Navigating the Gender Equality Maze

A study investigating how gender diversity reflects corporate value

Sophia Granfors[♣] Mathilda Normelli[♦]

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Abstract

This thesis explores if corporate value can be created through increased gender diversity in top management and board positions, using a unique dataset of 209 companies listed on Nasdaq Stockholm between 2013 and 2016. Firstly, we aim to determine the effect of female inclusion in leading positions on corporate financial performance, estimated through accounting- and market-based measures. Furthermore, we investigate how female and male CEOs may differ in terms of background characteristics, in an attempt to understand how this relates to the performance of Swedish firms. By the use of ordinary least square regressions and fixed effects models, we are able to evaluate the impact of greater gender diversity. Our results are vague in support of corporate value creation stemming from an increased female share in either executive or director positions. While we do find suggestive evidence that women and men in CEO positions differ in backgrounds, more research is necessary to validate the disparities. In conclusion, we suggest that companies appointing more females into decision-making positions should not have to fear performance deterioration. An increased female representation is instead suggested to improve companies' financial performance, or at worst, leave it unaffected.

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[♣]23546@student.hhs.se
[♦]23627@student.hhs.se

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1. Introduction

This thesis pursues the research stream that is focused on the proportion of females in the corporate governance function[1] and aims to investigate whether an increased female representation can have a positive effect on financial performance. Our sample consists of 209 companies listed on Nasdaq Stockholm between 2013 and 2016. Compared to previous studies on the same field our contribution is twofold. Firstly, we limit our focus to Sweden, a country that has experienced a large increase of females in both director and executive positions over the last two decades. Secondly, we seek to investigate whether female and male CEOs differ in terms of background characteristics, as this could be a piece to the puzzle why performance differences are expected. Neither our specific background characteristics of CEOs nor potential differences between female and male CEOs, and how these are reflected in corporate financial performance have, to our knowledge, been studied before in a Swedish context.

Two different hypotheses related to the issues presented will be of focus in this examination. The first one is centred on the financial performance of firms. Previous academic research on the field is divided, as not all studies reach the same conclusion on whether corporate value can be created through an increased female share in executive and director positions. Further, the objective of our second hypothesis is to test a selection of characteristics that are meaningful to a corporate career. We expect women as a group to be more alike each other and dissimilar from men in this regard, because of obstacles women are believed to face on their way to the top. Moreover, this is likely related to the performance of the firm, as one could expect different characteristics to have indirect consequences on the decision-making processes at top levels.

The hypotheses in this examination are tested through various ordinary least square (OLS) regressions and fixed effects models. For the first hypothesis, the female share in leading positions, measured on three different levels, will be the independent variable of focus. The dependent variable will be corporate financial performance, also measured in three different ways. Besides these variables, firm and CEO background control variables will be added to improve the accuracy of our results. For the second hypothesis, CEO background variables will be set as dependent variable per each regression, while the focus independent variable will be the gender of the CEO. To this we add firm control variables. All OLS

[1] We define the corporate governance function as all positions influencing the governance of the firm, in this case the board of directors and the executive management team, including the chief executive officer.

regressions will be run stepwise, with increasing amounts of controls included. Fixed effects will be the last layer of controls added per each regression.

Turning to the findings of this examination, our results denote mixed relations among measures of financial performance and female representation at various corporate governance levels. The initial OLS regressions and year fixed effects, with focus on either the share of females in the board or in the executive management team, suggest a significant positive correlation with firm performance. However, when controlling for firm fixed effects, no such positive effect can be determined with statistical significance. Instead the firm fixed effects models can only confirm a significant positive correlation between having a female CEO and performance. Changing focus to the background factors, there appear to be significant differences between the female and male CEOs. Our findings suggest that the women in our sample are more likely to pursue a degree in economics and have been employed at the companies for a longer time. It is also indicated that they are more likely to end up in certain sectors than others.

Yet, we would like to stress the issue of endogeneity, e.g. that firms that have CEOs for a longer time could be more likely to hire women, in gender diversity studies as we cannot with certainty declare our results to be free of this. Fixed effects do address some of the omitted variables issues, but reverse causality may remain a problem. Also, with a low number of females in our sample (6 % of the CEO observations), it is difficult to draw conclusions by grouping the sample on gender. Naturally, more observations of men will give a larger spread, and thus women will appear more alike. Nevertheless, as our findings point in a certain direction, we therefore believe they provide good reasons for further research on these areas.

2. Previous Research

2.1. Previous Literature Relating to Financial Performance

There is a widespread curiosity to whether appointing more women as top executives and in board positions can create corporate value and enhance firm performance. This is no longer a novelty, but the issue is still important, maybe even more so today with the progress that has been made so far. Although many studies in the field have been pursued, putting them together make the results seem ambiguous at their best. It is possible to find both those academic researchers that are spokespersons for an increased performance effect, as well as the opponents, who seem to find either a negative or no apparent effect. It is also interesting to dive into whether the women in corporate governance and executive positions have other implications for the firm. If they behave differently, this could also affect the firm in other regards that indirectly can be linked to performance.

2.1.1. The Agency Theory versus the Stakeholder Theory

From an agency-theoretic standpoint, when considering the overall impact of gender diversity on the daily work performed by a corporate board, it is not possible to tell whether promoting greater female participation will improve or impair corporate governance, and as follows financial performance. A good corporate governance structure should be designed to select the people who are most able and accountable to investors, regardless of gender or other factors alike (Francoeur, Labelle and Sinclair-Desgagne, 2007).

On the contrary, the stakeholder theory foresees financial and business benefits from gender diversity in senior management positions and boards. In an increasingly complex and constantly changing business environment, it may be advantageous to have a heterogeneous group that can bring different perspectives, creativity and experiences into the process of decision making, instead of relying on a group of people with similar mind-sets (Francoeur et. al. 2007). Further, normative and instrumental stakeholder theory suggest that corporations are responsible to mirror the societal diversity in their governance boards, and this should at the same time allow for improvement of relationships with the great variety of stakeholders (Arino, Ayuso, Garcia and Rodriguez, 2007).

2.1.2. Evidence of Positive Effects from an Increased Female Share

Findings on whether women have a positive effect on firm performance is often summarized as ambiguous, but there exist some prior studies with convincing results of the importance of increased gender diversity in corporate governance positions.

Smith, Smith and Verner (2006) conducted a study with 2,500 Danish companies over the time-period 1993-2001. They conclude that the influence of the proportion of women in management teams tends to have a positive effect on firm performance. However, this is strongly dependent on the qualifications of the women, and those without a university degree had a much smaller or insignificant effect on performance. They also provide an explanation to why evidence from previous studies may differ; a likely consequence of the use of different estimation models. The models are sensitive to which factors are controlled for or not. For instance, firm size is a factor that might correlate with the proportion of females in the organisation, and thus the picture might be blurred if this is not controlled for.

In a more recent study, Nordea (2018) examined the impact of diversity on corporate value creation. While an increased female leadership share does not appear to have an impact on share prices, evidence was found that it leads to more stable returns. The most noteworthy difference was for the group of more gender diverse management teams, where the volatility in ROCE was much lower. The study also concludes that stable returns on capital is rewarded by equity investors, with a distinct outperformance of the top 10 % ROCE stable firms in the sample of small- and mid-cap European stocks.

While many studies are done on a National basis, Noland, Moran and Kotschwar (2016) made a global survey of roughly 22,000 companies from 91 countries to determine whether the presence of women in corporate leadership positions improves firm performance. The findings were positive, with the largest gains from the proportion of female executives, followed by the proportion of female directors of the boards. However, having a female CEO appeared not to give any noticeable effect on firm performance. These results emphasize that the benefits of female leadership participation are driven by a more gender diverse leadership team rather than getting a lone woman to the top.

Narrowing down the focus to the composition of boards, Catalyst (2007) found that for the Fortune 500 companies with the highest representation of women board directors, the financial performance was significantly higher on average compared to those with the lowest representation. Further, they claim that companies that succeed in diversifying their boards

with women may experience benefits such as more independence, innovation and governance, which in turn are believed to indirectly enhance firm performance.

2.1.3. Evidence of Negative or No Effects from an Increased Female Share

Not everyone foresees value from having more women in leading positions, and neither do all studies arrive at this conclusion.

Adam and Ferreira (2009) stress that the positive correlation between gender diversity in the board and firm performance cited in popular press may not be robust. In their attempt to address for endogeneity, e.g. that past performance could affect board diversity, they instead find a negative correlation between performance and increased diversity. In the same study, they also found that gender diverse boards appear to be tougher monitors. Thus, they conclude that over-monitoring could decrease corporate value, and that diversity does not add any value to the average firm.

In an examination of the effect of the imposed quota law in Norway, Ahern and Dittmar (2012) also arrived at the conclusion that greater gender diversity in the boardroom led to declines in firm value. Another effect of the quota was the change in board characteristics as a result of a limited pool of female directors, that are younger and less experienced, as the share had to increase from 9 % to 40 % over a short period. The value loss was accompanied by increased firm size, more acquisitions and worse realized accounting returns.

Using a sample of 200 US firms with the largest market values, Shrader, Blackburn and Iles (1997) find no significant positive relationship for the percentage of women in top management and financial performance. However, they suggest that the explanation for this may be that there are very few female managers in their sample (less than 5 %) and no chief executives. Included in their findings were a negative impact on performance from higher percentages of female directors. This was measured using accounting returns, such as ROA and ROE, but it is stressed that the low representation of females in the boardroom (8 %) could again impair the validity of these results.

2.1.4. A Feminine Touch on Corporate Governance and Leadership

Matsa and Miller (2013) investigated whether a female corporate leadership style could be distinguished by examining the effect of the Norwegian quota introduced in 2006. Evidence

could be found that gender quotas affect the corporate strategy, as profit decreased because of increased labour costs from fewer layoffs and increased employment. Furthermore, they found indications of shared values and similar preferences among females in leadership positions, which could be extended outside of Norway.

A main implication from the study conducted by Smith et. al. (2006) is the importance of recruiting more women into higher ranked positions of firms, and thereby increase the number of women with qualifications to be selected into board positions and as CEOs. With a larger pool of female talent, the differences in leadership style associated to gender may diminish, as shareholders would with less effort be able to find candidates that match their preferences.

2.1.5. A Selection of Gender-Based Obstacles

It has been suggested that women may be appointed to leadership positions that are different from those occupied by men. Ryan and Haslam (2005) examine the companies of FTSE 100 (the London Stock Exchange) by looking at patterns of share price performance both before and after the assignment of a new board member. The women in the sample were more likely to be appointed to leadership positions of companies that had experienced consistently poorer performance in the precedent five-month period. Thus, these women faced a "glass cliff" as their positions had an increased risk of failure and was characterized by problematic circumstances.

In the analysis conducted by Noland et. al. (2016), the data from 2014 was compared to the graduation rates in the late 1990s, as current leadership candidates could have been expected to graduate in this period. Women represent more than half of graduates in the fields social science, business and law in nearly all countries included in the sample. This implies that education may not be the main obstacle to leadership success. Instead, indicators of openness to women's success, such as female to male income, was highly correlated to the outcomes.

2.2. Gender Equality in the Swedish Corporate Environment

Nordea (2018) made a Nordic survey screening for companies on the main local stock market indexes in each of the four countries. As OMXS30 is used for Sweden, they have data on 30

large Sweden-listed companies. It is shown that the share of women in boards in Sweden has increased from 20 % in 2004 to 35 % in 2016. In executive management teams, the share of women has risen from roughly 10 % to 24 %. Thus, the female share of leading positions has nearly doubled throughout this period.

The Swedish education system offers the same opportunities for all people of all genders to receive elementary and higher education. About 50 % more women than men are registered at institutions for higher education in Sweden, and females do overall have a higher education. However, there are still more males than females in corporate leadership positions requiring a high and specialised education. In Sweden, out of the population with a university education of three or more years, 60 % are women and 40 % are men. When looking at economic and engineering education, which are the most commonly occurring education areas among the CEOs at Swedish publicly listed companies, 53 % of economists are women as of 2018, and in the 1980s the number was roughly 33 % (SCB, 1980, 2018). Being the generous education opportunities in Sweden and that there is no lack of highly educated women, education should not be a barrier for more women to be present in CEO positions.

Furthermore, Sweden is ranked the fifth most gender equal country, as opposed to the United States which is ranked number 49. What makes Sweden the fifth most equal country is the high gender equality regarding economic participation and opportunities, among other factors (World Economic Forum, 2017). Sweden's high gender equality status makes it an interesting country to investigate, as it still has very few females in corporate leadership positions.

3. Contribution and Hypotheses

Previous research has in some cases shown a significant positive effect on financial performance from having an increased share of females in corporate governance positions. However, not much research has been conducted on the Swedish market for publicly listed companies. As Sweden is one of the world's most gender equal countries, and has a strong economic climate, it is of our interest to investigate how female representation in public listed companies affect the financial performance. Hence, our first hypothesis aims at re-examining the relationship between performance and female representation, for the Stockholm Stock Exchange. The first hypothesis is stated:

Hypothesis I: *There is a significant relationship between increasing the female share in corporate governance positions in the companies listed on Nasdaq Stockholm and the financial performance of these companies.*

The stakeholder theory suggests a positive relationship between gender equality in corporate governance positions and financial firm performance. However, in findings supporting this it is still left unexplained what drives the relationship other than increased diversity. Difficulties persist in distinguishing if there are more specific explanations to what would make female-inclusive firms outperform, and therefore we want to closer investigate background characteristics among CEOs in an attempt to shed some light on this matter. By looking at a selection of background factors of CEOs, grouped on gender, we wish to examine whether certain qualifications are recurring more or less in either group, and how the groups differ. If women are more alike, we expect this to be a result of gender obstacles that form the pathways to CEO positions, making the route different for men and women. We state the second hypothesis:

Hypothesis II: *There are differences in the background characteristics of women and men in CEO positions.*

By testing the hypotheses presented above, we are confident that we will add to the discussion of what increased female representation may imply for the performance of companies. Our research is conducted in an interesting period of time and place where we have seen effective recent development of female inclusion at various corporate governance levels. We also

believe we will add some new insight as we construct our own dataset with information regarding the backgrounds of the CEOs, that could not at this moment in time be easily accessed in any of the databases at our hands.

4. Dataset Construction

This section begins with a description of how the datasets were constructed. This is followed by an explanation of how the data is treated. Then definitions and clarifications of the different variables later used in the regression models are provided. Lastly, we describe how we had to prepare the data and some of the variables to make them ready to be run in regressions.

4.1. Sample Design and Collection

To test our hypotheses, we make use of three datasets: (1) background data on CEOs included in the sample constructed from annual reports, (2) financial data sourced from FinBas, and (3) company-level financial history data retrieved from the Serrano database.

4.1.1. Sample Collection

Our initial sample is drawn from companies listed on Nasdaq Stockholm between the years of 2013 until 2016. We choose to exclude the companies that have gone public later than the 1st of January 2013, as the information quality before listings often is poor or inadequate. A benefit of only keeping companies on which we can gather information for all variables is that the dataset will be balanced. This dataset is manually constructed from annual reports. If any piece of information seems to be missing from an annual report, Bloomberg is in first hand used to complement. In some cases, we use LinkedIn for minor parts such as 'years at company'. Cross-checking of the information between these sources has played a major part at this stage. This is our *core dataset* and can be described as a panel dataset, as we have data of 209 firms over four time periods, for a total of 836 observations.

In addition, we source data from the Serrano database and FinBas. From Serrano, we retrieve key price indicators and financial reporting information for each of our companies. The variables in focus are return on equity (ROE), return on total assets (ROA), equity to total assets and book value of total assets. FinBas provides us with financial data regarding the companies' market values and book values at the end of each calendar year. Neither FinBas nor Serrano have data for all years and companies, but the majority of the companies have complete information. This leaves us with 813 observations for ROE, 819 observations for

ROA and 586 observations for Tobin's Q to run our performance regressions. 809 observations were found for the equity to assets ratio.

4.1.2. Critical Discussion of Data Sources

The Serrano Database is mainly based on financial statement data from the Swedish Companies Registration Office (Bolagsverket). It is a controlled and quality assured financial history database. However, data was missing for the financial services companies and a few other companies for all years. Also, some of the organisation numbers had changed over the years, why one company could have different organisation numbers for different years. To address this, we complemented the data with the information in the annual reports. FinBas is a financial database containing market-information from the Nordic Stock Exchanges, MTF's and OTC markets. In the data sourced from FinBas some of the variables for all companies in 2016 were missing. We were also required to match the ISIN numbers given in FinBas with the organisation numbers in the rest of our data. While the core dataset was originally balanced, when merged with the datasets from Serrano and FinBas, we instead have an unbalanced dataset as these included some missing values (please refer to section 6.3.6. for further details).

4.2. Variables and Data Treatment

Descriptive statistics of key variables are presented to give an overview of what the dataset looks like. The different variables used are then grouped together and accompanied with motivations and descriptions.

4.2.1. Dataset Descriptive Statistics

From Table 1, we conclude that 6 % of the companies in the sample have a female CEO, that the female representation in the board is 27 %, and 20 % in the executive management team. Further, we notice a rather large standard deviation for especially Tobin's Q but also for ROE and ROA, which implies a large variation in performance from the statistical averages.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
ROE	813	10.32	15.3	38.04	-425.5	120.1
ROA	819	6.50	8	16.84	-174.2	74.6
Q	586	2.79	2.19	2.19	0.13	9.92
Fem_frac_board	836	0.27	0.29	0.14	0	0.67
Fem_frac_EM	836	0.20	0.17	0.17	0	0.83
Gender	836	0.06	0	0.24	0	1
Assets (SEK bn)	826	83.8	2.29	523	0.00593	6690
log_assets	826	21.94	21.55	2.27	15.60	29.53
Equity_ratio	809	49.72	46	20.94	-9	100
Birthyear	836	1963	1963	6.70	1945	1982
Years_employed	836	10.45	8	9.23	0	41
Years_as_CEO	836	6.2	4	7.0	0	35

This table presents descriptive statistics for key variables, based on winsorized and truncated values. It includes the number of firm-year observations (Obs), means, medians, standard deviations, minimum values and maximum values. ROE is return on equity, ROA is return on assets and Q is the Tobin's Q ratio. Fem_frac_board is the fraction of females in the board of directors for companies investigated, and Fem_frac_EM is the fraction of females in the management team. Gender is the gender of the CEO, with 0 being male and 1 being female. Sector is the sector of the company as listed on Nasdaq Stockholm. Assets is used as a proxy for firm size and is measured as total assets and the natural logarithm of total assets (log_assets). Equity_ratio is a proxy for risk and is measured as the equity to assets ratio, or financial solidity. Birthyear is the year of birth of the CEOs included in the samples. Years_employed is the number of years for which a CEO has been employed with the company, and Years_as_CEO is the numbers of years for which a CEO has been appointed as the CEO. ROE, ROA and Equity_ratio are presented as percentages and not in decimal form.

4.2.2. Financial Performance Measures

To estimate performance, three different methods are used to represent both accounting-based and market-based performance. Accounting-based performance is measured as ROE and ROA, whereas market-based performance is measured through Tobin's Q, as Tobin's Q is often used as a proxy for firm value. Given that three different indicators of performance are used, multiple regressions are run for each of these variables.

ROE compares the income available to equity investors to the capital they own. The benefits of having this variable is that it gives a meaningful comparison of the financial services firms to the rest of the firms (Corporate Finance Institute, 2018).

ROA provides information about management's capabilities in using assets to generate income. As it is less important to shareholders than ROE, and more in the interest of internal actors, it might be less subject to manipulation. The disadvantage is that it is not as

comparable to the financial services companies, as they are distinctly different in capital structure (Ibid.).

There are several approaches on how to calculate Tobin's Q, which describes the relation between a firm's assets and its market value. The original formula for Tobin's Q is Total Market Value of Firm divided by Total Asset Value of Firm, which describes the cost of replacing the firm's assets in relation to the value of the firm. A Tobin's Q ratio between 0 and 1 implies that the market value of the company is less than the replacement cost of its assets and is thereby undervalued, whereas a ratio above 1 implies that the firm is overvalued, as the premise of Tobin's Q is that the firm should be worth as much as its assets. The advantage of Tobin's Q is that it does not require any risk adjustment or normalization for comparisons across firms (Larry, Lang and René, 1994).

Another approach of calculating Tobin's Q is to divide Market Value of Equity by Book Value of Equity, making the assumption that the market value and the book value of a company's liabilities are equivalent. In the following research, the latter method is used to calculate the Q-ratio.

4.2.3. Measurement of Female Representation

To appraise the female representation in the firms selected, estimates have been used at three different levels. Firstly, the gender of the CEO is measured and computed as a dummy variable with 0 being male and 1 being female. Secondly, the proportion of females in the board of directors is measured and displayed as a fraction. Thirdly, the proportion of females in the executive management team is also computed as a fraction, treated in the same manner as the fraction of females in the board. These three variables may be summarized as 'female representation in corporate governance positions' or simply put '*female representation*'.

When calculating the fraction of females in the board, only tenured board members are included. The reason being that it is assumed that tenured members are more influential on the firm performance, as well as the possible appointment of a CEO. Furthermore, not all companies have employee representatives or deputies, why it would be misleading to include these positions for some but not all companies in the core dataset.

4.2.4. CEO Characteristics and Background Variables

In order to examine potential differences among and between female and male CEOs, information about their backgrounds and characteristics have been collected. The information on the variables included are: name, year of birth, gender, year of employment within the company, year of election as CEO, nationality, international experience of work or education, if the CEO has held previous position(s) as CEO, highest education, education area, and whether the CEO is founder or family or the founder of the company. The variables describing CEO background are used as both dependent variables, focus independent variables, and control variables, depending on the hypothesis tested.

Name is solely used as an identifier for an individual CEO, and has therefore not been included in any further analysis. 'year of employment' and 'year of election as CEO' are used to generate the number of years that a certain CEO has been employed within the same company, and the number of years that a certain CEO has been appointed to the CEO position, calculated respectively for the years of 2013 until 2016. Some CEOs have been employed with the company, or have been the CEO of the company, for a very long time since they are the founder of the company. To control for this, a dummy specifying whether the CEO is the founder of the company, or family of the founder, has been included.

The variables describing previous CEO positions and education areas are encoded into categorical variables. Similar education areas are grouped together when the numbers of observations within an education area are too few to play any predictive role, e.g. a Double Degree in Engineering & Marketing, Engineering & Management, or Engineering & Law is grouped into Engineering/Other.

Furthermore, data was collected on nationality of CEO, international experience and highest education. However, these variables are not used for further examination as they were either lacking in data quality, or suffered from potential multicollinearity issues.

4.2.5. Firm Control Variables

Firm Size

Firm size is often used as a routine control variable in corporate finance empirical studies. It is reasonable to think that smaller companies differ from larger companies in terms of resource constraints and limited scales of operations. Also, as larger companies are more visible, they may experience higher external pressure to act in accordance to the discussions

in society. Moreover, in the recent AP2 Index of Female Representation (2017) it is concluded that large-cap companies feature the highest share of both female board directors (37 %) and female executive managers (25 %). With this in mind, we find it reasonable to control for size. The book value of assets is used as a proxy for firm size. In line with previous research, the book value of assets of firms is logarithmically transformed. The reason being is that it is unlikely that the distribution of firm book value of assets is normally distributed, which could be confirmed for our dataset prior to log-transformation.

Sector

Certain sectors of the stock market have consistently delivered superior performance over extended periods of time. Sectors also differ in how recession-resistant and defensive they are. Thus, there are likely sector-specific drivers that may affect performance. Female representation also varies between sectors, and the sectors that boast the highest percentages of females in both board and executive management positions are Financial Services (39 % and 31 %) and Consumer Goods (34 % and 29 %) (AP2 Index of Female Representation 2017). Therefore, a sector dummy with ten categories is included as a firm control variable. The sectors included are Basic Materials, Consumer Goods, Consumer Services, Financials, Health Care, Industrials, Oil & Gas, Technology, Telecommunications, and Utilities.

Firm Specific Risk

Corporate governance theory predicts that leverage affects agency costs, and in turn this influences firm performance. To capture the capital structure, and thereby the financial risk of the companies, we use the equity to total assets ratio.

Firm Age

Another control variable that could have been included is firm age. However, as our dataset consists only of listed companies, we believe it is reasonable to assume that these companies are old enough to be past the growth-phase and more likely to exhibit stable growth. Thereby we assume the age-effect to be less important and, thus, it is excluded.

4.3. Data Preparations

To mitigate the potential effects of outliers, extreme values are identified. In the cases where the extreme values could have any misleading effects, winsorization or truncation have been used, depending on the nature of the extreme value.

4.3.1. Truncation

In some of the datasets, missing values for ROE and ROA are reported as 999 or -999, which would have altered the results. In these cases, missing values are replaced. Furthermore, negative values and values above 100 for Tobin's Q are truncated as the reason for these extreme values are differences in accounting measures.

4.3.2. Winsorization

In order to reduce the effects of outliers in the cases of abnormally high Q-ratios, values are winsorized at a relatively conservative level, at a ratio above 10. The lowest Q value in the dataset was 0.13, thus we chose to winsorize on high values only.

5. Methodology

In this section, we establish the statistical models for how we intend to use our data to test our hypotheses. Firstly, the relationship between female representation and financial performance of firms is explored, to test for Hypothesis I. This is done by using Ordinary Least Square (OLS) regression. Furthermore, fixed effects regressions are performed to control for some omitted variables in the panel data. Following this, we provide clarifications and descriptions of the various variables included in these models.

Next, we define a model used for comparing the background factors, and give clarifications of the variables included. This is done to test for Hypothesis II. We look at descriptive statistics to determine if there are background differences between female and male CEOs. To investigate whether this potential difference is statistically significant, we run both OLS and fixed effects regressions.

5.1. Regression Models: Performance

To determine which variables have explanatory power, we run standard OLS regression models. OLS regression is a statistical technique that attempts to find the linear function that best fits the data. The aim of the examination is to conclude whether increased female representation in certain influential positions have a significant positive effect on performance. More specifically, a multiple regression model will be used as we have included several control variables. With panel data, we are enabled to control for some endogeneity through the fixed effects model.

Table 2 describes the variable name in Stata, how each variable has been measured, definitions and variable names for the regression equations. The estimation is how the variables have been calculated, some are continuous while others are dummy or categorical.

Table 2 - Variable Description for the Performance Regressions

Stata Variable	Estimation	Definition	Equation Variable
ROE	Net Income/Equity	Return on Equity	Performance
ROA	Net Income/Total Assets	Return on Assets	Performance
Q	Market Value/Assets Value	Tobin's Q	Performance
Fem_frac_board	Females in Board/Total Board Members	Female share in board	FemRep
Fem_frac_EM	Females in Executive Management/ Total Executive Management Members	Female share in executive management	FemRep
Gender	Dummy Variable, 0 for Male 1 for Female	The gender of the CEO	FemRep
Sector	Categorical Variable	The sector of the firm	Sector
Assets	Log-transformed Book Value of Assets	The size of the firm	Size
Equity_ratio	Equity/Total Assets	Financial risk of firm	Risk
Birthyear	Year of Birth	Birth year of CEO	BY
Years_employed	Current Year - Employment Year	Number of years CEO has been with firm	YE
Education_area	Categorical Variable	Education area of CEO	EA
Previous_CEO	Dummy Variable, 0 if Yes 1 if Not	Previously held CEO position(s)	PCEO
Year FE	Year Fixed Effects	Year Fixed Effects	YFE
Firm FE	Firm Fixed Effects	Firm Fixed Effects	FFE

This table describes each variable in four ways: the variable name that will show up in Stata outputs, how each variable is calculated, short description of the variable and equation variables that are used as reference in equations. ROE, ROA and Tobin's Q are all labelled as 'Performance', and Fem_frac_board, Fem_frac_EM and Gender are all labelled as 'FemRep', as these replace each other in the regressions/equations (there will never be more than one performance measure and one female representation per each regression).

5.1.1. OLS Regression

To test for Hypothesis I, we begin with the OLS model. A multiple regression model permits us to estimate the effect on performance of changing our focus variable (female representation) while holding other variables, that we believe have an effect on performance, constant. Included as control variables at this initial stage are only those related to firm characteristics i.e. sector dummy, size and risk, please refer to eq. 5.1. Each proxy for performance is run three times, one time per each focus variable, resulting in nine regressions in total.

The OLS regression model is used a second time, and in addition to the firm controls, background characteristics of the CEOs are added as control variables, as shown in eq. 5.2. These are namely the birth year of the CEO, the number of years that the CEO has been employed with the company, the educational field of the CEO and whether a previous CEO position has been held. Again, nine regressions were run in total for this setting of the regression model.

(eq. 5.1) $$Performance_i = \beta_0 + \beta_1 FemRep_i + \beta_2 Sector_i + \beta_3 Size_i + \beta_4 Risk_i + \varepsilon_i$$

(eq. 5.2) $$Performance_i = \beta_0 + \beta_1 FemRep_i + \beta_2 Sector_i + \beta_3 Size_i + \beta_4 Risk_i + \beta_5 BY_i + \beta_6 YE_i + \beta_7 EA_i + \beta_8 PCEO_i + \varepsilon_i$$

5.1.2. Fixed Effects Regression

Fixed effects regressions are performed using control variables for yearly effects and firm specific effects. Year fixed effects are performed to capture effects caused by aggregate time-series trends. Controlling for firm fixed effects means to control for omitted variables that vary across entities but do not change over time. An example of this could be the corporate culture within a specific company. To capture these variances, fixed effects were added to the OLS regression models presented in section 5.1.1. Year- and firm fixed effects regressions were added stepwise to the regressions in eq. 5.1 and eq. 5.2. This resulted in eq. 5.3, with firm control variables and fixed effects, as well as eq. 5.4, with firm control variables, CEO background control variables and fixed effects. In total, 54 regressions are being run for testing of Hypothesis I, which can all be found in appendix (Table A.2-A.10).

(eq. 5.3) $$Performance_{it} = \beta_0 + \beta_1 FemRep_{it} + \beta_2 Sector_{it} + \beta_3 Size_{it} + \beta_4 Risk_{it} + \beta_5 YFE_t + \beta_6 FFE_i + \varepsilon_i$$

(eq. 5.4) $$Performance_{it} = \beta_0 + \beta_1 FemRep_{it} + \beta_2 Sector_{it} + \beta_3 Size_{it} + \beta_4 Risk_{it} + \beta_5 BY_{it} + \beta_6 YE_{it} + \beta_7 EA_{it} + \beta_8 PCEO_{it} + \beta_9 YFE_t + \beta_{10} FFE_i + \varepsilon_{it}$$

5.2. Regression Model: Background Factors

To be able to evaluate whether there is a difference in the background and the characteristics among female and male CEOs, several statistical regressions are run. These regressions are

conducted in the manner of determining the explanatory power of CEO gender on three different background factors used as dependent variables.

Table 3 contains variable names used in Stata, how each variable has been computed, definitions and variable names that are used in the regression equations. Some of the variables are continuous, while others are either categorical or dummy variables.

Table 3: Variable Description for the Background Regressions

Stata Variable	Estimation	Definition	Equation Variable
Gender	Dummy Variable, 0 for Male 1 for Female	The gender of the CEO	Gender
Sector	Categorical Variable	The sector of the Firm	Sector
Assets	Log-transformed Book Value of Assets	The size of the Firm	Size
Equity_ratio	Equity/Total Assets	Financial risk of Firm	Risk
Birthyear	Year of Birth	Birth year of CEO	BY
Years_employed	Current Year - Employment Year	Number of years CEO has been with Firm	YE
Years_as_CEO	Current Year - Year Elected CEO	Number of years as CEO of the firm	YCEO
Previous_CEO	Dummy Variable, 0 if Yes 1 if Not	Previously held CEO position(s)	PCEO
Founder	Dummy Variable, 0 if Yes 1 if Not	If CEO is the Founder	Founder
Year FE	Year Fixed Effects	Year variable capturing Year Fixed Effects	YFE
Firm FE	Firm Fixed Effects	Firm Fixed Effects	FFE

This table describes each variable in four ways: the variable names that will show up in Stata outputs (Variable), how each variable is calculated (Estimation), definitions of the variables, and variable names that are used as reference in equations (Equation Variable).

5.2.1. OLS Regression

To determine the explanatory power of gender of the CEO on the continuous variables available on CEO background, standard OLS regressions are conducted. The dependent variable is set as one of the background characteristics at a time, and the focus independent variable is gender of the CEO. Three different sets of OLS regressions are performed with birth year of CEO (eq. 5.5), years employed with company (eq. 5.6), and years as CEO (eq. 5.7), being the dependent variables. Furthermore, firm specific variables are added to control for differences related to firm size, risk, and sector.

$$\text{(eq. 5.5) } BY_i = \beta_0 + \beta_1 Gender_i + \beta_2 PCEO_i + \beta_3 Sector_i + \beta_4 Size_i + \beta_5 Risk_i + \beta_6 Founder_i + \varepsilon_i$$

$$\text{(eq. 5.6) } YE_i = \beta_0 + \beta_1 Gender_i + \beta_2 PCEO_i + \beta_3 Sector_i + \beta_4 Size_i + \beta_5 Risk_i + \beta_6 Founder_i + \varepsilon_i$$

$$\text{(eq. 5.7) } YCEO_i = \beta_0 + \beta_1 Gender_i + \beta_2 PCEO_i + \beta_3 Sector_i + \beta_4 Size_i + \beta_5 Risk_i + \beta_6 Founder_i + \varepsilon_i$$

5.2.2. Fixed Effects Regression

In addition to the OLS regressions, fixed effects methods are used. The reasoning behind fixed effects are the same as for the performance regressions (please refer to section 5.1.2.). Thus, fixed effects are here used to control for year-specific and firm-specific variances.
When running the fixed effects methods, the same OLS regressions are extended, with the addition of a categorical variable capturing year-fixed effects, and the absorption of organisation number, to control for firm-fixed effects. Adding the fixed effects to the original OLS model presented in 5.2.1., three additional regressions were performed (5.8-5.10), leaving us with six regressions in total for the testing of CEO background characteristics.

$$\text{(eq. 5.8) } BY_{it} = \beta_0 + \beta_1 Gender_{it} + \beta_2 PCEO_{it} + \beta_3 Sector_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \beta_6 Founder_{it} + \beta_7 YFE_t + +\beta_8 FFE_i + \varepsilon_{it}$$

$$\text{(eq. 5.9) } YE_{it} = \beta_0 + \beta_1 Gender_{it} + \beta_2 PCEO_{it} + \beta_3 Sector_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \beta_6 Founder_{it} + \beta_7 YFE_t + +\beta_8 FFE_i + \varepsilon_{it}$$

$$\text{(eq. 5.10) } YCEO_{it} = \beta_0 + \beta_1 Gender_{it} + \beta_2 PCEO_{it} + \beta_3 Sector_{it} + \beta_4 Size_{it} + \beta_5 Risk_{it} + \beta_6 Founder_{it} + \beta_7 YFE_t + +\beta_8 FFE_i + \varepsilon_{it}$$

5.3. Underlying Assumptions and Adjustments of the Regression Model

5.3.1. Assumptions of OLS Regression

The first assumption required to hold for the OLS regression model is that the relationship between the dependent and independent variables is linear in nature. Furthermore, it is

required that sampling of observations is random and that the conditional mean is zero, which implies that there is no correlation between the dependent variable and the error term. There needs to be no multicollinearity or perfect collinearity. In addition, there should be homoscedasticity and no autocorrelation. An optional assumption is that error terms should be normally distributed (Introduction to Econometrics, 2015). In order to determine the robustness of the OLS regressions performed, some tests have been conducted and methods have been used to mitigate the effects of non-holding assumptions. Potential issues include that although the sample selected is random in regard to the population, all companies on Nasdaq Stockholm listed prior to 2013 has been used in the analysis, why it could be argued that the sample is not completely random.

5.3.2. Assumptions of Fixed Effects Regression

The fixed effects model is used for panel data to control for unit-invariant differences across units and assumes that these differences can be captured by using differences in the constant term. Hence, the base assumption of the fixed effects model is that differences across units can be captured in differences in the constant term. Fixed effects estimation can be performed by either adding a categorical variable for each group, or by absorbing the effects of a certain variable to suppress its output and explanatory power.

5.3.3. Heteroscedasticity and Robust Standard Errors

In order to avoid issues related to heteroscedasticity and biased standard errors of OLS coefficients, robust standard errors are computed in Stata and used for all regressions. Often the structure of heteroscedasticity is unknown, but it is still safe to use the robust standard errors even if homoscedasticity would be present, as the robust errors will then turn into conventional OLS standard errors. Hence, by using robust standard errors in our regressions we are safeguarded from biased standard errors of OLS coefficients that could otherwise be obtained under heteroscedasticity (Yamano, 2009).

6. Empirical Results and Analysis

In this section, the outcome of the regressions run to test our hypotheses are presented. We initially show the results for Hypothesis I, divided into the three performance measures. For each of the three performance indicators, results have been reported related to the three different independent variables for female representation. When examining the results of the final regressions controlling for both year- and firm fixed effects, the main finding is that we only have support for the gender of the CEO regarding a positive significant relationship with financial performance. When performing OLS regressions, and with only year-fixed effects, the results show a significant relationship between accounting based financial performance and increasing fraction of females in both board and executive management team.

We then turn to the results for testing of Hypothesis II, and compare the various background variables between the two gender groups. As expected, because the group of men is larger, there is also a greater spread within this group. Nonetheless, these results still provide us with some insight, such that women are more likely to have a degree in economics and have been employed with the company for a longer time. We therefore seem to find some support for Hypothesis II; that the two different gender groups express significant differences.

6.1. Regressions of Performance Data

Test results of Hypothesis I, regarding firm performance and female representation, are presented in three different tables below. The division is based on the independent variable in focus per each regression. Following the explanation of results, we give our interpretations of these to shed some light on whether we find support of Hypothesis I.

6.1.1. The Share of Female Directors in the Boardroom

Table 4 - Results of Performance Regressions with Focus on the Board

VARIABLES	(1a) ROE	(1b) ROE	(1c) ROE	(1d) ROE	(2a) ROA	(2b) ROA	(2c) ROA	(2d) ROA	(3a) Q	(3b) Q	(3c) Q	(3d) Q
Fem_frac_board	34.39***	34.06***	34.83***	15.75	14.38***	14.08***	13.56***	2.173	0.170	0.220	-0.0535	0.158
	(10.13)	(9.643)	(10.61)	(17.50)	(4.662)	(4.319)	(4.544)	(7.115)	(0.664)	(0.695)	(0.718)	(0.725)
Sector (category)	Control	Control	Control	Omitted	Control	Control	Control	Omitted	Control	Control	Control	Omitted
Equity_ratio	0.232***	0.240***	0.240***	1.555***	0.183***	0.189***	0.189***	0.449***	-0.00641	-0.00930	-0.00944	-0.0167
	(0.0864)	(0.0914)	(0.0917)	(0.424)	(0.0311)	(0.0338)	(0.0340)	(0.146)	(0.00571)	(0.00597)	(0.00598)	(0.0108)
log_assets	2.916***	2.595***	2.590***	43.37***	1.254***	1.108***	1.106***	17.36***	-0.0130	-0.100*	-0.0967*	-0.211
	(0.849)	(0.909)	(0.906)	(9.935)	(0.358)	(0.385)	(0.383)	(4.100)	(0.0466)	(0.0530)	(0.0532)	(0.459)
Birthyear		0.336	0.344	-0.311		0.157*	0.151*	-0.247		0.00553	0.00275	0.0162
		(0.220)	(0.224)	(0.497)		(0.0896)	(0.0886)	(0.187)		(0.0158)	(0.0158)	(0.0276)
Years_employed		0.710***	0.716***	0.00797		0.331***	0.327***	-0.0862		0.0245**	0.0222**	0.00648
		(0.140)	(0.143)	(0.344)		(0.0633)	(0.0635)	(0.126)		(0.0107)	(0.0106)	(0.0197)
Education_area (category)		Control	Control	Control		Control	Control	Control		Control	Control	Control
Previous_CEO		-4.048	-3.986	-4.060		-1.027	-1.069	-0.348		0.286	0.260	0.562*
		(3.761)	(3.696)	(5.918)		(1.514)	(1.499)	(2.322)		(0.226)	(0.224)	(0.307)
Year FE			YES	YES			YES	YES			YES	YES
Firm FE				YES				YES				YES
Constant	-88.20***	-776.4*	-792.6*	-399.5	-39.94***	-375.1**	-362.5**	81.99	2.013*	-4.407	0.886	-22.17
	(22.67)	(425.2)	(435.0)	(941.1)	(8.951)	(176.2)	(174.5)	(354.6)	(1.190)	(31.10)	(30.96)	(57.75)
Observations	804	804	804	804	809	809	809	809	573	573	573	573
R-squared	0.121	0.204	0.205	0.701	0.117	0.220	0.221	0.717	0.167	0.233	0.243	0.892
Adj R-squared				0.586				0.609				0.828

The table presents the results of the regressions run with the share of females in the board (Fem_frac_board) as the focus independent variable. For each variable, the coefficient is shown as well as the robust standard error in parentheses. The number of observations and the coefficient of determination (R-squared) are also provided. Column 1a contains the results for the OLS regressions run for ROE with firm control variables included, and 1b with both firm and background controls. In column 1c, year fixed effects are added, and lastly, firm fixed effects are added in 1d. Results with ROA as the dependent variable are found in columns 2a-2d, and columns 3a-3d have the results for Tobin's Q as the dependent variable. ROE and ROA are displayed as percentages, while Tobin's Q is in decimal form. Significance levels are denoted by stars:
*** p<0.01, ** p<0.05, * p<0.1

In Table 4, we see that the results from the OLS regressions, as well as year fixed effects, point to a positive significant correlation between increasing the female share in board positions and increased corporate value proxied as both ROE and ROA. For ROE, the coefficient is 34.39 when we only add the company control variables, implying that if we were to increase the female share in boards with 0.10 or 10 %, we would expect ROE to increase by roughly 3 %. This result is significant at $p < 0.01$, which indicates strong evidence against the null hypotheses that there is no effect of changes in the board composition on the financial performance. When performing regressions including CEO background control variables (1b), and year fixed effects (1c), the relationship between board composition and financial performance is still significant in a 98% confidence interval. However, as firm fixed effects are included these correlations lose their significance. The coefficient is still positive in 1d, but less than half the size of 1a. Note that with firm fixed effects added, the variable 'Sector' is omitted as the companies do not change sector over time.

For ROA, columns 2a-2c show a significant correlation, with a coefficient of about 14, between increasing fraction of females in the board of directors and financial performance at a level of $p < 0.01$. When adding firm- and year fixed effects (2d), these correlations lose their significance.

In columns 3a-3d, the results of the regressions run with Tobin's Q as dependent variable are displayed. For the OLS regressions in column 3a-3b, there appears to be a positive relationship between the share of female board members and a higher firm value. However, this turns out to be negative when year fixed effects are added, and then again positive when firm fixed effects are added, with a coefficient of 0.16. A coefficient of 0.16 implies that Tobin's Q would increase by roughly 0.02 if the female share rose by 10 %. Yet, none of these results are significant.

The highest R-squared and adjusted R-squared are retrieved when performing regressions for Tobin's Q as performance measure. In these regressions, R-squared is very high at 0.892, and even when adjusting the R-squared, the value is still very high at 0.828. This essentially means that about 89 % and 83 % of the variation in Tobin's Q is explained by our model. This is further debated in section 6.3.5.

The results in Table 4 shows that there is mixed support for a positive correlation between increasing female representation in the board and enhanced corporate value. While all three performance measures seem to be positively impacted, we cannot declare this with statistical significance to be true when firm fixed effects are applied. Thus, the results here are vague regarding support of Hypothesis I.

6.1.2. The Share of Women in the Executive Management Team

Table 5: Results of Performance Regressions with Focus on the Executive Management

VARIABLES	(1a) ROE	(1b) ROE	(1c) ROE	(1d) ROE	(2a) ROA	(2b) ROA	(2c) ROA	(2d) ROA	(3a) Q	(3b) Q	(3c) Q	(3d) Q
Fem_frac_EM	16.81*	20.56**	20.55**	29.01	8.967**	10.51***	10.39***	7.129	-0.0352	0.329	0.270	-0.913
	(8.694)	(8.727)	(8.751)	(19.85)	(3.714)	(3.415)	(3.436)	(8.761)	(0.544)	(0.544)	(0.548)	(0.908)
Sector (category)	Control	Control	Control	Omitted	Control	Control	Control	Omitted	Control	Control	Control	Omitted
Equity_ratio	0.228***	0.239***	0.239***	1.520***	0.181***	0.189***	0.189***	0.440***	-0.00650	-0.00929	-0.00935	-0.0166
	(0.0873)	(0.0918)	(0.0921)	(0.416)	(0.0318)	(0.0343)	(0.0345)	(0.147)	(0.00572)	(0.00597)	(0.00598)	(0.0106)
log_assets	3.548***	3.193***	3.179***	42.73***	1.514***	1.343***	1.323***	17.23***	-0.00993	-0.0977*	-0.0990*	-0.181
	(0.824)	(0.901)	(0.911)	(9.776)	(0.331)	(0.368)	(0.370)	(4.064)	(0.0454)	(0.0520)	(0.0522)	(0.455)
Birthyear		0.371*	0.365	-0.447		0.172*	0.160*	-0.282		0.00562	0.00263	0.0215
		(0.223)	(0.229)	(0.509)		(0.0894)	(0.0891)	(0.192)		(0.0158)	(0.0157)	(0.0280)
Years_employed		0.748***	0.745***	-0.0996		0.351***	0.344***	-0.111		0.0251**	0.0228**	0.0116
		(0.140)	(0.141)	(0.336)		(0.0640)	(0.0639)	(0.127)		(0.0108)	(0.0107)	(0.0188)
Education_area (category)		Control	Control	Control		Control	Control	Control		Control	Control	Control
Previous_CEO		-2.666	-2.694	-2.972		-0.378	-0.474	-0.0838		0.301	0.269	0.520*
		(3.679)	(3.599)	(5.704)		(1.479)	(1.458)	(2.250)		(0.229)	(0.227)	(0.296)
Year FE			YES	YES			YES	YES			YES	YES
Firm FE				YES				YES				YES
Constant	-98.06***	-861.8**	-851.2*	-119.9	-44.25***	-411.4**	-386.6**	152.6	1.985*	-4.707	1.109	-33.04
	(22.63)	(430.7)	(443.2)	(959.9)	(8.705)	(175.2)	(174.7)	(365.2)	(1.196)	(31.01)	(30.84)	(58.28)
Observations	804	804	804	804	809	809	809	809	573	573	573	573
R-squared	0.112	0.199	0.199	0.703	0.112	0.218	0.220	0.718	0.166	0.233	0.244	0.892
Adj R-squared				0.589				0.610				0.830

The table presents the results of the regressions run with the share of females in executive management (Fem_frac_EM) as the focus independent variable. For each variable, the coefficient is shown as well as the robust standard errors in parentheses. The number of observations and the coefficient of determination (R-squared) are also provided. Column 1a contains the results for the OLS regressions run for ROE with firm control variables included, and 1b with both firm and background controls. In column 1c, year fixed effects are added, and lastly, firm fixed effects are added in 1d. Results with ROA as the dependent variable are found in columns 2a-2d, and columns 3a-3d have the results for Tobin's Q as the dependent variable. ROE and ROA are displayed as percentages, while Tobin's Q is in decimal form. Significance levels are denoted by stars: *** p<0.01, ** p<0.05, * p<0.1

Table 5 shows the performance regressions run with the female share in the executive management team as focus independent variable. As with the fraction of female board members, the OLS regressions and year fixed effects run for both ROE and ROA indicate a positive significant correlation between better performance and an increased share of women. For the regressions with CEO background variables (1b) and year fixed effects (1c) included, the correlations are significant at $p < 0.05$, with coefficients of 20.56 and 20.55, respectively. With firm fixed effects controlled for, this significance disappears again.

Regarding the regressions performed on ROA, there is a positive significant correlation between performance and board composition for column 2a-2c, whereas no significant relationship can be found when firm- and year fixed effects are included (2d).

Turning to Tobin's Q, the result in 3d indicate a negative correlation between increasing the number of females in the executive management team and firm value, albeit not significant. The coefficient is as high as -0.91, meaning that if the share of females in executive management would increase by 10 %, we would expect the firm value to decrease by -0.09, measured as Tobin's Q.

The results from Table 5 appear to give mixed support for Hypothesis I. While they partly point in the right direction for ROE and ROA with a positive relationship, the relation to Tobin's Q is instead changing signs and the interpretation is not as clear. Again, these results cannot be declared to hold with statistical significance with all controls added.

6.1.3. The Impact of Having a Female CEO

Table 6: Results of Performance Regressions with Focus on the CEO

VARIABLES	(1a) ROE	(1b) ROE	(1c) ROE	(1d) ROE	(2a) ROA	(2b) ROA	(2c) ROA	(2d) ROA	(3a) Q	(3b) Q	(3c) Q	(3d) Q
Gender	2.252	5.711	5.745	47.62**	-0.532	1.922	1.961	14.58***	-0.447**	-0.350	-0.354	-1.234*
	(3.487)	(3.767)	(3.754)	(23.67)	(1.525)	(1.845)	(1.832)	(5.171)	(0.186)	(0.229)	(0.229)	(0.721)
Sector (category)	Control	Control	Control	Omitted	Control	Control	Control	Omitted	Control	Control	Control	Omitted
Equity_ratio	0.226**	0.236**	0.236**	1.580***	0.180***	0.187***	0.187***	0.458***	-0.00670	-0.00943	-0.00948	-0.0180*
	(0.0878)	(0.0925)	(0.0928)	(0.425)	(0.0318)	(0.0346)	(0.0347)	(0.145)	(0.00573)	(0.00595)	(0.00596)	(0.0103)
log_assets	3.588***	3.302***	3.284***	39.04***	1.530***	1.400***	1.377***	16.10***	-0.0134	-0.0964*	-0.0980*	-0.0898
	(0.831)	(0.916)	(0.926)	(9.448)	(0.334)	(0.375)	(0.377)	(3.966)	(0.0458)	(0.0521)	(0.0524)	(0.399)
Birthyear		0.378*	0.369	-0.561		0.175*	0.161*	-0.327*		0.00555	0.00252	0.0318
		(0.223)	(0.229)	(0.473)		(0.0900)	(0.0896)	(0.178)		(0.0158)	(0.0157)	(0.0264)
Years_employed		0.722***	0.718***	-0.406		0.334***	0.327***	-0.211*		0.0228**	0.0206*	0.0305
		(0.147)	(0.149)	(0.330)		(0.0659)	(0.0658)	(0.126)		(0.0107)	(0.0107)	(0.0186)
Education_area (category)		Control	Control	Control		Control	Control	Control		Control	Control	Control
Previous_CEO		-2.900	-2.946	2.310		-0.603	-0.703	1.600		0.251	0.220	0.406
		(3.783)	(3.718)	(5.126)		(1.553)	(1.535)	(2.213)		(0.230)	(0.227)	(0.254)
Year FE			YES	YES			YES	YES			YES	YES
Firm FE				YES				YES				YES
Constant	-96.35***	-875.4**	-859.4*	177.0	-43.22***	-417.0**	-389.7**	263.0	2.069*	-4.392	1.489	-55.20
	(22.79)	(432.8)	(445.6)	(862.8)	(8.715)	(176.6)	(176.0)	(332.2)	(1.196)	(30.91)	(30.75)	(53.78)
Observations	804	804	804	804	809	809	809	809	573	573	573	573
R-squared	0.107	0.193	0.194	0.710	0.105	0.210	0.212	0.722	0.169	0.234	0.245	0.894
Adj R-squared				0.599				0.615				0.831

The table presents the results of the regressions run with the gender of CEO (Gender) as the focus independent variable. For each variable the coefficient is shown as well as the robust standard error in parentheses. The number of observations and the coefficient of determination (R-squared) are also provided. Column 1a contains the results for the OLS regressions run for ROE with firm control variables included, and 1b with both firm and background controls. In column 1c, year fixed effects are added, and lastly, firm fixed effects are added in 1d. Results with ROA as the dependent variable are found in columns 2a-2d, and columns 3a-3d have the results for Tobin's Q as the dependent variable. ROE and ROA are displayed as percentages, while Tobin's Q is in decimal form. Significance levels are denoted by stars: *** p<0.01, ** p<0.05, * p<0.1

Presented in Table 6, the results for the performance regressions run with the gender of the CEO as the focus independent variable may be found. The results here are quite different from the previous ones with the female share of the board and the executive team. Here, the added firm fixed effects increase the significance level of the positive correlation between gender of the CEO and all three performance measures. In column 2a in which only firm controls are added to the regression run for ROA, there seems to initially be a negative correlation between the gender of the CEO and ROA, of -0.53. However, in column 2b with background controls added this relationship is positive of 1.92, yet not significant. It is in column 2d with all firm and background controls and fixed effects added, in which we find a positive coefficient of 14.58 which is significant at $p < 0.01$. Thus, the results here when all controls are added seem to support our Hypothesis I. The same goes for ROE, where we find significance at $p < 0.05$, with a coefficient of 47.62 when adding firm and year-fixed effects (1d).

For Tobin's Q, the initial OLS regression with firm controls show a negative significant correlation. When background controls, year and firm fixed effects are added this correlation becomes even more negative, and in column 3d the coefficient of -1.23 is significant at $p < 0.10$.

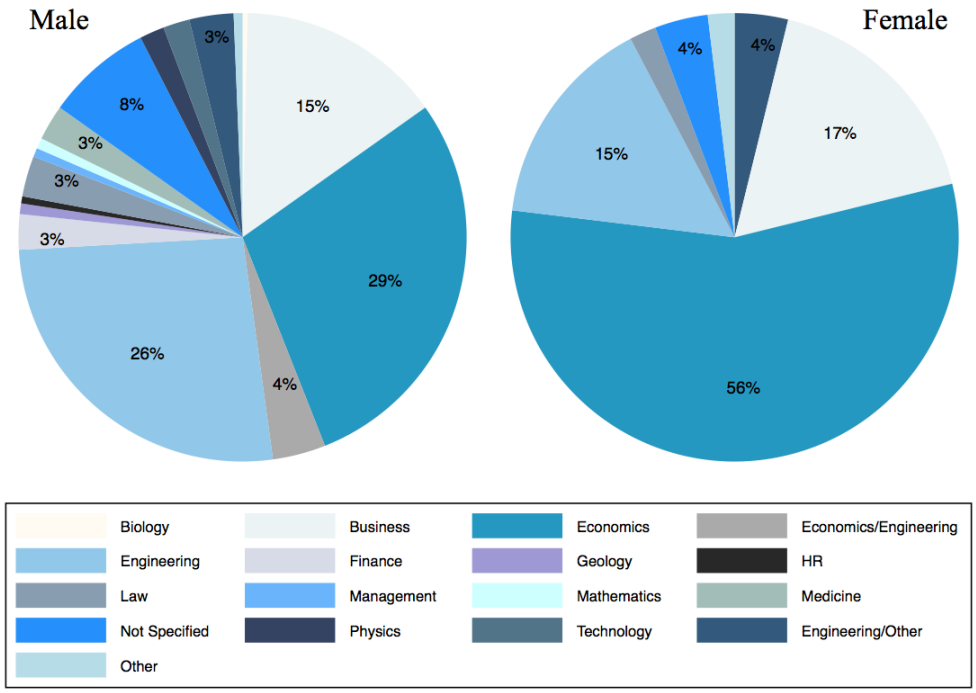
To summarize, it appears that we here have results that support Hypothesis I, when the gender of the CEO is in focus and performance is an accounting-based measure. For Tobin's Q, the results point against Hypothesis I as the relation is negative.

6.2. Analysis and Regressions of Background Data

Here, we present the test results of Hypothesis II, regarding the background characteristics of CEOs. Graphs and summaries describing the differences in backgrounds for female and male CEOs are displayed, together with the outcomes from the regressions performed.

6.2.1. Background Statistics

Figure 1: Education Area Distribution



These two graphs show what education area female and male CEOs have studied prior to their corporate career. Education areas are described in the graphs and is a categorical variable with the most common education areas for CEOs in the sample. The number of observations for the male group is 784 and for the female group 52.

From Figure 1, regarding the distribution of male and female CEOs and their respective education area, it seems that males have a greater diversity of education areas. This is also expected with a larger sample of male observations. Yet, both could be thought of as random samples (although, this is debated in section 5.3.1.), and should both be representations of the population. If we make this assumption, our results show that females to a larger extent holds a degree in economics (56 % for women and 29 % for men), while men have a larger representation in engineering. Turning to Figure A.2, we see that due to the small number of women CEOs, they only represent approximately 11 % of the CEOs with a degree in economics.

In Figure A.3 we have the education areas split per each sector. Clearly, there is a good share of CEOs that have pursued a degree in economics in nearly all sectors. Comparing this to the results in Figure A.4, women appear to be present in only a few sectors, whereas CEOs who have a degree in economics are represented in nearly all sectors. In Utilities, Oil and Gas, Technology and Basic Materials the share of female CEOs are 0 % in each sector,

while Oil and Gas is the only sector where no CEO has a background in economics. This implies that other factors than education determine in which sectors there are female CEOs.

6.2.2. Regression Models

Table 7: Regressions Results of Background Variables

VARIABLES	(1a) Birthyear	(1b) Birthyear	(2a) Years_ as_CEO	(2b) Years_ as_CEO	(3a) Years_ employed	(3b) Years_ employed
Gender	1.110	-0.269	-3.674***	3.986***	-3.847***	4.511***
	(0.889)	(1.187)	(0.621)	(0.955)	(0.933)	(1.065)
Previous_CEO	-1.143**	-0.692	-2.321***	-0.349	-7.323***	-3.019***
	(0.498)	(0.615)	(0.419)	(0.495)	(0.544)	(0.552)
Sector (category)	Control	Omitted	Control	Omitted	Control	Omitted
log_assets	-0.215*	-0.0769	-0.101	-0.233	0.735***	-0.547
	(0.112)	(0.466)	(0.103)	(0.375)	(0.159)	(0.419)
Equity_ratio	-0.00459	0.0141	0.0220*	0.00886	0.00470	0.0174
	(0.0135)	(0.0158)	(0.0112)	(0.0127)	(0.0145)	(0.0142)
Founder (dummy)	-4.286***	-8.412***	10.94***	16.20***	12.39***	21.43***
	(1.056)	(1.772)	(1.614)	(1.426)	(1.124)	(1.591)
Year FE		YES		YES		YES
Firm FE		YES		YES		YES
Constant	1,967***	1,965***	8.377***	9.752	2.203	23.60**
	(2.946)	(10.21)	(2.663)	(8.219)	(3.970)	(9.168)
Observations	809	809	809	809	809	809
R-squared	0.063	0.852	0.252	0.913	0.383	0.938

The table presents the results of the regressions run with the continuous background variables (Birthyear, Years_as_CEO and Years_employed), each run as the dependent variable twice. Independent variable of focus is the gender of the CEO (Gender). For each variable, the coefficient is shown as well as the robust standard error in parentheses. The number of observations and the coefficient of determination (R-squared) are also provided. Column 1a contains the results for the OLS regression run for Birthyear with control variables included, and 1b the same regression but added with both year and firm fixed effects. Results of Years_as_CEO as the dependent variable are found in columns 2a-2b, and columns 3a-3b contain the results for Years_employed as the dependent variable. The values are expressed in years.

Table 7 presents the results from the regressions run with the background variables as dependent variables. Regressions were also performed with year fixed effects, however, the results were similar to the OLS regressions, why these are not showcased in Table 7. In column 1a and 1b, regressions for birth year as dependent variable is found, but neither coefficient appear to be statistically significant. Thus, we are unable to draw any conclusions from these tests on whether a female CEO on average is younger or older than her male counterpart.

Changing focus to the years as CEO, the correlation resulting from the OLS regression is negative and significant at $p < 0.01$. The coefficient of -3.67 implies that if the CEO is

female, she ought to have been the CEO of a company in the sample 3.67 years less than if she would have been male, on average. However, when fixed effects are controlled for the coefficient turns positive instead, taking a value of 3.99. This suggests that the female CEO instead has been in the current CEO position at a given company for nearly four years longer than what her male counterpart would have been. This is also significant at $p < 0.01$. The mixed results show that there at least appears to be a significant difference between women and men for how long they have held their current CEO position. As firm fixed effects captures differences among firms, the appearance of significance when performing regression with firm fixed effects indicates that firms with female CEOs are different in some regards. We suggest that a difference is that firms that frequently change CEOs are more likely to appoint a male CEO than a female one, as the pool of female CEOs is limited. From our sample, we can tell that in cases where the CEO has been frequently changed, the newly appointed CEOs have almost in all cases been men. When performing the OLS regressions, female CEOs appear to have been CEO for a shorter time-period, whereas when firm fixed effects are added, female CEOs appear to have held the CEO position for a longer period.

Lastly, when turning to the results of "years employed at the current company", the results are similar to the results of "years as CEO". The OLS models suggest a negative correlation between gender and years employed, but with fixed effects the correlation is suggested to be positive. Both times, the tests appear to be statistically significant at $p < 0.01$. When controlling for firm- and year fixed effects, our results tell us that if we have a female CEO at a company, she has been employed at the company for roughly 4.51 years longer than if we would have had a male CEO. Noteworthy is that the significance of the founder dummy variable spikes when running the regressions on CEO background characteristics. This is likely to be a reason explaining why females seem to have been with the company for a shorter amount of time, as they are compared to founders which have been at the company since the start. From our main sample, we know that no founders are female, why the results regarding time as CEO and time with the company are hard to interpret, as the founder variable would not include any females.

6.3. Implications and Potential Biases Affecting Results

6.3.1. Implications of Having Time-invariant Variables

In general, fixed effects should be more informative than the OLS regressions as it absorbs some endogeneity that is not observed in OLS. Hence, fixed effects regressions should give

the most robust results as the largest proportion of omitted variables are controlled for. A potential problem with our data is that we do not have long time series, which might cause the risk of not observing enough changes. For instance, board compositions tend to be sticky and do not change much over shorter periods of time. Moreover, age is a typical example of a variable that only changes monotonic. Thus, the benefits of using fixed effects may be limited because we do not have more than four firm years.

In the case of having sticky variables such as board composition and executive management composition, fixed effects might be misleading as these variables do not change to a great extent over time. Furthermore, when performing both firm- and year-fixed regressions, we are left with very few observations for each firm as the time-series is only four years.

6.3.2. Implications of a Small Sample Size

Our sample of 209 companies, or 836 observations, is rather small compared to previous research relating to the European and US markets. Thus, there is a risk that the results may show significance even though none actually exists, or the other way around. However, Sweden is a relatively small country, and has a small market for publicly traded companies, why a larger sample size is hard to retrieve. With a larger sample size, the likelihood of getting significant results increases, as it would be a more reliable representation of the population mean. Therefore, one should bear in mind that the results generated in this examination risk being unrepresentative for the entire population of Swedish firms. However, for a larger dataset it would be difficult to collect the information details regarding the CEOs' backgrounds as extensively as we have done for the smaller dataset. The size of our core dataset is therefore limited by the margin of time, as information has to be gathered manually from mainly annual reports.

6.3.3. Implications of Truncation and Winsorization

The validity of our results may be challenged by the fact that we have some truncated variables, where extreme outliers are excluded. The criteria for the truncation we conducted was certain Q values being as high as above 100, which we found unreasonable as the Q measure is often in the size of 0-1. Furthermore, for Q we decided to winsorize the values above 10 with the same motivation as above. For ROE and ROA, we truncated values of -999

and 999 as these appeared to indicate missing values. Observations that did not fulfil our criteria or had missing values were thereby excluded. Having truncated and winsorized data makes it possible to have biased results. The benefits are that the data is less impacted by extreme values, and less likely to be long-tailed in either direction.

6.3.4. Endogeneity Concerns

The OLS regressions run for female representation and firm performance do for the most part show positive correlations. However, this correlation seems likely to disappear when procedures are made to tackle omitted variables and reverse causality problems, here done to some extent as added fixed effects. It is plausible that companies' choices to appoint females into different levels in the corporate governance structure could be influenced by company-specific characteristics. Thus, endogeneity concerns are likely to arise because of factors such as omitted unobservable firm characteristics or causality between independent and dependent variables of a model. As an example, the actual performance of a firm is likely to affect both the incentives for women to join the firm and the incentives for firms to hire females in the first place. Thus, in our case firm performance and the share of females in the executive management could be the subjects of causality. This may have been solved using a 'the methods of instrumental variables', but unfortunately our data did not include to us any variable that we with certainty could declare uncorrelated with performance and correlated with female representation (Adams and Ferreira, 2009). Our results do therefore contain the risk of having reverse causality.

The specific corporate culture of a company is an example of a potential omitted variable in the OLS regressions, as it is typically a variable unlikely to be observed. We make the assumption that corporate culture is a sticky variable in our sample, meaning it does not vary over our time-period studied, and therefore firm fixed effects should be effective in addressing the concern that omitted culture (as well as any other firm characteristic that is time-invariant) would be driving our results (Ibid.).

6.3.5. Implications of a High R-squared

As R-squared is a measure on how much of variances in one variable is described by the independent variable. Inclusion of all describing variables in a dataset would automatically generate an R-squared of 1, indicating that all variance in the dependent variable is described

by the model. Furthermore, R-squared is a biased estimate based on the sample used and does not take into account how many terms the model includes in relation to the total number of terms in the data. This implies that R-squared increases automatically with every new variable added to the regression. In order to adjust for this bias, Adjusted R-squared is used to deliver a more accurate measure of the explanatory power of the model. However, in the usage of firm fixed effect models, R-squared often takes on high values if there are large differences between firms, as all variance between firms is captured.

6.3.6. Implications of Unbalanced Panel Data

While we could ensure the core dataset to be balanced in the gathering phase, when merged with the other sourced datasets, we ended up with having an unbalanced dataset. An unbalanced dataset is not necessarily a problem, and Stata is expected to be able to work with this. Hence, we did not want to drop any observations for the benefit of having a balanced dataset. However, it is important to investigate why the dataset is unbalanced. As long as observations are missing at random there should be no implications. If observations are not missing at random, then the sample selection might cause the estimates to be biased. As all financial services companies had missing values for ROE, ROA and equity to assets, we completed these observations manually with information from the annual reports. The few remaining companies still having missing values appeared to be more at random, and no further action was taken. For the inputs in Tobin's Q, all companies had missing values for 2016. Thus, the sample was still random regarding the selection of companies. (StataCorp LP, 2018).

7. Discussion and Limitations

In this section, the analysis and interpretations of our results are extended through the linkage to previous research. Following this discussion, we highlight a few limitations of our study, and make suggestions for where continued research can take off.

7.1. Discussion

In short, our results denote mixed relations among measures of firm financial performance and female representation at various corporate governance levels. Our standard OLS regressions and year fixed effects regressions are supportive of enhanced firm performance on the accounting-based measures ROA and ROE from higher percentages of both female directors and executives, in line with much of the research previously conducted (Nordea, 2018 and Catalyst, 2007). However, adding firm fixed effects into the picture, any significance for these correlations disappear. This may be explained by the important point that Smith et.al. (2006) stress that the estimation models are highly impacted by which factors are controlled for, and this is often the reason why different studies arrive at contrasting results. Further, this reinforces how problematic these gender diversity studies are for overcoming the issue of omitted variables and reverse causality. No significance is confirmed when controlling for firm fixed effects in the regressions focused on executive management and board of directors. Therefore, it is not possible to rule out that the changes in financial performance stems from differences in unobservable firm-dependent variances.

If we only consider the firm fixed effects models, we partially find support for Hypothesis I, as our results point to a positive significant correlation between having a female CEO and firm performance. This goes somewhat against the findings of Noland et.al. (2016) who instead spoke for the benefits of having a more diverse leadership team rather than a lone woman at the top. If we instead only consider the OLS regressions and year fixed effects regressions, our findings would then agree with Noland et. al. (2016).

Turning to the background factors, there seem to indeed be some significant differences between female and male CEOs among our findings. As our results show that women in CEO positions both have held this position and have been employed at the company for a longer time, we suggest that a greater proportion of women may have been recruited internally, relative to the male proportion. This finding thereby stresses the importance of having a pool of female talent within the company, with candidates with

qualifications and potential to eventually be selected as CEO, as implied by the study of Smith et. al. (2006). Further, it is worth noting that the fixed effects model tells us that this is not random, it might be the case that firms with female CEOs have CEOs for longer periods of time.

Making a comparison of our results regarding education area to statistics on education in Sweden, the distributions are rather dissimilar. Out of people studying economics, as of today, 53 % are female (SCB, 2018), in 1979 about 33% were female (SCB 1979), while in our sample approximately 11% are female. Further, there appears to be a good share of CEOs with a background in economics in nearly all sectors. From this, we suggest and agree with Noland et. al. (2016) that education may not be the main obstacle for women making it to the top. As our results tell that the highest proportions of women may be found in the Financials and Consumer Services sectors, we suspect that this has another explanation. Perhaps women are more alike and have, as Matsa and Miller (2013) declare, a greater extent of shared values, and these values could then be the underlying reason to why women seek themselves to these particular sectors.

The interpretation of a lower Tobin's Q among female-led firms may have at least two versions. On one side, a lower Q value indicates a lower valuation of the company, which should mirror the expectations of the market. On the other side, a high Q value (above 1) may imply that the firm is overvalued, and this is expected to eventually be corrected by the market. Perhaps a lower Tobin's Q in our results is a consequence of the "glass cliff" described by Ryan and Haslam (2005), if female CEOs are in fact recruited to companies with precedent poor performance.

Furthermore, Tobin's Q is likely to vary to a large extent due to differences between firms. This implies that results obtained from regressions with firm fixed effects applied will be biased, due to the use of a model explaining almost all variance in the dependent variable. In the light of this, and the fact that the number of observations are few in comparison to the other measures, we do not emphasize the results regarding Tobin's Q.

7.2. Limitations and Suggestions for Continued Research

We agree with Adams and Ferreira (2009) as our results confirm the problematic issue of endogeneity when conducting studies on performance and gender diversity. Of utmost importance seems to be to find a model that appropriately tackles problems that may arise

because of omitted variables and reverse causality. Many previous research studies ignore this, which could potentially be the reason why we still have not arrived at a consensus today. Fixed methods may be effective for the omitted variables problem, but judging of what have been done previously there seems to be no easy way to deal with causality. Therefore, we suggest future researchers to attempt to find ways in handling this that goes beyond applying fixed methods. The method of instrumental variables could be one way to go, if a suitable instrument could be identified. We leave it to future studies to explore other options that could be utilized.

Another area we suggest to be studied further is the background factors of females and males in senior positions. Our findings indicate that to some extent women appear different from men in the CEO category. If it for a larger sample could be proven that women are more alike, it would be interesting to investigate what implications this have on the overall diversity effect on the group of people in leading positions. Perhaps it adds to diversity, but the opposite could also be the case.

The fact that females are still rarely represented in executive positions is in itself a limitation as the small sample size might imply difficulties in making statistically significant conclusions. It is also troublesome to investigate differences over time as women have been present as CEOs, in board positions and in executive management for a relatively short amount of time. Eventually, this is an issue that likely will subside in the future, why we suggest the topic to be continuously studied as the data on females in executive positions likely will increase over time.

8. Conclusion

This study explored the relationships between various measures of female representation in corporate governance and financial performance among firms listed on Nasdaq Stockholm. Drawing from previous research findings and reasoning behind the stakeholder theory, we hypothesized that companies with higher shares of women in corporate governance functions would be the outperformers. Our results, however, point to mixed relations of performance and an increased female share. We find a positive correlation for both the share of females in board and executive management teams in terms of performance, albeit not significant according to firm fixed effects models. While we cannot declare a positive relation, neither is there anything that would indicate a worse performance from increased female representation. Furthermore, there appears to be a significant positive effect on performance, using the accounting-based measures ROA and ROE, when the company has a female CEO. From this we conclude that companies that appoint more females into leading positions to reach gender equality should not have to fear performance deterioration. It is instead suggested to leave the companies' performance unaffected, or in some cases even improved.

When turning to whether female and male CEOs differ, our findings lead us to conclude that there are significant differences, judging by our sample. We rule out education to be an obstacle, and instead point towards other reasons for women to still be excluded from some sectors. Whether gender diversity is lost because of shared values among the women drawing them to certain industries, or if there are greater openness allowing women to join these companies, is left unexplained. As women are more likely to have been employed at the company for a longer time, we do suspect that the pathway to CEO position in these companies to be different. However, with very few observations of female CEOs compared to men, we do not consider our results to be evident enough to make such a statement. Instead, we consider this to be good reasons for future research. If we can pinpoint the obstacles and dead-ends that diversity, and the corporate value stemming from this, gets lost in, then we may also learn how to overcome them.

9. References

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Annual reports from the following companies for the years of 2013-2016

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Hexagon AB
HiQ International AB
Holmen AB
Hufvudstaden AB
Husqvarna AB
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ICA Gruppen AB
ICTA AB
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Indutrade AB
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JM AB
KABE AB
KappAhl AB
Karo Pharma AB
Karolinska Development AB
Kindred Group Plc
Kinnevik AB
Klövern AB
Knowit AB
Kungsleden AB
Lagercrantz Group AB
Lammhults Design Group AB
Investment AB, Latour
Lindab International AB
Loomis AB
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Modern Times Group MTG AB
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NAXS AB
NCC AB
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NetEnt AB
New Wave Group AB
Nobia AB
Nolato AB
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Studsvik AB
Svedbergs i Dalstorp AB
Svenska Cellulosa AB SCA
Svenska Handelsbanken
Svolder AB
Swedbank AB
Swedish Match AB
Swedish Orphan Biovitrum AB
Swedol AB
Systemair AB
Tele2 AB
Telia Company AB
Tieto Oyj
Traction AB
TradeDoubler AB
Trelleborg AB
Trention AB
Uniflex AB
VBG GROUP AB

Venue Retail Group AB
Viking Supply Ships AB
Vitec Software Group AB
Vitrolife AB
Volvo, AB
Vostok New Ventures Ltd, SDB
Wallenstam AB
Wihlborgs Fastigheter AB
XANO Industri AB
ÅF AB
Öresund, Investment AB

10. Appendix

Table A.1: Descriptive Statistics Divided Per Gender Group

	Male CEO					Female CEO				
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
ROE	761	10.24	39.16	-425.5	120.1	52	11.46	13.34	-27.4	48.8
ROA	767	6.49	17.27	-174.2	74.6	52	6.60	8.36	-18.4	31
Qwin	545	2.86	2.23	0.13	9.92	41	1.95	1.29	0.61	6.33
Fem_frac_board	784	0.26	0.14	0	0.67	52	0.33	0.14	0	0.6
Fem_frac_EM	784	0.18	0.15	0	0.75	52	0.43	0.19	0.08	0.83
Sector	784	5	2	1	10	52	4	1	2	9
Assets (SEK bn)	774	756	511	0.05937	6690	52	206	665	0.128	2640
Equity_ratio	758	49.73	20.78	-9	100	51	49.57	23.42	4.2	100
Birthyear	784	1963	6.75	1945	1982	52	1965	5.60	1953	1973
Years_employed	784	10.59	9.29	0	41	52	8.37	8.09	0	29
Years_as_CEO	784	6.4	7.1	0	35	52	3.2	3.5	0	16

The variables are based on winsorized and truncated values. It includes the number of observations (Obs), means, median, standard deviations, min values and max values. ROE is return on equity, ROA is return on assets and Q is the Tobin's Q ratio. Fem_frac_board is the fraction of females in the board, Fem_frac_EM is the fraction of females in the management team and Gender is the gender of the CEO. Sector is the sector of the company. Assets is used as a proxy for firm size and is measured as total assets and the natural logarithm of total assets (log_assets). Equity_ratio is a proxy for risk. Birthyear is the year of birth of the CEOs, Years_employed is the number of years which a CEO has been employed with the company, and Years_as_CEO is the numbers of years which a CEO has been appointed as the CEO. ROE, ROA and Equity_ratio are presented as percentages and not in decimal form.

Table A.2: Extended Version of ROE Performance Regression with Focus on the Board

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROE	ROE	ROE	ROE	ROE	ROE
Fem_frac_board	34.39***	34.04***	14.79	34.06***	34.83***	15.75
	(10.13)	(10.99)	(16.82)	(9.643)	(10.61)	(17.50)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.232***	0.232***	1.512***	0.240***	0.240***	1.555***
	(0.0864)	(0.0870)	(0.416)	(0.0914)	(0.0917)	(0.424)
log_assets	2.916***	2.913***	43.60***	2.595***	2.590***	43.37***
	(0.849)	(0.850)	(9.734)	(0.909)	(0.906)	(9.935)
Birthyear				0.336	0.344	-0.311
				(0.220)	(0.224)	(0.497)
Years_employed				0.710***	0.716***	0.00797
				(0.140)	(0.143)	(0.344)
Education_area (category)				Control	Control	Control
Previous_CEO				-4.048	-3.986	-4.060
				(3.761)	(3.696)	(5.918)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-88.20***	-88.73***	-1,018***	-776.4*	-792.6*	-399.5
	(22.67)	(22.30)	(227.6)	(425.2)	(435.0)	(941.1)
Observations	804	804	804	804	804	804
R-squared	0.121	0.121	0.698	0.204	0.205	0.701

This table is an extended version of Table 4, Section 6.1.1. It shows OLS and Fixed Effects regressions of ROE as dependent variable and Fem_frac_board as focus independent variable, with control variables included.

Table A.3: Extended Version of ROA Performance Regressions with Focus on the Board

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	ROA	ROA	ROA	ROA	ROA
Fem_frac_board	14.38***	13.46***	1.751	14.08***	13.56***	2.173
	(4.662)	(4.868)	(7.044)	(4.319)	(4.544)	(7.115)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.183***	0.183***	0.426***	0.189***	0.189***	0.449***
	(0.0311)	(0.0314)	(0.140)	(0.0338)	(0.0340)	(0.146)
log_assets	1.254***	1.253***	17.47***	1.108***	1.106***	17.36***
	(0.358)	(0.357)	(4.058)	(0.385)	(0.383)	(4.100)
Birthyear				0.157*	0.151*	-0.247
				(0.0896)	(0.0886)	(0.187)
Years_employed				0.331***	0.327***	-0.0862
				(0.0633)	(0.0635)	(0.126)
Education_area (category)				Control	Control	Control
Previous_CEO				-1.027	-1.069	-0.348
				(1.514)	(1.499)	(2.322)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-39.94***	-40.77***	-396.4***	-375.1**	-362.5**	81.99
	(8.951)	(8.890)	(92.72)	(176.2)	(174.5)	(354.6)
Observations	809	809	809	809	809	809
R-squared	0.117	0.119	0.712	0.220	0.221	0.717

This table is an extended version of Table 4, Section 6.1.1. It shows OLS and Fixed Effects regressions of ROA as dependent variable and Fem_frac_board as focus independent variable, with control variables included stepwise.

Table A.4: Extended Version of Tobin's Q Performance Regressions with Focus on the Board

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Q	Q	Q	Q	Q	Q
Fem_frac_board	0.170	-0.0662	0.0128	0.220	-0.0535	0.158
	(0.664)	(0.679)	(0.678)	(0.695)	(0.718)	(0.725)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	-0.00641	-0.00665	-0.0195*	-0.00930	-0.00944	-0.0167
	(0.00571)	(0.00572)	(0.0101)	(0.00597)	(0.00598)	(0.0108)
log_assets	-0.0130	-0.0118	-0.226	-0.100*	-0.0967*	-0.211
	(0.0466)	(0.0468)	(0.477)	(0.0530)	(0.0532)	(0.459)
Birthyear				0.00553	0.00275	0.0162
				(0.0158)	(0.0158)	(0.0276)
Years_employed				0.0245**	0.0222**	0.00648
				(0.0107)	(0.0106)	(0.0197)
Education_area (category)				Control	Control	Control
Previous_CEO				0.286	0.260	0.562*
				(0.226)	(0.224)	(0.307)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	2.013*	1.902	8.550	-4.407	0.886	-22.17
	(1.190)	(1.199)	(10.26)	(31.10)	(30.96)	(57.75)
Observations	573	573	573	573	573	573
R-squared	0.167	0.177	0.889	0.233	0.243	0.892

This table is an extended version of Table 4, Section 6.1.1. It shows OLS and Fixed Effects regressions of Tobin's Q as dependent variable and Fem_frac_board as focus independent variable, with control variables included stepwise.

Table A.5: Extended Version of ROE Performance Regressions with Focus on Management

VARIABLES	(1) ROE	(2) ROE	(3) ROE	(4) ROE	(5) ROE	(6) ROE
Fem_frac_EM	16.81*	16.65*	25.32	20.56**	20.55**	29.01
	(8.694)	(8.742)	(19.05)	(8.727)	(8.751)	(19.85)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.228***	0.228***	1.474***	0.239***	0.239***	1.520***
	(0.0873)	(0.0878)	(0.411)	(0.0918)	(0.0921)	(0.416)
log_assets	3.548***	3.516***	43.05***	3.193***	3.179***	42.73***
	(0.824)	(0.837)	(9.617)	(0.901)	(0.911)	(9.776)
Birthyear				0.371*	0.365	-0.447
				(0.223)	(0.229)	(0.509)
Years_employed				0.748***	0.745***	-0.0996
				(0.140)	(0.141)	(0.336)
Education_area (category)				Control	Control	Control
Previous_CEO				-2.666	-2.694	-2.972
				(3.679)	(3.599)	(5.704)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-98.06***	-98.94***	-1,006***	-861.8**	-851.2*	-119.9
	(22.63)	(22.41)	(223.9)	(430.7)	(443.2)	(959.9)
Observations	804	804	804	804	804	804
R-squared	0.112	0.114	0.699	0.199	0.199	0.703

This table is an extended version of Table 5, Section 6.1.2. It shows OLS and Fixed Effects regressions of ROE as dependent variable and Fem_frac_EM as focus independent variable, with control variables included stepwise.

Table A.6: Extended Version of ROA Performance Regressions with Focus on Management

VARIABLES	(1) ROA	(2) ROA	(3) ROA	(4) ROA	(5) ROA	(6) ROA
Fem_frac_EM	8.967**	8.808**	4.343	10.51***	10.39***	7.129
	(3.714)	(3.737)	(7.967)	(3.415)	(3.436)	(8.761)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.181***	0.181***	0.420***	0.189***	0.189***	0.440***
	(0.0318)	(0.0320)	(0.141)	(0.0343)	(0.0345)	(0.147)
log_assets	1.514***	1.487***	17.39***	1.343***	1.323***	17.23***
	(0.331)	(0.332)	(4.034)	(0.368)	(0.370)	(4.064)
Birthyear				0.172*	0.160*	-0.282
				(0.0894)	(0.0891)	(0.192)
Years_employed				0.351***	0.344***	-0.111
				(0.0640)	(0.0639)	(0.127)
Education_area (category)				Control	Control	Control
Previous_CEO				-0.378	-0.474	-0.0838
				(1.479)	(1.458)	(2.250)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-44.25***	-45.01***	-394.8***	-411.4**	-386.6**	152.6
	(8.705)	(8.642)	(91.98)	(175.2)	(174.7)	(365.2)
Observations	809	809	809	809	809	809
R-squared	0.112	0.115	0.712	0.218	0.220	0.718

This table is an extended version of Table 5, Section 6.1.2. It shows OLS and Fixed Effects regressions of ROA as dependent variable and Fem_frac_EM as focus independent variable, with control variables included stepwise.

Table A.7: Extended Version of Tobin's Q Performance Regressions with Focus on Management

VARIABLES	(1) Q	(2) Q	(3) Q	(4) Q	(5) Q	(6) Q
Fem_frac_EM	-0.0352	-0.0837	-0.973	0.329	0.270	-0.913
	(0.544)	(0.548)	(0.842)	(0.544)	(0.548)	(0.908)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	-0.00650	-0.00666	-0.0194*	-0.00929	-0.00935	-0.0166
	(0.00572)	(0.00573)	(0.0100)	(0.00597)	(0.00598)	(0.0106)
log_assets	-0.00993	-0.0129	-0.192	-0.0977*	-0.0990*	-0.181
	(0.0454)	(0.0458)	(0.458)	(0.0520)	(0.0522)	(0.455)
Birthyear				0.00562	0.00263	0.0215
				(0.0158)	(0.0157)	(0.0280)
Years_employed				0.0251**	0.0228**	0.0116
				(0.0108)	(0.0107)	(0.0188)
Education_area (category)				Control	Control	Control
Previous_CEO				0.301	0.269	0.520*
				(0.229)	(0.227)	(0.296)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	1.985*	1.925	7.983	-4.707	1.109	-33.04
	(1.196)	(1.203)	(9.937)	(31.01)	(30.84)	(58.28)
Observations	573	573	573	573	573	573
R-squared	0.166	0.177	0.889	0.233	0.244	0.892

This table is an extended version of Table 5, Section 6.1.2. It shows OLS and Fixed Effects regressions of Tobin's Q as dependent variable and Fem_frac_EM as focus independent variable, with control variables included stepwise.

Table A.8: Extended Version of ROE Performance Regressions with Focus on CEO

VARIABLES	(1) ROE	(2) ROE	(3) ROE	(4) ROE	(5) ROE	(6) ROE
Gender	2.252	2.394	33.36*	5.711	5.745	47.62**
	(3.487)	(3.438)	(18.82)	(3.767)	(3.754)	(23.67)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.226**	0.226**	1.507***	0.236**	0.236**	1.580***
	(0.0878)	(0.0882)	(0.416)	(0.0925)	(0.0928)	(0.425)
log_assets	3.588***	3.553***	40.59***	3.302***	3.284***	39.04***
	(0.831)	(0.845)	(9.457)	(0.916)	(0.926)	(9.448)
Birthyear				0.378*	0.369	-0.561
				(0.223)	(0.229)	(0.473)
Years_employed				0.722***	0.718***	-0.406
				(0.147)	(0.149)	(0.330)
Education_area (category)				Control	Control	Control
				(25.25)	(25.45)	(19.90)
Previous_CEO				-2.900	-2.946	2.310
				(3.783)	(3.718)	(5.126)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-96.35***	-97.34***	-951.3***	-875.4**	-859.4*	177.0
	(22.79)	(22.57)	(220.3)	(432.8)	(445.6)	(862.8)
Observations	804	804	804	804	804	804
R-squared	0.107	0.109	0.704	0.193	0.194	0.710

This table is an extended version of Table 6, Section 6.1.3. It shows OLS and Fixed Effects regressions of ROE as dependent variable and Gender as focus independent variable, with control variables included stepwise.

Table A.9: Extended Version of ROA Performance Regressions with Focus on CEO

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ROA	ROA	ROA	ROA	ROA	ROA
Gender	-0.532	-0.410	7.200*	1.922	1.961	14.58***
	(1.525)	(1.509)	(4.292)	(1.845)	(1.832)	(5.171)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	0.180***	0.181***	0.426***	0.187***	0.187***	0.458***
	(0.0318)	(0.0320)	(0.140)	(0.0346)	(0.0347)	(0.145)
log_assets	1.530***	1.502***	16.87***	1.400***	1.377***	16.10***
	(0.334)	(0.336)	(4.041)	(0.375)	(0.377)	(3.966)
Birthyear				0.175*	0.161*	-0.327*
				(0.0900)	(0.0896)	(0.178)
Years_employed				0.334***	0.327***	-0.211*
				(0.0659)	(0.0658)	(0.126)
Education_area (category)				Control	Control	Control
Previous_CEO				-0.603	-0.703	1.600
				(1.553)	(1.535)	(2.213)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	-43.22***	-44.06***	-383.4***	-417.0**	-389.7**	263.0
	(8.715)	(8.654)	(92.19)	(176.6)	(176.0)	(332.2)
Observations	809	809	809	809	809	809
R-squared	0.105	0.109	0.714	0.210	0.212	0.722

This table is an extended version of Table 6, Section 6.1.3. It shows OLS and Fixed Effects regressions of ROA as dependent variable and Gender as focus independent variable, with control variables included stepwise.

Table A.10: Extended Version of Tobin's Q Performance Regressions with Focus on CEO

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Q	Q	Q	Q	Q	Q
Gender	-0.447**	-0.437**	-0.997	-0.350	-0.354	-1.234*
	(0.186)	(0.184)	(0.698)	(0.229)	(0.229)	(0.721)
Sector (category)	Control	Control	Omitted	Control	Control	Omitted
Equity_ratio	-0.00670	-0.00683	-0.0200**	-0.00943	-0.00948	-0.0180*
	(0.00573)	(0.00573)	(0.00982)	(0.00595)	(0.00596)	(0.0103)
log_assets	-0.0134	-0.0164	-0.135	-0.0964*	-0.0980*	-0.0898
	(0.0458)	(0.0462)	(0.404)	(0.0521)	(0.0524)	(0.399)
Birthyear				0.00555	0.00252	0.0318
				(0.0158)	(0.0157)	(0.0264)
Years_employed				0.0228**	0.0206*	0.0305
				(0.0107)	(0.0107)	(0.0186)
Education_area (category)				Control	Control	Control
Previous_CEO				0.251	0.220	0.406
				(0.230)	(0.227)	(0.254)
Year FE		YES	YES		YES	YES
Firm FE			YES			YES
Constant	2.069*	2.008*	6.658	-4.392	1.489	-55.20
	(1.196)	(1.204)	(8.778)	(30.91)	(30.75)	(53.78)
Observations	573	573	573	573	573	573
R-squared	0.169	0.180	0.890	0.234	0.245	0.894

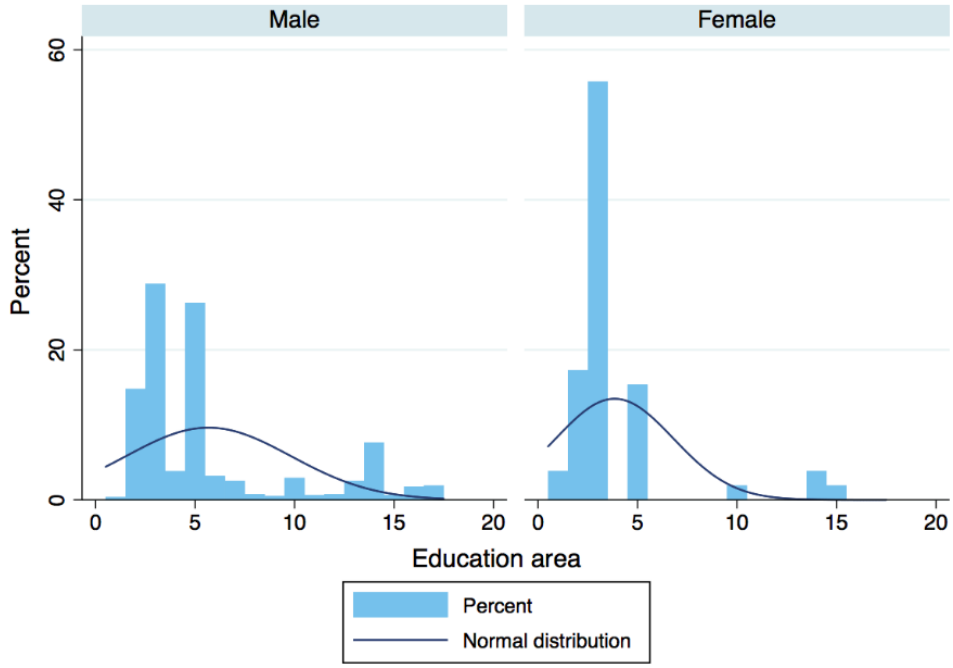
This table is an extended version of Table 6, Section 6.1.3. It shows OLS and Fixed Effects regressions of Tobin's Q as dependent variable and Gender as focus independent variable, with control variables included stepwise.

Table A.11: VIF Test Performance

Variable	Fem_frac_board	Fem_frac_EM	Gender CEO
Years_employed	1.60	1.62	1.63
Previous_CEO	1.38	1.39	1.42
log_assets	1.32	1.25	1.25
Birthyear	1.24	1.25	1.24
Female representation	1.15	1.11	1.11
Equity_ratio	1.11	1.08	1.07
Education_area	1.06	1.07	1.06
Year	1.06	1.06	1.06
Sector	1.06	1.02	1.02
Mean VIF	1.22	1.21	1.21

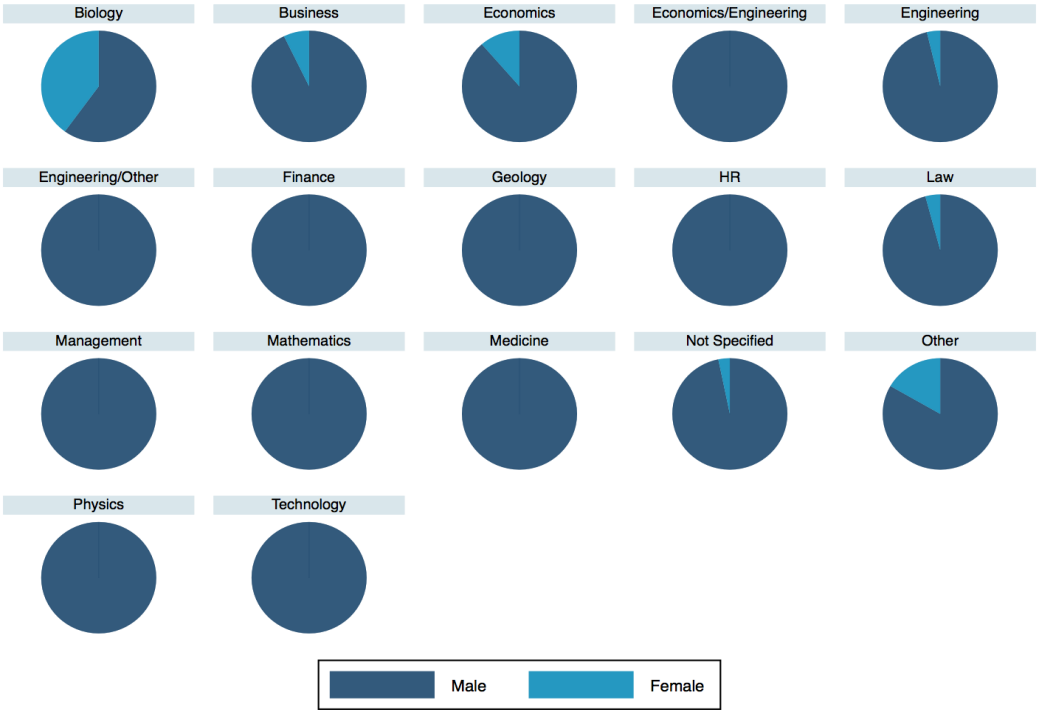
This table shows the results from a Variance Inflated Factor-test. Years_employed describes how many years a CEO has been employed with the company, Previous_CEO describes whether a CEO has held previous CEO positions, log_assets is the natural logarithm of Total Assets of the firm, Birthyear is the year of birth for the CEO. Female representation describes to which extent females are present in a company in three ways; female fraction in board, female fraction of executive management team, and whether the CEO is female. Equity_ratio is a measure of risk, Education_area is a category variable listing the education area of a CEO. Year is a year between 2013 and 2016 and Sector is the CEO in which a company operates. In the Fem_frac_board column, the VIF values for female fraction of board and the rest of the variables described. In the Fem_frac_EM column, the VIF values for female fraction of executive management and the rest of the variables described. In the Gender CEO column, the values for the gender of the CEO and the rest of the variables described.

Figure A.1: Education Area Distribution



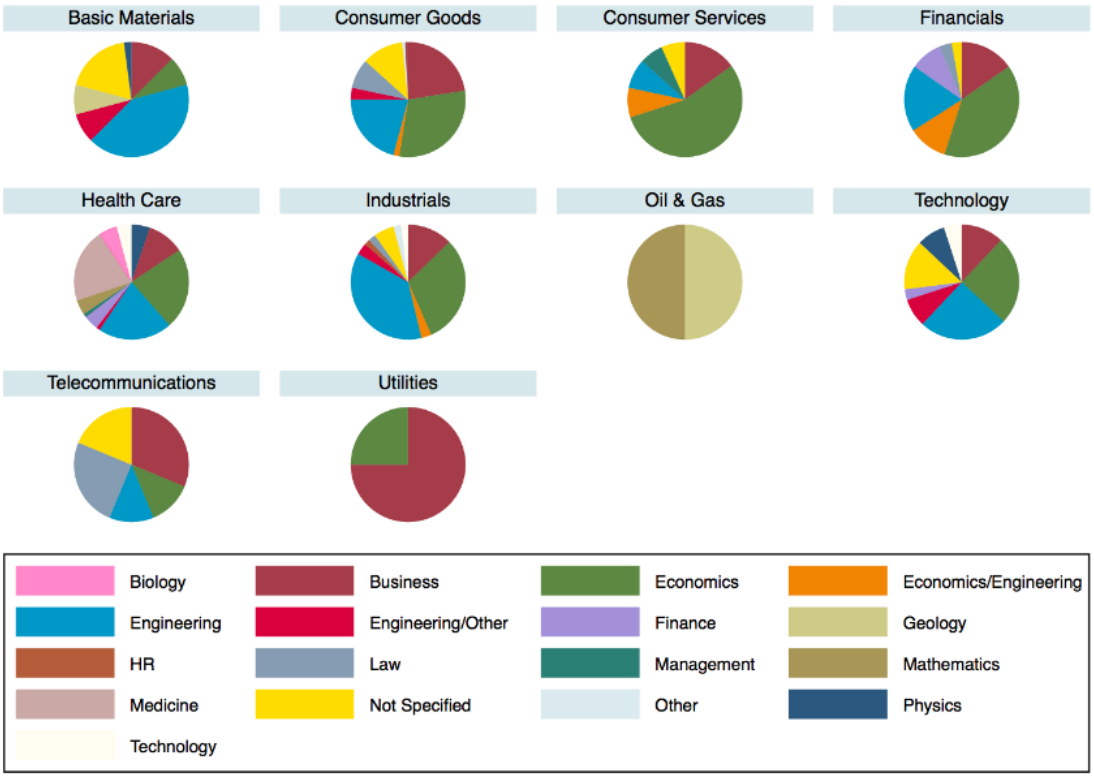
This graph shows the distribution of education areas, grouped by gender. Education area described as a categorical variable, taking on values from 0 to 17 (see Figure A.2 details). The fraction of females and males in each education area is presented in percentage and a normal distribution curve is drawn to show the difference in distribution. The number of observations for the male group is 784 and for the female group 52.

Figure A.2: Gender Fraction per Education Area



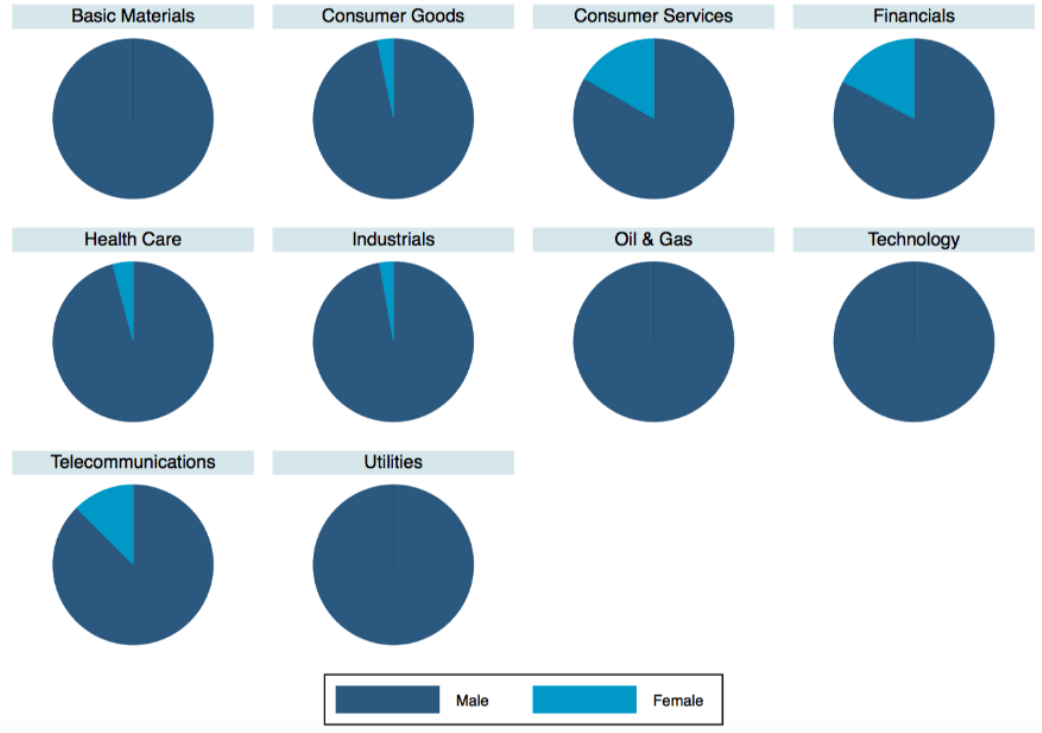
This graph shows the fractions of females and males in the education areas for all CEOs included in the sample. Fully navy circles imply no women in the sample pursued a degree in this education area.

Figure A.3: Education Area Split per Sector



This figure show the education area distribution per each sector. Of main interest for the text are Economics (green) and Engineering (blue).

Figure A.4: Gender Fraction per Sector



This figure show the gender division per each sector. Fully navy circles imply that the female share is 0 %.