Female board members and company performance

Do companies with female directors perform better than companies without females on their boards? Evidence from Sweden.
Master Thesis in Business Administration

Title: Female board members and company performance - Do companies with female directors perform better than companies without females on their boards? Evidence from Sweden.

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Key terms: Governance, Gender diversity, Board Composition, Financial Performance, Agency Theory, Stakeholder Theory, Resource Dependency Theory

Abstract

Background: Females are underrepresented in Swedish boards, and in 2016 females represented 29 % of all board members. Many researchers have studied the relationship between the gender composition of company boards and company performance, but they have not managed to reach consensus in explaining the relationship. Pure shareholder theory suggests that the company philosophy is to focus on profitability and shareholder maximization. If the gender distribution in the board affects the performance of the company, some companies may underperform because of their board composition. If so, this is an issue that should be solved according to the shareholder theory and some adjustments to the composition should be done.

Purpose: The purpose of this study is to investigate whether or not companies with female directors on their boards perform better than companies without female directors on their boards. The target group of the study is Swedish listed companies with a statutory domicile in Sweden.

Method: For conducting this research, data for a period of three years (2013-2015) are collected from a sample of 94 Swedish listed companies. The performance measurements investigated are the ratios; ROE, profit margin, ROCE, EBIT margin and EPS. As for control variables, the board size and company size are used. An independent samples t-test is conducted, as well as a correlation matrix analysis and a regression analysis, to fulfil the purpose of this study.

Conclusion: The results show that there is a significant positive correlation between female representation in the boardroom and the ratio EBIT margin. However, the correlation strength is so weak that it is not fair to draw the conclusion that female representation has a positive effect on the financial performance of the companies. Also, the regression analysis shows no relationship between the two variables. However, this study contributes by showing that there is no negative correlation between the presence of females on boards and the financial performance of the companies.
**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AEF</td>
<td>Amazone Euro Fund</td>
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<tr>
<td>EBIT</td>
<td>Earnings before interest and taxes</td>
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<td>EC</td>
<td>European Commission</td>
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<td>EPS</td>
<td>Earnings per share</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>ROE</td>
<td>Return on equity</td>
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<td>ROCE</td>
<td>Return on capital employed</td>
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<td>ROIC</td>
<td>Return on invested capital</td>
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<td>ROS</td>
<td>Return on sales</td>
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<td>SCB</td>
<td>Statistics Sweden</td>
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1 Introduction

1.1 Background & Problem discussion

Gender diversity in corporate boards is a controversial topic that has been discussed by researchers for decades (e.g. Blackburn & Iles, 1997; De Fuentes & Laffarga, 2014). Even though many companies aim to increase the number of female representatives in their boards (Tienari, Holgersson, Meriläinen & Höök, 2009), the majority of the board members in European companies are represented by males (European Commission (EC), 2016). In order to even out the gender inequality in boards, some European countries have decided to adopt regulations in the form of legislative quotas. There is legislation for gender quotas in Norway, Spain, Italy, France, Iceland, The Netherlands, and Belgium (EC, 2017). Furthermore, the EC (2011) has proposed for the introduction of quotas on company boards in the entire European Union (EU). The proposal suggests an objective of 40% of the non-executive directors in boards of listed companies to be represented by females in 2020. With this proposal, the EC promotes an accelerated development of gender balances in European corporate boards.

The main aim of the proposal of quotas, presented by the EC (2011), is to break the glass ceiling and promote equal opportunity for males and females to reach top positions in the EU's largest companies. The proportion of females on boards across the EU member states is increasing in a slow pace, and most countries use self-regulation and sets targets in the national corporate governance codes regarding the gender composition of boards (EC, 2011). It has been shown that legislation of gender quotas is one solution to increase the proportion of females on boards (EC, 2016). However, quotas are a controversial topic and a proposal for gender quotas on boards in Sweden was recently voted down because it was considered derogatory on the Swedish Companies Act (The Swedish Parliament, 2017). The members of the Swedish Parliament (2017) are promoting gender diverse boards, but do not find legislated gender quotas to be the solution. Instead, they believe that the owners of limited companies themselves should continue to regulate the proportion of females on boards. Also, the members of the Parliament argue that the Swedish government should take action on a EU level, in order to promote national self-determination regarding gender diversity on boards. The fact that the Swedish Parliament advocates self-determination by
the companies could imply that quotas might not be the most desirable method to create equal opportunity for females and males to reach positions in company boards.

According to Freidenvall and Hallonsten (2013), Sweden has been in the forefront internationally regarding gender equality, since the nation has a strong presence of females in political bodies and high overall presence of female employees. The political bodies in Sweden have over 40% female representatives (Freidenvall & Hallonsten, 2013). However, the presence of females on company boards is not as strong as in the political bodies. After the introduction of gender quotas on boards in Norway 2003, the question of gender equality on boards in Sweden became a discussed issue. Some questioned if Sweden can be considered a role model for gender equality when the gender distribution on boards in Sweden is unequal (Freidenvall & Hallonsten 2013; Tienari et al., 2009).

According to Statistics Sweden (SCB) (2017), females represented 29% of all board members in Swedish boards 2016, and males represented the remaining 71%. In 2009, when the study by Tienari et al. (2009) was conducted, Swedish boards consisted of 18% females and 82% males (SCB, 2017). Even though there has been an increase of females on Swedish boards, the gender distribution is still not equal. The increase indicates that the market has a positive effect on the gender equality on boards, but the percentage of females on boards is increasing at a slow pace (Freidenvall & Hallonsten, 2013).

The majority of the European countries that have introduced legislative quotas have decided that each gender should be represented by at least 40% of the board members (EC, 2017). Legislative quotas even out the gender distribution on boards quickly, since companies could be penalized if the gender quotas are not fulfilled (Reguera-Alvarado, De Fuentes & Laffarga, 2014). However, the adoption of quotas raises several issues and one main argument for not introducing gender quotas has been that the introduction would be derogatory on the national Company’s Act (The Swedish Parliament, 2017; Tienari et al., 2009). Another argument stated by Tienari et al. (2009) is that by introducing a gender quota, it will send a signal that females cannot receive positions on company boards based on their own competence.

Harjoto, Laksmana and Lee (2015) have found that a gender diverse board is beneficial for organizations since the boards will represent the various stakeholders, and through this, be
more aware of the needs from these different stakeholders. The question is, however, if the companies will benefit financially from the gender diverse boards, i.e. if there is a link between gender diversity on boards and the economic performance of the companies (Joecks, Pull & Vetter, 2013). Former research has not been consistent answering this question. Some researchers claim that there is a positive relationship between the level of gender diversity in boards and financial performance of the companies (e.g. Bonn, Yoshikawa & Phan, 2004; Campbell & Mínguez-Vera, 2008; Carter, Simkins & Simpson, 2003; Erhardt, Werbel & Shrader, 2003; Joecks et al., 2013; Reguera-Alvarado, 2014). Other researchers have found no such relationship between gender diversity and financial performance (e.g. Carter, D'Souza, Simkins & Simon, 2010; Gallego, García & Rodríguez, 2010; Rose, 2007; Shrader, Blackburn & Iles, 1997). With this in mind, prior researchers have not reached consensus in answering this question. However, this study aims to present an answer to this question with regards to the Swedish market. As far as the authors are concerned, there has not been any research published in Sweden regarding gender distribution on boards and firm performance, and this study will therefore fill a gap in existing research.

This study is important since it may discover that some Swedish companies are underperforming financially because of the gender composition in the boards. Pure shareholder theory suggests that the corporate philosophy is to focus on profitability and shareholder maximization (Rausch, 2011). If there are two groups of companies, one that include females in the boards and one that do not, and the result shows that one of the groups perform better than the other because of the gender composition, then the other group underperforms. If one of the groups underperforms, this is an issue that should be solved according to with the shareholder theory (Rausch, 2011).

1.2 Purpose

The purpose of this study is to investigate whether or not companies with female directors on their boards perform better than companies without female directors on their boards. The target group of the study is Swedish listed companies with a statutory domicile in Sweden.
1.3 Outline of thesis

Chapter 2 presents the frame of reference used to conduct this study. The agency theory, stakeholder theory, and resource dependency theory are presented in this chapter to create an understanding of the topic. Furthermore, the current situation of the gender distribution on Swedish company boards is presented, to demonstrate why this study can be of importance to Swedish companies. Also, underlying research which is of relevance to the empirical findings and analysis is presented.

Chapter 3 presents the method used for fulfilling the purpose of this thesis. This part of the study involves how the sample is collected, which measures are used, and a detailed explanation of each approach used in the empirical study to reach the results.

Chapter 4 presents the empirical findings and analysis from the conducted research. Each approach used to fulfil the purpose of this thesis is carried out in this chapter and the results from each approach is analysed one by one. Also, an analysis is presented, which links this study to underlying theory and previous research.

Chapter 5 presents the authors’ conclusion of this study, as well as a discussion of the findings. Based on the results of the empirical study, with regards to the underlying research and theories presented in chapter 2, the purpose of this study is fulfilled.
2 Literature Review

2.1 Theoretical framework

Some researchers argue that multiple theories are needed in order to create a theoretical framework that can explain the relationship between gender diverse boards and the financial performance of organizations (Kiel & Nicholson, 2003; Reguera-Alvarado et al., 2014). However, most studies conducted on the subject uses the agency theory as the main base for the theoretical framework (e.g. Gallego et al., 2010; Kiel & Nicholson, 2003; Reguera-Alvarado et al., 2014). The agency theory concerns the separation of ownership and control in organizations (Shleifer & Vishny, 1997). Asymmetric information between the managers and the shareholders can create agency costs and a suitable corporate governance structure can help to reduce agency costs, and therefore the corporate governance structure is linked to the organizational performance (Reguera-Alvarado et al., 2014). The board of directors is the foundation of the corporate governance structure, and is working to reduce agency costs and align the interest of the managers and the shareholders (Hillman & Dalziel, 2003; Rose, 2007). Hillman & Dalziel (2003) argues that if a more heterogeneous board can increase board independence, a gender diverse board can help to reduce agency problems, and thus increase the value of the organization. Furthermore, Luoma and Goodstein (1999) describe diversity as a necessity for fair and transparent decision-making.

Another theory linked to the issue of gender diversity on corporate boards is the stakeholder theory. It suggests that the value of the company depends on how well the company fulfil the contracts with its stakeholders (Cornell & Shapiro, 1987). According to Cornell and Shapiro (1987), effective stakeholder management is necessary for company success. Also, the board of directors plays a vital role to balance the management’s plans with the interest of multiple stakeholders. Through a gender diverse board, the board members will represent the diverse stakeholders in a better way than a homogenous board, and through this be more aware of the needs of the various stakeholders (Harjoto et al., 2015). Furthermore, Brown, Brown and Anastasopoulos (2012) argue that the corporate governance is of high importance when it comes to the performance of the company. Moreover, the authors explain that good corporate governance includes a good relationship with stakeholders, as proposed by the stakeholder theory.
A third theory, which can explain the link between the composition of the corporate board and the performance of the company, is the resource dependency theory. The theory describes that the corporate board is an essential link between the company and its environment. In other words, the corporate board fills the function of being the link to the external resources upon which the company depends (Lükerath-Rovers, 2013). Research by Hillman, Shropshire and Canella (2007) shows that companies can provide benefits from recruiting female directors, since these companies tend to be linking better with their stakeholders. The reason for this is that female directors on boards can provide a valuable form of legitimacy (Hillman et al., 2007).

2.2 Gender diversity in Swedish boards

In Sweden, there is no national legislation when it comes to the composition of board members with regard to gender. However, the Swedish Corporate Governance Board has developed the Swedish Corporate Governance Code (2016) to be used as a complement to legislation or other regulations or as an alternative to legislation. The code specifies a set of norms for good corporate governance and the target group for the code is all Swedish companies listed on a regulated market in Sweden, i.e. Nasdaq OMX Stockholm or NGM Equity. However, the code is not mandatory to obey for the target group. The companies can deviate from the norms in the code, but will then have to explain their own solution and explain why the deviation was made, in accordance with the comply-or-explain principle (Swedish Corporate Governance Code, 2016).

The Swedish Corporate Governance Code (2016) explains that the companies should strive for gender balance on the board. The nomination committee, in particular, should consider the requirement to strive for gender balance when nominating board members to the board. Furthermore, the nomination committee should in its statement include information regarding the diversity policy applied by the committee in its work (Swedish Corporate Governance Code, 2016).

As mentioned in the previous chapter of this study, the percentage of females on Swedish company boards was 29 % in 2016 and the percentage of males was 71 % (SCB, 2017). One might assume that gender balance is reached when the board consists of 50 % females and 50 % males. However, the majority of the European countries that have introduced quotas to reach gender balance on boards have stated that each gender should be represented by
40% (EC, 2017). Some countries have set the bar for gender equality even lower. The Netherlands has the lowest bar for gender equality, were each gender must be represented by 30% (EC, 2017). In the light of the different regulations for gender diversity in Europe, the Swedish boards with female representation of 29% is therefore not considered gender balanced.

The proportion of females on boards in Sweden has increased during the last decades, which is shown in figure 1 and 2 below, but the gender distribution is not yet completely balanced. The gender distribution shown in figure 1 and 2 is conducted by SCB every second year, and is based on data from all listed companies in Sweden. Figure 2 shows that the percentage of female directors in Swedish company boards has increased from 15% in 2004 to 29% in 2016.

Figure 1 - Board members of Swedish listed companies

![Board members of all Swedish listed companies 2004-2016](image)

1 SCB (2017)

2.3 Previous research on board gender diversity and firm performance

According to Finkelstein and Hambrick (1996), the composition of the board and its link to financial performance can be explained by two factors. Firstly, the board is responsible for the supervision of the company since it acts as representative of the shareholders. Secondly, the board has to be considered to have the most influence on the company’s decision-making. The board does therefore affect the performance of the company.

Diversity in the context of corporate governance is described by Van der Walt and Ingley (2003), as the composition of the board with respect to the different qualities, characteristics, and expertise of the individuals in relation to the decision-making in the board. Diversity in the form of gender diversity is therefore only one of the characteristics of diversity. However, in media the focus has been on gender diversity, and in Sweden in particular, the proposal for introducing gender quotas for appointing members to corporate boards was recently debated upon (The Swedish Parliament, 2017). Furthermore, the focus of previous research

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Figure 2 - Percentage increase of female directors in Sweden

![Diagram showing the percentage increase of female directors in Sweden from 2004 to 2016.](http://www.scb.se/hitta-statistik/statistik-efter-amne/levnadsforhallanden/jamstalldhet/jamstalldhetsstatistik/)
has been on gender diversity, and not so much on other forms of diversity (e.g. Adams & Ferreira, 2009; Bear, Rahman & Post, 2010; Lückerath-Rovers, 2013).

Since the focus of this study is to investigate the link between gender diversity in the boardroom and financial performance, some previous results from research in the field of study will be presented. Gender diversity in the board and its link to financial performance of the company have been researched by many, but different methods have been used and the researchers have also reached somewhat different conclusions.

There is a common conclusion by many researchers that there is a positive link between gender diversity on the board and the financial performance of the company (e.g. Apesteguia, Azmat & Iriberri, 2012; Bear et al., 2010; Bonn et al., 2004; Burgess & Tharebou, 2002; Burke, 1997; Campbell & Mínguez-Vera, 2008; Carter et al., 2003; Croson & Gneezy, 2009; Erhardt et al., 2003; Farrel & Hersch, 2005; Gordini & Rancati, 2017; Lückerath-Rovers, 2013; Post & Byron, 2015; Reguera-Alvarado, 2014; Robinson & Dechant, 1997; Torchia, Calabro’ & Huse, 2011; Tyson, 2003). For example, it has been found that the difference in the inborn characteristics between females and males could be a factor for success for companies (Burke, 1997; Farrell & Hersch, 2005). In more detail, studies have shown that females tend to be more risk averse than males (Croson & Gneezy, 2009; Post & Byron, 2015), and females tend to propose less aggressive strategies than males do, which enriches the boardroom with different perspectives (Apesteguia, et al., 2012). Furthermore, Burgess & Tharebou (2002) and Carter et al. (2003) agree on the fact that a wider range of perspectives among the board members can improve the performance because of the better decision-making in the team.

Another aspect to why gender diversity is linked to the financial performance bottoms from the stakeholder theory. Diversity within the boardroom reflects the diversity among stakeholders, which leads to that the company will be better off serving and retaining the market (Carter et al., 2003). Furthermore, Bear et al. (2010) explains that a company with a gender diverse board may be more interesting to invest in for socially responsible investors. This is because these investors tend to consider the existence of gender diversity, as a positive investment variable, when making an investment decision. In turn, the demand for these shares increases the market value of the shares.
Further, Tyson (2003) concludes that diversity among board members will result in different views within the board, which in turn will result in better performance of the company. Robinson and Dechant (1997) do also declare that heterogeneous boards produce higher quality decisions than homogenous ones, and that is why the mix of genders are of importance in a board.

Campbell et al. (2008) suggests that the gender diversity in the company board enables the board to possess new ideas, skills and views that are different from a homogenous board composition, and through this increase the value of the company. Gordini and Rancati (2017) and Lückerath-Rovers (2013) show a positive link between gender diverse boards and financial performance, through the effect that gender diverse boards has on financial ratios. For example, Gordini and Rancati (2017) show that gender diverse boards have a positive and significant effect on financial performance, measured by Tobin’s Q ratio. However, it is the percentage of females on the boards that matter according to that study, since Gordini and Rancati (2017) claim that the presence of one female alone on the board has no significant effect on company performance. The study also analyses the critique that gender diverse boards may destroy shareholder value, but the researchers are able to reject this theory, and conclude that shareholders do not penalize companies for appointing female directors to the board.

In contrary, there are studies, although a limited number, that shows a negative link between gender diversity in the boardroom and financial performance (e.g. Ahern & Dittmar, 2012; Böhren & Ström, 2010). Ahern and Dittmar (2012) find a clear negative link between firm value and the increase of females on Norwegian company boards. The study is conducted after the introduction of gender quotas in Norway, and shows a decrease in stock price, as well as a decrease in Tobin’s Q after the increased gender diversity on boards. Ahern and Dittmar, (2012) do state that the introduction of legislated quotas resulted in less experienced and younger boards, as well as deterioration in operating performance, which could be a reason to the negative link found between gender diverse boards and company performance. Furthermore, Böhren and Ström (2010), find that by increased gender diversity on Norwegian company boards, Tobin’s Q decreased, and the authors therefore find a negative link between gender diversity on boards and company performance. Böhren and Ström (2010)
do not encourage gender diversity on boards, but instead states that a less diverse board is preferable since it will create more value than a diverse board.

Further, some studies show mixed results, indicating both positive and negative links between gender diverse boards and company performance (e.g. Adams & Ferreira, 2009; Joecks et al., 2013). Adams and Ferreira (2009) show that female presence on the board increases board effectiveness since females tend to have better attendance records than males have, and also that males improve in their attendance records the more gender-diverse the board gets. However, the study also shows that the above arguments concerns companies with previously poor governance, and that the result shows a negative relationship between gender diversity and company performance in those companies with strong governance to begin with. Joecks et al. (2013) find a negative relation between gender diversity on boards and company performance. However, a negative relationship is only found when the percentage of female directors does not reach the critical mass of 30% females on the board. If the percentage of females reaches 30% or more, the study instead shows a positive link. The study by Haslam, Ryan, Kulich, Trojanowski and Atkins (2010) also shows mixed results, but indicates no link and negative link. Haslam et al (2010) find no link between gender diversity and firm performance when investigating the impact of accounting based performance measures. However, the study also shows a negative link between gender diversity and company performance when investigating the impact on Tobin’s Q.

Further, some studies show no link at all (e.g. Carter et al., 2010; Dwyer et al., 2003; Gallego et al., 2010; Rose, 2007; Shrader et al., 1997). For example, Rose (2007) explains that with a wider range of perspectives among the board members, the process of decision-making can be more time consuming and can potentially result in more conflicts within the board. The potential increased performance of the company from recruiting a gender diverse board will then be neutralised by the cost from lack of coordination within the board (Dwyer, Richard & Chadwick, 2003). Furthermore, Gallego et al. (2010) find that gender diverse boards do not influence corporate performance, since their study show that companies with a high level of diversity on boards do not outperform other companies, with low gender diversity on boards.

Joecks et al. (2013) explains that the studies, which show a negative, or no relationship between board diversity and company performance lacks because of an overall low or high
female representation in the sample, which in turn undermines the results of the studies. It should also be emphasized that the methods of how to conduct research that show a link between gender diverse boards and financial performance differ, and also, the financial ratios examined in the studies differ (e.g. Bonn et al., 2004; Campbell & Mínguez-Vera, 2008; Carter et al., 2010; Carter et al., 2003; Catalyst, 2007; Erhardt et al., 2003; Gallego et al., 2010; Joecks et al., 2013; Lückerath-Rovers, 2013; Reguera-Alvarado, 2014; Rose, 2007; Shrader et al., 1997; Torchia et al. 2011). For example, the Danish study conducted by Rose (2007) investigates the problem using Tobin’s Q ratio. Like Rose (2007), Campbell et al. (2008), Carter, et al. (2010) and Reguera-Alvarado (2014), also base their studies on Tobin’s Q ratio, however, the statistical tests conducted differ between these studies. Lückerath-Rovers (2013) and Shrader et al. (1997) do not base their research on Tobin’s Q, but on other financial ratios. However, they do not focus on the same financial ratios. Torchia et al. (2011) on the other hand use a unique method where a questionnaire was conducted and sent to Norwegian companies. The study by Torchia et al. (2011) is not based on statistical tests of financial ratios with connection to board gender diversity, like the previous mentioned studies. It is based on the connection between company innovation and board gender diversity, with the emphasis that innovation leads to company performance.

The research conducted by Lückerath-Rovers (2013) acts as a mainstay for this study. The research shows that return on equity (ROE) is statistical significantly higher for companies with female directors on their boards than for companies without female directors on their boards. However, Lückerath-Rovers (2013) explains that when the research was conducted, most of the companies with female directors only had one female on the board, and she was usually non-executive, and it can therefore be questioned how she could influence the financial performance of the company.

To some extent, the research by Lückerath-Rovers (2013) is built on the study by Catalyst (2007) and the McKinsey Report (2007). Catalyst (2007) find that companies with a high percentage of females on boards perform better than companies with a low percentage or no females at all on the board, with regards to ROE, profit margin, return on sales (ROS) and return on invested capital (ROIC). However, the study does not take any statistical significance into account. Also, extreme values are not taken into account, which could affect the accuracy of the outcome (Lückerath-Rovers, 2013).
The results of the McKinsey Report (2007) shows that companies with high gender diversity has 11 % higher ROE, 91 % higher earnings before interest and tax (EBIT) and 36 % higher stock price growth, than the average of all companies in the industry. The McKinsey Report is criticized for being biased, since the study was conducted in collaboration with a Swiss company AMM Finance and their Amazone Euro Fund (AEF). AMM/AEF made the selection for the researched companies not only based on gender diversity, but on previous performance (Lückerath-Rovers, 2013).

Table 1 shows a summary of the results from previous research on gender diversity and its relation to company performance, during the last 20 years. Under the column main finding, the link between gender diversity on boards and financial performance for each study is demonstrated. Since a majority of the previous studies show a positive link, the hypothesis tested in this study is:

\[ H_0: \text{Companies that include females on the boards perform better financially than companies that do not include females on the boards.} \]
<table>
<thead>
<tr>
<th>Year</th>
<th>Author(s)</th>
<th>Main results</th>
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<tbody>
<tr>
<td>2017</td>
<td>Gordini &amp; Rancati</td>
<td>Positive link</td>
</tr>
<tr>
<td>2015</td>
<td>Post &amp; Byron</td>
<td>Positive link</td>
</tr>
<tr>
<td>2014</td>
<td>Reguera-Alvarado</td>
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<td>2013</td>
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<td>Lückerath-Rovers</td>
<td>Positive link</td>
</tr>
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<td>2012</td>
<td>Ahern &amp; Dittmar</td>
<td><strong>Negative link</strong></td>
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<tr>
<td>2012</td>
<td>Apesteguía et al.</td>
<td>Positive link</td>
</tr>
<tr>
<td>2011</td>
<td>Torchia et al.</td>
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<tr>
<td>2010</td>
<td>Bear et al.</td>
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</tr>
<tr>
<td>2010</td>
<td>Böhren &amp; Ström</td>
<td><strong>Negative link</strong></td>
</tr>
<tr>
<td>2010</td>
<td>Carter et al.</td>
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<td>Gallego et al.</td>
<td><strong>No link</strong></td>
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<td>2003</td>
<td>Carter et al.</td>
<td>Positive link</td>
</tr>
<tr>
<td>2003</td>
<td>Dwyer et al.</td>
<td><strong>No link</strong></td>
</tr>
<tr>
<td>2003</td>
<td>Erhardt et al.</td>
<td>Positive link</td>
</tr>
<tr>
<td>2003</td>
<td>Tyson</td>
<td>Positive link</td>
</tr>
<tr>
<td>2002</td>
<td>Burgess &amp; Tharebou</td>
<td>Positive link</td>
</tr>
<tr>
<td>1997</td>
<td>Burke</td>
<td>Positive link</td>
</tr>
<tr>
<td>1997</td>
<td>Robinson &amp; Dechant</td>
<td>Positive link</td>
</tr>
<tr>
<td>1997</td>
<td>Shrader et al.</td>
<td><strong>No link</strong></td>
</tr>
</tbody>
</table>
3 Method

3.1 Sample

The sample of this study consists of 124 Swedish companies listed on the Swedish stock exchange on the 31st of December 2015. The research period is the years 2013-2015 and a random sample is collected according to the process explained in appendix 1. By using a multi-period instead of data from only one year, the reliability of the results increases and it allows for better control over changes in diversity (Erhardt et al., 2003). The reason for only including listed companies in this research is because these are the only companies required to report on gender compositions of boards, in line with the Swedish Corporate Governance Code (2016). Therefore, the same precision in the data collection would not be possible in non-listed companies. Only companies with a statutory domicile in Sweden are included in the study, since there are large differences in gender diversity between countries and the test results would not be fair if boards in other countries would be included. Also, listed investment funds are excluded because of the difference in management of those companies compared to non-financial companies.

A complete set of data for each company during the years of 2013-2015 is available for 94 companies. The complete set of companies selected for the final sample is presented in appendix 2. Table 2 shows the distribution of males and females in the sample. Of the 94 companies in the sample, 21 companies have no female director in the board during the three years examined, and 73 companies have at least one female member in the board during at least one of the three years examined. Most companies with female directors only have one to three females on their boards. For example, in 2013, 11 of the 73 companies had zero female board members, 27 had one female board member, 17 had two female board members, 12 had three female board members, and six of the companies had four or more female board members. The average percentage of female directors on boards for the complete sample of 94 companies over the three years examined is 20,05 %, while the average percentage of female directors for the 73 companies including females is 25,82 %.
Table 2 - Distribution of final sample

<table>
<thead>
<tr>
<th>Distribution of final sample</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>1400</td>
</tr>
<tr>
<td>Females</td>
<td>392</td>
</tr>
<tr>
<td><strong>Total number of board members</strong></td>
<td>1792</td>
</tr>
<tr>
<td>Companies with female directors</td>
<td>73</td>
</tr>
<tr>
<td>Companies without female directors</td>
<td>21</td>
</tr>
<tr>
<td><strong>Total number of companies</strong></td>
<td>94</td>
</tr>
<tr>
<td>Average % of females for entire sample</td>
<td>20.05%</td>
</tr>
<tr>
<td>Average % of females for companies with female directors</td>
<td>25.82%</td>
</tr>
<tr>
<td>Average % of females for companies without female directors</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

3.2 Measures

The design of this study is based on the research conducted by Lückerath-Rovers (2013). Below, four different approaches are presented, which are used to test the hypothesis: companies that include females on the boards perform better financially than companies that do not include females on the boards. The performance measures examined for all the companies in the sample are ROE, profit margin, return on capital employed (ROCE), EBIT margin, and earnings per share (EPS). Furthermore, in order to control for other variables that might interact with the probability of female directors being appointed, control variables, such as the board size and firm size (natural logarithm of total assets) is analysed.

Descriptive statistics is conducted showing the means and medians for the financial ratios and control variables of; the total final sample (94 companies), the companies with females on boards (73 companies), and the companies without females on boards (21 companies). The descriptive statistics is used as a foundation for approach 1 and 2.

3.3 Approaches

In this study, four approaches are used to fulfil the purpose of this research. In approach 1 the financial ratios of the companies with females on boards are compared to the financial ratios of the entire sample. A percentage difference is calculated to provide the difference in means and medians of the different performance measures. This is not a comparison
between two different groups, since the companies with females on boards are part of the total sample. Therefore, a t-test is not applicable for this measure.

In approach 2, a comparison is conducted between the two groups in the sample; companies with females on the board (73 companies) and companies without females on the board (21 companies). A percentage difference is calculated to provide the difference in sample means and medians of the two groups. Since the percentage difference of the sample means cannot provide a fair picture of the difference in population means (\( \mu \)), a t-test, with a 95% confidence interval, is conducted.

In approach 3, a correlation matrix is conducted, in order to investigate whether or not there is correlation between a gender diverse board and the financial ratios, which was proved to be significant in the t-test conducted in approach 2.

In approach 4, a regression analysis is conducted if correlation is found at a significant level, between one or more of the financial ratios and gender diversity on boards.

### 3.4 Data collection

The financial data used for comparison of ROE, profit margin, ROCE, EBIT margin, EPS and total assets (natural logarithm) of all companies in the sample is collected from Amadeus database. Data regarding the percentage of female directors on boards and board size are hand collected from the corporate governance reports of each company in the sample.

### 3.5 Comparison of financial ratios

Bearing in mind that financial ratios do not follow a normal distribution, and means are affected by extreme values, the study will apply a means test using the t-distribution. Also, a comparison of medians is conducted. This gives the comparison a more fair result, since the comparison in medians do not allow the comparison to be influenced by extreme values.
4 Empirical findings & Analysis

4.1 Approach 1 – Comparison to average

Table 3 - Approach 1: Difference in means and medians

<table>
<thead>
<tr>
<th>Variables</th>
<th>All companies</th>
<th>Companies with female directors</th>
<th>Difference mean</th>
<th>Difference median</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>Median</td>
<td>n</td>
</tr>
<tr>
<td>Female directors (%)</td>
<td>94</td>
<td>0.2005</td>
<td>0.2000</td>
<td>73</td>
</tr>
<tr>
<td>ROE</td>
<td>94</td>
<td>0.0345</td>
<td>0.1118</td>
<td>73</td>
</tr>
<tr>
<td>Profit margin</td>
<td>94</td>
<td>0.0582</td>
<td>0.0458</td>
<td>73</td>
</tr>
<tr>
<td>ROCE</td>
<td>94</td>
<td>0.0567</td>
<td>0.0911</td>
<td>73</td>
</tr>
<tr>
<td>EBIT Margin</td>
<td>94</td>
<td>0.0698</td>
<td>0.0520</td>
<td>73</td>
</tr>
<tr>
<td>EPS</td>
<td>94</td>
<td>0.2284</td>
<td>0.0977</td>
<td>73</td>
</tr>
<tr>
<td>Total assets (ln)</td>
<td>94</td>
<td>11,1003</td>
<td>10,8833</td>
<td>73</td>
</tr>
<tr>
<td>Board size</td>
<td>94</td>
<td>6,3546</td>
<td>6,0000</td>
<td>73</td>
</tr>
</tbody>
</table>

n = companies
ln= natural logarithm

Table 3 demonstrates the means and medians for the financial ratios and control variables of all companies included in the sample, as well as for the companies that include female directors. Also, the percentage difference in means and medians for the financial ratios is shown in this table. During the period of 2013-2015, 73 companies of the total sample of 94 companies included at least one female director sometime during this period. The table also specifies that on the average, 20.05 % of all board members were females during this time period.

One can see that, for this sample, the means and the medians of all financial ratios is larger for the companies that include females than the means and medians of all companies included in the sample. The largest difference in mean and median is for EPS, where the mean for companies including females is 27.50 % and the median is 84.46 % larger than for the mean and median of all companies. The smallest difference in mean is for profit margin, which is 19.88 % larger for companies including females, and the smallest difference in median is for ROCE, which is 13.62 % larger for companies that include females than for the median of all companies.
4.3 Approach 2 – Comparison between the two groups

Table 4 - Approach 2: Difference in means and medians

<table>
<thead>
<tr>
<th>Variables</th>
<th>Companies without female directors</th>
<th>Companies with female directors</th>
<th>Difference (t value)</th>
<th>Difference median</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>Median</td>
<td>n</td>
</tr>
<tr>
<td>Female directors (%)</td>
<td>21</td>
<td>0,0000</td>
<td>0,0000</td>
<td>73</td>
</tr>
<tr>
<td>ROE</td>
<td>21</td>
<td>0,0002</td>
<td>0,0482</td>
<td>73</td>
</tr>
<tr>
<td>Profit margin</td>
<td>21</td>
<td>0,0180</td>
<td>0,0211</td>
<td>73</td>
</tr>
<tr>
<td>ROCE</td>
<td>21</td>
<td>0,0131</td>
<td>0,0388</td>
<td>73</td>
</tr>
<tr>
<td>EBIT Margin</td>
<td>21</td>
<td>0,0105</td>
<td>-0,0068</td>
<td>73</td>
</tr>
<tr>
<td>EPS</td>
<td>21</td>
<td>0,0105</td>
<td>-0,0028</td>
<td>73</td>
</tr>
<tr>
<td>Total assets (ln)</td>
<td>21</td>
<td>9,5402</td>
<td>9,2646</td>
<td>73</td>
</tr>
<tr>
<td>Board size</td>
<td>21</td>
<td>5,0317</td>
<td>5,0000</td>
<td>73</td>
</tr>
</tbody>
</table>

n = number of companies
N/A = Not applicable

Table 4 shows the difference in means and medians between the two groups of this sample; companies with females on the board, and companies without females on the board. Also, the table shows the t-value derived from the conducted t test (see appendix 3).

The t-test shows if the population means of the two groups compared are equal or significantly different from each other. For the mean values that are significantly different between the groups, a further analysis of this financial ratio is conducted. However, for the mean values that are considered as equal between the groups, no further analysis of this ratio is conducted. Since this study investigates if companies that include female board members perform better than companies that do not, it is not interesting to analyse the ratios that has equal means, since no group performs better or worse according to the t-test. The critical value to compare with the t-value is +/- 1,960 (see appendix 3). If the t-value is larger than +1,960 or smaller than -1,960, the difference between the two groups is considered significant.

The average board has 6 board members; 6 for companies which included females and 5 for companies with only male board members. The difference in board size is significant (t = -6,9) and firm size is significantly larger for companies with female directors (t = -9,3).
4.3.1 Difference in means of financial ratios

The descriptive statistics demonstrates that companies, which include females in their board score, on average, better than companies excluding females regarding all the financial ratios examined for the companies in the sample (i.e. ROE, profit margin, ROCE, EBIT margin and EPS).

The largest difference in means is for ROE, where companies including females have an average of 4.43 %, while the average for companies excluding females have a ROE of 0.02 %, which is a difference of 24 301,98 %. However, the difference is not significant ($t = -0.634$), and cannot be considered applicable to the total population. The difference in profit margin is also large in the descriptive statistics, with an average of 6.97 % for companies including females and 1.8 % for companies excluding females, which gives a difference in means of 288,13 %. However, the difference in means for profit margin cannot be considered significant ($t = -1.492$). Furthermore, the average in means for ROCE is 429.83 % higher for companies including females than for companies excluding females, but cannot be considered significant either ($t = -1.132$).

However, the difference in means for EBIT margin and EPS between the two groups of companies, are respectively 731,63 % ($t = -2.167$) and 2686,51 % ($t = -2.552$) higher for the companies that include females in their boards, and the differences in EBIT margin and EPS are significant.

4.3.2 Difference in medians of financial ratios

As mentioned previously, the median values between the two groups are compared since the mean values can include extreme values. Since it is not possible to conduct a t-test for the median values, like it is for the mean values, only the percentage difference in medians are analysed. According to the calculations in table 4, the largest percentage difference of medians of these two groups belongs to the profit margin (174,65 %). Since EBIT margin and EPS for companies without female directors is negative, it is not possible to calculate the accurate percentage difference of EBIT margin and EPS between the two groups (see table 4), therefore a diagram is included in order to provide information about these two ratios (see figure 3). When analysing the diagram in figure 3, all financial ratio medians are higher for the companies including females than companies excluding females, but the EPS tend to have the largest percentage difference in median between the two groups.
4.4 Outcome from approach 1 & 2

According to the t-test (see appendix 3 and section 4.3.1), the financial ratios with a significant difference in population mean (µ) from the t-test are the EBIT Margin and EPS. The difference between the two groups in the sample means for ROE, Profit margin and ROCE cannot be found in the entire population, and a further investigation of these financial ratios is therefore not possible. Also, EPS has the largest percental difference in both mean and median when comparing companies with female directors to the average, in approach 1. Therefore, EPS and EBIT Margin are investigated further in the correlation matrix presented in the next section of this study.
4.5 Approach 3 – Correlation analysis

Significant difference in population means is found for EBIT margin and EPS, therefore are these financial ratios tested for correlation in Table 5.

Table 5 - Approach 3: Correlation Matrix

<table>
<thead>
<tr>
<th></th>
<th>ROE</th>
<th>ROCE</th>
<th>EPS</th>
<th>Assets logarithm</th>
<th>Board Size</th>
<th>Females (%)</th>
<th>Significance</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROE</td>
<td>1.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>1.000</td>
<td>0.000</td>
</tr>
<tr>
<td>ROCE</td>
<td></td>
<td>0.807</td>
<td>0.895</td>
<td>0.534</td>
<td>0.316</td>
<td>0.191</td>
<td>0.211</td>
<td>0.057</td>
</tr>
<tr>
<td>EPS</td>
<td>0.000</td>
<td>0.423</td>
<td>0.245</td>
<td>0.298</td>
<td>0.534</td>
<td>0.121</td>
<td>0.341</td>
<td>0.302</td>
</tr>
<tr>
<td>Assets</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*: Correlation is significant at the 0.01 level (2-tailed).
*: Correlation is significant at the 0.05 level (2-tailed).

Table 5 highlights the significant correlation between various financial ratios and board diversity metrics, indicating that there is a strong relationship between these variables.
Total assets (logarithm) and board size are only used as control variables and table 6 is used to interpret the correlation matrix in table 5. Both control variables have significant correlation to board diversity at a 99 % confidence level (P=0). The correlation matrix (table 5) shows that there is weak to moderate positive correlation between total assets (logarithm) and the presence of female directors (0,420). This indicates that the firm size is related to the presence of female directors on boards. The larger the firm, the more likely it is that the firm has female directors on the board. Table 5 also shows that there is a weak but positive correlation between board size and the presence of female directors on boards (0,319). This indicates that there is some relation between the board size and the presence of female directors on boards. The larger the board, the more likely it is that females are represented on the board.

Regarding the analysis of the correlation between gender diversity and the financial ratios EBIT Margin and EPS, the following is found. Table 5 shows that EBIT Margin is correlated to board diversity at a 95 % confidence level (P = 0,031). However, the correlation strength only adds up to 0,128, which is a weak but positive correlation. In order to have a strong linear relation, the correlation should add up to at least 0,7, but in this case, EBIT Margin is
not even close to this number. EPS does not have a significant correlation to board diversity \((P = 0.169)\), and EPS and company performance can therefore not be considered correlated to each other. Emphasized should be that no negative correlation is found between gender diversity and EBIT margin or EPS.

Since the correlation matrix resulted in a significant weak positive correlation for the ratio EBIT margin, a regression analysis was conducted, but with no results to show. Therefore, the empirical study ends here, since the stated hypothesis, \(H_1\), companies that include females on the boards perform better financially than companies that do not include females on boards, is rejected.

4.6 Analysis

Most of the previous research in the field of study shows a positive link between female board members and company performance. The outcome of this study is not in line with the result from these studies. However, in order to draw any conclusions from this study some analysis regarding the theories and findings from previous research is presented below.

The stakeholder theory suggests that the value of the company depends on how well the company fulfils the contract with its stakeholders. Since no negative link is found between female directors and company performance in this study, it can be assumed that the stakeholders are not against the presence of females on boards. This is also in line with Gordini and Rancati (2017), who concluded that the presence of females on boards could not destroy shareholder value. Furthermore, the resource dependency theory suggests that companies can benefit from recruiting females, and in line with this theory, Hillman et al. (2007) suggests that the benefits depend on that the companies with female board members tend to link better with their stakeholders. From the perspective of the stakeholder theory, presented by Harjoto et al. (2015), a gender diverse board is more aware of the needs of the stakeholders and through this increases company performance. The result from this study cannot confirm these assertions, since the hypothesis is rejected. One possible reason for this study to show no correlation between board gender diversity and company performance could be the increased agency costs, explained by Rose (2007), for conflicts and for increased lead times to make decisions in diverse boards where different perspectives collide. So even if the gender diverse board contributes to better company performance because of the better
linking to the stakeholders, the diversity within the board causes agency costs because of the increased conflicts within the board. This argumentation is also in line with Dwyer et al. (2003), which claim that the increased performance will be neutralised by the cost from lack of coordination within the board.

Joecks et al. (2013) is somewhat critical to previous studies, which show a negative or no relationship between gender diversity and company performance. The reason for criticism is the overall low or high female representation in the sample. From this perspective, this study may also be criticized for the sample including too few companies excluding females or for the overall low representation of females in the sample. However, the number of females represented on company boards in Sweden is on average low. This study shows that the companies that include females, in most cases only have one to three females on their board, and it can therefore be questioned if these females can make an impact on the company performance. This argumentation is in line with former findings presented by Gordini & Rancati (2017), which shows that the presence of one woman alone could not have any impact on the financial performance of a company. Furthermore, the argumentation is also in line with the study conducted by Joecks et al. (2013), which states that a positive link between gender diverse boards and company performance can only be found when females are represented by 30% or more of the members of the board.

When it comes to the former studies, which have presented a negative link between gender diversity in boards and company performance, the Tobin’s Q is used for performance analysis (Ahern & Dittmar, 2012; Böhren & Ström, 2010). Tobin’s Q is a stock based performance measure, while the performance measures used in this study is purely accounting based, which makes it difficult to compare this study to the studies based on Tobin’s Q. The studies that showed a pure negative correlation are both conducted in Norway after the introduction on legislative quotas, and Ahern & Dittmar (2012) indicates that the decrease in Tobin’s Q could be because of the introduction of quotas. This is an example of the difficulty to prove causality in these types of studies, it cannot be excluded that Tobin’s Q decreased because of the introduction of quotas and not because the boards became more gender diverse. The same difficulty is found in this study, it cannot be ruled out that company performance is affected by other factors than the presence of females on the boards. For example, the board composition can depend on the specific characteristics
of the company, e.g. companies with more female employees will probably have more females of all levels of the company (Lückerath-Rovers, 2013).
5 Conclusion & Discussion

This study shows that gender diversity in company boards has a significant correlation to the EBIT margins in the companies, which means that the gender diversity in boards may affect the economic performance of the companies. The correlation strength is positive; however, it is very weak and it would not be fair to accept the hypothesis that companies that includes females in their board perform better than companies that do not. Also, the regression analysis did not show any regression between the two variables EBIT margin and gender diversity. Furthermore, all the other financial performance measures examined in this study did not show significant positive correlation to gender diversity within the board. Therefore, the hypothesis is rejected. The pure outcome from this research is that none of the categories of boards (including/excluding females) underperforms, and there is no need to change the gender composition of Swedish boards from this perspective. However, from an ethical perspective, there could be other reasons for including more females to company boards to balance the gender composition, which is uneven in Swedish listed companies.

While this study cannot show a strong positive correlation between the presence of females on boards and the financial performance of companies, it should be emphasized that the study shows that there is no negative correlation. This result is in line with the study by Gordini and Rancati (2017), which concluded that the presence of females on boards does not destroy shareholder value. Also, according to the same study, it was concluded that one female alone will not have any impact on the financial performance. Since the result from this study shows that most of the companies included in the study had one to three females included in the boards, and with no positive correlation to company performance to show, one can question the impact of these females on the company performance.

Previous research about gender diversity and its relation to financial performance have had somewhat different outcomes. One explanation for the different outcomes could be that different financial ratios have been examined in the previous studies. Financial performance can be measured in several ways, for example, Torchia et al. (2011) believes that financial performance can be measured by innovation level, while other researchers base their studies on pure financial ratios. Another explanation to the mixed results could be that different methods have been used to perform the studies. Also, it can be difficult to make comparison between these studies since they are conducted in different countries, where some have
legislative quotas and others, like Sweden, have self-regulation for the composition of company boards.

Many studies assume that a gender-diversified board makes better decisions because of the several perspectives represented within the board, which can improve company performance. Also, some claim that an independent board can reduce agency costs and thereby improve company performance. One problem with drawing such conclusions from single factor research is the difficulty to prove causality. Causality is difficult to prove in this study as well, since the economic performance may depend on several factors, which are not part of this study.

As for future research, the correlation between gender diversity in company boards and the economic performance of the companies could be studied with regard to the percentage of females on boards. In other words, if the performance of the companies increases or decreases with respect to the share of females on boards. Also, the critical mass theory could be investigated with regards to the boards of Swedish listed companies.
Reference list


Appendices

Appendix 1 – Collection of random sample

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Companies collected from Amadeus</strong>*</td>
<td>388</td>
</tr>
<tr>
<td><strong>Random sample</strong></td>
<td>124</td>
</tr>
<tr>
<td><strong>Final sample</strong></td>
<td>94</td>
</tr>
</tbody>
</table>

* The companies collected from Amadeus were listed on the Swedish stock exchange on the 31st of December 2015.

**The random sampling function in Excel is used in the following steps;

Step 1. All 388 listed observed companies collected from Amadeus database are given a random number between one and zero.

Step 2. The random numbers are sorted from the smallest to the largest value.

Step 3. The 124 companies with the smallest values are collected to be part of the sample.

***Companies selected from Amadeus with incomplete data are excluded, resulting in a final sample of 94 companies.
Appendix 2 - Companies included in final research sample

1. AAK AB (PUBL)
2. ACANDO AB
3. ADDNODE GROUP AKTIEBOLAG (PUBL)
4. ADDVISE GROUP AB (PUBL)
5. AKTIEBOLAG FAGERHULT
6. ALFA LAVAL AB
7. ALLGON AB (PUBL)
8. ALLTELE ALLMÄNNA SVENSKA TELEFONAKTIEBOLAGET (PUBL)
9. ANOTO GROUP AB
10. ATRIUM LJUNGBERG AB
11. AVEGA GROUP AB
12. AVENSIA AB
13. AVTECH SWEDEN AB (PUBL)
14. BE GROUP AB (PUBL)
15. BERGS TIMBER AB (PUBL)
16. BETSSON AB
17. BJÖRN BORG AB
18. BOLIDEN AB
19. BOULE DIAGNOSTICS AB
20. BREDBAND2 I SKANDINAVIEN AB
21. CAPERIO HOLDING AB
22. CATELLA AB
23. CELLAVISION AB
24. CONCORDIA MARITIME AKTIEBOLAG
25. CONFIDENCE INTERNATIONAL AKTIEBOLAG
26. CONSILIUM AKTIEBOLAG
27. DEDICARE AB (PUBL)
28. DISTIT AB
29. DIÖS FASTIGHETER AB
30. DORO AB
31. DUROC AKTIEBOLAG
32. ELECTRA GRUPPEN AB (PUBL)
33. ENDOMINES AB (PUBL)
34. ENIRO AB
35. EOLUS VIND AKTIEBOLAG (PUBL).
36. FASTIGHETS AB BALDER
37. FEELGOOD SVENSKA AKTIEBOLAG (PUBL)
38. FIREFLY AB
39. FORMPIPE SOFTWARE AB
40. GENERIC SWEDEN AB (PUBL)
41. GHP SPECIALTY CARE AB (PUBL)
42. GÖTENEHUS GROUP AB
43. H & M HENNES & MAURITZ AB
44. HIFAB GROUP AB
45. HIQ INTERNATIONAL AB
46. INTRUM JUSTITIA AB
47. INVESTOR AKTIEBOLAG
48. KAPPAHL AB (PUBL)
49. KENTIMA HOLDING AB (PUBL)
50. MACKMYRA SVENSK WHISKY AB
51. MAVSHACK AB (PUBL)
52. MICRO SYSTEMATION AB (PUBL)
53. MIDSONA AB
54. MINDMANCER AB (PUBL)
55. MISSEN ENERGY AB (PUBL)
56. MODERN TIMES GROUP MTG AB
57. MULTIQ INTERNATIONAL AB
58. NET INSIGHT AB
59. NETJOBS GROUP AB
60. NORDIC FLANGES GROUP AB (PUBL)
61. NORDIC LEISURE AB
62. NOTE AB (PUBL)
63. NOVOTEK AKTIEBOLAG
64. ODD MOLLY INTERNATIONAL AB
65. ONIVA ONLINE GROUP EUROPE AB
66. OPUS GROUP AB (PUBL)
67. ORTIVUS AKTIEBOLAG
68. PALLAS GROUP AB
69. PEBAB AB
70. PRECIO FISHBONE AB
71. PRECOMP SOLUTIONS AKTIEBOLAG (PUBL)
72. RAYSEARCH LABORATORIES AB (PUBL)
73. REJLERS AB (PUBL)
74. RNB RETAIL AND BRANDS AB (PUBL)
75. SCANDBOOK HOLDING AB
76. SINTERCAST AKTIEBOLAG
77. SJR IN SCANDINAVIA AB
78. SKÅNSKA ENERGI AKTIEBOLAG
79. SOFTRONIC AKTIEBOLAG
80. STOCKWIK FÖRVALTNING AB
81. SWEDOL AB (PUBL)
82. SVOLDER AKTIEBOLAG
83. TETHYS OIL AB
84. TRADEDOUBLER AKTIEBOLAG
85. TRENTION AKTIEBOLAG
86. UNIFLEX AB
87. VBG GROUP AB (PUBL)
88. VENUE RETAIL GROUP AKTIEBOLAG
89. WEST INTERNATIONAL AKTIEBOLAG (PUBL)
90. VICTORIA PARK AB
91. VIKING SUPPLY SHIPS AB
92. VITROLIFE AB
93. XVIVO PERFUSION AKTIEBOLAG
94. ZETADISPLAY AB
Appendix 3 – T-test

1. Hypotheses statement

The stated hypotheses for the different financial ratios are the following:

H_A: The population mean of ROE for companies without female directors on the board is equal to the population mean of ROE for companies with female directors on the board
H_B: The population mean of Profit Margin for companies without female directors on the board is equal to the population mean of Profit Margin for companies with female directors on the board
H_C: The population mean of ROCE for companies without female directors on the board is equal to the population mean of ROCE for companies with female directors on the board
H_D: The population mean of EBIT Margin for companies without female directors on the board is equal to the population mean of EBIT Margin for companies with female directors on the board
H_E: The population mean of EPS for companies without female directors on the board is equal to the population mean of EPS for companies with female directors on the board

For control purposes, the following hypotheses are also tested:

H_F: The population mean of Total assets (natural logarithm) for companies without female directors on the board is equal to the population mean of Total assets (natural logarithm) for companies with female directors on the board
H_G: The population mean of Board size for companies without female directors on the board is equal to the population mean of Board size for companies with female directors on the board

2. Determination of critical value

With a 95 % confidence interval, a = 0,05
For a two-tailed test a = 0,05/2 \( \rightarrow a = 0,025 \)
Degrees of freedom > 100
Critical value according to the T-distribution table = +/- 1,960
## T-distribution table

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4. Results

\[ H_1: -0.634 \ > \ -1.960 \ \rightarrow \ \text{Accept hypothesis} \]
\[ H_2: -1.492 \ > \ -1.960 \ \rightarrow \ \text{Accept hypothesis} \]
\[ H_3: -1.132 \ > \ -1.960 \ \rightarrow \ \text{Accept hypothesis} \]
\[ H_4: -2.167 \ < \ -1.960 \ \rightarrow \ \text{Reject hypothesis} \]
\[ H_5: -2.552 \ < \ -1.960 \ \rightarrow \ \text{Reject hypothesis} \]

Control variables
\[ H_6: -9.346 \ < \ -1.960 \ \rightarrow \ \text{Reject hypothesis} \]
\[ H_7: -6.867 \ < \ -1.960 \ \rightarrow \ \text{Reject hypothesis} \]