FEMALE CORPORATE LEADERS AND FIRM FINANCIAL PERFORMANCE

A STUDY OF 152 SWEDISH PUBLIC COMPANIES DURING THE PERIOD OF 2010-2017

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EBBA SJÖSTRAND

Bachelor Thesis

Stockholm School of Economics

2019

Female corporate leaders and firm financial performance : A study of 152 Swedish public companies during the period of 2010-2017

Abstract:

This thesis tests whether there is a relationship between the presence of female corporate leaders and firm financial performance in one of the most gender equal countries in the world- Sweden. The study involves a collection of 152 Swedish public companies during a time period of eight years- from 2010 to 2017. Firm financial performance is measured with the accounting-based performance measures Return on Equity (ROE), Return on Assets (ROA), Return on Capital Employed (ROCE), Return on Operating Capital (ROOC), Operating Margin and Profit Margin. The presence of females in leading positions is measured as the presence of a female Chief Executive Officer (CEO), female Chief Financial Officer (CFO), female Chairman of the board of Directors, the share of women on the board of directors and the share of women in the executive management group. After controlling for industry, time, leverage, size and firm age, the research findings provide no support for an underperformance on the part of female corporate leaders and some support for a positive effect of the presence of female corporate leaders on firm financial performance. More specifically, the relationship seems to hold solely for the share of females on corporate boards and not the presence of a female CEO, CFO, Chairman nor the presence of a higher share of female executive management members.

Keywords:

Females as corporate leaders, gender, financial performance, accounting-based measures

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1. Introduction

The question of gender equality in a corporate context has been intensively discussed during the past decade. From a historical point of view, organizations all over the world has almost exclusively been led and controlled by men. However, we have begun to see changes and an increasing presence of women in leading positions. This has raised questions regarding whether this shift has positive or negative effects. The consequences of the shift have been addressed from many perspectives, ranging from socio-political consequences to pure financial ones. While many can agree that the socio-political outcomes are positive, the connection between the presence of women in corporate leading positions and financial performance is more widely debated. The research findings range from suggestions that females in corporate leading positions are underperforming in comparison to their male counterparts to suggestions that females outperform their male counterparts (Kolev, Geueorgui. 2012; Sharpe, Rochelle, 2000).

Despite major changes, the fact remains that the presence of women in leading positions is low to this day. The average share of women on the Board of Directors of the biggest public companies is 26% within the European Union. Meanwhile, approximately half of Europe's population consists of women. Even in Sweden, considered one of the most gender equal countries in the world, the presence of women in leading positions is low. Again, while approximately half of Sweden's population consists of women, only around a third of the Board of Directors of the biggest listed Swedish companies are female. (Ekonomifakta, 2018). While the number of female corporate board members represent 33% of all corporate board members in Swedish listed companies, the number of female chairmen remains even lower. Thus, the presence of gender inequality in Swedish board rooms is apparent. Nonetheless, the Board of Directors ratios outshine executive management group ratios in terms of gender equality. Only 4% of the females employed by Swedish listed firms hold a Chief Executive Officer (CEO) position, while the corresponding number for men is 17%. In addition to this, it has been found that there exists a reluctance to offer women positions in which they are given direct responsibility of profitability. That is, there is a tendency to dismiss women both as executive management members and board members on a more regular basis than men (AllBright, 2017).

As of 2018, Sweden was ranked to be one of the most gender equal countries in the world. The annual Global Gender Gap Report by the World Economic Forum ranks countries

based on an index consisting of four sub-indices; Economic Participation & Opportunity, Educational Attainment, Health & Survival and Political Empowerment. Their most recent report findings suggest that the average distance completed to gender equality is 82% in Sweden, a number that makes Sweden the third most gender equal country in the world (World Economic Forum, 2018). Moreover, Sweden is unique in the sense that the share of women attaining higher education has been higher than the share of men for the last twenty years (Statistics Sweden, 2015). This is exactly what makes Sweden an interesting object of study. Given these statistics, one might expect that the gender equality would be reflected in the corporate boardrooms and executive management groups. Yet, the share of women in leading positions remains low to this day which raises the question if the low presence of women in leading positions is justifiable by inferior performance on the part of females or if it is explained by other societal factors.

Given this situation in Sweden, there is an aspiration to bring clarity to the question if the presence of women in leading positions is associated with either inferior or superior financial performance in comparison to their male counterparts. The question will be approached by studying 152 Swedish listed companies between the period of 2010-2017 with respect to their presence of females corporate leaders and financial performance. The presence of females as corporate leaders is measured as the presence of a female Chief Executive Officer (CEO), Chief Financial Officer (CFO), Chairman of the Board of Directors, the share of female corporate board members and the share of female executive management members. Firm financial performance is measured with the accounting-based performance measures Return on Equity (ROE), Return on Assets (ROA), Return on Capital Employed (ROCE), Return on Operating Capital (ROOC), Operating margin and Profit Margin. The results indicate that only the share of female corporate board members matter for the financial performance of a firm.

The thesis is structured in the following way: Section 2 begins with a review of the recent literature and outlines the most important research findings within the field in order to give the reader a solid background before outlining the null hypothesis. The hypothesis is followed by an outline of the data used in section 3 and the method will be presented in section 4. The results will be presented in section 5 and a discussion of the results in section 6 will follow. Lastly, in section 7, the findings are concluded and a foundation for further research will be provided.

2. Literature review

2.1 The presence of female corporate board members and firm financial performance

There are various studies that investigate the presence of female corporate board members and its connection to the financial performance of firms. Campbell and Mínguez-Vera examined Spanish firm performance using the market-based performance measure Tobin's Q and the fraction of females in corporate boards. The authors found that the financial market did not respond negatively to the presence of female corporate board members. Furthermore, they concluded that diversity in the boardrooms, and not female presence per se, had a positive effect on firm value. (Campbell & Mingues- Vera, 2008)

With the same performance measure, Tobin's Q, economist Niccolò Gordini found that gender diversity on Italian corporate boards had a significant positive impact on Tobin's Q. Gordini pointed out that there was an insignificant relationship between the presence of one or more female corporate board members, per se, and firm performance. Therefore he could conclude that the presence of one woman, for the sake of it, did not have a positive effect on firm performance, whereas a larger fraction of women did (Gordini, Rancati, 2016).

A study conducted by the research group Catalyst found that female corporate board representation had a positive relationship to accounting-based performance ratios. Catalyst used Return on Equity (ROE), Return on Sales (ROS) and Return on Invested Capital (ROIC) and their respective relationship to female representation on corporate boards. The analysis was conducted by comparing the highest performing quartile of the US Fortune 500 companies with the lowest performing quartile (Catalyst, 2007).

Another study conducted by management consultancy firm McKinsey & Company investigated the relationship between female corporate board members and financial performance using both market-based and accounting-based performance measures such as Return on Equity, Operating Margin, Earnings Before Interest and Taxes (EBIT) and stock return. They used a comparative method where they compared listed US companies with the best diversity score in the corporate boardroom against the industry average score. Their findings suggested that companies with a high diversity score also possessed higher values of their performance ratios (McKinsey & Company, 2007).

Professor Mijntje Lückerath-Rovers conducted a study which compared Dutch firms without female corporate board members to those with female corporate board members in

the Netherlands. Extending the methods used by McKinsey & Catalyst, that has been widely cited, it was found that the presence of female corporate board members had a significant positive effect on firm performance, in terms of Return on Equity (ROE) (Lückernath-Rovers, 2011).

However, there are studies that show contradicting results. A study that investigated all FTSE 100 companies during a period of five years, found that there was no relationship between the presence of female corporate board members and accounting-based measures such as Return on Equity (ROE) and Return on Assets (ROA) which they referred to as objective performance measures. However, they found a negative relationship between the presence of female corporate board members and market-based performance measures of firm financial performance which they referred to as subjective performance measures. In short, their conclusion was that the findings were consistent with claims that women are perceived to perform poorly by the market but that this perception was not aligned with the underlying realities of company performance in terms of accounting-based measures (Haslam, Ryan, Kulish, Trojanowski, Atkins, 2010)

In 2015, Pletzer, Nikolova, Kedzior and Voelpel found that female presence on corporate boards was neither correlated with accounting-based performance measures nor market-based performance measures, if other factors were taken into consideration. They conducted a meta-analysis with papers that had a correlation coefficient, *r*, between the percentage of female representation on corporate boards and firm performance measured as Return on Equity (ROE), Return on Assets (ROA) and Tobin's Q (Pletzer, Nikolova, Kedzior, Voelpel, 2015).

2.2 The presence of females in executive management and firm financial performance

While some reports have looked at the relationship between women on corporate boards and firm financial performance, other researchers have focused on the presence of females in other leading positions, namely the presence of female executive management members. A selection of these research findings are outlined below.

Professor of Finance, Marcelo Eduardo and co-writer Brooks Poole recently conducted a study that examined the relationship between CEO gender and market performance in the US. This was done by investigating the accumulated stock returns for each year after the

appointment of a female CEO. The analysis, conducted on Fortune 500 companies listed between 2007-2012, resulted in findings that suggested a significant positive effect between female CEO's and market performance (Eduardo, Poole 2016).

An American study that included S&P 1.500 companies over 15 years, found that the presence of women in executive management positions had a positive effect on Tobin's Q. However, the research findings indicated that this positive relationship was limited to companies that focused on innovation as a part of their corporate strategy (Dezsö and Gaddis Ross, 2012)

A Swedish study, conducted twenty years ago, examined the relationship between growth in sales, profitability and female entrepreneurs. By running a regression on a sample of 4200 companies with less than 20 employees they concluded that firms where a woman held the chief managerial role had inferior performance to those firms in which a male held the chief managerial role. However, after controlling for size-related measures they found that the relationship did no longer hold (Du Rietz and Henreksson, 1999).

2.3 Our contribution

First, to our knowledge, there are no topical Swedish research papers that investigate the relationship between the presence of females in leading positions and financial performance. Second, the research on females in leading positions in a corporate context is often limited to either the presence of female board members or the presence of female executive management members. By taking into consideration both of these aspects, a more holistic understanding of the effect of the presence of women in leading positions on firm financial performance can be obtained. Third, most reports look at market-based ratios or a mix of market-based and accounting-based ratios. In line with Haslam, Ryan, Kulish, Trojanowski and Atkins, it is conceded that the inclusion of variables and ratios that has a connection to the financial markets, such as stock price and Tobin's Q can distort important findings. Consequently, this report will focus exclusively on accounting-based ratios with the reason being that market-based ratios can be coloured by the preconceptions of investors, information asymmetries and other market imperfections. As a consequence, there is a risk that market-based performance measures capture factors such as prejudices against female corporate leaders. By excluding market-based ratios, the ambition is to minimise the impact of such factors on the research findings.

2.4 Presentation of hypothesis

With the outline of the most important previous research findings as well as the gender equality statistics in mind, the following null hypothesis can be formulated with regards to the effect of female corporate leaders on firm financial performance in Sweden:

> *H_0: The presence of female corporate leaders, either as corporate board members or as members of the executive management group has neither a positive nor a negative effect on firm financial performance.*

3. Data

In this section, the data used to test the null hypothesis will be described. First, the choice of dependent variables used to measure firm financial performance will be presented and explained. Second, the independent variables used to measure the presence of females in leading positions of the firms will be presented and explained. Third, the inclusion of certain control variables will be presented and motivated. Fourth, the sample selection will be explained and followed by an outline of the method used to obtain the sample.

3.1 Dependent variables

There is an abundance of performance measures that function as indicators for the financial performance of a firm and naturally, not all of them can be included. To ensure robust findings regarding the effect of females in corporate leading positions on firm financial performance, several performance measures have been incorporated in the analysis. To arrive at the final selection of dependent variables used to measure firm financial performance, three criteria was used.

First, the choice of dependent variables was chosen to reflect the aim of analysing the potential effect of the presence of females in leading positions on firm financial performance. Because market-based measures are potentially affected by investor perceptions, there is a risk that research findings based on such measures would be distorted by factors such as prejudices of females in top positions (Haslam, Ryan, Kulish, Trojanowski, Atkins, 2010). Furthermore, there is a risk that important findings would be distorted by other market imperfections such as information asymmetries (Ciner and Karagozoglu, 2008). Taking into

account the aim of investigating the potential effect of females in leading positions on firm financial performance rather than the investor perception of females in leading positions, accounting-based ratios were regarded as superior to the aim of the paper.

Second, the choice of performance measures was guided by the principle of comparability which lead to the inclusion of performance measures that has frequently been used to compare performance across industries and/or companies. What the performance measures down below all have in common is that a higher value of them indicates better financial performance- regardless of the industry or company. R&D intensity, on the other hand, is one example of a measure that has been deliberately excluded from the analysis since it is only relevant for certain companies within certain industries.

Third, the chosen performance measures have a connection to both the performance of the corporate board and the executive management group. For instance, by making decisions about acquisitions and other fundamental corporate issues, the corporate board and executive management can affect returns as well as profitability margins.

These three criteria led to a collection of six different accounting-based measures. For each of these measures, there are differing opinions of what is ought to be included in the denominator and numerator respectively. Because the data was obtained from the database Retriever, the outline of the dependent variables below builds on their definition of the respective ratios (Retriever, 2019).

Of all the fundamental ratios that investors tend to look at, *Return on Equity (ROE),* is perhaps the most common one. It is an accounting-based measure that serves as an indicator of profitability and is often used to compare companies operating in the same industry. With earnings after financial income in the numerator and shareholders equity in the denominator, it indicates how effectively a firm uses its shareholders equity to generate earnings. The formula of the ratio is:

$$ROE = \left[\frac{EBIT + Financial\ income}{Shareholders\ equity + Untaxed\ reserves \bullet 0.72} \right]$$

Return on Assets (ROA) is another accounting-based measure that serves as an indicator of firm financial performance. Like ROE, it gauges the company's ability to generate earnings from its investments. The main factor that separates ROA from ROE is leverage. In simplified

terms, the two measures will differ for a firm only when it has debt on its balance sheet. The formula of the ratio is:

$$ROA = \left[\frac{EBIT + Financial\ Income}{Total\ Assets}\right]$$

Return on Capital Employed (ROCE) is another accounting-based ratio that is used to measure the return from a company's capital employed. It is a widely used performance measure for capital-intensive industries and the main difference to ROA is that the ROCE calculation comprises the equity, long-term debt and short-term debt to credit institutions. That is, short-term debt such as account payables is excluded. The formula of the ratio is:

$$ROCE = \left[\frac{EBIT + Financial\ Income}{equity + long{-}term\ debt + short{-}term\ debt\ to\ credit\ institutions}\right]$$

Return on Operating capital (ROOC) is a performance measure used to describe the relationship between the operating profit and the capital needed within operations. With operating profit in the numerator and assets excluding short-term investments and short-term liabilities in the denominator, it illustrates how efficient the company is in generating return from its core business. The formula of the ratio is:

$$ROOC = \left[\frac{Operating\ profit}{assets{-}cash\ \&\ bank\ balances\ {-}short\ term\ investments{-}short\ term\ liabilities}\right]$$

Operating Margin is a fifth accounting-based performance measure. With the numerator excluding income statement items that are not related to the core operations and net sales in the denominator, Operating Margin is a measure of how efficient a firm is in generating profit from its core operations. The formula of the performance measure is:

$$Operating\ Margin = \left[\frac{operating\ profit}{net\ sales}\right]$$

Finally, *Profit Margin* is an accounting-based performance measure that is used to measure how effectively a company generates profits from its sales. In simplified terms, it indicates

how many Swedish Kronor (SEK) of profit a firm generates for every 100 SEK of sales. The formula of the performance measure is:

$$Profit\ Margin = \left[\frac{net\ profit}{net\ sales} \right]$$

3.2 Independent variables

Five independent variables have been included to quantify the presence of female corporate leaders. In line with the the null hypothesis that is to be tested, independent variables have been chosen so that they collectively represent the presence of females on corporate boards as well as the presence of females in executive management positions.

The first independent variable included is the gender of the Chief Executive Officer (CEO). This is a dummy-variable that takes on a value of 1 when a female holds the CEO position and a value of 0 when a male holds the CEO position (see table 1). The gender of the CEO for a particular year and for a particular company was determined by the gender of the person that held the position for the majority of the accounting period. For instance, if a female was appointed as CEO the last two months of the accounting period, the gender of the CEO was set to be male rather than female[1].

The second independent variable included is the gender of the Chief Financial Officer (CFO). Like the CEO-variable, it is a dummy-variable that takes on a value of 1 when a female holds the CFO position and a value of 0 when a male holds the CFO position (see table 1). If a female CFO was appointed during the accounting period, the same decision rule as for the CEO variable was used to determine the value of the variable.

The third independent variable is the gender of the Chairman of the corporate board. Like the two variables outlined above, it is a dummy-variable that takes on a value of 1 when a female holds the Chairman position and a value of 0 when a male holds the Chairman position (see table 1). To determine the value of the variable when the gender of the Chairman changed during the accounting period, the same method as for the two previous variables was used.

[1]Note that the distinction between female and male assumes that a person with a female (male) name defines herself (himself) as female (male). No unisex names have been encountered in the data collection. Accordingly, the line has been drawn in reference to sex rather than gender. For simplification purposes, gender is used as a synonym for sex in the paper.

The share of female corporate board members (SFBM) is the fourth independent variable included (see table 2). Regarding the share of females on the corporate board, all corporate board members except deputy corporate board members have been included in the denominator. In the numerator, all female corporate board members except deputy corporate board members that held their position for the majority of the accounting period have been included. The reason that female corporate board representation is included in percentage form rather than in absolute numbers was the strive of capturing the influence of women rather than the number of women. It was therefore regarded appropropriate that an observation where two out of three (67%) corporate board members were females was given a different value of the independent variable than a company where two out of ten (20%) corporate board members were female[2].

The share of female executive management members (SFMM) is the last independent variable included (see table 2). This variable was included to capture the potential effect of females holding executive management positions other than the CEO and CFO positions. The numerator consists of the number of female executives that held their position for the majority of the accounting period while the denominator consists of the total number of management executives reported in the corporate governance reports of the respective companies. For the same reason as for the SFBM variable, the presence of females in executive management groups is measured as a percentage of the total executive management group rather than as the number of executive management members.

Table 1. Descriptive statistics for the three independent dummy variables in the final dataset.

		Observations	
Independent variable	**Type of variable**	**Female [% of observations]**	**Male [% of observations]**
CEOdummy (1=female)	Dummy	89 [8.67%]	1027 [91.33%]
CFOdummy (1=female)	Dummy	255 [22.85%]	861 [77.15%]
Chairmandummy (1=female)	Dummy	44 [3.94%]	1072 [96.06]

[2] Note that the *board of directors* will be referred to as the *board* in the following sections to avoid excessively long descriptions.

Table 2. Descriptive statistics for the two independent variables measured at a continuous level in the final dataset.

Independent variable	Type of variable	Min. value	Max. value	Mean
SFBM	Continuous	0.000	0.667	0.259
SFMM	Continuous	0.000	1.000	0.193

Note: The minimum values, maximum values and means are given in decimal form.

3.3 Control variables

Since the aim of the thesis is to investigate the effect of females as corporate leaders and firm financial performance it is vital to consider the potential effect from omitted variables. If not controlled for, there is a risk that the regression models attribute the effect of the missing variables to the estimated effect of the independent variables. Consequently, control variables have been included in the analysis. (Newbold, Carlson, Thorne 2013). The variables chosen have been selected with regards to their impact on financial performance and measurability.

First, discontinuous control variables for the industry of the company have been included. These control variables are dummy variables that take on a value of 1 if the company operates within the industry in question and a value of 0 if not. The companies included in the dataset represent 15 different industries (see appendix 1). The reason that industry is controlled for is the belief that the values of the performance ratios vary with the industries. Therefore it is appropriate to control for the industry when investigating the potential effect of the presence of women in leading positions and firm performance. If not, there is a risk that the findings are distorted by the fact that females generally operate in more profitable industries than men or the other way around. The reason that industry was controlled for instead of the firms of the observations was that there were no changes in many of the independent variables between 2010-2017 for several firms in the dataset. For instance, many companies had a male chairman and CEO during all eight years included in the data set. Furthermore, the share of female board members (SFBM) and share of female executive management members (SFMM) remained the same for certain companies during the eight years included in the data set. Because the statistical usefulness of a set of dummy variables require that there is some variation in the other independent and control variables within the categories that the dummy variables represent, the inclusion of company dummy variables variables was not considered appropriate.

Second, discontinuous control variables for the year of the observation have been included for the reason that certain years are generally worse than other in terms of financial performance. For example, many industries have a positive correlation with the business cycle and experience a worse financial performance during the contraction stage than they do during the expansion stage (Fabio Yoshio Suguri Motoki. 2015). The dummy variables take on a value of 1 if the year of the observation is 201X and 0 otherwise.

Third, a continuous control variable for the book value of the total assets has been included since research has suggested that it might impact the profitability of a company. Although previous research findings regarding the effect of firm size on performance are mixed, a firm's size have generally been expected to have a positive effect on profitability since larger companies are better equipped to exploit economies of scale (Yazdanfar and Öhman, 2015).

Fourth, a continuous control variable for the debt-to-equity ratio of the companies has been included to control for the leverage of the respective companies. The relationship between debt financing and firm performance has been intensively discussed within the field of managerial finance since it is associated with a trade-off between costs and gains. Some research has pointed out that leverage can be used to boost Return on Equity while other research has pointed to the fact that leverage can affect performance measures such as Return on Assets negatively (Yazdanfar and Öhman, 2015).

Fifth, a continuous variable for the firm age has been included which takes on a value equal to the number of years since the company was registered. Prior research has suggested that older firms are more likely to benefit from learning effects, business experience and reputation effects. On the other hand, it has also been suggested that firm age is negatively correlated with profitability because of organisational rigidities and assets that become obsolete (Loderer and Waelchli, 2012).

3.4 Sample selection

The initial dataset consisted of observations for 155 Swedish Nasdaq- listed companies between the period of 2010 to 2017. Because the thesis question concerns the potential effect that females in leading positions have on financial performance in Sweden, only Swedish companies have been included. The delimitation to public companies was regarded necessary since private companies and public companies have differing requirements regarding their

executive management group in Sweden. For instance, private companies are not required to have a CEO (Bolagsverket, 2018). Moreover, the industry classification benchmark, described in the section below, was available exclusively for public companies.

Taking into consideration the aim of investigating the effect of the presence of female corporate leaders and firm performance in general and not within a specific industry or category of companies, a diverse set of companies was sought after. For that reason, the data set was created to include companies distributed evenly over large, mid, and small capitalisation companies- 49 large cap companies, 52 mid cap companies and 54 small cap companies. In addition, companies from 15 different industries were included. The industries represented in the dataset are Oil & Gas, Basic Resources, Construction & Materials, Industrial Goods & Services, Automobile & Parts, Food & Beverage, Personal & Household Goods, Health Care, Retail, Media, Travel & Leisure, Telecommunications, Real Estate, Financial Services and Technology (see appendix 1). Each industry included is represented by at least two companies.

The time period of eight years, ranging from 2010-2017 was chosen with two criteria in mind. The first criteria was that of relevance and led to the selection of observations in the most recent years[3]. The second criteria was to exclude the years of the financial crisis since that was a period of abnormal performance for many firms. A time period of eight years and 155 companies gave a number of 1240 observations in the initial dataset.

In the following stages of the sample selection process, the data was tested for potential outliers in the dependent variables- that is values that deviated far from other observations. This was carried out to avoid the influence of outliers on error variance and subsequent estimates. From the histograms of each dependent variable, it could be observed that all dependent variables had outliers in the 1st and 99th percentiles (see appendix 2 and 3). After removing the 1st and 99th percentiles for each of the dependent variables, additional outliers were removed for the dependent variables ROE, ROOC, Operating Margin and Profit Margin (see appendix 4). Descriptive statistics of each dependent variable in the initial dataset can be found in table 3.

After removing the outliers, a number of 152 companies remained in the dataset, with a total of 1116 final observations (see appendix 5). This was the sample size that was used in

[3] The annual reports for the year of 2018 had not been released at that point in time

the final regression analysis. A table of the descriptive statistics for all variables can be found below (see table 3).

Table 3. Descriptive statistics for all variables in the final dataset.

Dependent variables	**Median**	**Mean**	**Std.Dev**	**Observations**
ROE	0.146	0.127	0.194	1116
ROA	0.072	0.072	0.092	1116
ROCE	0.107	0.110	0.140	1116
ROOC	0.115	0.137	0.243	1116
Operating Margin	0.072	0.109	0.243	1116
Profit Margin	0.075	0.140	0.279	1116
Independent variables	**Median**	**Mean**	**Std.Dev**	**Observations**
CEOdummy (1=female)	N/A	N/A	N/A	1116
CFOdummy (1=female)	N/A	N/A	N/A	1116
Chairmandummy (1=female)	N/A	N/A	N/A	1116
SFBM	0.250	0.259	0.140	1116
SFMM	0.167	0.193	0.172	1116
Control variables	**Median**	**Mean**	**Std.Dev**	**Observations**
Total Assets	2.329.500	20.100.000	49.200.000	1116
DE (Debt-to-equity ratio)	1.160	1.811	6.960	1116
YearsSinceRegistration	26.000	38.971	30.769	1116
Industry dummy variables (1=industry X)	N/A	N/A	N/A	1116
Year dummy variables (1=year 201X)	N/A	N/A	N/A	1116

Note: To avoid reporting misleading information, no median, mean or standard deviation has been reported for dummy variables since they are not measured at the continuous level.

3.5 Method of obtaining dataset

Data for the dependent variables (ROE, ROA, ROCE, ROOC, Operating Margin and Profit Margin) was obtained from the database Retriever. Data for the independent variables, that is, information regarding the gender of the CEO, the gender of the CFO, the gender of the

Chairman, the share of females present on the board, and the share of females in the executive management group was manually collected from the annual reports of the companies in question. All in all, 1240 annual reports were examined to arrive at the initial dataset of 1240 observations. This was a time consuming but necessary stage in the data collection process since there was no database that contained compiled data for this information at that point in time.

Information on the control variables was obtained from two sources. The value of the total assets, the debt-to-equity ratios as well as the registration date was obtained from the same database as the dependent variables - Retriever. To obtain the number of years since registration for each observation, the year of registration for each company was deducted from the year of the observation. The industry classification benchmark (ICB) is developed by Dow Jones and FTSE and the categorisation of the companies was obtained from Nasdaq. The classification of companies into large, mid and small capitalisation companies was obtained from Nasdaq as well.

4. Method

In this section, the method used to test the null hypothesis will be presented. The section will begin with an outline of the multiple variable regression method. Explanations and tests of the assumptions associated with multiple variable regression model will follow.

4.1 The multiple variable regression model

The multiple variable regression model is an extended version of the single regression model, meaning that it has more than two independent or control variables that is used to predict the dependant variable. Besides being a transparent and robust method, the advantage of the multiple variable regression model is that the relationship between a dependent variable and several independent variables can be included and tested in one single regression. Moreover, the multiple variable regression model allows for the inclusion of control variables which can prevent overstating the explanatory value of the independent variables. The rationale behind including six different regressions, with different performance measures as the dependent variable, was to ensure robust findings regarding the effect the presence of female corporate leaders and firm financial performance. The general formula for the multiple variable regression model is as follows:

$$Y_i = \beta_0 + \beta_1 x_{1it} + \beta_2 x_{2it} + \beta_3 x_{3it} \ldots \beta_k x_{kit} + \varepsilon_{it}$$

where, β_0 is the intercept. $\beta_1, \beta_2, \beta_3 \ldots \beta_k$ are the coefficients for the independent or control variables ($X_{1it}, X_{2it}, X_{3it} \ldots X_{kit}$) and describe their respective effect on the dependant variable, Y_{it}. ε_{it} is the residual, sometimes referred to as an error term and represents the difference between the predicted value of the model, $\widehat{Y}_{it}$, and the actual value of the observation Y_{it} (Newbold, Carlson, Thorne 2013, p. 475). Six regression models have been included with the following constituents:

$$Y_{it} = \beta_0 + \beta_1 \cdot CEOdummy_{it} + \beta_2 \times CFOdummy_{it} + \beta_3 \cdot Chairmandummy_{it} + \beta_4 \cdot SFBM_{it} + \beta_5 \cdot SFMM_{it} + \beta_6 \cdot Totalassets_{it} + \beta_7 \cdot DE_{it} + \beta_8 \cdot Yearssinceregistration_{it} + \alpha(ICB) + \alpha(t)$$

where β_0 is the intercept and Y_{it} is the dependent variable, that is, the financial performance measure of each of the six regressions. In the first regression, the financial performance measure is ROE, in the second regression it is ROA, in the third regression it is ROCE, in the fourth regression it is ROOC, in the fifth regression it is Operating margin and in the sixth regression it is Profit margin. All values are given in decimal form.

β_1 is the coefficient for $CEOdummy_{it}$ which is an independent dummy variable that takes on a value of 1 if a female holds the CEO position of the specific company in the specific year, and 0 otherwise. β_1 represents the percentage point change in the financial performance measure, given in decimal form, when a female holds the position as opposed to when a male holds the position.

β_2 is the coefficient for $CFOdummy_{it}$ which is an independent dummy variable that takes on a value of 1 if a female is holding the CFO position of the specific company in the specific year, and 0 otherwise. β_2 represents the percentage point change in the financial performance measure, given in decimal form, when a female holds the position as opposed to when a male holds the position.

β_3 is the coefficient for $Chairmandummy_{it}$ which is an independent dummy variable that takes on a value of 1 if a female zholds the Chairman position of the specific company in the specific year, and 0 otherwise. β_3 represents the percentage point change in the financial

performance measure, given in decimal form, when a female holds the position as opposed to when a male holds the position.

β_4 is the coefficient for $SFBM_{it}$ which is an independent continuous variable that takes on a value equal to the share of females on the board of the specific company in the specific year. The share of women is given in decimal form. β_4 represents the percentage point change in the performance measure, given in decimal form, when the share of females increases by 100 percentage points. A somewhat more intuitive way of interpreting the coefficient is that $\beta_4/10$ represents the percentage point change in the financial performance measure, given in decimal form, when the share of females increases by 10 percentage points.

β_5 is the coefficient for $SFMM_{it}$ which is an independent continuous variable that takes on a value equal to the share of women in the executive management group of the specific company in the specific year. The share of women is given in decimal form. β_5 represents the percentage point change in the performance measure, given in decimal form, when the share of females increases by 100 percentage points. Again, a somewhat more intuitive way of interpreting the coefficient is that $\beta_5/10$ represents the percentage point change in the financial performance measure, given in decimal form, when the share of females increases by 10 percentage points.

β_6 is the coefficient for $Totalassets_{it}$ which is a continuous control variable that takes on the value of the total assets of the specific company in the specific year. The value of the total assets is given in Swedish Kronor (SEK). β_6 represents the percentage point change in the performance measure, given in decimal form, when the value of the total assets increases by 1 SEK.

β_7 is the coefficient for $Yearsinceregistration_{it}$ which is a continuous control variable that takes on a value equal to the number of years since the specific company was registered. β_7 represents the percentage point change in the financial performance measure, given in decimal form, when the age of the company increases by 1 year.

β_8 is the coefficient for DE_{it} which is a continuous control variable that takes on a value equal to the debt-to-equity ratio of the specific company in the specific year. The value of the ratio is given in decimal form. β_8 represents the percentage point change in the financial performance measure, given in decimal form, when the debt-to-equity ratio increases by 100% percentage points. A more intuitive way of interpreting β_8 is that $\beta_8/10$ represents the percentage point change in the performance measure, given in decimal form, when the debt-to-equity ratio increases by 10 percentage points.

$\alpha(ICB)$ represents the industry classification benchmark (ICB) dummy variables. which are control dummy variables representing the industry classification of the companies. These control variables take on a value of 1 if the specific company operates in the industry that the dummy variable represents and 0 otherwise. α represents the percentage point change in the financial performance measure of the regression, given in decimal form, when the company operates in the industry that the dummy variable represents in comparison to the base case[4] industry which is the technology industry. Information regarding which industry each dummy variable represents can be found in appendix 1.

$\alpha(ICB)$ represents the year dummy variables which are control dummy variables that represent the year of the observation. The variables take on a value of 1 if the specific observation is from year 201X and 0 otherwise. α represents the percentage point change in the financial performance measure that can be explained by the year of the observation, in comparison to the year of 2010 which is the base case year[5].

4.2 Assumptions of the multiple regression model

The multiple regression coefficients are computed by a mathematical least square procedure. This method results in estimators that can be used in the regression model. (Newbold, Carlson, Thorne 2013 p. 481) The multiple regression model relies on four fundamental standard assumptions, that should always be met (Newbold, Carlson, Thorne 2013, p .482). These are outlined below. A significance level of 5% has been chosen for all tests.

4.2.1. Multicollinearity

The first assumption is that there should be no multicollinearity. Multicollinearity is a case where the independent and/or control variables of the regression models are correlated. An applicable test for multicollinearity is the variance inflation factor-test (VIF-test) which assigns VIF-values for each variable included in the regression (see appendix 6). These are not to exceed 10 in order for the assumption to hold (O'Brien, 2007). Moreover, a table of correlation was constructed to get a clear overview of the correlation between the variables of

[4] The base case industry refers to the industry that has not been assigned an industry dummy variable. The use of a base case industry is necessary because the number of dummy variables should be N-1, where N is the number of categories (industries).

[5] The base case year refers to the year that has not been assigned an year dummy variable. The use of a base case year is necessary because the number of dummy variables should be N-1, where N is the number of categories (years).

each regression. Neither the VIF-test nor the table of correlation indicated the presence of multicollinearity (see appendix 6 and 7).

4.2.2. Linearity

Second, there should be linearity meaning that the value of the dependent variables, Y, should be mirrored as a linear function of the independent variables, $X_1, X_2, X_3 \ldots X_k$. To be able to discern signs of non-linearity in multiple variable regressions, the standardised residuals of a regression model can be plotted against the independent variables (University of Utah, 2019) In the case where there is no discernible pattern of a non-linear relationship between the residuals, non-linearity is not an issue. Hence, the pattern in the scatter plots should be random. Scatter plots with each dependent variable and each continuous independent variable and signs of non-linearity was not discernible (see appendix 8).

4.2.3. Heteroscedasticity

Third, the regression models should display *homoscedasticity,* meaning that the variance of the error terms should remain constant along the line of fitted values and have a mean of 0. If this assumption is violated, heteroscedasticity prevails, $Var(ei) \neq (\sigma^2)$. The consequences of a heteroscedastic model is the risk of distorted p-values and thus the legitimacy of the regression model results (Newbold, Carlson, Thorne, 2013). In order to test for heteroskedasticity, the two-tailed Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity was used which states that whenever the calculated p-value exceeds the selected level of significance, the presence of homoscedasticity can be validated (Halungaa, Ormeb, Yamagatac, 2014). The residuals displayed heteroscedasticity in all regressions but regression 3, in which ROCE is the dependent variable (see appendix 9). The prevalence of heteroscedasticity in these regressions can further be observed in the scatter plots where the standardised error terms of each regression were plotted against their predicted values (see appendix 10). In order to correct for heteroscedasticity, the final regression was conducted using robust standard errors. This operation factors the prevalence of heteroscedasticity and corrects for it by modifying the least square estimation of the error terms (Gujarati & Porter 2010).

4.2.4. Autocorrelation

Fourth, the regression models should be absent of *autocorrelation* (also known as serial correlation) meaning that the error terms should not be correlated with each other- that is, a pattern should not be discernible in the error terms (ε_i) which translates to, $Cov(ei, ej) = 0$ in statistical terms. Autocorrelation is more common for time series data and panel data than in cross-sectional data and the consequences of an autocorrelated regression model is similar to those of heteroscedasticity (Newbold, Carlson, Thorne, 2013). The regression models were tested for autocorrelation with the Wooldridge test. The results indicated that autocorrelation all regression models except for regression suffered from autocorrelation (see appendix 11). To correct for heteroscedasticity and autocorrelation, clustered standard errors can be used in the final regressions (Hoechle, 2007).

4.2.5. Normally distributed residuals

The final assumption of a multiple regression is the assumption of normally distributed residuals. In order to test for residual normality, a common test procedure is the Shapiro-Wilk test which exhibits strong power and is suitable for both small and large samples. The null hypothesis of the test is that the residuals are normally distributed. Thus, the assumption of normally distributed residuals is rejected if the p-value is lower than the selected level of significance (Mohd Razali, Wah, 2011). The output from the Shapiro-Wilk test showed that all regressions displayed a lack of normally distributed residuals (see appendix 12). One common method to tackle non-normally distributed residuals is to construct a log, square or box-cox transformation of the variables (Feng, Wang, Lu, Chen, He, Lu, M Tui, 2014). However, as the dependent variables in the dataset contain both positive as well as negative values, such a procedure is not feasible. In order to preclude this fully as an option, a log-transformation was conducted for the independent variables that are suitable for the procedure- that is, variables without negative values and great variance. Once again using the Shapiro-Wilk test, it could be concluded that these operations did not generate any further statistical validity with regards to the normality of the residuals (see appendix 13).

5. Results

In this section, the result of each multiple variable regression will be presented one at a time with regards to their statistical and economic significance. A compilation of the result from all six regressions can be found in table 4. Full regression results for each regression can be found in appendix 14-19.

5.1 Regression 1 (ROE)

The share of female board members (SFBM) was the only variable that displayed statistical significance in the first regression. Neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members displayed statistical significance (SFMM) (see table 4).

Because the share of female board members (SFBM) displayed a statistical significance at the 1% level and a coefficient of 0.244, the economic interpretation is that a 10 percentage point increase in the share of female board members is associated with a 2.44 percentage point higher Return on Equity (ROE). The economic interpretation of the remaining independent variables is that neither the presence of a female CEO, the presence of a female CFO, the presence of a female Chairman nor a higher share of female executive management members (SFMM) has a positive nor negative effect on the Return on Equity (ROE) of a firm. More detailed regression results for regression 1 can be found in appendix 14.

5.2 Regression 2 (ROA)

In the second regression, similarly, the share of female board members (SFBM) was the only one of the independent variables that displayed statistical significance (See table 4). Again, neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members (SFMM) displayed statistical significance.

Because the share of female board members (SFBM) displayed a statistical significance at the 1% level and a coefficient of 0.120, the economic interpretation is that a 10 percentage point increase in the share of female board members is associated with a 1.20 percentage points higher Return on Assets (ROA). The economic interpretation of the remaining independent variables is that neither the presence of a female CEO, the presence of

a female CFO, the presence of a female Chairman nor a higher share of female executive management members (SFMM) has a positive or negative effect on the Return on Assets (ROA) of a firm. More detailed regression results for regression 2 can be found in appendix 15.

5.3 Regression 3 (ROCE)

Like in the two first regressions, the share of female board members (SFBM) was the one independent variable that displayed statistical significance in the third regression. Once again, neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members (SFMM) displayed statistical significance (see table 4).

Because the share of female board members (SFBM) displayed a statistical significance at the 1% level and a coefficient of 0.172, the economic interpretation is that a 10 percentage point increase in the share of female board members is associated with a 1.72 percentage points higher Return on Capital Employed (ROCE). The economic interpretation of the remaining independent variables is that neither the presence of a female CEO, the presence of a female CFO, the presence of a female Chairman nor a higher share of female executive management members (SFMM) has positive or negative effect on the Return on Capital Employed (ROCE) of a firm. More detailed regression results for regression 3 can be found in appendix 16.

5.4 Regression 4 (ROOC)

In the fourth regression, likewise, the share of female board members (SFBM) was the only one of the independent variables that displayed statistical significance (See table 4). Once again, neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members (SFMM) displayed statistical significance.

Because the share of female board members (SFBM) displayed a statistical significance at the 1% level and a coefficient of 0.327, the economic interpretation is that a 10 percentage point increase in the share of female board members is associated with a 3.27 percentage points higher Return on Operating Capital. The economic interpretation of the remaining independent variables is that neither the presence of a female CEO, the presence of

a female CFO, the presence of a female Chairman nor a higher share of female executive management members (SFMM) has positive or negative effect on the Return on Operating Capital (ROOC) of a firm. More detailed regression results for regression 4 can be found in appendix 17.

5.5 Regression 5 (Operating Margin)

In the fifth regression, again, the share of female board members was the only independent variable that displayed statistical significance (see table 4). Once again, neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members (SFMM) displayed statistical significance.

Because the share of female board members (SFBM) displayed a statistical significance at the 1% level and a coefficient of 0.177, the economic interpretation is that a 10 percentage point increase in the share of female board members is associated with a 1.77 percentage points higher Operating Margin. The economic interpretation of the remaining independent variables is that neither the presence of a female CEO, the presence of a female CFO, the presence of a female Chairman nor a higher share of female executive management members (SFMM) has positive or negative effect on the Operating Margin of a firm. More detailed regression results for regression 5 can be found in appendix 18.

5.6 Regression 6 (Profit margin)

In contrast to the regressions outlined above, the p-value of 0.086 of the share of female board members (SFBM) implies that the SFBM variable neither displayed statistical significance at the 1%, 5% nor 10% level in the sixth regression[6] (see table 4). Likewise, neither the presence of a female CEO, the presence of a female CFO nor the presence of a higher share of female executive management members (SFMM) displayed statistical significance.

The economic interpretation of the independent variables is that an increase the presence of a female CEO, a female CFO, a female Chairman, the presence of female corporate board members (SFBM) and the presence of female executive management members (SFMM) has a positive or negative effect on the Profit Margin of a firm. More detailed regression results for regression 6 can be found in appendix 19.

[6]Note that a significance level of 10% (0.1) requires a p-value of 5% (0.05) in order for statistical significance to be confirmed. This is because it is the null-hypothesis of neither a positive nor negative correlation between the independent variable and dependent variables that is to be rejected. Hence, the test is two-tailed.

Table 4. Extracted output of all six regressions.

Independent variables		Regression					
		R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
CEOdummy (1=female)	Coefficient	-0.027	-0.011	-0.018	0.000	-0.047	-0.032
	Std. Err	[0.035]	[0.019]	[0.029]	[0.054]	[0.029]	[0.055]
	P-value	0.440	0.562	0.527	0.994	0.105	0.557
CFOdummy (1=female)	Coefficient	0.013	-0.005	0.009	0.013	-0.022	-0.014
	Std. Err	[0.023]	[0.019]	[0.019]	[0.032]	[0.015]	[0.029]
	P-value	0.569	0.646	0.645	0.681	0.141	0.637
Chairmandummy (1=female)	Coefficient	0.009	-0.007	-0.005	-0.024	0.012	0.045
	Std. Err	[0.029]	[0.016]	[0.018]	[0.032]	[0.025]	[0.060]
	P-value	0.768	0.640	0.771	0.445	0.622	0.455
SFBM	Coefficient	0.244	0.120	0.172	0.327	0.177	0.137
	Std. Err	[0.083]	[0.040]	[0.059]	[0.107]	[0.050]	[0.079]
	P-value	0.004***	0.003***	0.004***	0.003***	0.000***	0.086
SFMM	Coefficient	0.023	0.014	0.030	0.010	-0.028	-0.058
	Std. Err	[0.064]	[0.033]	[0.051]	[0.083]	[0.039]	[0.066]
	P-value	0.718	0.676	0.553	0.902	0.463	0.383
Number of observations		1116	1116	1116	1116	1116	1116
R^2		0.111	0.077	0.093	0.071	0.370	0.463
Industry dummy variables		Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Year dummy variables		Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
D/E -ratio variables		Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Years since registration variable		Incl.	Incl.	Incl.	Incl.	Incl.	Incl.
Total assets variable		Incl.	Incl.	Incl.	Incl.	Incl.	Incl.

Note: OM denotes Operating Margin and PM denotes Profit Margin. Std. Err denotes clustered standard errors in R1-R4 and R6. In R5, Std.Err denotes robust standard errors. Incl. denotes that the variable(s) has(have) been included and Not incl. denotes that the variable(s) has(have) not been included. *** Indicates statistical significance at the 1% level, ** denotes statistical significance at the 5% level and * indicates statistical significance at the 10% level. The coefficients are reported in decimal form.

5.7 Summary of results

To summarise the results from all six regressions, the one independent variable that displayed statistical significance did so in five out of six regressions. More specifically, the share of female board members (SFBM) displayed a statistical significant relationship with all dependent variables but the Profit Margin which is the dependent variable in regression six. Moreover, the statistical significant relationship between the share of female board members and the dependent variables was positive in all five regressions. Because all regressions included control variables for the size of the company (total assets), age of the company (years since registration), leverage of the company (D/E-ratio), the year of the observation, and the industry of the company, it can furthermore be concluded that the statistically significant and positive effect of the share of female board members on five out of six financial performance measures could not be explained by either of these control variables.

Before moving on to the discussion of the results, two points should be emphasized. First, it is important to remember that the residuals of the regressions are not normally distributed[7]. As a consequence, the p-values should be interpreted with certain caution. Second, when interpreting the results for the CEO dummy variable and the Chairman dummy variable, the low number of observations where a female held the position should be taken into consideration[8]. This is because there is a risk that the low number of observations where females held these positions were not sufficient to generate robust regression results which in turn could have obstructed relevant interpretations.

6. Discussion of results

In this section, the results of the six regressions will be discussed. First, the results will be discussed in relation to the model specification. Second, the direction of causality is explored which is followed by a discussion of omitted variables before further economic interpretations are outlined.

[7]Demonstrated in section *4.2.5 Normally distributed residuals*

[8]As demonstrated in table 1, the number of observations where a female held the position was 89 (8.67% of the total observations) and 44 (3.94% of the total observations) for the CFO position and the Chairman position respectively

6.1 Model specification

One possible reason that could explain the fact that only the share of female board members (SFBM) displayed statistical significance in the majority of the regressions could be that the SFBM variable only had values ranging from 0 to 0.67, meaning that the maximum share of female board members in the boards included in the dataset was 67% or two thirds of the board (see table 2). Meanwhile, the share of female executive management members (SFMM) ranged from 0 to 1 meaning that the maximum share of females in the executive management groups included in the dataset was 100%. An answer for the difference in statistical significance between the SFMM and the SFBM variables could therefore lie in the fact that it is gender diversity that matters, not the presence of females per se. If this would hold, the relationship between the share of females and financial performance should remain positive until the value exceeds a certain point, proposedly somewhere around 0.5 (50%) to thereafter become negative. Because the share of female board members never exceeded 67% while the share of female executive management members ranged from 0 to 100%, it is possible that the the SFBM variable did not capture the potential negative effect of a less diverse group, where the gender diversity in the boardroom would have been imbalanced to the disadvantage of men. The possibility that it is gender diversity that affects financial performance and not the presence of females per se, further provides an explanation for the statistical insignificance of the independent dummy variables since these variables simply represented the gender of the person holding either the CEO, CFO or Chairman position rather than gender diversity.

This explanation is related to a more general point that should be kept in mind about the regression models- that it is a linear relationship that is tested. With that said, the lack of statistical significance for the SFMM variable is not equivalent with a non-existing relationship between the share of female executive management members and the financial performance of a firm. Rather, the results of the six regressions indicate that there is no statistical significant *linear* relationship between the share of executive management members variable and the financial performance of the firm.

6.2 Reverse causality

Reverse causality, or reverse causation, refers to a direction of cause-and-effect relationship that runs contrary to common presumption. In the context of this analysis, the possibility of a reverse causation implies that it is important to not hastily draw the conclusion that a higher

share of female board members *lead* to superior financial performance. Thus, the results that indicated that firms with a higher share of female board members are generally more profitable than other do not necessarily imply that a firm can boost their financial performance by hiring more female board members.

In the context of this analysis, reverse causation could be present if more profitable companies have a tendency to hire more female board members. Another source of reverse causation could be that women, as a consequence of the underrepresentation of women, are more in demand in the recruitment for corporate leaders and thus have a greater possibility than men to choose to work for more profitable companies. However, to our knowledge, there is no research on the relationship between females in leading positions and firm performance that suggests the prevalence of such a reverse causation. As a final point, the two directions of causation are not mutually exclusive since there is a possibility of a two-way causal relationship.

6.3 Omitted variables

The control variables and the independent variables included in the regression are by no means collectively exhaustive with regards to their effect on the financial performance of a firm. Finding and including all such variables in each of the regression models would be insurmountable. Therefore, there is always a risk that factors not captured by the included variables could have an effect on the outcomes of the regressions. A common type of omitted variable bias is fixed effects. That is, time invariant characteristics of an individual or a group. In the context of this analysis, that translates to time invariant characteristics of a certain company or companies within a certain industry. Having controlled for the industry of all observations and having excluded company dummy variables only after concluding insufficient variation in them[9], that type of omitted variable bias has been minimised.

6.4 Further economic interpretations

The fact that there is an statistical insignificant relationship between firm financial performance and the presence of a female CEO, CFO, Chairman and the presence of a higher share of female executive management members (SFMM) might not be all that surprising given the high level of gender equality in the broader society in Sweden. In particular, the

[9] As discussed in *3.3 Control variables*

gender equality in educational background that exists and has existed in Sweden for more than two decades points to the fact that Swedish men and women should be equally well equipped to perform well in leading positions with regards to their educational background.

There are various possible explanations to why one of the independent variables did show statistical significance in five out of six regressions- that is the share of female board members (SFBM). In line with the discussion of reverse causality, one explanation is that firms that are more profitable hire more women than less profitable firms. Another explanation, in line with the issue discussed in the model specification, is that more gender diverse boards perform better because women and men contribute with different perspectives and therefore complement each other to generate a more solid mix of competences and traits which in turn is mirrored in the financial performance of the firm. As mentioned above, it is possible the results indicating that an increase in the share of female board members (SFBM) has a positive effect on financial performance could be explained by the fact that the SFBM variable only had values ranging from 0 to 67%. Hence, it is possible that the regression models did not capture the potential negative effects of an imbalanced board consisting predominantly of women.

7. Concluding remarks

7.1 Females as corporate leaders and firm financial performance

This paper aimed to investigate the potential effect the presence of female corporate leaders on firm financial performance. Four out of five independent variables measuring the presence of females in leading positions lacked statistical significance in all six regressions indicating that they have a statistically insignificant relationship with the performance measures Return on Equity (ROE), Return on Assets (ROA), Return on Capital Employed (ROCE), Return on Operating Capital (ROOC), Operating Margin and Profit Margin respectively. In contrast, the one independent variable that displayed statistical significance did so in five out of six regressions indicating that a higher share of female board members leads to superior financial performance.

In the light of the above findings, it is imperative to interpret the findings vigilantly and question suggestions that the gender of corporate leaders has a positive or negative effect on the financial performance of firms. First, no support was found for the notion that women in leading positions underperform in comparison to their male counterparts. Second, it can be

concluded that the gender of the CEO, the CFO or the Chairman neither has a positive nor a negative effect on firm financial performance. Third, regarding the share of female executive management members, it can be said that a higher share neither has a positive nor negative effect on the financial performance of a firm. Finally, regarding the share of female board members, it can be said that a higher share has a positive effect on firm financial performance- at least up to the point where two thirds of the board consists of women. Thus, the findings do not provide any support for the notion that a company led predominantly or exclusively by women would be associated with better financial performance than a company led predominantly or exclusively by men. To summarise, the null hypothesis- a non-existing effect of the presence of female corporate leaders on firm financial performance can only partially be rejected. Consequently this paper adds to the existing literature of mixed and complex findings regarding the impact of female corporate leaders.

Seen from a policy-maker's perspective, these findings are noteworthy. Given the findings suggesting that female corporate leaders do not underperform in comparison to their male counterparts and the fact that there exists about as many qualified females as males in regards to educational attainment in Sweden, the low presence of women in leading positions of companies is seemingly unjustified. From a policy-maker's perspective then, the findings suggests that gender quotas could be enforced without hurting the financial performance of Swedish firms.

7.2 Limitations & further research

Regarding the limitations of this paper, two points should be emphasised. First, that the relationship between the presence of female corporate leaders and firm financial performance has only been tested with regards to public companies. This is important to highlight since there is a possibility that the findings might have been different if the selection of companies would have included private companies as well as public companies or solely private companies. One line of reasoning that supports such a possibility could be that a person holding a leading position has less direct influence over the financial performance of a public company than a private company since public companies are not seldom larger- both in terms of assets and the number of employees. Another line of reasoning that supports such a possibility is that public companies are subject to greater scrutiny and could therefore, to a higher extent than private companies, be pressured to hire female corporate leaders. The

second point that should be emphasised is that the relationship between the presence of female corporate leaders and firm financial performance has only been tested with regards to a limited set of performance measures. Thus, the enumeration of the performance measures that has been tested is not exhaustive.

As with any statistical analysis, the results can be made more robust with a larger sample. A possible pathway to increase the sample size substantially is to include not only public companies but also private. However, like we have experienced, the data for private companies is more inaccessible and would, like the data for public companies, have to be collected manually- a time consuming procedure. Furthermore, the issue with the low number of observations containing a female CEO and/or a female Chairman can hardly be mended with a larger data set, however, since it is not a feature of the particular sample used in this thesis but rather a feature of the population as a whole.

Regarding alternative empirical methods that could be used to complement the method used in this thesis, an ANOVA-analysis could be used to gain further insight into the relationship between females in leading positions and firm financial performance. For instance, given the results of the multiple variable regressions presented, it would be of interest to compare boards that are comprised of 0%-40% females, 40-60% females and 60%-100% females and compare their respective financial performance measures and explore the potential connection between gender diversity and financial performance. Such an analysis could indicate if there is a certain gender composition that is optimal in terms of financial performance and guide policymakers in their design of potential gender quota requirements.

Regarding the broader area of research on the relationship between the composition of corporate boards, executive management groups and firm financial performance, there are other dimensions of group compositions than gender to explore. For instance, intersectional factors such as ethnicity and cultural background could give additional insights. To further nuanced the findings, an analysis of potential differences regarding gender and performance amongst different industries could be an intriguing approach to generate comparative findings.

Finally, other academic fields could be fruitful in the strive of gaining a deeper understanding of the low presence female corporate leaders. With the lack of evidence for the notion that women underperform in comparison to their male counterparts, the low presence

of women in leading positions remains perplexing. Although it would most likely entail approaching other academic fields, it would be interesting to explore explanations other than those relating to financial performance to untangle this enigmatic issue.

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Appendix

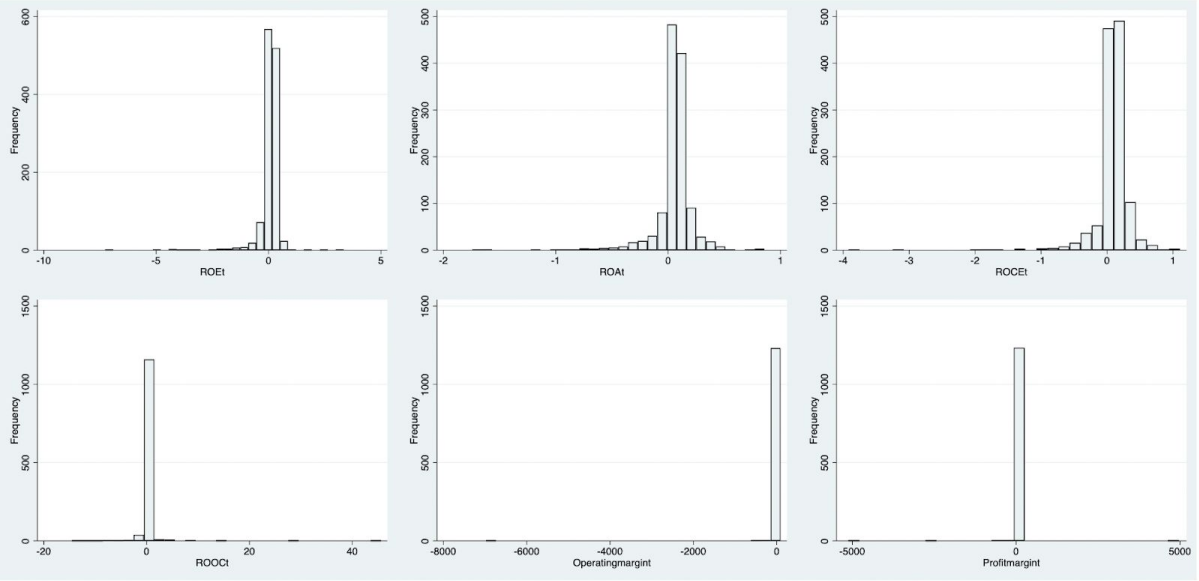
Appendix 1. Name of all industries and supersectors included in the dataset. The supersectors are referred to as industries throughout the thesis.

Name given in regression	NASDAQ ICB-code	Industry	Supersector
ICBdummy1	500	Oil & Gas	Oil & Gas
ICBdummy2	1700	Basic Materials	Basic resources
ICBdummy3	2300	Industrials	Construction & Materials
ICBdummy4	2700	Industrials	Industrial Goods & Services
ICBdummy5	3300	Consumer goods	Automobile & Parts
ICBdummy6	3500	Consumer goods	Food & Beverage
ICBdummy7	3700	Consumer goods	Personal & Household Goods
ICBdummy8	4500	Health care	Health care
ICBdummy9	5300	Consumer Services	Retail
ICBdummy10	5500	Consumer Services	Media
ICBdummy11	5700	Consumer Services	Travel & Leisure
ICBdummy12	6500	Telecommunications	Telecommunications
ICBdummy13	8600	Financials	Real Estate
ICBdummy14	8700	Financials	Financial Services
Base case	9500	Technology	Technology

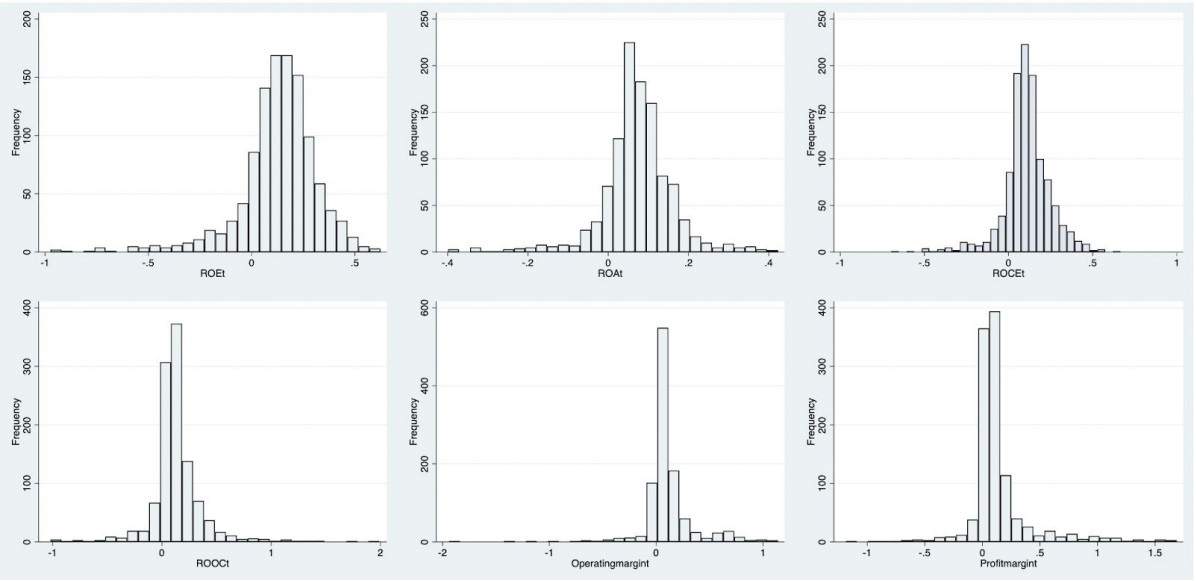
Appendix 2. Descriptive statistics for each of the dependent variables in the initial dataset. All values are given in decimal form. Std. deviation denotes standard deviation.

	Dependent Variable					
	R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
Min. value	-7.270	-1.740	-3.920	-14.541	-6973.00	-5117.860
Max. value	1.640	0.750	0.849	9.440	4.880	4962.670
1% percentile	-1.990	-0.710	-0.920	-4.273	-30.250	-24.530
99% percentile	0.620	0.63	0.630	3.998	1.150	1.830
Std. Deviation	0.534	0.18	0.290	1.929	200.530	217.240
Mean	0.070	0.050	0.080	0.161	-8.350	-3.630

Appendix 3. Histograms of each dependent variable including all observations in the initial dataset, before any trimming.



Appendix 4. Histograms for each dependent variable with the observations remaining after trimming the dataset.



Appendix 5. Name of all companies included in the final regression model listed in alphabetical order.

	Company name		Company name (cont.)		Company name (cont.)		Company name (cont.)
1	A3 Allmänna IT - och Telekomaktiebolaget (publ)	**39**	Bulten AB	**77**	Holmen Aktiebolag	**115**	Proact IT Group AB
2	AAK AB (publ)	**40**	Bure Equity AB	**78**	Husqvarna Aktiebolag	**116**	PROBI Aktiebolag
3	AB Sagax	**41**	C-Rad AB	**79**	ICA Gruppen Aktiebolag	**117**	ProfilGruppen AB
4	ABB AB	**42**	Castellum Aktiebolag	**80**	ICTA AB (publ)	**118**	Qliro Group AB (publ)
5	Acando AB	**43**	Catena AB	**81**	Intrum AB	**119**	Railcare Group AB
6	ACTIVE Biotech AB	**44**	CellaVision AB	**82**	Investor Aktiebolag	**120**	Ratos AB
7	Addnode Group Aktiebolag (publ)	**45**	Clas Ohlson Aktiebolag	**83**	Invisio Communications AB	**121**	RaySearch Laboratories AB (publ)
8	Addtech AB	**46**	Cloetta AB	**84**	KappAhl AB (publ)	**122**	RNB RETAIL AND BRANDS AB (publ)
9	Aktiebolag Fagerhult	**47**	Collector AB	**85**	Kinnevik AB	**123**	SAAB Aktiebolag
10	Aktiebolaget Electrolux	**48**	Concordia Maritime Aktiebolag	**86**	Knowit Aktiebolag (publ)	**124**	SAS AB
11	Aktiebolaget Industrivärden	**49**	Consilium Aktiebolag	**87**	Kungsleden Aktiebolag	**125**	Scandic Hotels Group AB
12	Aktiebolaget SKF	**50**	Corem Property Group AB	**88**	Lammhults Design Group AB	**126**	SECTRA Aktiebolag
13	Aktiebolaget Volvo	**51**	CTT Systems AB	**89**	Lindab International AB	**127**	Semcon Aktiebolag
14	Alfa Laval AB	**52**	Diös Fastigheter AB	**90**	Loomis AB	**128**	Sensys Gatso Group AB
15	Anoto Group AB	**53**	Dometic Group AB (publ)	**91**	Lundin Petroleum AB	**129**	Skanska AB
16	AQ Group AB	**54**	DORO AB	**92**	Magnolia Bostad AB	**130**	SkiStar Aktiebolag
17	ASSA ABLOY AB	**55**	Duni AB	**93**	Medivir Aktiebolag	**131**	Softronic Aktiebolag
18	Atlas Copco Aktiebolag	**56**	Duroc Aktiebolag	**94**	Mekonomen Aktiebolag	**132**	SSAB AB
19	Atrium Ljungberg AB	**57**	Elanders AB	**95**	Micro Systemation AB (publ)	**133**	Stockwik Förvaltning AB
20	Avanza Bank Holding AB	**58**	Elos Medtech AB	**96**	Midsona AB	**134**	Studsvik AB
21	Axfood Aktiebolag	**59**	Empir Group AB	**97**	Midway Holding Aktiebolag	**135**	Svedbergs i Dalstorp AB
22	Bactiguard Holding AB	**60**	Enea Aktiebolag	**98**	Modern Times Group MTG AB	**136**	Svenska Cellulosa Aktiebolaget SCA
23	BE Group AB (publ)	**61**	Eniro AB	**99**	MOMENT GROUP AB	**137**	SWECO AB (publ)
24	Beijer Alma AB	**62**	Eolus Vind Aktiebolag (publ).	**100**	MQ Holding AB	**138**	Swedish Match AB
25	Beijer Electronics Group AB	**63**	Episurf Medical AB	**101**	Mycronic AB (publ)	**139**	Swedol AB (publ)
26	Beijer Ref AB (publ)	**64**	Fabege AB	**102**	Net Insight AB	**140**	Systemair Aktiebolag
27	Bergman & Beving Aktiebolag	**65**	Fastighets AB Balder	**103**	NetEnt AB (publ)	**141**	Tele2 AB
28	Bergs Timber AB (publ)	**66**	Feelgood Svenska Aktiebolag (publ.)	**104**	NGS Group Aktiebolag	**142**	Telia Company AB
29	Besqab AB (publ)	**67**	Fingerprint Cards AB	**105**	NIBE Industrier AB	**143**	Tethys Oil AB
30	Betsson AB	**68**	FormPipe Software AB	**106**	Nobia AB	**144**	TradeDoubler Aktiebolag
31	Bilia AB	**69**	Getinge AB	**107**	Nobina AB (publ)	**145**	Trention Aktiebolag
32	BillerudKorsnäs Aktiebolag (publ)	**70**	GHP Specialty Care AB (publ)	**108**	NOTE AB (publ)	**146**	VBG GROUP AB (publ)
33	BioGaia AB	**71**	H & M Hennes & Mauritz AB	**109**	NOVOTEK Aktiebolag	**147**	Venue Retail Group Aktiebolag
34	BioInvent International Aktiebolag	**72**	Haldex Aktiebolag	**110**	Odd Molly International AB	**148**	Vitec Software Group AB (publ)
35	Björn Borg AB	**73**	Hexagon Aktiebolag	**111**	Orexo AB	**149**	Wallenstam AB
36	Boliden AB	**74**	HiQ International AB	**112**	Pandox Aktiebolag	**150**	Wise Group AB
37	Bong AB	**75**	HMS Networks AB	**113**	Peab AB	**151**	XANO Industri AB
38	BTS Group AB	**76**	Hoist Finance AB	**114**	Poolia AB	**152**	ZetaDisplay AB

Appendix 6. Variance inflation factor test for all control variables except the dummy variables for each company.

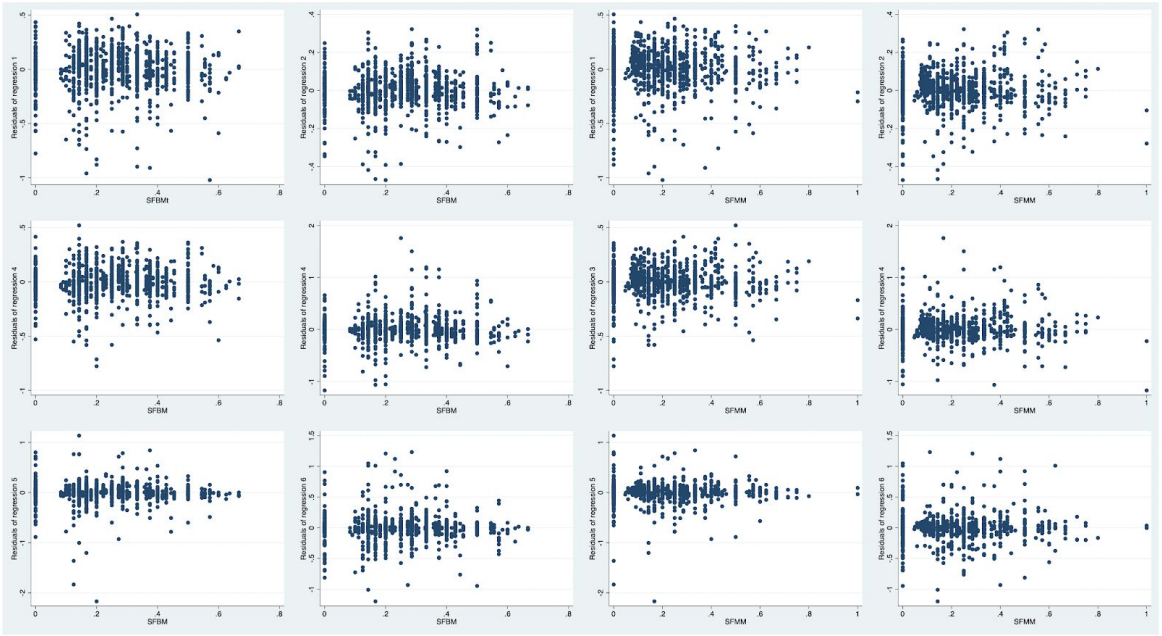
Variable	VIF	1/VIF
CEOt	1.34	0.743
CFOt	1.19	0.839
SFMMt	1.59	0.628
SFBMt	1.32	0.755
Chairmant	1.15	0.870
YearSinceRegistration	1.48	0.675
TotalAssets	1.44	0.692
DEt	1.12	0.889
ICBdummy1	1.11	0.901
ICBdummy2	1.47	0.682
ICBdummy3	1.46	0.684
ICBdummy4	2.29	0.437
ICBdummy5	1.25	0.800
ICBdummy6	1.64	0.609
ICBdummy7	1.68	0.596
ICBdummy8	1.14	0.878
ICBdummy9	1.30	0.7695
ICBdummy10	1.27	0.785
ICBdummy11	1.63	0.612
ICBdummy12	1.75	0.571
ICBdummy13	1.13	0.887
ICBdummy14	1.53	0.652
dummy2017	1.89	0.529
dummy2016	1.84	0.545
dummy2015	1.82	0.550
dummy2014	1.79	0.558
dummy2013	1.79	0.558
dummy2012	1.77	0.564
dummy2011	1.76	0.567
Mean VIF	1.52	

Appendix 7. A table showing the correlation between each of the dependent and independent variables included in the final regression.

Correlation table	ICBdummy1	ICBdummy2	ICBdummy3	ICBdummy4	ICBdummy5	ICBdummy6	ICBdummy7	ICBdummy8	ICBdummy9	ICBdummy10	ICBdummy11	ICBdummy12	ICBdummy13	ICBdummy14
ICBdummy1	1.0													
ICBdummy2	-0.0277	1.0												
ICBdummy3	-0.0317	-0.0604	1.0											
ICBdummy4	-0.0653	-0.1245	-0.1422	1.0										
ICBdummy5	-0.0223	-0.0426	-0.0486	-0.1003	1.0									
ICBdummy6	-0.0376	-0.0717	-0.0819	-0.1689	-0.0578	1.0								
ICBdummy7	-0.0346	-0.0660	-0.0754	-0.1555	-0.0532	-0.0896	1.0							
ICBdummy8	-0.0171	-0.0326	-0.0372	-0.0768	-0.0263	-0.0442	-0.0407	1.0						
ICBdummy9	-0.0241	-0.0460	-0.0526	-0.1084	-0.0371	-0.0625	-0.0575	-0.0284	1.0					
ICBdummy10	-0.0179	-0.0341	-0.0389	-0.0803	-0.0275	-0.0463	-0.0426	-0.0210	-0.0297	1.0				
ICBdummy11	-0.0355	-0.0677	-0.0773	-0.1594	-0.0545	-0.0918	-0.0845	-0.0417	-0.0589	-0.0436	1.0			
ICBdummy12	-0.0328	-0.0626	-0.0715	-0.1474	-0.0504	-0.0849	-0.0782	-0.0386	-0.0545	-0.0404	-0.0801	1.0		
ICBdummy13	-0.0145	-0.0277	-0.0317	-0.0653	-0.0223	-0.0376	-0.0346	-0.0171	-0.0241	-0.0179	-0.0355	-0.0328	1.0	
ICBdummy14	-0.0337	-0.0643	-0.0735	-0.1515	-0.0518	-0.0873	-0.0803	-0.0397	-0.0560	-0.0415	-0.0824	-0.0762	-0.0337	1.0
dummy2017	-0.0234	-0.0015	-0.0018	-0.0012	0.0044	-0.0056	0.0019	0.0039	-0.0066	-0.0010	0.0166	-0.0085	-0.0008	0.0072
dummy2016	0.0012	0.0022	0.0025	0.0011	0.0075	-0.0006	-0.0037	-0.0134	-0.0034	0.0014	-0.0187	0.0175	0.0012	0.0014
dummy2015	0.0005	0.0009	0.0011	-0.0019	-0.0087	0.0073	-0.0052	0.0055	-0.0186	0.0006	-0.0001	0.0051	0.0005	-0.0002
dummy2014	-0.0002	-0.0003	-0.0004	0.0017	0.0054	-0.0135	0.0034	0.0047	0.0085	-0.0002	0.0083	-0.0177	-0.0002	-0.0017
dummy2013	-0.0011	-0.0022	-0.0025	-0.0027	0.0039	0.0124	-0.0090	0.0035	0.0068	-0.0014	0.0059	0.0014	-0.0011	-0.0039
dummy2012	-0.0002	-0.0003	-0.0004	-0.0048	-0.0097	-0.0040	0.0034	0.0047	0.0085	-0.0002	0.0083	-0.0070	-0.0002	-0.0017
dummy2011	0.0002	0.0003	0.0004	0.0032	-0.0092	0.0064	0.0042	0.0051	0.0091	0.0002	-0.0009	0.0044	0.0002	-0.0009
CEOt	-0.0355	-0.0525	-0.0638	-0.0725	-0.0545	-0.0104	0.0526	-0.0417	0.0098	0.0248	0.1820	0.1939	-0.0355	0.0196
CFOt	0.0421	-0.0273	-0.0908	0.0163	0.0423	0.0404	-0.0597	-0.0311	0.0796	-0.0365	0.1470	0.0624	-0.0656	-0.1029
SFBMt	-0.0720	-0.1027	-0.0147	-0.0843	-0.0578	-0.0698	0.1737	-0.0084	-0.0943	-0.0030	0.0131	0.0427	0.1420	0.0933
SFMMt	-0.0717	-0.0479	-0.1033	-0.0969	-0.0351	0.1153	0.2264	-0.0273	0.0260	0.0325	0.1212	0.1087	-0.0521	0.0151
Chairmant	-0.0244	-0.0466	-0.0532	-0.0877	-0.0375	-0.0308	-0.0235	-0.0287	-0.0406	0.1287	0.0763	0.1447	0.1305	-0.0567
DEt	-0.0230	-0.0214	-0.0078	-0.0455	-0.0254	-0.0426	-0.0174	0.0038	-0.0004	-0.0101	0.0018	0.2772	-0.0096	-0.0222
TotalAssets	-0.0460	0.0252	0.0318	0.0200	-0.0665	-0.1010	-0.0315	-0.0359	-0.0422	0.2373	0.0136	0.1682	-0.0251	0.0430
YearSinceRegistration	-0.0840	0.2143	0.0861	0.1215	0.0233	-0.1228	0.0276	-0.0938	-0.0705	-0.0553	-0.0703	0.0975	-0.0822	0.0386

	dummy2017	dummy2016	dummy2015	dummy2014	dummy2013	dummy2012	dummy2011	CEOt	CFOt	SFBMt	SFMMt	Chairmant	DEt	TotalaAssetst	arSinceRegistrati
ICBdummy1															
ICBdummy2															
ICBdummy3															
ICBdummy4															
ICBdummy5															
ICBdummy6															
ICBdummy7															
ICBdummy8															
ICBdummy9															
ICBdummy10															
ICBdummy11															
ICBdummy12															
ICBdummy13															
ICBdummy14															
dummy2017	1.0														
dummy2016	-0.1422	1.0													
dummy2015	-0.1434	-0.1399	1.0												
dummy2014	-0.1446	-0.1411	-0.1423	1.0											
dummy2013	-0.1464	-0.1428	-0.1440	-0.1452	1.0										
dummy2012	-0.1446	-0.1411	-0.1423	-0.1434	-0.1452	1.0									
dummy2011	-0.1440	-0.1405	-0.1417	-0.1429	-0.1446	-0.1429	1.0								
CEOt	0.0365	-0.0187	-0.0101	0.0083	0.0356	-0.0116	-0.0109	1.0							
CFOt	0.0292	-0.0005	0.0225	0.0001	-0.0043	0.0001	-0.0049	0.0525	1.0						
SFBMt	0.1731	0.1429	0.0808	-0.0230	-0.0719	-0.0637	-0.0954	0.1509	0.0439	1.0					
SFMMt	0.0786	0.0248	0.0486	0.0206	-0.0044	-0.0235	-0.0644	0.4053	0.2788	0.2563	1.0				
Chairmant	0.0746	0.0653	0.0358	0.0345	-0.0226	-0.0628	-0.0625	0.0083	-0.0116	0.1995	0.0525	1.0			
DEt	0.0106	0.0050	0.0089	0.0179	0.0137	0.0106	-0.0558	-0.0228	0.1271	0.0428	0.0640	0.0090	1.0		
TotalAssets	0.0431	0.0346	0.0202	0.0048	-0.0235	-0.0190	-0.0214	-0.0453	-0.0019	0.0886	0.0917	0.1171	0.0857	1.0	
YearSinceRegistration	0.0468	0.0372	0.0231	-0.0022	-0.0121	-0.0162	-0.0316	-0.1030	-0.0016	-0.0078	-0.0757	-0.0214	0.0004	0.4209	1.0

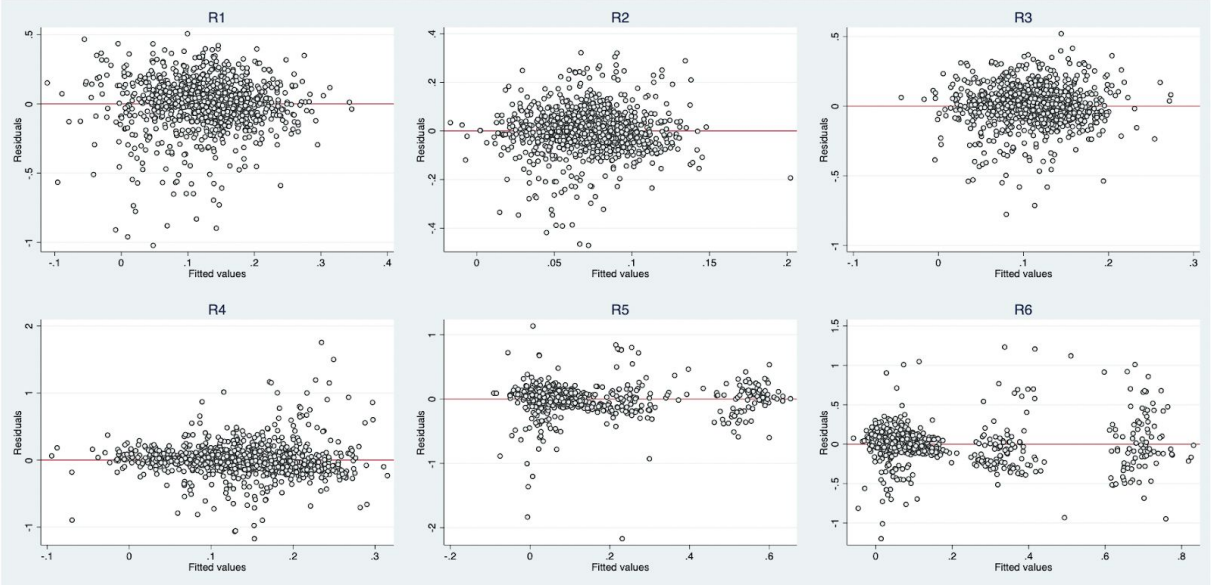
Appendix 8. The residuals of each regression plotted against the share of female board members variable (SFBM) and the share of female executive management members variable (SFMM). No scatterplots for the dummy independent variables have been included since they are not measured at the continuous level.



Appendix 9. Output from the two-tailed Breusch-Pagan/ Cook-Weisberg test for homoscedasticity. The dependent variable of each regression is shown in the parenthesis following the regression number. OM denotes Operating Margin and PM denotes Profit Margin. From the fourth row, it can be understood that all regressions but R3 (ROCE) display heteroscedasticity.

Breusch-Pagan/ Cook-Weisberg test	**Regression**					
	R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
Chi2	98.790	5.800	4.500	130.900	26.120	544.50
Prob > Chi2	0.000	0.0160	0.034	0.000	0.000	0.000
Heteroscedastic	Yes	Yes	No	Yes	Yes	Yes

Appendix 10. The residuals of each of the six regressions plotted against their fitted values. The dependent variable is ROE in R1, ROA in R2, ROCE in R3, ROOC in R4, Operating margin in R5, Profit margin in R6.



Appendix 11. Output of the Wooldridge test for autocorrelation for all six regressions. The dependent variable of each regression is shown in the parenthesis following the regression number. OM denotes Operating Margin and PM denotes Profit Margin. From the fourth, it can be understood that all regressions except R5(OM) suffer from autocorrelation.

Wooldridge test	Regression					
	R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
F-value	13.673	17.910	15.697	21.345	0.149	6.640
Prob > F	0.000	0.000	0.000	0.000	0.670	0.011
Autocorrelation	Yes	Yes	Yes	Yes	No	Yes

Appendix 12. Output of the Shapiro-Wilk test for normally distributed residuals. The dependent variable of each regression is shown in the parenthesis following the regression number. OM denotes Operating Margin and PM denotes Profit Margin. From the sixth row, it can be understood that all regressions display a lack of normally distributed residuals.

Shapiro-wilk test	**Regression**					
	R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
W	0.920	0.926	0.939	0.837	0.720	0.808
V	55.502	51.837	42.752	113.832	195.507	133.869
z	9.991	9.821	9.341	11.777	13.123	12.181
Prob > z	0.000	0.000	0.000	0.000	0.000	0.000
Normally distributed residuals	No	No	No	No	No	No

Appendix 13. Shapiro-Wilk test for normally distributed residuals with log-transformed variables. The dependent variable of each regression is shown in the parenthesis following the regression number. OM denotes Operating Margin and PM denotes Profit Margin. From the sixth row, it can be understood that none of the regressions had normally distributed residuals.

Shapiro-wilk test	**Regression**					
	R1(ROE)	R2(ROA)	R3(ROCE)	R4(ROOC)	R5(OM)	R6(PM)
W	0.927	0.928	0.943	0.837	0.723	0.809
V	50.950	50.025	39.785	113.279	193.230	132.821
z	9.778	9.732	9.162	11.765	13.094	12.161
Prob > z	0.000	0.000	0.000	0.000	0.000	0.000
Normally distributed residuals	No	No	No	No	No	No

Appendix 14. Full regression results for regression R1 in which ROE is the dependent variable. Std.Err denotes errors that are clustered on companies.

Number of obs	1116
R-squared	0,111
Root MSE	0,185

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.060	0.063	0.960	0.341	-0.065	0.185
ICBdummy2	-0.051	0.051	-1.010	0.314	-0.151	0.049
ICBdummy3	0.103	0.045	2,310	0.022	0.015	0.191
ICBdummy4	0,029	0.046	0,630	0.530	-0.061	0.119
ICBdummy5	0.026	0.051	0.510	0.613	-0.075	0.126
ICBdummy6	-0.058	0.067	-0.860	0.389	-0.191	0.075
ICBdummy7	0.033	0.064	0.510	0.613	-0.095	0.160
ICBdummy8	-0.131	0.126	-1.040	0.299	-0.379	0.117
ICBdummy9	0.062	0.071	0.880	0.383	-0.078	0.203
ICBdummy10	-0.018	0.050	-0.350	0.724	-0.116	0.081
ICBdummy11	0.029	0.046	0.620	0.536	-0.063	0.120
ICBdummy12	0.029	0.055	0.520	0.601	-0.080	0.138
ICBdummy13	-0.016	0.075	-0.210	0.836	-0.165	0.133
ICBdummy14	-0.010	0.044	-0.240	0.813	-0.097	0.076
dummy2017	-0.024	0.023	-1.050	0.294	-0.070	0.021
dummy2016	-0.015	0.024	-0.620	0.537	-0.061	0.032
dummy2015	-0.032	0.023	-1.380	0.170	-0.077	0.014
dummy2014	-0.044	0.021	-2.050	0.042	-0.086	-0.002
dummy2013	-0.045	0.019	-2.370	0.019	-0.082	-0.007
dummy2012	-0.059	0.020	-2.970	0.004	-0.098	-0.020
dummy2011	0.001	0.018	0.030	0.974	-0.035	0.036
CEOdummy	-0.027	0.035	-0.770	0.440	-0.095	0.041
CFOdummy	0.013	0.023	0.570	0.569	-0.032	0.059
SFBMt	0.244	0.083	2.940	0.004	0.080	0.408
SFMMt	0.023	0.064	0.360	0.718	-0.104	0.150
Chairmandummy	0.009	0.029	0.300	0.768	-0.049	0.066
DEt	0.002	0.001	2.100	0.037	0.000	0.003
Totalassets	0.000	0.990	0.324	0.000	0.000	0.000
YearsSinceregistration	0.000	0.000	0.650	0.516	0.000	0.001
Constant	0.058	0.053	1.090	0.277	-0.047	0.163

Appendix 15. Full regression results for regression R2 in which ROA is the dependent variable. Std.Err denotes errors that are clustered on companies.

Number of obs	1116
R-squared	0,077
Root MSE	0,090

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.065	0.049	1.33	0.187	-0.03	0.164
ICBdummy2	-0.02	0.023	-0.98	0.328	-0.06	0.023
ICBdummy3	0.025	0.022	1.15	0.253	-0.01	0.069
ICBdummy4	0.002	0.022	0.12	0.907	-0.04	0.046
ICBdummy5	0.021	0.021	1.03	0.306	-0.02	0.063
ICBdummy6	-0.01	0.036	-0.33	0.745	-0.08	0.060
ICBdummy7	0.014	0.031	0.48	0.633	-0.04	0.076
ICBdummy8	-0.04	0.037	-1.14	0.258	-0.11	0.031
ICBdummy9	0.044	0.038	1.15	0.254	-0.03	0.120
ICBdummy10	-0.00	0.023	-0.16	0.87	-0.05	0.042
ICBdummy11	0.006	0.021	0.29	0.773	-0.03	0.048
ICBdummy12	0.007	0.024	0.3	0.765	-0.04	0.056
ICBdummy13	-0.01	0.029	-0.58	0.56	-0.07	0.040
ICBdummy14	-0.000	0.022	-0.38	0.701	-0.05	0.035
dummy2017	-0.01	0.011	-1.1	0.271	-0.03	0.010
dummy2016	-0.00	0.011	-0.78	0.439	-0.03	0.013
dummy2015	-0.00	0.010	-0.93	0.353	-0.03	0.010
dummy2014	-0.01	0.009	-1.62	0.108	-0.03	0.003
dummy2013	-0.02	0.009	-2.28	0.024	-0.03	-0.00
dummy2012	-0.02	0.008	-2.31	0.023	-0.03	-0.00
dummy2011	-0.00	0.008	-0.21	0.837	-0.01	0.015
CEOdummy	-0.01	0.018	-0.58	0.562	-0.04	0.025
CFOdummy	-0.00	0.011	-0.46	0.646	-0.02	0.017
SFBMt	0.119	0.040	2.97	0.003	0.040	0.199
SFMMt	0.013	0.033	0.42	0.676	-0.05	0.079
Chairmandummy	-0.00	0.015	-0.47	0.64	-0.03	0.023
DEt	-0.00	0.000	-1.84	0.068	-0.00	0.000
Totalassets	0.000	0.000	0.620	0.538	0.000	0.000
YearsSinceregistration	0.000	0.000	0.350	0.727	0,000	0.000
Constant	0.048	0.026	1.860	0.065	-0.003	0.098

Appendix 16. Full regression results for regression R3 in which ROCE is the dependent variable. Std.Err denotes errors that are clustered on companies.

Number of obs	1116
R-squared	0,093
Root MSE	0,136

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.052	0.060	0.870	0.386	-0.067	0.171
ICBdummy2	-0.047	0.036	-1.290	0.200	-0.119	0.025
ICBdummy3	0.045	0.035	1.310	0.191	-0.023	0.114
ICBdummy4	0.004	0.035	0.120	0.905	-0.065	0.074
ICBdummy5	0.011	0.033	0.320	0.748	-0.055	0.077
ICBdummy6	-0.040	0.051	-0.790	0.432	-0.142	0.061
ICBdummy7	0.018	0.048	0.390	0.701	-0.076	0.112
ICBdummy8	-0.056	0.060	-0.940	0.350	-0.173	0.062
ICBdummy9	0.060	0.061	0.990	0.325	-0.060	0.180
ICBdummy10	-0.021	0.035	-0.580	0.560	-0.090	0.049
ICBdummy11	-0.032	0.034	-0.940	0.351	-0.099	0.035
ICBdummy12	0.016	0.039	0.400	0.689	-0.062	0.094
ICBdummy13	-0.035	0.046	-0.760	0.451	-0.125	0.056
ICBdummy14	-0.019	0.034	-0.550	0.581	-0.086	0.049
dummy2017	-0.028	0.018	-1.520	0.131	-0.064	0.008
dummy2016	-0.016	0.018	-0.930	0.356	-0,051	0.018
dummy2015	-0.022	0.017	-1.310	0.191	-0.055	0.011
dummy2014	-0.033	0.016	-2.100	0.038	-0.064	-0.002
dummy2013	-0.039	0.014	-2.790	0.006	-0.067	-0.012
dummy2012	-0.042	0.013	-3.190	0.002	-0.067	-0.016
dummy2011	0.003	0.013	0.230	0.820	-0.023	0.029
CEOdummy	-0.018	0.029	-0.630	0.527	-0.075	0.039
CFOdummy	0.009	0.019	0.460	0.645	-0.028	0.045
SFBMt	0.172	0.059	2.920	0.004	0.055	0.288
SFMMt	0.030	0,051	0.590	0.553	-0.070	0.131
Chairmandummy	-0.005	0.018	-0.290	0.771	-0.041	0.030
DEt	0.001	0.001	2.140	0.034	0.000	0.003
Totalassets	0.000	0.000	0.040	0.971	0.000	0.000
YearsSinceregistration	0.000	0.000	0.830	0.409	0.000	0.001
Constant	0.073	0.040	1.830	0.070	-0.006	0.152

Appendix 17. Full regression results for regression R4 in which ROOC is the dependent variable. Std.Err denotes errors that are clustered on companies.

Number of obs	1116
R-squared	0,071
Root MSE	0,238

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.034	0.082	0.410	0.679	-0.128	0.197
ICBdummy2	-0.094	0.056	-1.690	0.093	-0.205	0.016
ICBdummy3	0.007	0.054	0.130	0.893	-0.100	0.114
ICBdummy4	-0.029	0.055	-0.530	0.600	-0.138	0.080
ICBdummy5	-0.031	0.053	-0.580	0.561	-0.136	0.074
ICBdummy6	0.039	0.104	0.370	0.709	-0.166	0.243
ICBdummy7	-0.006	0.069	-0.090	0.927	-0.143	0.130
ICBdummy8	-0.144	0.086	-1.680	0.095	-0.313	0.025
ICBdummy9	0.082	0.096	0.850	0.396	-0.108	0.271
ICBdummy10	-0.062	0.051	-1.210	0.229	-0.163	0.039
ICBdummy11	-0.076	0.056	-1.350	0.181	-0.187	0.035
ICBdummy12	-0.040	0.058	-0.690	0.489	-0.155	0.075
ICBdummy13	-0.102	0.058	-1.770	0.079	-0.217	0.012
ICBdummy14	-0.067	0.054	-1.240	0.217	-0.173	0.040
dummy2017	-0.047	0.034	-1.370	0.173	-0.115	0.021
dummy2016	-0.022	0.032	-0.690	0.489	-0.085	0.041
dummy2015	-0.022	0.031	-0.690	0.491	-0.084	0.040
dummy2014	-0.031	0.030	-1.060	0.291	-0.090	0.027
dummy2013	-0.039	0.027	-1.420	0.157	-0.093	0.015
dummy2012	-0.064	0.026	-2.470	0.015	-0.116	-0.013
dummy2011	0.005	0.024	0.210	0.835	-0.042	0.052
CEOdummy	0.000	0.054	-0.010	0.994	-0.108	0.107
CFOdummy	0.013	0.032	0.410	0.681	-0.050	0.077
SFBMt	0.327	0.107	3.070	0.003	0.116	0.538
SFMMt	0.010	0.083	0.120	0.902	-0.155	0.175
Chairmandummy	-0.024	0.032	-0.770	0.445	-0.087	0.038
DEt	0.000	0.001	0.310	0.760	-0.001	0.002
Totalassets	0.000	0.000	-0.470	0.638	0.000	0.000
YearsSinceregistration	0.000	0.000	0.820	0.412	0.000	0.001
Constant	0.090	0.063	1.430	0.156	-0.035	0.215

Appendix 18. Full regression results for regression R5 in which Operating Margin is the dependent variable. Std. error denotes robust standard errors.

Number of obs	1116
R-squared	0,370
Root MSE	0,196

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.238	0.080	2.990	0.003	0.082	0.394
ICBdummy2	-0.005	0.015	-0.310	0.754	-0.033	0.024
ICBdummy3	0.017	0,013	1.360	0.173	-0.008	0.042
ICBdummy4	-0.013	0.015	-0.860	0.388	-0.041	0.016
ICBdummy5	-0.044	0.078	-0.560	0.576	-0.197	0.110
ICBdummy6	-0.011	0.026	-0.440	0.663	-0.063	0.040
ICBdummy7	-0.016	0.014	-1.140	0.256	-0.044	0.012
ICBdummy8	-0.062	0.039	-1.600	0.110	-0.138	0.014
ICBdummy9	0.072	0.022	3.260	0.001	0.029	0.116
ICBdummy10	0.010	0.022	0.440	0.661	-0.034	0.053
ICBdummy11	0.504	0.028	18.070	0.000	0.449	0.558
ICBdummy12	0.158	0.051	3.120	0.002	0.059	0.257
ICBdummy13	-0.037	0.016	-2.300	0.022	-0.068	-0.005
ICBdummy14	0.004	0.018	0.250	0.806	-0.031	0.040
dummy2017	0.011	0.024	0.450	0.654	-0.037	0.058
dummy2016	-0.007	0.030	-0.240	0.809	-0.067	0.052
dummy2015	0.011	0.023	0.450	0.651	-0.035	0.056
dummy2014	0.011	0.025	0.440	0.657	-0.038	0.060
dummy2013	-0.008	0.024	-0.320	0.748	-0.055	0.039
dummy2012	-0.008	0.026	-0.300	0.761	-0.058	0.042
dummy2011	0.002	0.030	0.060	0.951	-0.056	0.060
CEOdummy	-0.047	0.029	-1.620	0.105	-0.104	0.010
CFOdummy	-0.022	0.015	-1.470	0.141	-0.052	0.007
SFBMt	0.177	0.050	3.540	0.000	0.079	0.275
SFMMt	-0.028	0.039	-0.730	0.463	-0.104	0.047
Chairmandummy	0.012	0.025	0.490	0.622	-0.036	0.060
DEt	0.001	0.001	1.460	0.145	0.000	0.002
Totalassets	0.000	0.000	3.560	0.000	0.000	0.000
YearsSinceregistration	0.000	-0.930	0.354	0.000	0.000	0.000
Constant	0.018	0.028	0.650	0.514	-0.037	0.073

Appendix 19. Full regression results for regression R6 in which Profit Margin is the dependent variable. Std.Err denotes errors that are clustered on companies.

Number of obs	1116
R-squared	0,463
Root MSE	0,207

Independent variable	Coefficient	Std. Err	t	P>|t|	[95% Conf.	Interval]
ICBdummy1	0.254	0.157	1.620	0.107	-0.056	0.565
ICBdummy2	-0.016	0.030	-0.520	0.602	-0.075	0.044
ICBdummy3	0.009	0.028	0.330	0.743	-0.046	0.065
ICBdummy4	-0.012	0.028	-1.410	0.679	-0.067	0.044
ICBdummy5	0.066	0.041	1.600	0.111	-0.015	0.146
ICBdummy6	0.001	0.051	0.010	0.990	-0.101	0.102
ICBdummy7	-0.014	0.027	-0.530	0.600	-0.067	0.039
ICBdummy8	-0.044	0.043	-1.010	0.316	-0.129	0.042
ICBdummy9	0.073	0.053	1.390	0.166	-0.031	0.178
ICBdummy10	-0.026	0.063	-0.420	0.677	-0.150	0.098
ICBdummy11	0.634	0.075	8.410	0.000	0.485	0.783
ICBdummy12	0.270	0.081	3.340	0.001	0.110	0.429
ICBdummy13	-0.039	0.026	-1.520	0.131	-0.089	0.012
ICBdummy14	-0.002	0.033	-0.050	0.963	-0.066	0.063
dummy2017	-0.033	0.022	-1.510	0.134	-0.076	0.010
dummy2016	-0.037	0.027	-1.370	0.173	-0.091	0.016
dummy2015	-0.038	0.020	-1.910	0.058	-0.078	0.001
dummy2014	-0.037	0.023	-1.580	0.116	-0.083	0.009
dummy2013	-0.054	0.021	-2.560	0.011	-0.095	-0.012
dummy2012	-0.033	0.025	-1.300	0.195	-0.083	0.017
dummy2011	-0.040	0.024	-1.690	0.094	-0.087	0.007
CEOdummy	-0.032	0.055	-0.590	0.557	-0.141	0.076
CFOdummy	-0.014	0.029	-0.470	0.637	-0.070	0.043
SFBMt	0.137	0.079	1.730	0.086	-0.020	0.293
SFMMt	-0.058	0.066	-0.880	0.383	-0.187	0.072
Chairmandummy	0.045	0.060	0.750	0.455	-0.074	0.164
DEt	-0.001	0.001	-0.490	0.628	-0.003	0.002
Totalassets	0.000	0.000	1.680	0.095	0.000	0.000
Yearssinceregistration	0.000	0.000	-0.340	0.735	-0.001	0.001
Constant	0.068	0.040	1.720	0.087	-0.010	0.147