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HANDELSHÖGSKOLAN

How Does Gender Diversity on Corporate Boards Affect the Firm Financial Performance?

An Empirical Investigation of Swedish OMX-listed Firms

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Authors: Marcus Alm and Jonathan Winberg

Supervisor: Moursli Mohamed-Reda

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Marcus Alm and Jonathan Winberg

Abstract

The aim of this thesis is to determine whether gender diversity in corporate boards has an impact on firm financial performance of Swedish OMX-listed firms. The study is conducted in Sweden, as there is frequent political pressure of a board gender quota, but no major research to base the discussion on. Previous research finds both positive and negative relationship between firm financial performance and the female gender variable; depending on market studied, time period and political climate. A common finding is that gender diversity has no impact on financial performance. Our study is based on panel data for 255 companies over a period of six years. We find that there is not a statistically significant relationship between neither ROA nor Tobin's Q and the female gender variable; which indicates that no clear link can be seen in the gender diversity-performance relationship.

Keywords: Board Diversity, Corporate Governance, Financial Performance, Board Composition, Gender Diversity

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1. Introduction

Improvements in corporate governance is a widely discussed topic around the world as demographics is evolving to become more diverse, the foundation of this contemporary discussion is due to that this trend has been not been followed; neither in management nor in boardrooms for the larger corporations (Carter et al., 2010). Due to the lacking progress, sixteen countries in different parts of the world now require quotas to increase the number of women in the boardroom and many have voluntary quotas in their corporate governance codes (Rhode and Packel, 2015). Norway is among the frontrunners, already in 2003 having passed a law where at least 40 % of the boards is to be composed of women by 2008 (Børen and Strøm, 2010). Even though no legislation is yet in place in Sweden, the issue of women on boards has gotten an increasing amount of attention; with plenty of political pressure for companies to improve the situation or follow in Norway´s footsteps with legal actions (Lindén, 2014). High profile politicians, like former Swedish Minister of Finance, Anders Borg, declares that the board composition in Sweden, currently consisting of 24 % women is unacceptable. Borg continues with; unless the fraction of women on corporate boards increase, Sweden is going towards a legal quota (Andersson, 2013). The situation with legal actions occurs as the leaders of the listed cooperation's are not always equally convinced of a positive diversity-performance relationship. As an example, Herman Bulls, former CEO of Real Estate Advisory Group and a director for Comfort Systems USA, states that: "When I'm sitting in that boardroom, my fiduciary responsibility is to the shareholders of that company – not social engineering. I can talk about diversity. But there ought to be a business case" (Dvorak, 2008). Even though decision makers and corporate leaders are not always convinced, the general opinion in this debate and even an argument for legislations is often that a gender diverse board is financially beneficial to a homogenous one (Egan, 2013).

Some of the most common arguments for gender diversity on the boardrooms are that women are equally skilled as men but are not given the opportunity. Another argument is that boards can enhance their effectiveness since women has unique skillsets and different thinking compared to men (Adams and Ferreira, 2009). There is also research supporting these arguments; for example Reguera-Alvarado et al. (2015) argues a positive relationship between gender diversity on corporate boards and firm financial performance, as women are more risk averse than men in addition to proposing less aggressive and more sustainable investment strategies. However, further research presented by Carter et al. (2010) states that gender

diversity on corporate boards result in diverse opinions and critical thinking that makes decision-making more time-consuming and less effective. Therefore, even though women might have unique skillsets and offer different perspectives that argue financially beneficial, it is not widely accepted in the specialized academic literature that the impact gender diversity has on financial performance has to be positive. Prior studies associate gender diversity with negative financial results, (Bøhren and Strøm, 2010), while some find positive results, (Reguera-Alvarado et al., 2015) and some researchers even find that there is no link between the two variables (Carter et al., 2010).

Based on the framework on previous studies, in this paper we are doing the first research on Sweden where there is yet to be a publication on gender diversity on financial performance. We are answering the question: does gender diversity on the corporate boards affect the financial performance of Swedish OMX-listed firms? We are also investigating the impact of female leadership and the result it has on firm financial performance. Finally, we are exploring the fraction of ownership that females have compared to males and what influences that has on the firm financial performance. We are by answering these questions providing a foundation in the discussion in Sweden concerning board gender quotas. In order to do so, we use both ordinary least square (OLS) regressions and two stage least square (2SLS) regressions with panel data from 255 companies during a period of six years, both with robust standard errors to correct the problem of heteroscedasticity. We especially analyze and address the concern of endogeneity that occurs due to firm characteristic omitted variables, unobserved variables and the issue of reverse causality due to the potential incentives to join firms with a positive financial performance. The issues were resolved primarily using time- and firm fixed effects, lagged variables and Instrumental Variables (IV). Overall, our result shows that gender diversity on corporate boards on Swedish OMX-listed firms has no effect on neither of our two measurement variables of financial performance, ROA and Tobin's Q.

The structure of the paper is as follows: we examine the existing theories in the diversity-performance relationship and present the existing empirical literature in section 2. In section 3 we present our hypothesis. Section 4 is the data analysis; starting with the situation of females on corporate boards followed by descriptive statistics of all data collected. In section 5 we present the methodology where we explain how we conduct the research, how we gather the data and a variable explanation. Section 6 is a presentation of our regression results and section 7 concludes the thesis. In the end we include an appendix section.

2. Literature Review

2.1 Theoretical Part

According to Carter et al. (2010), a corporate board of directors is commonly assumed to have four areas of responsibilities: (i) monitoring and controlling managers; (ii) providing information and council to managers; (iii) monitoring compliance with applicable laws and regulations; as well as (iv) linking the corporation to the external environment (Carter et al., 2010). The authors highlight composition of the board affects how these functions are performed, and thus partially determines financial performance (Carter et al., 2010). To comprehend the concept of the diversity-performance relationship, several theories have been explored. In their influential work on the topic Terjesen et al. (2008), Carter et al. (2010) and Mateos de Cabo et al. (2011) all argue that no single theory can fully explain the relationship between board diversity and firm financial performance. Hence, they have all used the four sub-theories: (i) resource dependence theory; (ii) human capital theory; (iii) agency theory; and (iv) social psychological theory when explaining the complexity of this topic.

2.1.1 Resource Dependence Theory

Resource dependence theory discusses how external resources of the organization (Terjesen et al., 2008) affect organizational behavior. Since corporate boards function as a link between the company and external organizations, resource dependence theory plays an important role when researching the relationship between the diversity of corporate boards and firm financial performance (Hillman et al., 2002). Subsequently, as ethnic and gender diversity provides a broader information set available for management in the decision making process; board diversity can play an important part in the company's financial performance (Carter et al., 2010). Based on this, Carter et al. (2010) argue that the basis for some of the most convincing theoretical arguments for a business case of board diversity can be found in resource dependence theory.

2.1.2 Human Capital Theory

Human capital theory complements some of the concepts derived from resource dependence theory as it discusses how the education, experience and skills of the human capital can benefit the organizations (Carter et al., 2010). Based on this, Cartel et al. (2010) argue that

human capital theory is a key determinant in regards to the financial performance of companies. As differences in gender also result in difference in the human capital, this theory is highly relevant when discussing the diversity-performance relationship (Terjesen et al., 2008). Human capital theory predicts that the performance of a corporate board will be affected by board diversity in a number of ways but the direction of this effect can be both positive and negative (Carter et al., 2010).

2.1.3 Agency Theory

A board's role to monitor and control managers is a fundamental concept of agency theory (Carter et al., 2003). Agency theory suggests that a diverse board frequently increases board independence, which in turn increases the board's ability to monitor the management. However, even though more efficient monitoring of management might have a positive impact on firm financial performance, on the contrary to resource dependence theory and human capital theory, agency theory provides no clear link between board diversity and firm financial performance (Carter et al., 2010).

2.1.4 Social Psychological Theory

Social psychological theory discusses group dynamics inside boardrooms, and predicts that individuals who have a majority position have the potential to exert a disproportionate amount of influence on group decisions (Mateos de Cabo et al., 2011). Therefore, according to the social psychological theory, the minorities of a diverse set of board members may not influence the decisions board (Carter et al., 2010). On the contrary, social psychological theory also suggests that board diversity can have a positive impact on group dynamics by encouraging different thinking. In turn, different ideas can have a positive impact on the decision-making process and as a result a positive impact on an organization's financial performance (Westphal and Milton, 2000). However, Campbell and Minguez (2008) suggest that a more gender diverse board can result in different, and thus critical thinking, which may result in a decision making process that is both more time-consuming and less effective. Opposing theories and results on social psychological theory suggest that board gender diversity can have both positive and negative impact on financial performance (Carter et al., 2010).

2.2 Empirical Part

The existing empirical evidence on the relationship between board diversity and firm financial performance is inconclusive in the sense that very different results have been found. Results have shown both positive, negative or no effect of diversity on financial performance. Moreover, previous research has also shown that the diversity of the board has other implications than its impact on financial performance, such as board director behavior and risk taking.

Adams and Ferreira (2009) studied the relationship between corporate board diversity and firm financial performance in the US. They found both positive and negative relationships between board gender diversity and financial performance. The positive impact a gender diverse board had on firm financial performance was in companies with weak governance; measured in takeover defenses while they had negative impact on companies with stronger governance; also measured in takeover defenses. Thus, they concluded that there is no reason to support gender quota legislation. This somewhat contradicts prior research for the US by Carter et al. (2010), who find that neither ethnicity nor gender had an impact on financial performance. Carter et al. (2010) do however agree with Adams and Ferreira (2009) that there is no reason to support gender quotas. Francoeur et al. (2008) study the diversity-performance relationship while considering risk; they also found that the impact board diversity had on financial firm performance showed different results depending on the companies' situation. They find that females had a positive impact on companies operating under difficult circumstances with a larger risk of failure. However, they also find that companies with a high proportion of females in the boardrooms usually did not create excess return, but managed to keep pace with the stock market index. They concluded that women might have a positive impact on financial firm performance as they argue that women might be given circumstances that are more difficult to start with.

A study on the relationship between corporate board diversity and firm financial performance is conducted in by Fan (2012) in Hong Kong who researched companies listed on the Hong Kong stock exchange. She researched both gender and nationality of the boards and found some support for a diverse board to likely have a better both firm performance and firm independence. However, the findings varied depending on the different proxy measurements of board diversity. Reguera-Alvarado et al. (2015) when researching companies on the

Madrid stock exchange find that women increased the financial performance of the firms due to new ideas, views and skills. They also argued that women on boards provided social visibility and attraction of human talent. An important aspect of the findings by Reguera-Alvarado et al. (2015) is that it, on the contrary to the previously mentioned research, is a follow up on the already implemented law of 40 % females in the boardrooms, and thus a larger proportion of females in the sample.

A more relevant study to the situation in Sweden is the Norwegian study led by Bøhren and Strøm (2010). However, on the contrary to Sweden they researched gender diversity´s impact on financial performance in a country with an already implemented law of boardroom gender quotas, Norway. They established a clear negative link in the diversity-performance relationship when measured by the firm value. Based on their findings they argue that politicians should encourage less gender diversity. They also discovered that employee directors have a negative impact on creating firm value. Rose (2007) has conducted further Scandinavian research on the subject in Denmark. This study is also of high importance as Denmark is in a similar situation to Sweden, where the gender quota is not yet a law but implemented in the code of corporate governance (Rose, 2007; Lindén, 2014). Contradictory to the previous Scandinavian research they found no relationship between board diversity and firm financial performance. Mateos de Cabo et al. (2011) who research
ed 612 European banks conduct one of the most comprehensive studies on the topic. They found no clear link in the diversity-performance relationship; they did however find patterns such as females tend to sit on the boards in low risk banks.

3. Hypothesis

Resource dependence theory and human capital theory both suggest that there can be a positive relationship between gender diversity on corporate boards and financial performance, but whether it is positive or not depends on a diverse set of circumstances. Agency theory and social psychological theory has no clear suggestion whether the diversity-performance relationship is positive or negative. Furthermore, the limited amount of empirical evidence does not provide clear support for the direction of the link being positive or negative. As we do not yet know the circumstances in Sweden and the fact that we want to test whether the

widely discussed gender quotas in the boardrooms has any substance in terms of financial performance, our main hypothesis states that:

Hypothesis 1: All else being equal, the number of women on corporate boards does not affect financial performance of Swedish OMX-listed firms.

The second hypothesis concerns board ownership, which is an extensively used variable when researching board gender diversity on firm financial performance. Carter et al. (2010) argues that board ownership result in a more involved board with better monitoring, which can be a positive variable. However, they also argue that high ownership might result in an entrenched board that does not support the interest of all stakeholders; thus takes a negative direction. Adams and Ferreira (2009) also argue that board ownership can influence financial performance both positively and negatively as too much monitoring can affect shareholder value; however, the direction of the link depends on the shareholder rights. Further, they argue that too much monitoring in a well-managed company can be counterproductive. Carter et al. (2010), Adams and Ferreira (2009) and Reguera-Alvarado et al. (2015) all argue that a gender diverse board increases monitoring, but finds no clear direction of the relationship on the impact that the monitoring might have on financial performance. Therefore, our second hypothesis regarding board ownership states that:

Hypothesis 2: All else being equal, female share ownership does not affect financial performance of Swedish OMX-listed firms.

The third hypothesis concerns female leadership, in the case of this thesis, measured with companies having either a female CEO or a female Chairman. The reason for including both positions is due to the relative small number of CEO´s and Chairmen that are female in this sample. In the previous research of board diversity on firm financial performance, the female leadership variable is seldom considered, even as a control variable. We are unsure of whether or not it is due to the low number of female leaders or simply not of interest. We believe however, since we on the contrary to certain existing published papers on board diversity are focusing only on gender; leadership would be an interesting variable to not only control for, but to take into full consideration. In addition, based on the limited prior literature taking the leadership variable into consideration, we hope to contribute to the research field by exploring

its significance. Francoeur et al. (2008) explore the effect women in top management has on financial performance and find no overall clear link, therefore our third hypothesis states:

Hypothesis 3: All else being equal, female leadership does not affect financial performance of Swedish OMX-listed firms.

4. Data Analysis

4.1 Data Collection

We collect data on firm financial performance from Thomson Reuter's DataStream. Director data is hand collected from Boards of Directors and Auditors in Sweden's Listed Companies, SIS Ägarservice. Ownership structure data is collected from Owners and Power in Sweden's Listed Companies, SIS Ägarservice. Data on ownership and compensation is collected from corporate governance reports (annual reports). Our data includes Swedish firms traded involving 255 firms from the Stockholm stock exchange Nasdaq OMX between years 2006 and 2011. Our sample consists of 10,315 director-firm-year observations.

4.2 Situation of Females on Corporate Boards

Figure 1 in Panel A shows the percentage of males and females on corporate boards. We can see that the majority of the board members are male with 79.89 %, and only 20.11 % of the board members are females. In 2013, Anders Borg stated that unless companies increased the fraction of females on corporate boards; eventually Sweden is going towards a quota (Andersson, 2013).
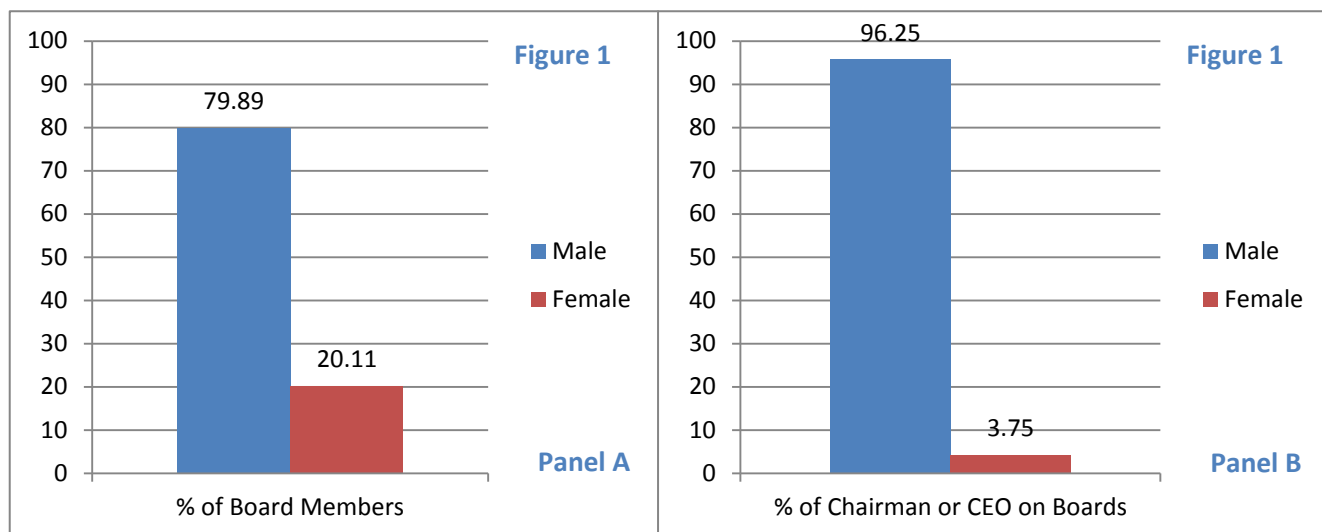
Figure 1 in Panel B shows the percentage of female CEOs and Chairmen in Swedish corporate boards. Panel B shows a much smaller fraction of females compared to Panel A. 96.25 % of the CEO's or Chairmen in the data set are males and consequently 3.75 % females.

Figure 2 demonstrates the difference in share ownership between the genders on corporate boards. Females own on average 5.67 % and consequently males own 94.33 % of the total amount of shares owned by board members. We can conclude that females have neither leadership roles nor the fraction of the share ownership that is representative for the 20.11 % of the directorships on corporate boards that they hold. A reason for this proportion might be that there is a vast majority of male CEO and Chairman, as shown in Panel B in Figure 1. We removed the employee directors from the sample, as they have very limited influence in the corporate boardrooms.

Figure 2 – Percentage Between the Genders of Share Ownership
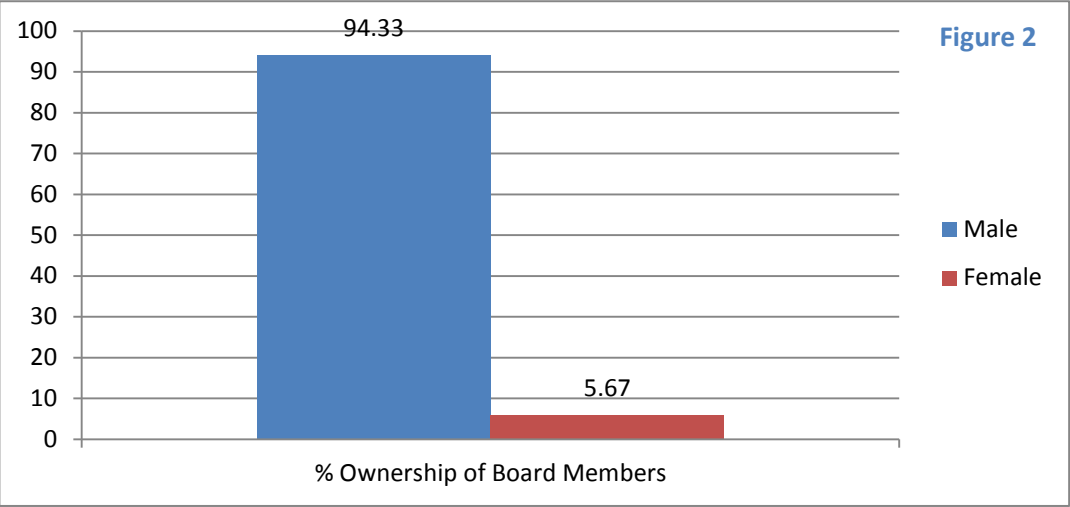
Figure 3 demonstrates the difference between the genders of independent directors on corporate boards. 69.80 % of the independent directors are male and consequently 30.20 % are female.

Figure 3 – Percentage Between the Genders of Independent Directors
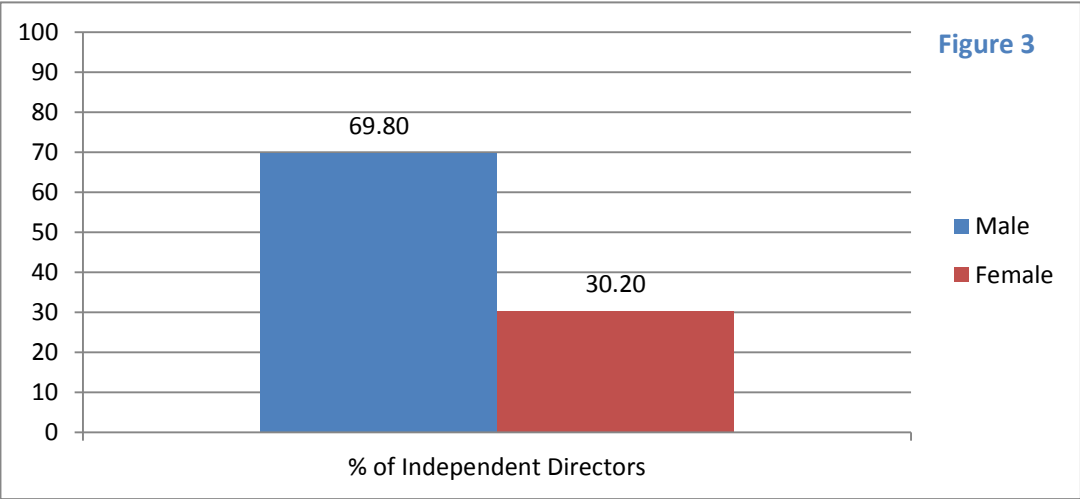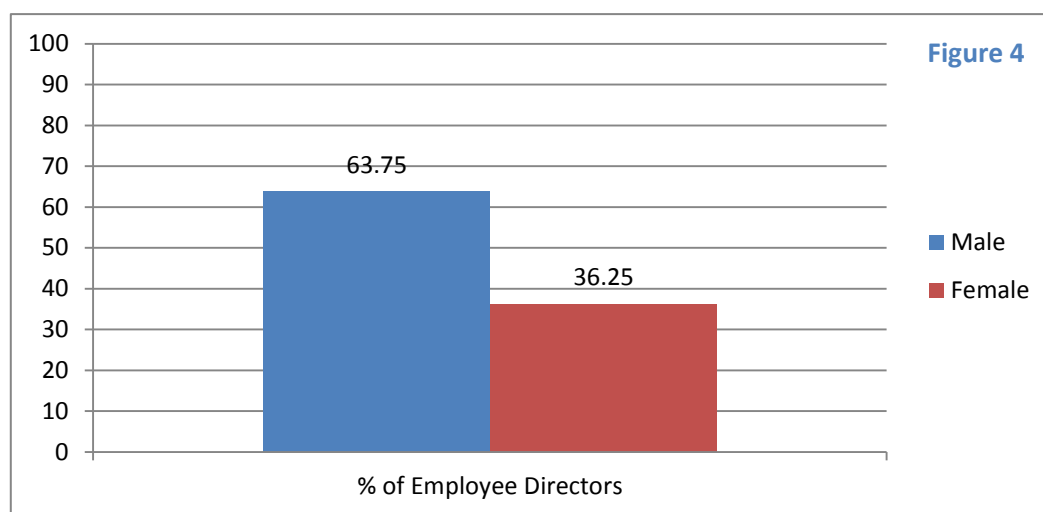

Figure 4 displays that the difference between the genders of employee directors on corporate boards. 63.75 % of the employee directors are males and the remaining 36.25 % are females.

Figure 4 – Percentage Between the Genders of Employee Directors

4.3 Descriptive Statistics

Table 1 shows the descriptive statistics for firm and board data. The average board size is 8.55 board members. The smallest board consists of 3 members and the largest board in the sample consists of 15 board members. We measure CEO compensation in millions of SEK and there are substantial outliers with a maximum of 28.49. The standard deviation of the CEO compensation (M SEK) is 5.243, which is substantial compared to the mean of 5.259. As previously presented in Figure 1, there are on average approximately 20 % women on the boards of Swedish OMX-listed companies. The board with the highest fraction of women consists of 57.1 % females; however, there are also boards fully represented by males. There are on average 42.8 % independent directors and 11.2 % employee directors. The male CEO ownership is 99.96 % and the female CEO ownership is 0.04 %. The female CEO Compensation is 4.712 (M SEK) and the male CEO Compensation is 7.425 (M SEK).

4.4 Dependent Variables

In this study, we use two measurements of financial performance; ROA and Tobin's Q. These are commonly used as proxies for financial performance in previous research (Carter et al., 2010; Adams and Ferreira, 2009; Gul et al., 2011). We calculate Tobin's Q by the market value plus the total debt of a company, divided by the total assets (Bodie et al., 2015). Tobin's Q is the market valuation of the firm. If the value is less than zero, the amortized historical

cost of the assets is greater than the market value of the creditors and shareholders' investment. On the contrary, ROA is a measure on the accounting income created for the stockholders and it is the operating performance (Carter et al., 2010). It is calculated by the net income of a company divided by the total assets (Hillier et al., 2010). We conduct the calculations on Tobin's Q and ROA with data on market value, total debt, total assets and net income that we collect from Thomson Reuter's DataStream. Since we have some negative values on ROA and the natural logarithm cannot be calculated with negative values; we add a constant equal to one to the consisting values of the natural logarithm of ROA. We also calculate the natural logarithm of Tobin's Q.

4.5 Independent Variable of Primary Interest

Our study is focusing on the females´ situation on Swedish corporate boards; therefore our independent variable of primary interest is the gender variable. We calculate the gender variable as the proportion of female directors on the board divided by the total number of directors on the board. Previous researchers that also use this definition are Mateos de Cabo et al. (2011), Adams and Ferreira (2009) and Gul et al. (2011).

4.6 Control Variables

We use different types of control variables such as firm characteristics and board characteristics. Two of our control variables, ROA and Tobin´s Q, have a lag with one period. The reason that we include lagged performance variables are: (i) the performance from the previous year can affect this year's performance; and (ii) the performance from the previous year can affect board structure, which implies reverse causality and thus endogeneity problems (Carter et al., 2010). Previous papers that also apply lagged variables are Adams and Ferreira (2009) and Carter et al. (2010). Our paper also applies two firm characteristic variables; firm size and CEO compensation. As Carter et al. (2010) and Gul et al. (2011) we also utilize the natural logarithm of total assets as a proxy for firm size. The other firm characteristic is the natural logarithm of total CEO compensation, which Adams and Ferreira (2009) also use. We use it because we believe that the CEO compensation increases the effort from the CEO and that it will affect the firm financial performance.

We control for six different board characteristics in our regression. We use the average age of the board directors of each board and year; this has been done before by Carter et al. (2010)

and Adams and Ferreira (2009). The control variable for female ownership is calculated by the total amount of shares owned by female directors divided by the total amount of shares owned by all directors on the board. We apply board size as a board characteristic control variable, which is also applied by Gillan et al. (2003) and Carter et al. (2010). We use a dummy variable for whether the CEO is male or female and whether the Chairman is male or female. In our fixed effects model, we use the fraction of independent directors on the board divided by the total number of directors on the board (Adams and Ferreira, 2009). Our last board characteristic is the fraction of employee directors on the board; which is calculated by the total number of employee directors on the board divided by the total number of directors on the board (Bøhren and Strøm, 2010).

5. Methodology

5.1 Panel Data and Fixed Effects

In our study, we use panel data and fixed effects as some of the most influential published research on the diversity-performance relationship is conducted in that way (Carter et al., 2010; Bøhren and Strøm, 2010; Reguera-Alvarado et al., 2015; Adams and Ferreira, 2009). As we use data from several different time periods and want to omit the unobserved effect that does not change over time, we used the fixed effects model. Fixed effects can partly also mitigate endogeneity issues due to omitted variable bias (Wooldridge, 2014).

5.2 Endogeneity

When researching the diversity-performance relationship, the issue of endogeneity and causality often occurs and needs to be addressed (Carter et al., 2010; Adams and Ferreira, 2009; Reguera-Alvarado, 2015; Bøhren and Strøm, 2010). Endogeneity can take place due to several different reasons, Adams and Ferreira (2009) argues that the issue needs to be addressed due to omitted and unobserved firm characteristics. They argue that there are omitted variables, linked to firm characteristics that affect both the selection of female directors and the decisions of the corporate boards. It is a possibility that some firms, due to a progressive corporate culture, choose to operate with a more gender diverse board. The issue of omitted variable endogeneity is addressed in two ways; firstly, under the assumption that there are no variations in corporate culture over time, we have addressed the issue of omitted

firm characteristic variables by using fixed effects (Adams and Ferreira, 2009; Reguera-Alvarado, 2015). Secondly, as Bøhren and Strøm (2010) points out, endogeneity concerns such as omitted variables is and partly mitigated due to using panel data; which we also use in this thesis and allows us to observe the same companies over a period of time.

Another major concern when studying the diversity-performance relationship is reverse causality. Previous literature (Carter et al. 2010; Adams and Ferreira, 2009; Reguera-Alvarado, 2015) have all addressed that it is likely that performance can have an effect on both women's incentives to join the company and the company's willingness to increase the amount of females on the corporate boards. In the case of this thesis, it means that the dependent variables of firm financial performance might affect the independent variable of primary interest, gender. To overcome this issue we have, just as when mitigating the omitted variable concern, used two different methods. Firstly, just as Bøhren and Strøm (2010) we use lagged performance variables as independent variables (lagged ROA and lagged Tobin's Q). This allows for performance persistence and for feedback from past performance to current board composition. The second method we use to mitigate the reverse causality concern is to follow the path of Carter et al. (2010), Adams and Ferreira (2009) and Reguera-Alvarado (2015) and use instrumental variables (IV) and two-stage-least square (2SLS).

5.3 Instrumental Variables (IV)

In order to deal with the endogeneity and causality problems, we need to define instrumental variables (IV) that correlate with the endogenous variable, but does not correlate with the error term (Wooldridge, 2014). To find suitable instrumental variables, we examine Table 10. There we can see that the lagged gender variable is statistically significant when the dependent variable is gender, so we can conclude that lagged gender is a valid IV for gender. The validness of the IV can also be determined by the results in Table 11. There we can see that the lagged gender variable and gender have a partial R-squared of 0.6749 when ROA is the dependent variable and a partial R-squared of 0.6771 when Tobin's Q is the dependent variable. The partial R-squared partial out the effect of the other explanatory variables and shows the correlation between the endogenous variable, gender, and the instrumental variable, lagged gender. The partial R-squared can take values between zero and one where a high value is a condition for a valid IV, which means that the lagged gender variable is an effective IV for the gender variable. We have also tested endogeneity for the independent variables

female leadership and female ownership. The lagged female ownership variable was statistically significant when the female ownership was the dependent variable, which means that it is a suitable IV for the female ownership variable. It is also validated with the partial R-squared of 0.7465 when Tobin's Q was the dependent variable and 0.7392 when ROA was the dependent variable. The lagged female leadership variable was statistically significant when the female leadership was the dependent variable, which means that it is a suitable IV for the female leadership variable. We can determine that it is valid by the partial R-squared of 0.6001 when Tobin's Q was the dependent variable and 0.5862 when ROA was the dependent variable.

5.4 Model

1. OLS fixed effects regression model:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + a_i + u_{it}, \; t = 1,2,3,4,5,6$$

2. Pooled OLS Regression model:

$$Y = \beta_0 + \beta_1 X + \beta_2 Z + \varepsilon$$

3. 2SLS regression model:

(i). $Y = \beta_0 + \beta_1 X + \beta_2 Z + \varepsilon$

(ii). $X = \alpha_0 + \alpha_1 A + \alpha_2 Z + u$

In the OLS fixed effects regression model our dependent variables, ROA and Tobin's Q, are denoted as Y. The constant is denoted as β_0, and our independent variable of primary interest, gender, is denoted as X. Furthermore, we have 10 control variables in the model: ROA_{t-1}, Tobin's Q_{t-1}, firm size, age, female ownership, board size, female leadership, independent directors, employee directors and CEO compensation. The control variables are denoted with Z in the OLS fixed effects regression model. The error term is divided into two different error terms. One that does not change over time, "a_i", and one that does change over time, "u_{it}". The "i" is the firm and "t" is the time period. In the pooled OLS regression model the dependent variables, independent variable of primary interest and the control variables denotes the same as in the OLS fixed effects regression model. The error term denotes ε in the pooled OLS regression model. The 2SLS regression model is divided into two models, (i) and

(ii). The notations in the 2SLS model in (i) is identical with the pooled OLS regression model. The second part in the 2SLS model has the gender variable as the dependent variable, noted as X. The constant in (ii) is noted as α_0 and the instrumental variable, lagged gender is noted as A. Furthermore, the control variables are denoted as Z and the error term is denoted as u.

5.5 Diagnostic Tests

5.5.1 Breusch-Pagan/Cook-Weisberg Test for Heteroscedasticity

We use the Breusch-Pagan/Cook-Weisberg test to test for heteroscedasticity in the data set; with that test, we can determine if the error term is normally distributed. When we conduct the Breusch-Pagan/Cook-Weisberg test, we find that we have to reject the null hypothesis that the error term is normally distributed, since the p-value is 0.000, and that there is heteroscedasticity in the data set. In order to correct for the problem of heteroscedasticity, we use robust standard errors in our OLS regressions (Wooldridge, 2014). The Breusch-Pagan/Cook-Weisberg test is displayed in Table 4, in Panel A.

5.5.2 Breusch-Godfrey Test for Serial Correlation

We apply the Breusch-Godfrey test, to test whether there is serial correlation or not in the data set. Due to our p-value, which is 0.000, there is strong evidence for serial correlation even at the 1 % significance level. In order to correct for the serial correlation in our sample we use robust standard errors in our OLS regressions (Wooldridge, 2014). The Breusch-Godfrey test is presented in Table 4, in Panel B.

5.5.3 Durbin-Wu-Hausman Test of Endogeneity

Table 5 shows the Durbin-Wu-Hausman test of endogeneity which tests for endogeneity and reverse causality. Examining Table 5, we can conclude that our independent variable of primary interest, gender, does not have an endogeneity issue. This can be determined, as the Durbin score p-value is 0.2469 and the Wu-Hausman p-value 0.2496 for ROA. For Tobin's Q the Durbin score p-value is 0.3763 and the Wu-Hausman p-value is 0.3792; which means that we fail to reject the null hypothesis that the gender variable is exogenous (Wooldridge, 2014). We also test for endogeneity in our independent variables female leadership and female ownership. We find no endogeneity issue in either of the variables, although the test results are not shown in the table below.

5.5.4 Pair-wise Correlation Matrix

To check for multicollinearity we construct a pair-wise correlation matrix. The pair-wise correlation matrix shows the correlation between the independent variables. It can take values from -1 to 1 where -1 is perfect negative correlation and 1 is perfect positive correlation. The multicollinearity problem arises when the correlation between two variables exceeds 0.9. In terms of the pair-wise correlation matrix, the highest correlation measured is 0.6713 which takes place between the independent variables board size and employee directors. Therefore, we can conclude that we do not have a problem with multicollinearity (Wooldridge, 2014). Other pair-wise correlations that are noticeable are for example, the correlation between board size and firm size is 0.6575. We expected a high correlation between these variables since the board size would increase with firm size. Furthermore, the correlation between ROA and the lagged ROA is 0.4373, which is expected as the financial performance from this year is most likely affected by the performance from the previous year. The pair-wise correlation matrix is presented in Table 6.

Table 6 – Pair-wise Correlation Matrix

Pair-wise Correlation Matrix	ROA	Gender	Lagged ROA	Firm Size	Age	Female Ownership	Board Size	Female Leadership	Independent Directors	Employee Directors	CEO Compensation
ROA	1										
Gender	0.0193	1									
Lagged ROA	0.4373	-0.0124	1								
Firm Size	0.1709	0.2002	0.1519	1							
Age	0.0033	-0.1199	-0.0123	0.1430	1						
Female Ownership	0.0466	0.1834	0.0433	0.0686	0.0042	1					
Board Size	0.0594	0.2608	0.0442	0.6575	0.0601	0.1173	1				
Female Leadership	-0.0828	0.2109	-0.0857	-0.0355	-0.0274	0.0278	-0.0876	1			
Independent Directors	-0.0620	0.1832	-0.0542	0.0399	0.0608	0.0217	-0.0981	0.0975	1		
Employee Directors	0.0197	0.1985	0.0052	0.2956	0.0462	0.0691	0.6713	-0.0296	-0.2409	1	
CEO Compensation	0.0632	0.2134	0.0524	0.6262	0.0776	0.0923	0.5520	-0.0396	0.0662	0.2974	1

[This table shows a pair-wise correlation matrix between the variables in all regressions.]

6. Results

We present the results of the fixed effects regression in Table 7, the 2SLS regression in Table 8 and the pooled OLS regression in Table 9. As we can see, our independent variable of primary interest, gender, is not statistically significant at the 1, 5 or 10 % significance levels in any of the six regressions. At first sight when we considered the fixed effects regression, we believed that the statistically insignificant result of the gender variable could depend on the lack of variation over time. However, observing the 2SLS regression and the pooled OLS regression where the gender variable also is statistically insignificant; that theory had to be rejected. Instead we considered reverse causality issues, however when conducting the 2SLS regression where we use lagged gender as an IV and gender as an endogenous variable; we still find a statistically insignificant result. One of the reasons might be that board members with a different background tend to assimilate into the more traditional behavior and adapt the customs of the existing board members. This suggests that a minority, in this case females on corporate boards, would in fact affect firm financial performance less than males. It might even result in that females, in order to be appointed at the board in the first place, already have adapted the behavior of the existing majority of the board members, males. Consequently, the possible gains of having females on corporate boards would never be reflected on the financial performance measurements' (Rose, 2007). Based on this, we can conclude that we fail to reject the null hypothesis that gender affects financial performance.

The female ownership variable is not statistically significant at any significance level, in any of our six regressions. Certain theory suggests that an increased ownership of the board member increases incentive to monitor (Carter et al., 2010). According to such theory, due to female directors on average less ownership, they would have less incentive to monitor. However, existing literature (Adams and Ferreira, 2009) also suggest that females tend to monitor more than males; therefore, the result can be insignificant as females then might not be as motivated by ownership as males. Furthermore, as board members might alter their ownership in a company depending on financial performance, we suspect that there might be a reverse causality issue, and thus utilize the lagged female ownership as an IV for the female ownership variable. The female leadership variable is not significant in any of our regression models. Since the result was insignificant in the fixed effects regression, we considered the fact that there might be a lack of variation over time. However, we did not get significant results in the 2SLS and the pooled OLS regression either; therefore, we had to reject that

theory. Furthermore, we found it of great importance to control for endogeneity in this variable, especially reverse casualty as existing literature argues that females might be given on average more difficult circumstances to start with. This would imply that females, for being more risk averse, are given leadership roles in companies that are not performing well (Francoeur et al., 2008). Their theory applied to our results suggests that females in fact could affect financial performance positively, but it would not be noticed. Therefore, as financial performance might affect the recruitment of females we utilize lagged female leadership as an IV for female leadership. With all this being said, the reason for all three hypotheses not being rejected can depend on that gender diversity simply does not affect firm financial performance

We find that all lagged variables, except lagged ROA in the fixed effects regression, are statistically significant even at the 1 % significance level. We believe that there might be a lack of variation in the lagged ROA in the fixed effects regression, which causes the statistically insignificant result. Regarding firm size, we find that the variable is statistically significant in all six regressions; however, the significance level differs between the regressions. Firm size has a negative relationship with Tobin's Q and a positive relationship with ROA in all regressions. On the variable age, we can see that it is only statistically significant in the fixed effects model, on both Tobin's Q and ROA. We believe that the age variable is statistically significant in the fixed effects regression, as the average age of the board most likely changes frequently. The relationship is negative which indicates that there might be financial benefits of having an on average younger board. The independent director variable is statistically significant in the fixed effects regression, with ROA as the dependent variable. On the contrary, the independent director variable is statistically significant, with Tobin's Q as the dependent variable in the 2SLS regression and with both financial performance measurement tools in the pooled OLS regression. The direction of the relationship is positive for Tobin's Q and negative for ROA.

Table 7 – Fixed Effects Regression Results

VARIABLES	(Reg. 1) Tobin's Q	(Reg. 2) ROA
Gender	-0.239	0.0689
	(0.286)	(0.159)
Lagged Tobin's Q	0.268***	
	(0.0510)	
Firm Size	-0.375***	0.275***
	(0.0682)	(0.0810)
Age	-0.0142*	-0.0147**
	(0.00762)	(0.00653)
Female Ownership	0.0517	-0.0888
	(0.130)	(0.0710)
Board Size	0.00650	-0.00413
	(0.0179)	(0.0126)
Female Leadership	-0.0658	-0.0202
	(0.128)	(0.0510)
Independent Directors	0.125	-0.100**
	(0.103)	(0.0483)
Employee Directors	0.406	-0.298
	(0.518)	(0.190)
CEO Compensation	-0.0228	-0.00928
	(0.0261)	(0.0124)
Lagged ROA		-0.117
		(0.0942)
Constant	6.679***	-3.019***
	(0.966)	(0.905)
Observations	938	934
R-squared	0.158	0.143
Number of firm id	213	212

[This table shows a fixed effects regression with robust standard errors in parentheses and coefficients above. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.]

Table 8 – Second Stage Least Squares (2SLS) Regression Results

VARIABLES	(Reg. 3) Tobin's Q	(Reg. 4) ROA
Gender	-0.0115	0.00891
	(0.155)	(0.0586)
Lagged Tobin's Q	0.906***	
	(0.0300)	
Firm Size	-0.0207*	0.0191***
	(0.0109)	(0.00741)
Age	-0.00250	-0.000524
	(0.00369)	(0.00215)
Female Ownership	0.0753	0.0416
	(0.0705)	(0.0273)
Board Size	0.000335	-0.00858
	(0.0110)	(0.00578)
Female Leadership	-0.0218	-0.0578
	(0.0565)	(0.0666)
Independent Directors	0.314***	-0.0509*
	(0.0746)	(0.0285)
Employee Directors	0.238	0.0250
	(0.185)	(0.0714)
CEO Compensation	0.0134	-0.00806
	(0.0181)	(0.0113)
Lagged ROA		0.443***
		(0.148)
Constant	0.00843	-0.0383
	(0.287)	(0.112)
Observations	938	934
R-squared	0.834	0.210

[This table shows a 2SLS regression with standard errors in parentheses and coefficients above. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.]

Table 9 – Pooled OLS Regression Results

VARIABLES	(Reg. 5) Tobin's Q	(Reg. 6) ROA
Gender	-0.0908	0.0633
	(0.133)	(0.0709)
Lagged Tobin's Q	0.906***	
	(0.0302)	
Firm Size	-0.0204*	0.0190**
	(0.0110)	(0.00742)
Age	-0.00288	-0.000259
	(0.00368)	(0.00224)
Female Ownership	0.0831	0.0363
	(0.0706)	(0.0273)
Board Size	0.000982	-0.00904
	(0.0111)	(0.00583)
Female Leadership	-0.0126	-0.0645
	(0.0566)	(0.0661)
Independent Directors	0.324***	-0.0571*
	(0.0745)	(0.0293)
Employee Directors	0.247	0.0182
	(0.185)	(0.0714)
CEO Compensation	0.0140	-0.00854
	(0.0183)	(0.0117)
Lagged ROA		0.443***
		(0.149)
Constant	0.0207	-0.0471
	(0.288)	(0.112)
Observations	938	934
R-squared	0.834	0.211

[This table shows a pooled OLS regression with robust standard errors in parenthesis and coefficients above. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.]

Table 10 – First Stage Least Squares Regression Results

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VARIABLES	(Reg. 7) Gender
Lagged Gender	0.810***
	(0.0212)
Firm Size	-0.000321
	(0.00147)
Age	-0.00174***
	(0.000601)
Female Ownership	0.0256**
	(0.0119)
Board Size	0.00296*
	(0.00176)
Female Leadership	0.0379***
	(0.0125)
Independent Directors	0.0292***
	(0.0109)
Employee Directors	-0.000156
	(0.0247)
CEO Compensation	-0.000559
	(0.00344)
Constant	0.115**
	(0.0519)
Observations	938
R-squared	0.735

[This table shows a pooled OLS regression with robust standard errors in parenthesis and coefficients above. This regression is done do determine if lagged gender is a proper IV for gender. *** p<0.01, ** p<0.05, * p<0.1.]

7. Conclusion

The aim of this study is to investigate whether the composition of the corporate boards in terms of gender affects the financial performance of Swedish OMX-listed firms. Further, we want to determine whether the female share ownership have any impact on financial performance. Finally, we are considering the impact on financial performance that might be due to the company having a female Chairman or female CEO. By doing this, we hope to present empirical evidence that can be utilized in the discussion regarding gender quotas on Swedish corporate boards. We have an overall low level of significance in our regressions, with an insignificant result on the independent variable of primary interest, gender. This result suggests that diversity-performance relationship in terms of gender composition of the corporate boards has no effects on the financial performance. Hence, we fail to reject our primary hypothesis that gender diversity has no impact on firm financial performance. The result of the second hypothesis was also insignificant, which means that we cannot reject that female share ownership has no effect on firm financial performance. Finally, we also find an insignificant result on our third hypothesis, which results in that we also fail to reject that female leadership has no impact on firm financial performance. Yet, as listed in the result section, there are factors that might influence the findings.

We find some statistically significant board- and firm characteristic variables that can be of interest for corporate financial performance. Primarily, we can determine that age has a negative relationship on both Tobin's Q and ROA. Therefore, we can conclude that companies might benefit financially from having an on average younger board. Firm size has a statistically significant negative relationship with Tobin's Q but a positive relationship with ROA, even at the 1 % significance level. This finding indicates that, when conducting research concerning the diversity-performance relationship, it can be both necessary and useful to measure performance in several different ways. The final significant variable that we have is the independent directors, however because the six regressions had very different results, it is difficult to draw a valid conclusion of the actual effect.

The key findings were expected as it corresponds with our previously presented papers from the US, France and Denmark. However, it differs from primarily South European and Asian research that find either positive or negative statistically significant results in their research on board diversity on financial performance. Our result also varies from Børen and Strøm (2010)

who find a negative link between females on corporate boards and firm financial performance. We suspect that the results differ, as the law of the 40 % quota on females on corporate boards was already implemented in Norway during the collection of their data. This was also the reason why our main hypothesis was not based on the findings of Børen and Strøm (2010). To conclude, the result of this thesis does not support the implementations of a gender quota on Swedish corporate boards due to financial reasons.

We find that further research would be both highly necessary and interesting due to the political climate regarding gender quotas on corporate boards in Sweden. As the European Parliament recently approved the EU-commission´s bill of 40 % women in the boardrooms by 2020 (Lindén, 2014), we encourage further research in Sweden with more recent data on the relationship between gender diversity and firm financial performance. During the further research, we recommend to have several measurements of financial performance. The reason for this being that we find that the same independent variable can have both positive and negative relationships, depending on the way in which financial performance is measured. A limitation of this study is the amount of time that we have; with an increased amount of time, we can investigate more companies over a longer period. We can also increase the amount of explanatory variables, such as board experience, board tenure, director compensation, firm industry, multiple directorships and a market index indicator that might have given us more statistically significant results. In addition to that, we can improve existing variables, such as female ownership by having the voting rights of the owned shares rather than the amount of shares.

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Appendix

Table 1 – Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Board Size	10,315	8.550	2.202	3	15
CEO Compensation (M SEK)	10,315	5.259	5.243	0	28.490
Female CEO Compensation (M SEK)	10,315	4.712	4.831	0	12.123
Male CEO Compensation (M SEK)	10,315	7.425	6.533	0	28.490
Age	10,315	54.46	3.679	40	65.50
Gender	10,315	0.201	0.119	0	0.571
Independent Directors	10,315	0.428	0.232	0	0.889
Female Independent Directors	10,315	0.302	0.332	0	1
Male Independent Directors	10,315	0.698	0.459	0	1
Employee Directors	10,315	0.112	0.116	0	0.333
Female Employee Directors	10,315	0.3625	0.168	0	1
Male Employee Directors	10,315	0.6365	0.276	0	1
Female Leadership	10,315	0.0375	0.190	0	1
Male Leadership	10,315	0.9625	0.674	0	1
Female Ownership	10,315	0.0567	0.165	0	1
Male Ownership	10,315	0.9433	0.445	0	1
Female CEO Ownership	10,315	0.0004	0.0023	0	1
Male CEO Ownership	10,315	0.9996	0.7544	0	1

[This table shows the number of observations, the mean, the standard deviation, the minimum value and the maximum value of all the variables in our sample. The data contains the following number of firms each year: 2006 – 198 firms, 2007 – 216 firms, 2008 – 221 firms, 2009 – 220 firms, 2010 – 220 firms and 2011 – 219 firms.]

Table 2 – Descriptive Statistics Variable Definition

Variable name	Descriptive Statistics Variable Definition
Board Size	Number of directors on the board for each firm and year.
CEO Compensation (M SEK)	CEO compensation for each firm and year.
Female CEO Compensation (M SEK)	Female CEO compensation for each firm and year.
Male CEO Compensation (M SEK)	Male CEO compensation for each firm and year.
Age	Average age of the board members for each firm and year.
Gender	Proportion of females on the board.
Independent Directors	Total number of independent directors on the board divided by the total numbers of directors on the board.
Female Independent Directors	Total numbers of female independent directors on the board divided by the total numbers of independent directors on the board.
Male Independent Directors	Total numbers of male independent directors on the board divided by the total numbers of independent directors on the board.
Employee Directors	Total number of employee directors on the board divided by the total number of directors on the board.
Female Employee Directors	Total number of female employee directors on the board divided by the total number of employee directors on the board.
Male Employee Directors	Total number of male employee directors on the board divided by the total number of employee directors on the board.
Female Leadership	Total number of female CEO's and Chairmen divided by the total numbers of CEO's and Chairmen.
Male Leadership	Total number of male CEO's and Chairmen divided by the total numbers of CEO's and Chairmen.
Female Ownership	Total shares owned by females on the board divided by the total number of shares owned by the board members.
Male Ownership	Total shares owned by males on the board divided by the total number of shares owned by the board members.
Female CEO Ownership	Total number of share equity owned by female CEO's divided by total number of share equity owned by the total number of CEO's.
Male CEO Ownership	Total number of share equity owned by male CEO's divided by total number of share equity owned by the total number of CEO's.

[This table shows the variable names and the variable definitions of our descriptive statistics.]

Table 3 – Regression Variable Definition

Variable Name	Fixed Effects Regression Variable Definition
Dependent Variables	
Return on Assets (ROA) (%)	Natural logarithm of return on assets. It is calculated by net income divided by total assets.
Tobin's Q	Natural logarithm of Tobin's Q. It is calculated by the market value plus total debt, divided by total assets.
Independent Variable of Primary Interest	
Gender	Proportion of females on the board.
Control Variables	
Lagged ROA	Natural logarithm of lagged ROA.
Lagged Tobin's Q	Natural logarithm of lagged Tobin's Q.
Firm Size	Natural logarithm of total assets.
Age	Average age of the board members for each firm and year.
Female Ownership (%)	Total shares owned by females on the board divided by the total amount of shares owned by the board members.
Board Size	Number of directors on the board for each firm and year.
Female Leadership	A dummy variable which equals 1 if there is a female CEO or Chairman on the board and 0 otherwise.
Independent Directors (%)	Total number of independent directors on the board divided by the total numbers of directors on the board.
Employee Directors (%)	Total number of employee directors on the board divided by the total number of directors on the board.
CEO Compensation	Natural logarithm of CEO compensation for each firm and year.

[This table shows the variable names and the variable definitions which we use in all regressions. The variables are divided into three categories: (i) dependent variables; (ii) independent variable of primary interest; and (iii) control variables.]

Table 4 – Breusch-Pagan/Cook-Weisberg test and Breusch-Godfrey test

Breusch-Pagan/Cook-Weisberg test	ROA	Tobin's Q
Number of parameters estimated	10	10
Chi^2	188.56	202.71
Prob > Chi^2	0.000	0.000
		Panel A

Breusch-Godfrey test	ROA	Tobin's Q
Chi^2	127.1	538.5
Lags	1	1
df	1	1
Prob > Chi^2	0.000	0.000
Number of gaps	44	40
		Panel B

[This table shows the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity in Panel A and the Breusch-Godfrey test for serial correlation in Panel B.]

Table 5 – Durbin-Wu-Hausman Test of Endogeneity

Durbin-Wu-Hausman Test of Endogeneity	ROA	Tobin's Q
H0: Variable gender is exogenous		
Durbin score Chi^2 (1)	1.3408	0.7826
Durbin score p-value	0.2469	0.3763
Wu-Hausman F(1,923)	1.3270	0.7741
Wu-Hausman p-value	0.2496	0.3792

[This table shows the Durbin-Wu-Hausman test of endogeneity. It shows the Durbin score Chi^2-value, Wu-Hausman F-value and the p-values of the Durbin score and the Wu-Hausman.]

Table 11 – First-stage Regression Summary Statistics

First-stage regression summary statistics	ROA	Tobin's Q
Endogenous variable	Gender	Gender
Instrumental variable	Lagged Gender	Lagged Gender
R-squared	0.7300	0.7324
Adjusted R-squared	0.7273	0.7298
Partial R-squared	0.6749	0.6771
F(1,928)	1918.11	1946.06
Prob > F	0.000	0.000

[This table shows the First-stage regression summary statistics from the 2SLS regression. The partial R-squared shows the correlation between the endogenous variable and the instrumental variable after it partial out the effect of the other explanatory variables in the model.]