20)
Dummy diversity * Quota	0.0161		
	(1.42)		
Board size (natural log)	-0.0110	-0.0142	-0.0121
	(-1.28)	(-1.61)	(-1.37)
Firm size (natural log)	-0.0414***	-0.0411***	-0.0405***
	(-2.98)	(-2.94)	(-2.91)
GDP (natural log)	-0.102***	-0.103***	-0.103***
	(-3.78)	(-3.84)	(-3.83)
Leverage	0.000120	0.0000316	0.00000943
	(0.33)	(0.09)	(0.03)
Average Board Age	-0.00148	-0.00141	-0.00147
	(-0.90)	(-0.84)	(-0.87)
Percentage diversity		-0.0789*	
		(-1.84)	
Percentage diversity * Quota		0.0323	
		(1.30)	
Blau diversity			-0.0743**
			(-2.57)
Blau diversity * Quota			0.0255
			(1.17)
Constant	3.622***	3.671***	3.660***
	(5.40)	(5.47)	(5.44)
Observations	1241	1241	1241
Adjusted R-squared	0.151	0.150	0.153

t statistics in parentheses
* p<0.10, ** p<0.05, *** p<0.01

Table 21: Fixed effects regressions Tobin's Q and one quota dummy