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Gender Distribution on Boards and Company's Performance: do women on company boards impact the business' financial performance?

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Abstract

Purpose: The purpose of this thesis is to examine the impact of diverse boards with one, two, three or more women in limited companies founded in Sweden in 2010 on financial performance. Firm's characteristics as board's gender distribution, net sales, ROE, board size and number of employees will be examined aiming to understand how these boards are composed in terms of gender diversity and the impact of it on firm's performance. This research aims to offer a different approach for gender diversity studies in the field of new ventures.

Methods: This thesis comprises a quantitative analysis based on data from the Swedish Tax Agency. The data was collected from Retriever Database, containing all limited companies (AB) founded in Sweden in 2010 (and still operating in 2015) that had 3 or more board members. This study's dependent variable is net sales. Its independent variables are boards with one woman, boards with two women and boards with three or more women. As control variables ROE and the number of employees have been observed among others.

Findings: Using our initial research model we were not able to confirm some theoretical expectations that were tested by the hypothesis. However, alternatives analysis to the initial model has shown that boards with 4 women on its boards have better performance than other boards in comparison to our reference category of boards with 0 woman.

Implications: This study demonstrates that it is essential to study gender on boards taking into account the absolute number of women in it. Also, as it shows that even in newly started companies having 4 women on the boards impacts performance positively, it adds new elements to entrepreneurs cognitive framework, stressing the importance to attract more women professionals to the board since the very beginning. We also explored the industry impact on it and we observed great discrepancy between industries. We would recommend these differences among industries to be studied with more attention in future studies.

Keywords: Gender composition; women on boards; company performance.

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Introduction

Diversity in teams is an important subject for literature nowadays, mainly in terms of how diversity in company's board affect the overall company performance (van Knippenberg et al., 2013; van Dijk et al.,2018). Numerous studies point out how gender diversity on board affects company's performance, using many different approaches (Marinova et al, 2016; Reguera-Alvarado et al, 2017; Cabrera-Fernándes et al,2016). Most studies analyze national databases and if the presence of women on boards has a positive effect on the company's financial performance indicators, without necessarily analyzing the amount of women in those boards (Cabrera-Fernández et al, 2016). The literature also discusses the ratio between man and women on boards and their effect on the firm's financial performance (Campbell et al, 2008). Cabrera-Fernandez et al (2016), argues that the current literature on the topic presents mixed results and that we cannot be certain about the effect of gender diversity on boards and firms performance. We believe that such conflicted results comes from overlooking the number of women in such boards. Following the research line adopted by Torchia et al (2011), we will use the lenses of the critical mass theory and analyze the number of women on boards, looking at how the presence of one, two, three or more women on the company's board can affect its performance. Most of the studies on the issue have been quantitative but

they have not taken the critical mass into consideration. We believe that by adding that perspective to our data analysis we can reach different results that can help solving the literature's lack of consensus.

According to Erkut et al. (2008), boards change their perception about the presence of women depending on the number of women present in the board. Based on the critical mass theory, there is a big shift on company's perception in regards to women when the board has three or more women. When this critical mass is reached the women do not feel the pressure to represent the opinion of all womanhood and also they have an easier time to propose, for example, diversity questions to the board's agenda, being able to actually contribute in the discussions (Erkut et al., 2008).

In addition to the critical mass theory, there are several other aspects to be considered in case of assessing gender diversity within a corporate board. Galbreath (2011) has found that a more gender-diverse corporate board could "raise the confidence of investors, who expect increasing accountability, transparency and moral duty from firms' directors" (Galbreath, 2011;p. 21). He also noticed that the higher representation of women on a corporate board implies that the ethical code is enforced more efficiently in order to endorse moral behavior that protects against the abuse of the investor's financial resources. Similarly, Galbreath, Capezio and Mavisakalyan (2016) shows that improved gender diversity within the company's boards would imply in an improved corporate governance as female directors are able to accommodate diminished fraud. However we are looking to find out if the observed firms have actually benefited financially from the gender diverse boards after the observed 5 years period. In other words we would like to know if there is a discernible link between having one, two, three or more women on the companies' boards and the financial performance of these firms.

Observing such situation, our key research questions are: Does having 3 or more

women on the company's board has a positive effect on the firm's performance? Do the mixed boards with three or more women perform better than the other boards?

In order to answer this question, the dissertation analyses if different number of women on mixed boards with either one, two or three women affects the board's performance indicators. Thus we use data from the Swedish government containing information on all Swedish limited companies (AB) founded in 2010 and its board members. From the 15 844 limited companies founded in Sweden in that year, we excluded the ones with less than 3 board members, as well as companies which had no net sales during this five years period, eventually analyzing a sample of 1393 companies.

Sweden ranks in third place in the most recent World Economic Forum Gender Gap Report (World Economic Forum, 2019) which measures the gender equality across the globe. This makes us believe that it can offer us suitable data to conduct this analysis. Considering the Swedish society's gender policies, we expect that it will be easier to find adequate observations of mixed boards with three or more women to make a statistically significant analysis. In addition, the country has laws about data being a public asset and a long tradition with information accessibility, which makes the government's database extensive, easy to access and reliable (Sweden, 2019).

1.1 Purpose

The purpose of this thesis is to examine whether new venture firms with three or more women on their boards have higher net sales than firms that lack female directors. More specifically we want to investigate how the critical mass theory is applicable to the selected sample. In this study, we particularly want to look at new business scenarios and that is the reason behind choosing young companies that were founded in 2010 and

were, therefore, subjected to the same external economic situation.

Furthermore, this dissertation has the objective to expand the applicable cognitive framework for entrepreneurs in their decision-making process when it comes to the selection of the board of directors. The thesis aims to provide an overview of the literature about the importance of the boards in new businesses as well as to contribute with practical implications based on the findings uncovered while analyzing the collected data. By adding the critical mass perspective to the quantitative research, we aim to offer further insight into the research field about how to study gender contributions on boards, going beyond the presence or lack of women on boards. In sum, the aim of this study is to further investigate the impact of women on the company's boards, making use of the critical mass theory to add a new perspective on gender diversity studies in entrepreneurial studies.

1.2 Outline of the thesis

Chapter 2 shows the theoretical framework employed to conduct the study. The chapter presents the analysis of previous research findings as well as literature on the subject of gender diversity on companies' boards. The link between firm performance and board diversity, the resource dependency theory, the critical mass theory, literature concerning the importance of the role of boards for new ventures as well as the contradictory literature has been presented in the chapter in order to create an understanding and solid foundation for the researched topic. Furthermore, firm performance measurements are introduced in the chapter and explained how they are relevant to the current study.

Chapter 3 shows the quantitative methodology used to conduct the data collection as well as the method used to analyze the collected data. This chapter presents how

the sample was selected and collected, which measures are used as variables and a comprehensive overview and description of the employed approaches used within the empirical study to attain the results. In addition, the strengths and limitations of the study have been discussed and critically evaluated here.

Chapter 4 provides a comprehensive view of the empirical analysis. The different approaches employed in order to accomplish the purpose of this dissertation are carried out in this chapter. Additionally, the outcome of each approach is analyzed and presented.

Chapter 5 provides the conclusion of the research, as well as includes the discussion of the findings. Based on the previously discussed analysis, the underlying research and theories explained in the theoretical framework, the summary of the results are introduced. Finally, future recommendations are made on further studies that can unfold from this thesis' findings.

2

Theoretical Framework

Based on Cannella et al.'s (2008) research we can find evidence that there is a direct link between the board and the financial performance of a firm. First of all, that boards are responsible for supervising the firms as they act as representatives of the stakeholders and secondly, boards are considered to have the utmost control and pressure on the decision making within the firm. (Cannella et al., 2008).

There have been several papers written on the topic of company performance since the late 1980s, early 1990s. Pearce and Zahra (1989), Pettigrew (1992), Huse (1994, 1995 and 1998) have conducted research about how board composition relates to firm performance. In these studies, when researching how diversity affects firm performance, they have considered many different aspects such as racial diversity (Roberson and Park, 2007) gender, age and educational diversity (Fraga and Silva, 2012). This dissertation will mainly focus on gender diversity and its relationship to companies' financial performance.

Considering that the focus of this thesis is to examine the relationship between the gender distribution of the observed firm's boards and their financial performance, some

earlier findings from researchers will be presented. The topic of gender diversity on companies' boards and their relationship to the firm's financial performance have been researched by numerous authors. A wide variety of methods have been employed while assessing these variables and the researchers have reached somewhat different conclusions.

On one hand, several scholars have previously found a positive correlation between the higher amount of female board members and increased firm performance. Post and Byron (2015) found that "women on boards of directors—due to their differences in terms of knowledge, experience, and values—shape both the content and process of board decision making and board activities that ultimately affect firm performance" (Post and Byron, 2015; p. 1559). Similarly, Reguera-Alvarado's study states that "the results show that having more women in governance positions increase the business performance"(Reguera-Alvarado, 2014; p. 347). Other authors, like Lückerath-Rovers, suggest that "The presence of women might improve team performance, because more diverse teams may consider a greater range of perspectives and therefore reach better decisions." (Lückerath-Rovers, 2013; p. 495). Other studies have also argued that there are different gender-specific characteristics that might have an influence on firm performance. Based on Croson Gneezy's (2009) reasoning, females are more risk-averse than males and therefore tend to suggest less aggressive approaches and actions than males would. Eventually, this should enhance the boards with diverse perspectives.

On the other hand, a few researchers presented contradictory findings. Dobbin and Jung states that "female directors have negative effects on stock value and no effects on profits." (Dobbin and Jung, 2011; p. 837). They base their findings on panel data and different statistical methods constructed to be able to exclude endogeneity. Rose's (2007) research in Denmark during 1998-2001 showed similar results. He concluded

that “Danish evidence showing that gender in relation to board composition does not inuence rm performance.” (Rose, 2007; p.411) However, none of these articles have taken into consideration the effect of the critical mass theory and they have considered a board as diverse or not based on the presence or lack of women.

One of the main papers cited on the topic of gender diversity on boards and its outcomes in terms of performance was done by a nonprofit organization in the US called Catalyst. In 2004, they used two measures, Return on Equity (ROE) and Total Return to Shareholders (TRS) to look into 353 listed companies in the US. They found a positive correlation between having more women on the boards and getting better financial results when looking at those two particular measures. However, other scholars have criticized the Catalyst methodological approach, arguing that when analyzing big listed companies' boards it is hard to understand the causality direction. In such cases, it is difficult to say if the boards' gender composition has caused the better performance or if it is the other way around (Marinova et al, 2015). Similarly to the Catalyst report, Gabrielsson (2007) and Murphy et al. (1996) have used ROE and net sales (among other factors) as financial performance indicators to measure the growth or decline in the firm performance. Mauboussin (2012) also stated that net sales is one of the most commonly used KPI (Key Performance Indicator) to determine a company's financial performance.

2.1 Resource dependency theory

From a theoretical point of view, the presence of women directors on corporate boards has been previously studied through many different lenses (Terjesen et al, 2009). We primarily base our analysis on the Resource Dependency Theory which argues that com-

panies are operating in an open and competitive space and their performance relates to the access they have to the market's resources (Terjesen et al, 2009). Board members' backgrounds play an essential role in that perspective, bringing important resources from the director's human and social capital. Several different papers studied by Terjesen (2009) shows that women have different social and human capital than man, which makes us believe that by having more women on boards, companies should increase their chances of better performing by adding to its pool of available market resources: women's connections, backgrounds and psychological constructions of self. According to PWC's most recent 2018 Annual Corporate Directors Survey, 94% of the board directors say that women bring an unique perspective to the boardroom and 84% agree that it enhances the performance of the board. The report also pointed out that a more gender-diverse board improves the relationship with investors, enhance the performance of the company and improves strategy and risk oversight in general (PwC, 2018). Deloitte's "Women in the boardroom" report had very similar findings, it also adds that female leaders are role models and mentors to other women and girls. This phenomenon generates a cascade effect, stimulating younger women to pursue careers in different sectors which results in a decrease of the wage gap in traditionally male-dominated fields, such as business, technology, math, engineering, and science. The break down of such stereotypes leads to a more inclusive economy (Deloitte, 2017)

Even though the theory suggests that having gender diversity on the board will add those different elements that will increase the company's access to resources and consequently increase their chances to perform better, boards tend to be mostly homogeneous (Terjesen et al, 2009). That can be explained by social identity theory that explores how individuals tend to surround themselves with their similar. Normally, people tend to classify others as insiders or outsiders in reference to their groups and the insiders

are better trusted and evaluated than the outsiders (Terjesen et al, 2009). In that sense, at the same time that companies need different genders in their boards to have access to a diverse pool of resources, boards are ultimately composed of individuals, and individuals tend to flock around their similar. If the insiders are better evaluated by their peers than the outsiders, as a consequence, most boards will be homogeneous and will be prevented to reach essential resources that will affect their financial performance.

2.2 The Importance of boards in new business

Research conducted on gender diversity on boards normally observes established and public companies (Cabrera-Fernández et al., 2016; Catalyst, 2004; Kwapisz et al., 2014; Carter et al., 2003; Gregory-Smith et al., 2014). Even though the study of boards has been traditionally done on bigger companies, there is a growing discussion on the literature about the importance and the benefits of boards on new ventures (Blagburn, 2016). According to Blagburn (2016) boards play an important role in new business as they bring in resources and talents that help the companies to effectively grow. The author points out that boards in this stage of the company play an important role in creating the right information package to inform about the organization, in asking the CEO relevant questions that pushes the company further, in investing on building the right team since the early days, and in giving feedback on themselves and the organization, starting a positive circle.

The board of directors has 5 main functions inside limited responsibility companies: (1) to confirm decisions regarding assets and finances; (2) to advice, providing insights to the managers; (3) to oversight, supervising the company's administration and coordinating the work; (4) to make decisions regarding the organization administration; (5) to

inform about the management board' duties (Weber, 2016). While working those parts inside the organization, the boards are seen by many scholars as important pieces to understand firms' performance. Especially when it comes to bringing in more diversity to those boards, it has been perceived as an opportunity to add new viewpoints that can shape the company from within (Siciliano, 1996).

2.3 Controversial results in the literature

Besides the theoretical studies regarding gender balance on boards and its impact on company's access to resources, there are many other studies on the subject, analysing data from different countries, with different samples. Those studies, however, lack consensus regarding the results. One of the articles on the subject says that " surprisingly, none of the diversity measures aside from gender affected startup success, and gender diversity in the founding team had a negative impact on startup success." (Kwapisz et al., 2014; p.1) another research by Ortu et al. (2017) showed divergent results, based on their findings "gender diversity was the most dominant metric explaining data variance and was positively associated with productivity" (Ortu et al.,2017; p.2). Van Knippenberg et al. (2013) when analyzing the current research on gender and company's success points out that "diversity beliefs and climates may play an important moderating role in these effects, but it is unclear what form these should take to promote the positive effects of diversity"(Van Knippenberg et al., 2013; p. 183). Most gender diversity research on boards of directors concentrates on profitability and, up until now, no consensus could be reached in the literature on the relationship between firm performance and women's representation on corporate boards. This subject has been relatively contradictory as few studies find that gender diversity within boards results in better performance, while

others do not find evidence for such a connection. (Carter et al., 2003; Gregory-Smith et al., 2014).

Analysing the state of the art regarding women's participation on boards, Cabrera-Fernándes et al (2016) points out that most of the arguments in favor of more women on boards revolve around the idea that the usage of gender biases when picking board members prevent companies from picking the right people and therefore affects their chances to success. Also, it is important to note that gender diversity indicates a more socially responsible company, generates more creativity in decision making and foster new discussions within the board. Besides that, when companies have more women on the boards, it should promote other types of leadership and incentives female role-models that push the overall women's presence in the company. Cabrera-Fernández et al (2016) made a comprehensive analysis of the literature in the area and when comparing different studies conducted around the globe, they could not find consensus about gender diversity on boards and better performance on companies. Some authors, such as Adams and Ferreira (2009) have found positive correlations between more women on boards and company's competitive advantage, company's value on the long term, value added to income and cash flow, profitability and financial performance. They concluded, "that the gender composition of the board is positively related to measures of board effectiveness." (Adams and Ferreira, 2009; p. 307). Others found negative correlations between higher gender diversity on boards and stock prices, return on investments and performance (Cabrera-Fernández et al, 2016).

Besides that, it is important to note that the samples for most of theses studies are composed by big corporations. The analysis of bigger board makes it easier to find more observations to conduct the research but at the same time it makes it harder to understand the direction of causality. As pointed out by Marinova et al (2015) to have

more females in the boards may contribute to have better performance but it is also possible that companies that perform better are more open and tend to hire more women to their boards. That adds on to the reasoning behind our research choosing to observe new ventures and the board composition in the moment that the company is founded. In new companies the skills and expertise used to overcome the difficulties of starting a venture have a huge impact on its results (MacMillan, 1983). For that reason, we believe that when analyzing the initial board composition of limited companies, it is possible to find a more clear causality effect between gender distribution on boards and financial performance.

2.4 Critical mass theory

The research further investigates whether the firm's performance is connected with only the presence of women or with the actual number of female representatives on the boards. To analyze such questions, we use Erkut et al's (2008) work, that explores the dimensions of numerical representation of women on boards and how this changes the company's effective access to their human and social resources. Through their study, they came to the conclusion that there is a certain critical mass from which women start to have a relevant position in the board and the different gender resources can be properly used. In boards with only one woman there is an invisibility phase, in which that individual will be singled out by her peers and have her opinions undervalued in comparison to her colleagues (Erkut et al., 2008). Boards with two women are in the 'conspiracy' phase in which the two women are seen as one and distrusted as a collective. Boards with three or more women, however, start seeing the presence of women in a mainstream way, normalizing the fact that there are women in there. The study

shows that women effectiveness increases considerably on boards with more than three women (Erkut et al, 2008). Considering that situation, we believe that the mere presence of women on boards is not enough to understand their impact on company's firm performance. In our research we will include the analysis of the number of women present, taking into consideration that it takes three or more women in the board to make an effective intervention.

Therefore the following hypotheses were proposed:

Hypothesis 1: Companies with at least two women on the board perform better than companies with one woman on the board.

Hypothesis 2: Boards with at least three women outperform boards with two or one woman on the board.

Hypothesis 3: Boards with at least three women outperform boards with all other compositions.

3

Research Design, Methods, and Data

3.1 Research design and methods

Following a long tradition in social sciences, our empirical analysis is based on an large-N observational research design. Observational studies are defined by the fact that there is no intervention of the researcher on the observed variables. As Fox (2008) notices, in observational studies ”the values of the explanatory variables are observed by the researcher, not assigned”. Large-N means that we are dealing with many observations. Thus, we are dependent on statistical techniques to obtain reliable information from our data. Finally, since we do not have variation in time, we are carry on what the literature traditionally calls *cross-sectional analysis*.

According to Toshkov (2016), ”in large-N cross-sectional designs we try to identify a causal effect by comparing the distribution of the outcome across the subsets of units defined by a particular value of the main explanatory variable. If the latter takes only two values (...) we compare the two groups.” (p.231, 2016) We are aware of the limitations of such a research design, for example, to address casual claims, especially as

the observational environment presents, by definition, a series of bias that are difficult to focus on. However, we believe that this research design are adequate to be employ to our research questions.

We are analyzing Swedish firms, more specifically, we are interested in observing firms and their boards in order to answer to the aforementioned research question, stated previously, which is the effect of female presence on the selected boards and their relationship to the financial performance in the observed new ventures. Since we are analyzing considerable number of firms, we apply quantitative techniques to test our main hypotheses. Our information on Swedish firms comes from an extensive financial database on Swedish companies called Retriever Business. The collected data has been curated and verified by the Swedish Tax Agency (Skatteverket) and is being analyzed in order to answer the research questions. We use a deductive approach, in order to explain the relationship between the applied approach and the collected variables as well as being able to measure these concepts quantitatively and eventually be able to generalize the findings (Kenneth and Hyde, 2000; Creswell, J.W. & Creswell, J.D. 2018).

Since our research questions/hypothesis are dependent on statistical tools, we describe the main technique that we employ to our data: linear regression analysis. In general terms, "regression analysis examines the relationship between a quantitative variable, Y, and one or more quantitative variables, $X_1, ...X_k$."(Fox, p13, 2008). Being more specific, the basic structure for statistical inference applied in this work is based on the Ordinary Least-Squares (OLS) regression, which is represented by the following model (3.1), where α and β are the population parameters; Y and X, the dependent and independent variable; and ε, the error term, which represents, for example, omitted variables.

$$Y_i = \alpha + \beta X_i + \varepsilon_i \tag{3.1}$$

Drawing on the OLS model, we are able to compare means of different groups (*t-test* under the simple regression analysis framework) as wells as using it to estimate the effect of our main independent variables on firm performance using a series of controls (multiple regression analysis). Both techniques are able to provide a robust evidence to help us to answer our main questions. Although they are used frequently, we are aware of the limitations of this type of research design: among other things, it is difficult to observe causal mechanisms. To have a better view over the mechanisms, the recommended research design approach, in the case of firms, would be a deep case study analyses[1].

3.2 Data

In total, 1393 non-listed companies were examined in the thesis. All the companies were founded in 2010 and we have observed their data in 2010 and 2015. This period of time has provided insight in order to see the impact of boards with 1, 2 and 3 or more women on the firm's performance. We have chosen the 5 year time period as it is a sufficient length of time in order to observe the companies' performance during the same business life-cycle and still considered to be new ventures. According to Gabrielsson, "studies have shown differences in the composition of boards depending on the age and life-cycle of small companies" (Gabrielsson, 2007). Similarly, Huse emphasizes that "It is well documented that contingencies such as company size, industry, local geography

[1] Other statistical techniques to causal evaluation are also available, such as regression discontinuity, difference-in-differences, instrumental variables, etc.

and legislation, type of organization, company age and life cycle, etc. are important when understanding boards" (Huse, 2000). Most of these factors have been considered during the selection of the sample.

The entire population of Swedish companies that have been established in 2010 was selected, with the criteria that the board must consist of 3 or more members as well as to have at least 1 SEK net sales during the five years time span. All companies who have filed for bankruptcy within the observed time period have been excluded.

The data was gathered from Retriever Business. After data collection, filters were applied so that the sample would match this study's prerogatives. The independent variables were coded as dummies and the first statistical procedure used was a linear regression. Our predictor was coded respecting a 2 level system, in our case 0 vs. 1 or belonging vs. not belonging to that group. Because of that reason, our simple regression analysis is equivalent to an independent t test (Pandis, 2016) . As pointed out by Pandis (2016), this research model allows us more flexibility as it makes possible to add other variables to the analysis in a unified approach.This first analysis allowed us to observe if there was a statistically significant difference between the means in two unrelated groups.

In the used database additional important information was available and eventually aided us to investigate the matter further. Such information was coded as our control variables. Considering that, to improve our statistical investigation on the subject and to use our data to its highest potential, we have also ran a multiple regression analysis. In addition, we also explored our data further analyzing the impact of the absolute number of women on net sales. All analyses were done using the R software.

The thesis is fully based on secondary data. The advantages of using such data in the case of this study is that it enables us to have a more comprehensive although more

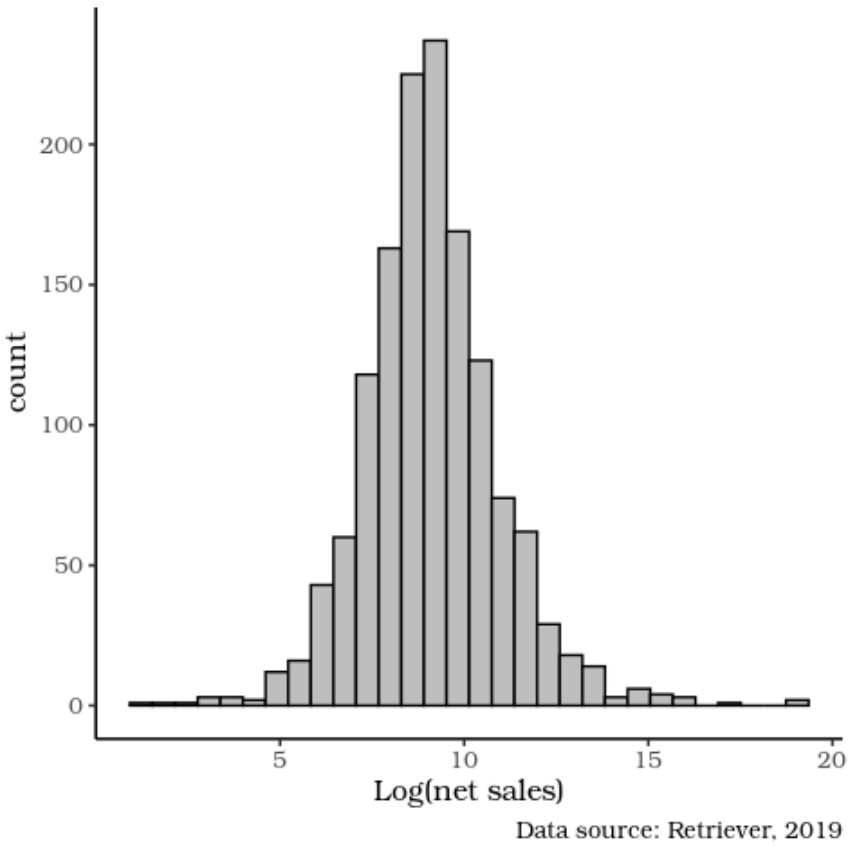
generic viewpoint from the situation than it would be possible using qualitative methods. Besides that, the collected data is proven high quality as it originates from the Swedish Tax Agency's (Skatteverket) database, and it generates a possibility for a more extensive and lengthy analysis. Also, the data is from secondary sources which makes it free of any personal bias. Nevertheless, secondary data analysis can be impaired by incomplete or missing data. Besides that, while using secondary data we could not ask specific questions that could add insights to our research, instead, we had to find ways to use the available information to explore different meanings of it. In addition to that, there is also a trade-off element between qualitative and quantitative research. As we focused on analyzing the database, we had a generic but broad view of the topic. However, that resulted in a lost ability to discuss causal relationships in depth. Nevertheless, we believe that the advantages of the chosen method has outpaced the disadvantages in the case of this thesis.

3.2.1 Dependent variable

Our dependent variable is the company's financial performance. To operationalize this concept we have collected the net sales value reported by the selected companies in their 2015 report to the Swedish Tax Agency. In order to meet the normal multi variability assumptions in the regression analysis, we have used a natural logarithm in the case of this measure. The net sales (log) have been used in similar previous studies (Gabrielsson, 2007; Catalyst, 2004), being reportedly robust measures to indicate firm performance. According to Delen et al. (2013) in order to increase the overall performance of a company, it requires to have high sales. Delmar et al (2003) add to it, while discussing various performance measures, that if only one indicator should be chosen

to measure the growth of a firm, then their most favored measure of growth would be sales. We have concluded that this measure is the most suitable indicator for us to be able to assess firm performance.

Figure 3.1: Distribution of the Log(net sales)



As can be observed in **table 3.2**, the average net sales in our sample is 329000, with a standard deviation of 6260000. For that reason, we followed the common protocol of data transformation, using in our model the *log* of the Net sales as our main dependent variable. **Figure 3.1** shows the distribution of the *Log(net sales)*.

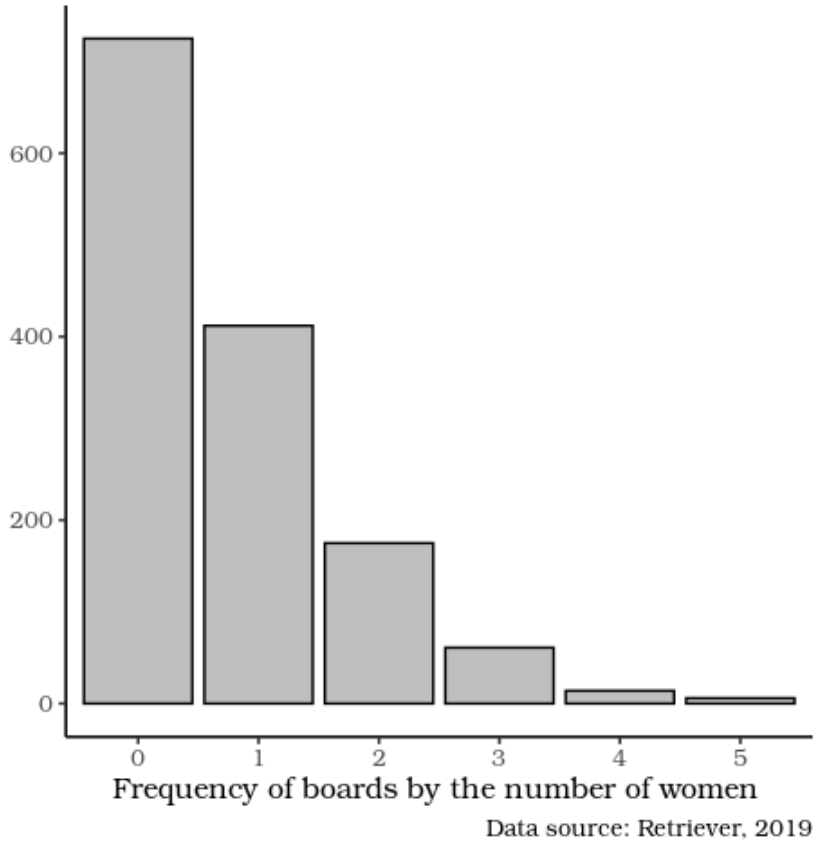
3.2.2 Primary independent variables

The number of women on boards represent our primary independent variables. In **figure 3.2**, we can see the distribution of women on boards in our sample. Observing the data, it is interesting to note that more than half of the firms do not have women on their boards. And the distributing is almost as decreasing exponentially. As also indicated in **table 3.2**, boards with one women represents 29% of the sample and boards with 5 women, 0.4%.

Going further, we can observe that 52% of the boards are composed only by man. The boards with at least 1 woman account for 29.6% of the sample. The boards with two women correspond to 175 companies, adding up to 12% of the whole sample. Only 5.8% of the observed boards have three or more women on it. Having this low amount of companies with three or more women on the board could possibly be very harmful to our statistical analysis. By having more observations we would have more meaningful data which in return would allow us to have more reliable and significant results (Davies, 2016). Besides that, this shows that there are still very few women are on companies boards and within the companies that have women on their boards, most of them have only one woman on it. Furthermore it reveals the gender inequality on boards as only the smallest percentage have three or more women on their respective boards.

We operationalized the counting of women on boards into three different categorical variables: *One Woman*, Critical Mass 1 (*WBoards*) and Critical Mass 2 (*AllBoards*). All information regarding the board's members were collected from 2010's report. This way we were able to observe the initial board's composition and the results after 5 years. They are all *dummy variables* which means that they were coded using a binary system, in which the value 0 or 1 was assigned to each observation depending on them

Figure 3.2: Distribution of women on boards



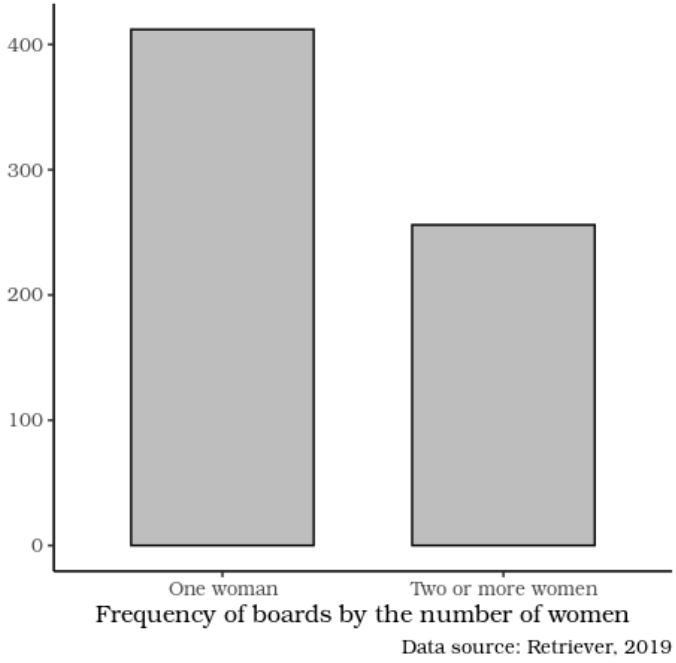
belonging or not to a certain category.

For the variables *One Woman* and *WBoards*, the boards that did not contain women were excluded and on **table 3.2** they can be observed as "missing values". In the *One Woman* category, we assigned 0 to boards with one woman and 1 to boards with 2 or more women. This variable is directly related to our first hypothesis that companies with at least two women on the board perform better than companies with one woman on the board. In the *WBoards* variable, the value 0 was assigned for boards that had 1 or 2 women and the value 1 was assigned for boards with three or more women.

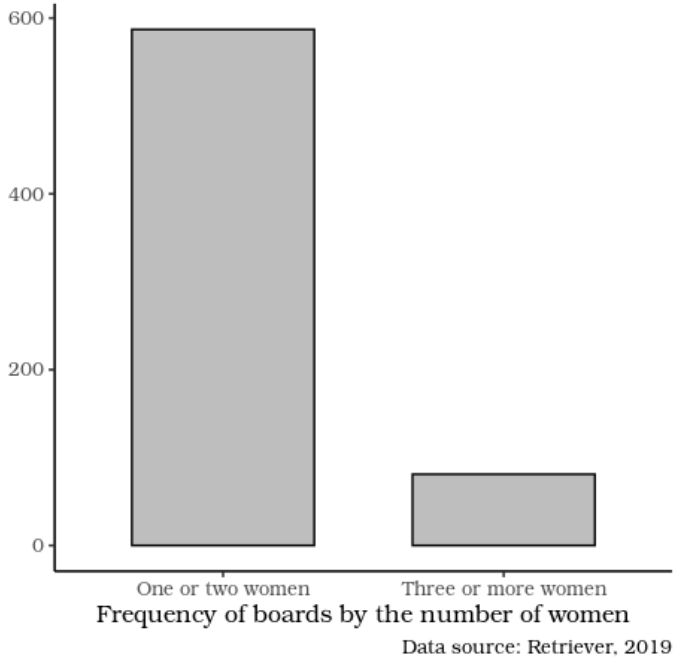
That variable is directly related to our second hypothesis that boards with at least three women outperform boards with two or one woman on the board.

The last variable, *AllBoards* is similar to the *WBoards* with the difference that it does not exclude the boards with only man. In this variable, the value 0 was assigned to boards with 2 or less women (including boards with 0 woman) and the value 1 was assigned to boards with three or more women. This variable is directly related to our third hypothesis that boards with at least three women outperform boards with all other compositions. **Figure 3.3** shows the distribution of our three primary independent variables. Since we have a skewed distribution, as already described, the variable *AllBoards* presents the greater difference between the two categories.

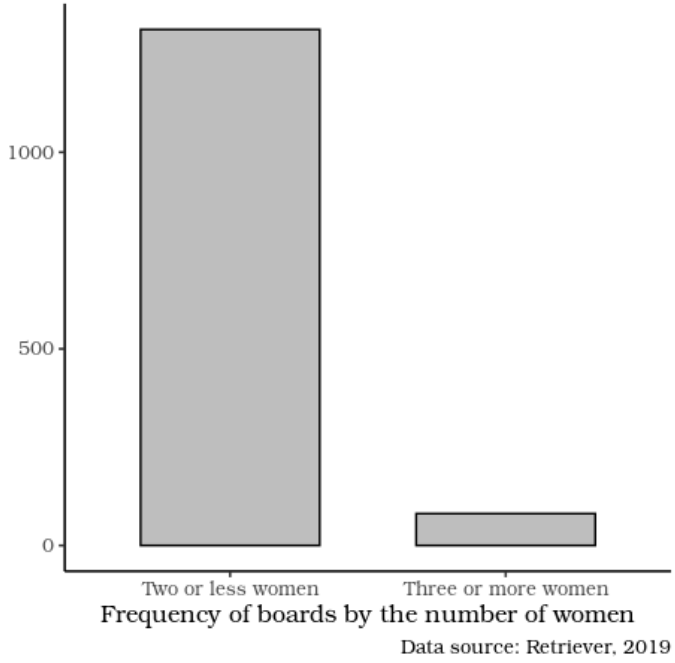
Figure 3.3: Distribution of the main independent variables



(a) One Woman



(b) WBoards



(c) AllBoards

3.2.3 Control variables

In order to control for other possible factors that could affect firm performance, we added *Return on Equity (Roe*) as a control variable. It is a performance measure that shows how well a firm makes investments in order to generate growth in their earnings (The Economic Times, 2019). The Roe was collected from the selected companies' report to the tax agency in 2015. According to the literature review made by Murphy et al (1996), Roe is one of the most popular measures used by scholars to see management efficiency and its impact on the firm's overall performance. We collected the required data for ROE from Retriever Database. We assume that when a company has a higher rate of return on equity, it might indicate an increase in their sales. According to Prof. Moro Visconti's (2018) recent study, ROE measures, among other things, the management's ability to generate earnings from the available equity. Following this logic, we believe that companies with a higher level of Roe have more efficient management and therefore have the ability to generate more sales.

In addition to the above-mentioned variables, we have added the *Number of Employees* as an indicator of firm size. To measure this variable we have taken the number of people employed in the selected company in 2015. Many studies have found evidence that firm size has a positive effect on firm performance (Bhattacharyya and Saxena, 2009; Lee, 2009; Kuncová, Hedija and Fiala, 2016) and we wish to find out if, in the case of our study, if larger firm size can be an additional indicator for higher firm performance. In our sample, on average, the studied companies have 5 employees. However, we can observe that this measurement varies a lot, from 1 to 28 100. The uneven distribution of such variables in our sample indicates that there are both smaller and bigger companies in the sample, but the majority of them are of small size as we can infer by

Table 3.1: Operationalization of concepts

Variables	Operational Definition
Dependent variable	
Net sales	Continuous variable represented by the log of firms' net sales in 2015.
Primary independent variables	
One woman	Categorical variable: boards with 1 woman (0) and boards with 2 or more women (1).
Critical mass (WBoards)	Categorical variable: boards with 1 or 2 women (0) and boards with 3 or more women (1).
Critical mass (AllBoards)	Categorical variable: boards with 2 or less women (0) and boards with 3 or more women (1).
Control variables	
Number of employees	Continuous variable represented by the number of registered employees in 2015.
Return on equity (Roe)	Continuous variable represented by the Roe declared in 2015.
Board size	Continuous variable represented by the number of board members in 2010.
Industry	Categorical variable that classifies firms by industries based on the Industry Classification Benchmark (ICB) (9 categories) .

analyzing the medium.

The subject of how or if a given firm's industry affects its performance has divided the researchers. Several authors believe that following the Industrial Organizational theory – which compares the average profitability of the different industries and aims to discover if there are any significant differences associated with their structure – is the right path (Short et al., 2007; Bamiatzi and Hall, 2009; Roquebert et al., 1996). On the

other hand, some argue that the Resource-Based Theory – meaning that the "the heterogeneity of the resources available to companies which determines their differences in performance" (Barney et al., 2011), regardless of the industry in which they are operating – is a more crucial factor to be considered. We have chosen to follow the Industrial Organizational theory and therefore use the industry as a control variable within the analysis. The original 26 industry categorization, specified in Retriever Business, has been reduced to 9 based on the Industry Classification Benchmark (ICB)(FTSE Russell, 2019). We have done it, aiming to have more observations in each category. For the regression to be successful we needed categories with higher number of companies in them. We believed that by bundling companies in a smaller set we could achieve broader and more robust industry categories. The topic is discussed in detail in **section 4**, **subsection 4.2.**

Table 3.1 provides a summary of how each concept was coded, showing the measurements used and how they were operationalized. Also, **table 3.2** present the descriptive statistics of our sample.

Table 3.2: Descriptive statistics

	Overall (n=1393)
One woman	
0	412 (29.6%)
1	256 (18.4%)
Missing	725 (52.0%)
Critical mass (Wboards)	
0	587 (42.1%)
1	81 (5.8%)
Missing	725 (52.0%)
Critical mass (Allboards)	
0	1312 (94.2%)
1	81 (5.8%)
Boards by the number of women	
0	725 (52.0%)
1	412 (29.6%)
2	175 (12.6%)
3	61 (4.4%)
4	14 (1.0%)
5	6 (0.4%)
Proportion of women on boards	
Mean (SD)	0.196 (0.248)
Median [Min, Max]	0.00 [0.00, 1.00]
Board size	
Mean (SD)	3.75 (1.20)
Median [Min, Max]	3.00 [3.00, 13.0]
Number of employees	
Mean (SD)	81.9 (1120)
Median [Min, Max]	5.00 [1.00, 28100]
Return on equity (Roe)	
Mean (SD)	81.9 (275)
Median [Min, Max]	50.3 [0.100, 5380]
Net sales	
Mean (SD)	329000 (6260000)
Median [Min, Max]	8350 [3.00, 1.64e+08]

Source: Retriever, 2019

4

Empirical Analysis

4.1 T-test and regression analysis

Our first analysis consist of evaluating the impact of our primary independent variables – *One woman*, *Wboards*, and *Allboards* – on firms' performance, which is measure by the *Log(net sales)*. Since our primary independent variables are *dummy variables*, which varies between 0 or 1, we will compare firms' performance under both conditions. Thus, we compare the means of the *Log(net sales)*, taking into account the statistical uncertainty. The appropriate technique to compare the means of the two groups is the *t-test* for independent samples. However, the same result can be obtained by a simple OLS regression, when the independent variable is a *dummy variable*. In this case, we estimate the following models:

$$Log(netsales) = \hat{\alpha} + \hat{\beta} * Onewoman + \hat{\varepsilon} \tag{4.1}$$

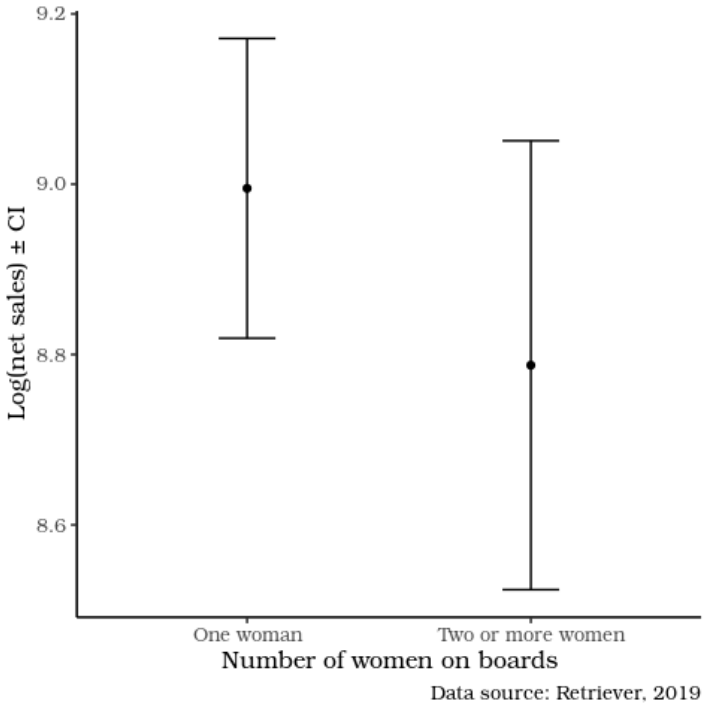
$$Log(netsales) = \hat{\alpha} + \hat{\beta} * Wboards + \hat{\varepsilon} \tag{4.2}$$

$$Log(netsales) = \hat{\alpha} + \hat{\beta} * Allboards + \hat{\varepsilon} \tag{4.3}$$

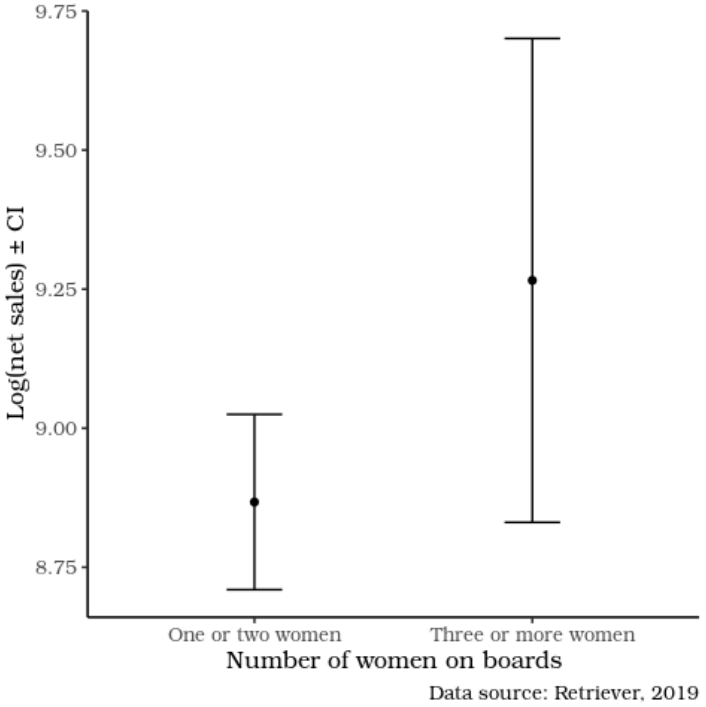
The results of our first test can be observed in **figure 4.1**. It is possible to notice that when comparing means, the boards with three or more women have better performance than the boards with one or two women, especially analysing in for models 4.2 and 4.3. However this graph also brings information on the Confidence Intervals (CI). The CI offers an interval that includes an unknown population parameter, the estimated range being calculated from a given set of sample data (Friedman, 2016). The selection of a confidence level sets the probability that the CI produced will contain the true parameter value. In our analysis we have chosen a CI of 95%, which is a conventional number for this type of analysis (Friedman, 2016). We see by observing the graphs, that the confidence intervals overlap which allows to conclude that the means are not statistically significant.

In sum, when comparing the means of the *Log(net sales)* for the three conditions, we are not able to find evidence of the theoretical hypotheses stated in section 2. That means, we are not able to affirm that: companies with at least two women on the board perform better than companies with one woman on the board **hypothesis 1:**; boards with at least three women outperform boards with two or one woman on the board **hypothesis 2:**; and boards with at least three women outperform boards with all other compositions **hypothesis 3:**.

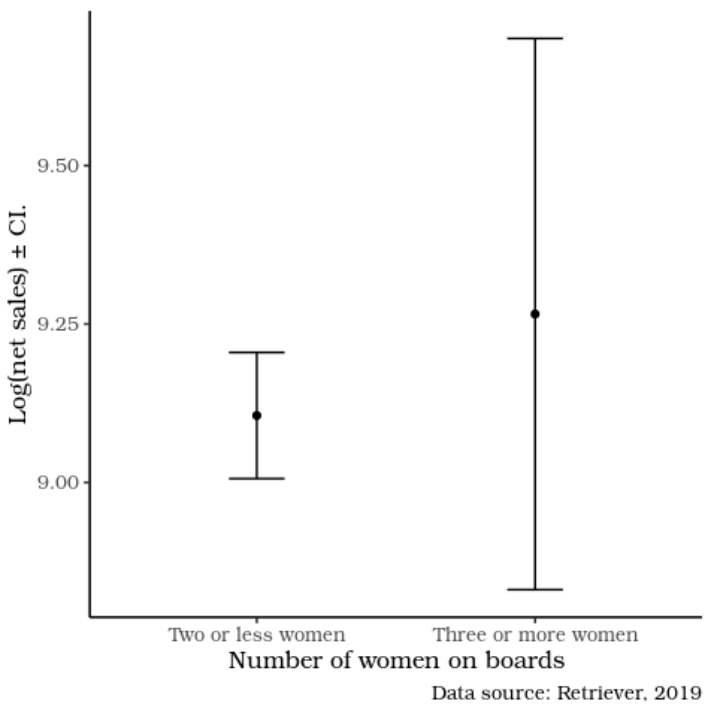
Figure 4.1: Comparing means



(a) Model (4.1)



(b) Model (4.2)



(c) Model (4.3)

The same results can be observed in **table 4.1**. We can notice that there is not a high level of significance throughout it. The statistical significance is what allows us to say that the analysis' results can be extrapolated to the whole population and not just the sample. In this regression analysis, we observe that the only model that has statistical significance is the second one, although the significance is low. When we combine this low significance seen on the table with the confidence levels observed in the graphs, we conclude that this analysis lacks enough data to confirm our theoretical expectations. Following the standards for reporting regression results in tables, as it is specified in all regression table's footnote, one asterisks (*) means $p < 0.1$; two asterisks (**), $p < 0.05$; and three asterisks (***), $p < 0.01$.

Table 4.1: OLS regression analysis

	Dependent variable		
	Log (net sales)		
	(1)	(2)	(3)
One woman	-0.208		
	(0.155)		
Critical mass (Wboards)		0.398*	
		(0.231)	
Critical mass (Allboards)			0.160
			(0.211)
Constant	8.995***	8.867***	9.106***
	(0.096)	(0.080)	(0.051)
Observations	668	668	1,393
R^2	0.003	0.004	0.0004
Adjusted R^2	0.001	0.003	-0.0003
Residual Std. Error	1.948 (df = 666)	1.946 (df = 666)	1.847 (df = 1391)
F Statistic	1.795 (df = 1; 666)	2.983* (df = 1; 666)	0.573 (df = 1; 1391)
Note:			*p<0.1;* ***p<0.05;*** p<0.01

4.2 Industry effect

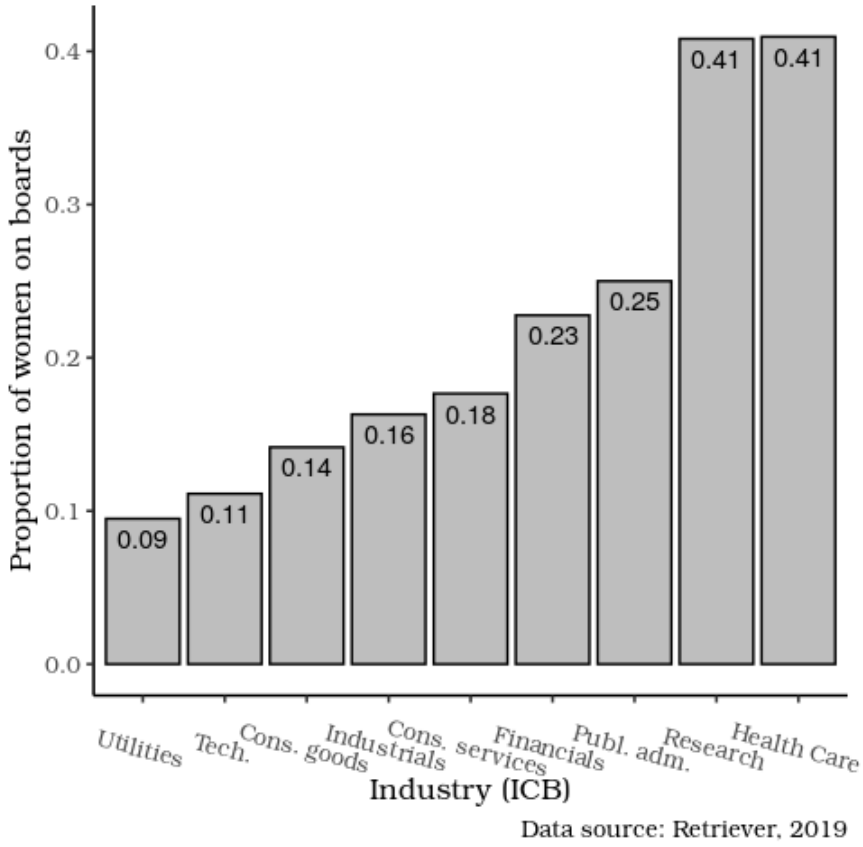
Although we were not able to find evidence of our theoretical hypotheses taking into account the *t-test* to compare the means of *Log(net sales)* under theoretical conditions, we decided to take a more careful look into to subject by examining the presence of women on boards into distinct industries. As already mentioned in **section 3**, firm's industry is an fundamental factor to be evaluated when observing performance. More interestingly, we notice a considerable difference of the presence of women on boards by industry.

As mentioned previously, the original 26 industry categorization specified in Retriever Business has been reduced to 9. We reclassified this variable based on the Industry Classification Benchmark (ICB)(FTSE Russell, 2019), namely: Utilities, Industrials, Consumer goods, Consumer services, Public administration and society, Financials, Technology, Healthcare, Education, Research and Development as well as the whole sample as point of comparison. Seven out of the nine industries were based on the Industry Classification Benchmark (FTSE Russell, 2019), however, there were two industries which had no respective classification (Education, research development and Public administration society) therefore they were included as two separate industries. With this analysis the aim is to compare and analyse standard measures in the different groups. All data are coming from the companies' official financial declaration from 2015.

Figure 4.2 shows there is a considerable difference in the proportion of women depending on the industry. First and formost, we notice that firms in the Utilities sector have around 9% of women on their boards. It is much lower than our sample's average, which is 19%, even though the average board's size does not varies that much among

industry. Firms in the Research and Health Care sectors are those with the highest rates of women in their boards.

Figure 4.2: Women presence on boards by industry



On **table 4.2**, we can extract more information on the topic. The first three variables, One Woman, Critical Mass (WBoards) and Critical Mass (Allboards) are representing the thesis' hypothesis, referring to the board composition. When analyzing the first hypothesis, One Woman is a dummy variable and equals 0 when the number of women on boards is equal to 1; and equals 1 when the number of women on boards is greater than or equal to 2. In the case of our second variable, Critical Mass (WBoards), it

equals 0 when the number of women on boards is 1 or 2; and equals 1 when the number of women on boards is greater than or equal to 3. Finally, Critical Mass (Allboards) equals 0 when the number of women on boards is less than or equal to 2; and equals 1 when the number of women on boards is greater than or equal to 3. The Missing row shows all companies which are outside of these two classifications, namely companies with only men on their boards.

The table shows that in case of six industries close to or more than 50% of the boards are only consist of men. Only the Healthcare and Education, research and development industries are below 30%. In addition, it is also visible that only 256 companies out of the whole sample have a board with at least two women on it. When observing the corresponding numbers to Critical Mass (WBoards) and Critical Mass (Allboards), it indicates that only 5.8% of the sample (81 companies) reaches the critical mass, meaning having three or more women on their boards. These companies are relatively equally distributed among the industries, with the highest number (13 companies) coming from the health industry. This was expected as according to the Swedish Statistical Agency's (SCB) latest gender report, in 2015/2016, 83.7% of the healthcare and social care related degrees at the undergraduate and graduate levels in higher education were female students (scb.se,2018). The same report shows, that in 2016, 92% of the healthcare and social care employees have been female. Nevertheless, it has been indicated as the largest occupational sector in Sweden during the same year.

The proportion of women on boards presents a percentage of female representation on the observed boards. This measure shows a visible difference among the different industries. The industry having the lowest proportion is the Utilities with a lower than 10% (9,5%) average. On the opposite side of the spectrum, the two industries with the highest representation of women on their boards are the Healthcare and Education,

research and development with an average of 41%. When examining these 3 industries net sales figures, (Utilities : 155 000 thousand SEK, Healthcare: 35 400 thousand SEK, Education, research and development: 15 100 thousand SEK) it is clearly visible that the industry with a lower proportion of women on boards outperforms the industries with higher proportion of women on their boards multiple times. However, comparing the Financials sector, which has the third highest proportion of women on boards (22.8%) with the Utilities, it shows different results. The Financials industry had an average net sale of 728 000 thousand SEK which is over four times more than the results of the Utilities industry. Therefore, it is difficult to give a conclusive evidence neither to support nor to reject the hypotheses.

Finally, when looking closely at the presence of women on boards by industry across the whole sample, a few interesting observations can be made. First of all, it is clearly visible that the distribution of women on boards across the different industries are not even. As it was indicated in the analysis above, it was expectable that health industry is ranked among the industries with the highest percentage of women on the boards. Similarly, the Education, research and development industry had 41% in case of women representation on the company boards. Here the women represent approximately 62% of the total workforce within this industry according to The Swedish Occupational Register (The Swedish occupational register 2017, 2019). Looking at the other side of the spectrum in case of the Utilities Industry, only 5.25% of the total workforce is women (The Swedish occupational register 2017, 2019). Relating this with what can be observed in the Swedish Statistical Agency's (SCB) latest gender report, we can say that the areas where higher number of women are receiving their education are also the ones with higher chances of having more women on their companies' boards.

Table 4.2: Descriptive statistics by industry

	Utilities (n=61)	Industrials (n=179)	Consumer goods (n=227)	Consumer services (n=200)	Public administration & society (n=1)	Financials (n=502)	Technology (n=117)	Heath care (n=59)	Education, research & development (n=47)	Overall (n=1393)
One woman										
0	16 (26.2%)	55 (30.7%)	61 (26.9%)	55 (27.5%)	1 (100%)	158 (31.5%)	29 (24.8%)	15 (25.4%)	22 (46.8%)	412 (29.6%)
1	6 (9.8%)	24 (13.4%)	25 (11.0%)	32 (16.0%)	0 (0%)	116 (23.1%)	8 (6.8%)	27 (45.8%)	18 (38.3%)	256 (18.4%)
Missing	39 (63.9%)	100 (55.9%)	141 (62.1%)	113 (56.5%)	0 (0%)	228 (45.4%)	80 (68.4%)	17 (28.8%)	7 (14.9%)	725 (52.0%)
Critical mass (Wboards)										
0	21 (34.4%)	74 (41.3%)	81 (35.7%)	77 (38.5%)	1 (100%)	236 (47.0%)	36 (30.8%)	29 (49.2%)	32 (68.1%)	587 (42.1%)
1	1 (1.6%)	5 (2.8%)	5 (2.2%)	10 (5.0%)	0 (0%)	38 (7.6%)	1 (0.9%)	13 (22.0%)	8 (17.0%)	81 (5.8%)
Missing	39 (63.9%)	100 (55.9%)	141 (62.1%)	113 (56.5%)	0 (0%)	228 (45.4%)	80 (68.4%)	17 (28.8%)	7 (14.9%)	725 (52.0%)
Critical mass (Allboards)										
0	60 (98.4%)	174 (97.2%)	222 (97.8%)	190 (95.0%)	1 (100%)	464 (92.4%)	116 (99.1%)	46 (78.0%)	39 (83.0%)	1312 (94.2%)
1	1 (1.6%)	5 (2.8%)	5 (2.2%)	10 (5.0%)	0 (0%)	38 (7.6%)	1 (0.9%)	13 (22.0%)	8 (17.0%)	81 (5.8%)
Number of employees										
Mean (SD)	34.7 (108)	136 (790)	14.2 (29.6)	10.4 (19.6)	6.00 (NA)	152 (1810)	14.5 (35.1)	61.2 (132)	19.8 (37.2)	81.9 (1120)
Median [Min, Max]	7.00 [1.00, 646]	6.00 [1.00, 7380]	6.00 [1.00, 253]	5.00 [1.00, 174]	6.00 [6.00, 6.00]	4.00 [1.00, 28100]	6.00 [1.00, 344]	14.0 [1.00, 770]	8.00 [1.00, 228]	5.00 [1.00, 28100]
Return on equity (Roe)										
Mean (SD)	47.9 (45.0)	50.9 (56.8)	95.4 (384)	78.0 (222)	89.3 (NA)	90.7 (320)	98.3 (277)	67.3 (85.9)	77.3 (80.5)	81.9 (275)
Median [Min, Max]	36.7 [0.400, 261]	40.2 [0.100, 539]	53.4 [0.600, 5150]	49.3 [0.300, 2600]	89.3 [89.3, 89.3]	53.7 [0.200, 5380]	54.7 [1.30, 2440]	53.7 [0.700, 643]	55.9 [1.80, 398]	50.3 [0.100, 5380]
Net sales										
Mean (SD)	155000 (710000)	308000 (1990000)	35200 (136000)	49300 (225000)	5140 (NA)	728000 (10300000)	70600 (434000)	35400 (68000)	15100 (19800)	329000 (6260000)
Median [Min, Max]	12300 [20.0, 5490000]	10900 [281, 23600000]	9610 [9.00, 1870000]	8910 [69.0, 2640000]	5140 [5140, 5140]	6470 [29.0, 1.64e+08]	7060 [3.00, 4230000]	9030 [647, 387000]	7980 [89.0, 97500]	8350 [3.00, 1.64e+08]
Board size										
Mean (SD)	4.48 (1.64)	3.75 (1.16)	3.61 (0.978)	3.60 (0.993)	4.00 (NA)	3.81 (1.34)	3.67 (0.900)	3.58 (1.09)	3.72 (1.30)	3.75 (1.20)
Median [Min, Max]	4.00 [3.00, 9.00]	3.00 [3.00, 9.00]	3.00 [3.00, 9.00]	3.00 [3.00, 8.00]	4.00 [4.00, 4.00]	3.00 [3.00, 13.0]	3.00 [3.00, 6.00]	3.00 [3.00, 9.00]	3.00 [3.00, 10.0]	3.00 [3.00, 13.0]
Proportion of women on boards										
Mean (SD)	0.0949 (0.143)	0.163 (0.218)	0.142 (0.208)	0.177 (0.240)	0.250 (NA)	0.228 (0.253)	0.111 (0.184)	0.410 (0.351)	0.408 (0.287)	0.196 (0.248)
Median [Min, Max]	0.00 [0.00, 0.556]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.00 [0.00, 1.00]	0.250 [0.250, 0.250]	0.200 [0.00, 1.00]	0.00 [0.00, 0.750]	0.333 [0.00, 1.00]	0.333 [0.00, 1.00]	0.00 [0.00, 1.00]

Source: Retriever, 2019

Regarding the number of employees (also referred as firm size), the different industries show similar means, on average the firm size is approximately between 10-60 employees. There are two outliers, the Financials and Industrials where these numbers are more than double of all other industries, ranging between 136-152 employees on average. Although these two industries have the highest standard deviation which indicates that these higher means are caused by few outliers within the two observed industries.

When observing the return on equity (the numbers are displayed in percentage), it shows that all industries medians are high, ranging between close to 50% and almost 100%. It also presents conflicting results when comparing to our hypothesis as the two companies with the lowest and highest average return on equity are the companies with the lowest number of women on their boards.

Once we examine the descriptive statistics by industry in detail, which provides hints for us further, the next step would be: to run similar *t-tests* to compare the means of *Log(net sales)* by each industry. And if we find evidence, the following step would be to run a regression analysis, controlling for other effects, and examining the interaction effect of industry and the presence of women on boards on *Log(net sales)*. As can observed in the **figure A.1 figure A.2** in the Appendix, we were not able to find difference in firm's performance by industry according to our theoretical expectations. The results may have been affected by the low number of observations in each sector. For this reason, we believe the topic deserves a more detailed analysis.

4.3 Additional analysis: the number and the proportion of women on boards

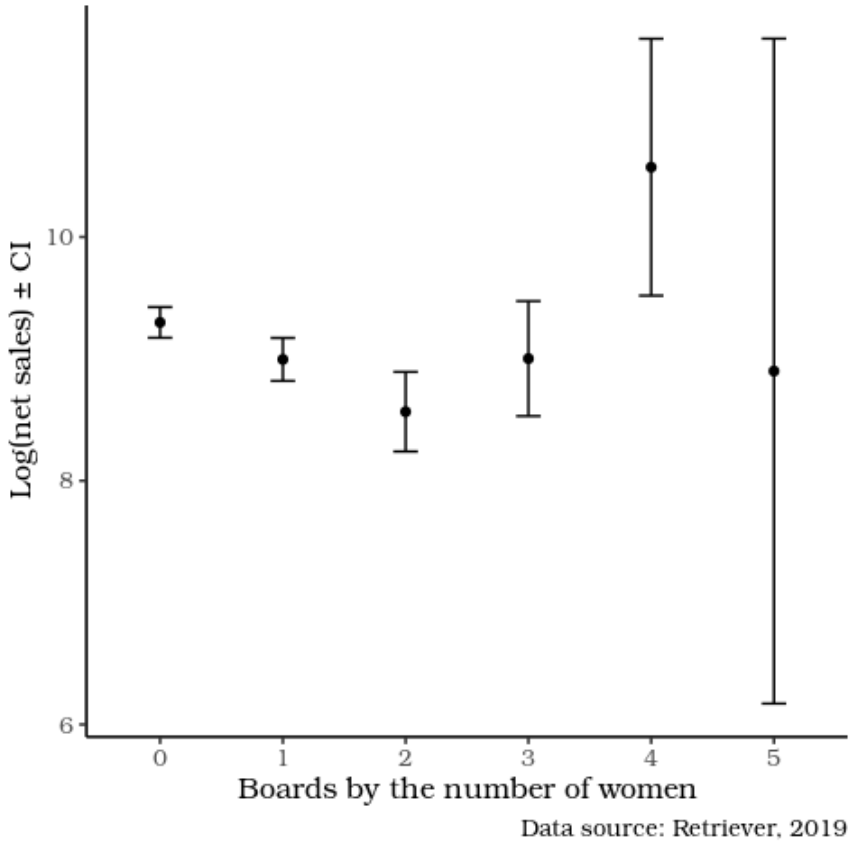
Taking further advantage of the available data, we decided to present an additional analysis, which is indirectly related to our theoretical hypothesis and that can be explored in future studies on the topic. Thus in this section we investigated the impact of boards by the absolute number of women and the proportion of women on boards on the net sales.

For our first analysis, we have classified boards by the number of women, so we are treating this explanatory variable as categorical, representing 1, 2, 3, 4 and 5. Boards with no women is coded as 0 and is treated as a reference category. And the proportion of women is achieved by dividing the number of women on the boards by the board's size. With this measurement we aim to have the percentage of women on boards.

In **figure 4.3**, we compare the means of the *Log(net sales)* and observe interesting data regarding the boards with 4 women. Its mean is significantly higher than all the other groups. Besides that, we observe that its CI does not overlap with the groups with less women, which allows us to conclude that the data is statistically significant.

Furthering our analysis we have added these control variables to our regression and we have run a multiple regression analysis. In **table 4.3** we showcase our results divided in 4 models, in which from model (1) to (4) we slowly add the control variables. In the regression table, one asterisks (*) means $p < 0.1$; two asterisks (**), $p < 0.05$; and three asterisks (***), $p < 0.01$. As we can observe through the models, boards with four women shows high statistically significant results and much higher coefficients than all the other boards in comparison to our reference category that is boards with 0 woman. Even in model (4) in which we have employed all the control variables, we can observe that the Boards with four women show much higher net sales results.

Figure 4.3: Impact of boards by the number of women on net sales



We also ran a regression using the proportion of women as independent variable; however, that also has not returned conclusive results. The tables with the results for both alternative analysis are displayed in **table A.1** in the Appendix [1].

[1] In all regression table's footnote, one asterisks (*) means $p < 0.1$; two asterisks (**), $p < 0.05$; and three asterisks (***), $p < 0.01$.

Table 4.3: Regression analysis – impact of absolute number of women on net sales,

	Dependent variable			
	Log (net sales)			
	(1)	(2)	(3)	(4)
Boards with 1w	-.303***	-.257**	-.266**	-.262**
	(.113)	(.108)	(.108)	(.109)
Boards with 2w	-.733***	-.731***	-.731***	-.726***
	(.154)	(.147)	(.147)	(.149)
Boards with 3w	-.297	-.256	-.253	-.244
	(.244)	(.233)	(.233)	(.237)
Boards with 4w	1.274***	1.295***	1.300***	1.292***
	(.493)	(.472)	(.472)	(.476)
Boards with 5w	-.399	-.352	-.348	-.343
	(.749)	(.717)	(.717)	(.717)
Number of employees		.0005***	.0005***	.0005***
		(.00004)	(.00004)	(.00004)
Roe			.0002	.0002
			(.0002)	(.0002)
Industrials				-.025
				(.259)
C. goods				-.426*
				(.252)
C. services				-.446*
				(.255)
Publ. adm.				-.865
				(1.757)
Financials				-.556**
				(.238)
Technology				-.741***
				(.275)
Health care				-.114
				(.323)
Research				-.546
				(.342)
Constant	9.299***	9.244***	9.231***	9.649***
	(.068)	(.065)	(.066)	(.226)
Observations	1,393	1,393	1,393	1,393
R^2	.024	.105	.106	.120
Adjusted R^2	.020	.102	.102	.111
Residual Std. Error	1.827 (df = 1387)	1.750 (df = 1386)	1.750 (df = 1385)	1.741 (df = 1377)
F Statistic	6.820*** (df = 5; 1387)	27.211*** (df = 6; 1386)	23.497*** (df = 7; 1385)	12.539*** (df = 15; 1377)
Note:				*p<0.1;* ***p<0.05;*** p<0.01

5

Conclusion

When we started writing this thesis we had assumptions which were eventually changed as the research progressed. For one, we assumed that because Sweden ranked in third place in 2009's World Economic Forum Gender Gap Rank we would find among its firms enough observations of mixed boards that would allow an extensive quantitative research. We also assumed that it would be easy to find companies that had more than three women on its boards. However, as we broadly discussed throughout the thesis, that was not the reality what we found. The representation of men and women on boards still remains very unequal and most boards are exclusively male. The ones that do have women, mostly have only one woman. Only the smallest percentage of those companies have three or more female members. That shows that even though Sweden stands high on gender ranks there is still a big gender gap when it comes to the presence of women on boards in case of new ventures and we believe that needs to be addressed in a serious and systematic way.

As shown and discussed in our empirical analysis chapter (Chapter 4), we were unable to find evidence to support our hypothesis. We believe that such results were due

to the low amount of observations of companies with three or more women. Because of the low numbers, our model had a small explanation potential. However, as we further explored the data , we were able to make interesting findings that can eventually bring further research opportunities in the field.

Regarding the Critical Mass Theory, which was essential to this thesis theoretical framework, we couldn't prove with our data that the 3 woman was a threshold for having a better performing board. However, in our additional analysis of the existing data set (item 4.3), in which we explored the financial performance of boards with 1,2,3,4 and 5 women, we found significant evidence that boards with 4 women outperformed all the rest. Considering that, we would recommend further analysis on the theory suggesting a revision of this potential threshold number. This research approach would still need more refinement with further academic work, however, we believe that such results shows strong evidence that the number of women on boards plays an important role in the firm's financial performance and therefore the theory should continue to be developed.

We also found interesting information while analyzing gender distribution and its industry impact. The most evident finding was the fact that the presence of women on boards varies drastically between industries. Our study showed that Education, Research and development and Healthcare are the industries with the most women on their boards. We have connected these results to what we learned from studying the Swedish Statistical Agency's (SCB) 2019's gender report, in which is shown that Healthcare and Education, research and development are the areas that women mostly get their education in. That is an important observation as it supports the notion that by having more women being educated in a certain sector, it will raise the chances of having more women in executive positions in that same sector. That should be observed especially

when thinking about the industries with the lowest percentage of women, namely in our sample: Utilities and Technology.

The low number of observations of boards with female members - especially three or more women - has had a large impact on our research. When running a statistical model is key to have a balanced data set in order to get significant results that can give categorical answer to hypothesis. Considering the low number of found observations in our research, we were unable to find such categorical answers that we were looking for. That brings forward an important reflection regarding the controversial results found in the literature on women's impact on business' performance that we explored in Chapter 2: Theoretical Framework. Even though we used recent data from a country that is highly rated in the international gender equality ranks, we still did not get a sufficient amount of observations to create meaningful models. The low amount of observations made it hard to extract conclusive results even when using different analysis and variable coding approaches. Considering that, we would suggest that one possible explanatory reason for the controversial results found in the field is that categorical conclusion are being extracted from data sets that return weak statistical data.

To conclude, after exploring our data set in length, we would recommend future research on the topic to keep exploring the data involving women and its impact on performance using different lenses. We have collected data from two points in time, 2010 and 2015; however, we believe that by observing our variable's variation through time, in a year by year basis, it could provide a more precise analysis that would bring forward interesting results.Furthermore, we reinforce the necessity of increasing the number of women on boards. That will result in better databases which will undoubtedly allow the success of future models capable of answering important questions regarding the subject.

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Appendix A

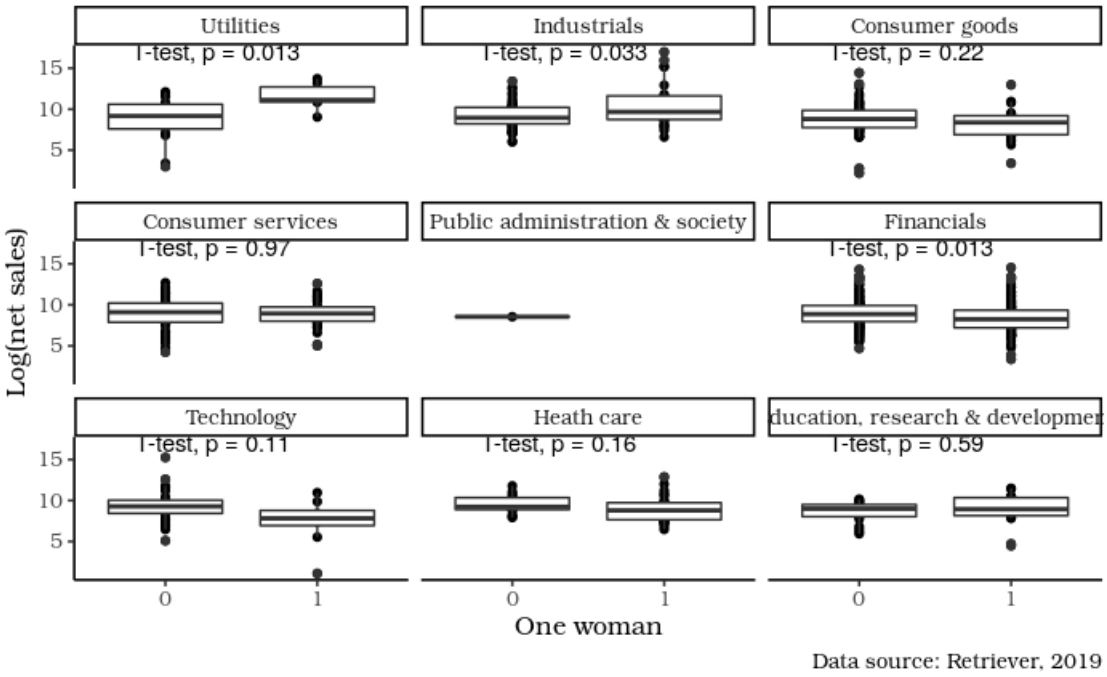
A.1 Regression analysis

A.2 Industry effect

Table A.1: OLS regression analysis – proportion of women on boards

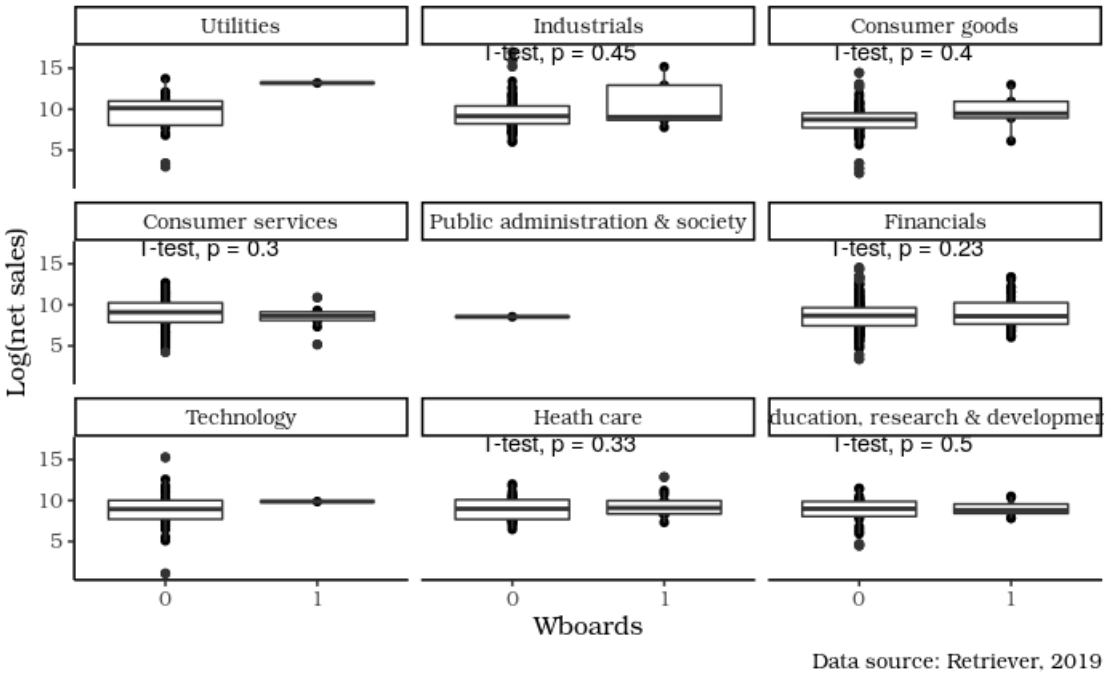
	Dependent variable			
	Log (net sales)			
	(1)	(2)	(3)	(4)
Proportion of women on boards	-1.243***	-1.190***	-1.194***	-1.259***
	(.197)	(.189)	(.189)	(.197)
Number of employees		.0005***	.0005***	.0005***
		(.00004)	(.00004)	(.00004)
Roe			.0002	.0002
			(.0002)	(.0002)
Industrials				.031
				(.258)
C. goods				-.366
				(.251)
C. services				-.367
				(.254)
Publ. adm.				-.798
				(1.750)
Financials				-.447*
				(.237)
Technology				-.698**
				(.274)
Health care				.227
				(.323)
Research				-.306
				(.342)
Constant	9.359***	9.310***	9.296***	9.635***
	(.062)	(.060)	(.061)	(.223)
Observations	1,393	1,393	1,393	1,393
R^2	.028	.108	.108	.123
Adjusted R^2	.027	.106	.107	.117
Residual Std. Error	1.821 (df = 1391)	1.745 (df = 1390)	1.745 (df = 1389)	1.736 (df = 1381)
F Statistic	39.779*** (df = 1; 1391)	83.890*** (df = 2; 1390)	56.329*** (df = 3; 1389)	17.687*** (df = 11; 1381)
Note:				*p<0.1;* ***p<0.05;*** p<0.01

Figure A.1: Comparing means by industry



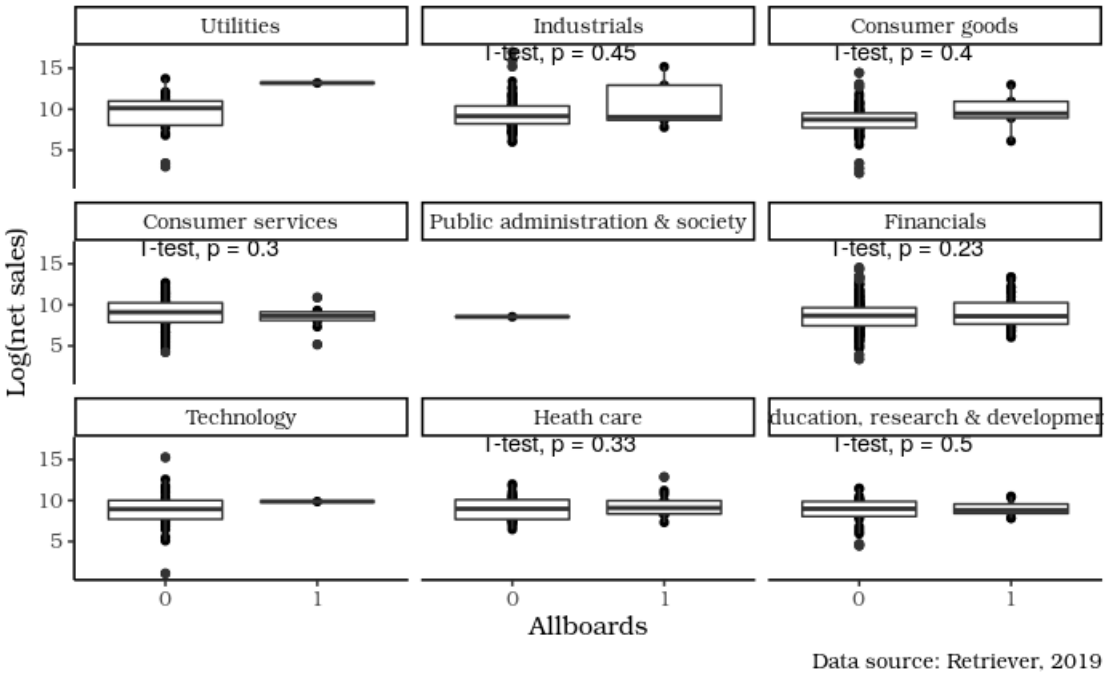
Data source: Retriever, 2019

Figure A.2: Comparing means by industry



Data source: Retriever, 2019

Figure A.3: Comparing means by industry



Data source: Retriever, 2019