LUND UNIVERSITY
School of Economics and Management

Women in the Boardroom:

Firm Performance and Quotas

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Abstract

Title: Women in the Boardroom: Firm Performance and Quotas

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Keywords: Firm Performance, Women, Board of Directors, Quota, Canada, Corporate Governance, Gender.

Purpose: The purpose of this thesis is to evaluate how the percentage of female directors on a company's board affects the firm's performance. The empirical results of this thesis will be used to help decide whether Canada should establish a quota for female board members.

Theories: There are four main theories referenced in this thesis, they are; agency theory, signaling theory, resource dependency theory, and board size and performance**.**

Methodology: Three measurements are used to evaluate firm performance, they are; average return, Tobin's q, and return on assets. Three types of regressions are used, they are; ordinary least squares, fixed effects, and two stage least squares. The data needed to perform this thesis was taken primarily from annual reports and stock indices.

Conclusion: This thesis has come to the conclusion that there is no observable performance benefit to adding more women to the board of directors. Out of all the regressions performed not a single one found a significant and positive relationship between the percentage of women on the board and performance. These results suggest that if Canada decides to implement a gender quota for public corporations, they should not expect to observe any increase in firm performance.

Acknowledgements

We would like to start of by thanking our advisor, Professor Lars Oxelheim, for his guidance and helpful input on this thesis. We would also like to thank our opponents for giving us constructive input on our thesis during the seminars.

Yours sincerely

Lund 2012

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1 Introduction

In this chapter a background of the thesis subject, if adding women onto company boards has an affect on the performance of the company, is presented. In the next section the countries that are included in the study are introduced. In the following section the problem statement together with the purpose of the thesis are presented. The chapter ends with limitations and demarcations of the thesis together with the disposition.

1.1 Background

Recently there has been much discussion on the composition of companies' board of directors. How do companies perform with regards to board size, insiders versus outsiders, compensation, women directors? Explicitly considering women directors, a growing number of countries throughout the world are considering setting a quota for the percentage of women who have to be on a company's board of directors. In Norway a quota system already exists. In 2003 the Norwegian government voted to implement a quota of 40% female directors, giving government companies till 2006 to comply and public companies till 2008. At this time Canada is considering implementing quota system.

"Canada has not adopted similar requirements for public company boards, but quotas have been championed by Liberal Senator Céline Hervieux-Payette, who introduced a private member's bill in the Senate calling for Canada to adopt quotas for women on corporate boards. The bill has not received support from the majority Conservative government."
(*Source: Globe and Mail, Janet McFarland, Dec 2011*)

This paper will support this growing body of work by evaluating company performance as the percentage of woman directors increases.

Throughout the world the percentage of board members who are women is quite low. The percentages, computed with data primarily from 2011, for some of the world's major economies are as follows; USA 16.1%, Germany 11.2%, Canada 10.3%, China 8.5%, Japan 0.9% (Catalyst, 2012). Observing the percentage of women on the boards of Canada's 60 largest companies

yielded the following results: in 2009 14.21%, 2010 15.22%, 2011 16.14%. There are some theories that would suggest that a greater number of woman directors would increase firm performance. Most of these theories are based on corporate governance and that adding more women to the board will make governance more efficient. The theories referenced in this thesis are; Agency theory, Resource dependency theory, Signaling theory, and Board size theory.

Sometimes when a market is left completely unregulated the result is inefficiencies that benefit one group at the cost of others. An example of this kind of inefficiency would be a monopoly. Many countries have laws to prevent monopolies. A question should then be asked, that if it can be proven that a company performs better when it has more women on the board and that the companies are reluctant to hire more women, should the government make a law requiring companies to have a certain percentage of women.

An argument for establishing a quota is that it would effectively dismantle the old boys club. This would then open board membership up to a greater talent pool. Also, it is possible that the board would become more independent of management as companies will have to go outside their usual recruiting methods to fill the positions. There is some evidence that a more independent board will be more successful (Carleton, Nelson, and Weisbach, 1998). This is because the independent board members will reduce agency costs. However, some thinkers assume that the board may become even less independent as insiders will promote female friends and family to meet the quota.

Adams and Ferreira (2008) investigated measures of board inputs with respect to how many women were serving on the board. They found that women directors had fewer attendance problems than their male counterparts, and that boards with a higher proportion of women directors had, overall, better attendance than boards with a lower proportion of women. They also found that executive compensation is more sensitive to stock performance with boards with a higher proportion of women, which indicates more monitoring. Also compensation is more closely tied to performance when a board has more women. Even though they achieved all the previous results, which may indicate better board performance, they found overall that greater gender diversity had a negative effect on performance. Most of the negative effect came from the firms with greater diversity having fewer takeover defences.

Adding more women to the board can hurt firm performance because boards tend to increase the size of the board to accommodate more women instead of replacing male board members.

There are a few reasons why establishing a quota system may hurt firm performance. While analyzing the data a trend appeared. Over the period 2009 to 2011 the percentage of women on the boards increased from 14.21 % to 16.14%. This increase was made up entirely by the adding of 17 women to the boards of the companies, not a single man was added or taken away. Because of this the average board size increased from 12.3 to 12.6. If Canada establishes the same 40% quota as Norway and assuming that the number of men will stay constant, the boards, as a collective would have to hire 301 more women to get to a total of 423 woman board members. This would cause the average board size to drastically increase to 17.62. David Yermack (1994) found a negative correlation between board size and firm value. If Canadian companies meet the women director requirements of a quota by simply adding more women to their current boards they could be wiping out the potential benefits that the women bring. However, a study done at the University of Michigan by Ahern and Dittmar (2011) found that after Norway established their quota system there was no significant increase in board size. This could be from the dismantling of the old boys club and the end of tokenism.

Another potential drawback of establishing a quota would be that the quality of the board could deteriorate. There may not be enough qualified women to hold positions on the board. Ahern and Dittmar (2011) show support of this theory by looking at the performance of Norwegian firms after they introduced their quota system. This cost of the quota system may fall unfairly on smaller companies. Larger companies with more resources will be able to attract top female talent to their board of directors. They may even poach women directors who are serving on boards of other companies. This will create a bad situation for small companies as they will scramble to find women to not only meet the quota but also replace the women they already had.

Does having more women on the board of directors actually increase performance, or could there be a cause and effect situation? Over the past decades women have made vast strides in achieving equality. In fact, in Canada, women now make up 57% of university students (Statistics Canada, 2010) and also have a higher graduation rate than their male counterparts. One could assume that as a company is growing and becoming more profitable it would make more hires. These companies would be bringing in more of these highly educated females who

will eventually make it to senior positions and possibly board position. On the other hand, a company that is not profitable and shrinking will not be hiring and will hold onto their male heavy workforce. This could generate the allusion that women are driving the success of the companies.

To summarize, a board that has a larger proportion of women is expected to increase the financial performance of the firm because of the following:

- A higher proportion of women will be better at monitoring, because the board will become more independent of management.
- Women bring unique skills to the board gained from life experiences.
- Considering women for positions on the board opens up a larger talent pool to draw from.
- The firm will benefit by being seen as socially conscious.

1.2 Reason for Canada

This study is important for a variety of reasons. One reason for this study is that, like many other countries, Canada is currently contemplating whether or not to establish a quota on female directors. There have been other studies on women directors and performance, but this will be the first that focuses on Canadian companies. There are a few aspects of Canada that differentiate from other countries. One aspect that is unique to Canada is it location. Canada is in a unique situation sharing the world's largest land border with the USA. Because the US economy is so much larger than Canada's and that Canada and the US share a common language (English), Canadian companies are in an excellent position to attract highly qualified female directors. An aspect of the Canadian economy that is relevant to this study is that 28 of the 60 largest Canadian companies are in the energy and materials sector, compared to the S&P 100 where 11 of the companies are in the energy and materials sector (Standard and Poors 100 Index, 2012). The energy and materials sectors have typically been male dominated. The percentage of board members that were women, of just the energy and materials companies, in 2009 was 10.06% compared to 14.21% for the index as a whole. It is possible that these male dominated industries could benefit most from an increase in female directors.

When it comes to having to make a decision on whether to implement a quota Canada is in a fortunate position. Norway has recently implemented a quota system requiring 40% or directorships to be held by women. Since the Norwegian and Canadian economies are quite similar, the success or failure of the Norwegian system can assist in Canada's decision on whether to implement. An outline of the similarities in the make ups of the Norwegian and Canadian economies can be observed in Table 1.

Table 1: GDP by Sector of Economy:

	Canada	Norway
Agriculture	1.9%	2.7%
Service	71%	59%
Industry	27.1%	38.3%

(Source: CIA World Factbook, 2011)

Agriculture is a small part of both Canada's and Norway's economies. Even if the agricultural sectors were quite different, because of their small weight in the overall economy, the two countries could still be compared. However, similar climates would lend one to believe that the agricultural industries are more the same than different.

Like in most modern economies the service sectors are the largest parts of both Canada's and Norway's economies. The service sectors are quite similar in Canada and Norway, just as they are in most western nations. These similarities will allow for comparison.

The industrial sector in modern economies is where there is the most differentiation between nations. This is the sector where Canada and Norway are quite similar compared to other nations. The oil and gas industry dominates both Canada's and Norway's industry sector, but that is not the only similarity. Forestry, fishing and mining are three other primary industries that make up a significant part of the economy of the two nations (CIA World Factbook, 2011). Overall, there are obviously some difference between Canada and Norway that will prevent the two from being

perfectly comparable. However, the similarities stated above indicate that a reasonable comparison can be conducted.

1.3 Problem Statement

The underlying problem that this thesis will attempt to answer is whether an increasing percentage of women on the boards of the largest publicly traded Canadian companies will have an affect on firm performance.

1.4 Purpose

The purpose of this thesis is to evaluate how the percentage of female directors on a company's board affects the firm's performance. The empirical results of this thesis will be used to help decide whether Canada should establish a quota for female board members. Previous research on board diversity and our own analysis of the Norwegian quota system will assist in answering whether Canada should implement a similar quota.

1.5 Limitations and Demarcations

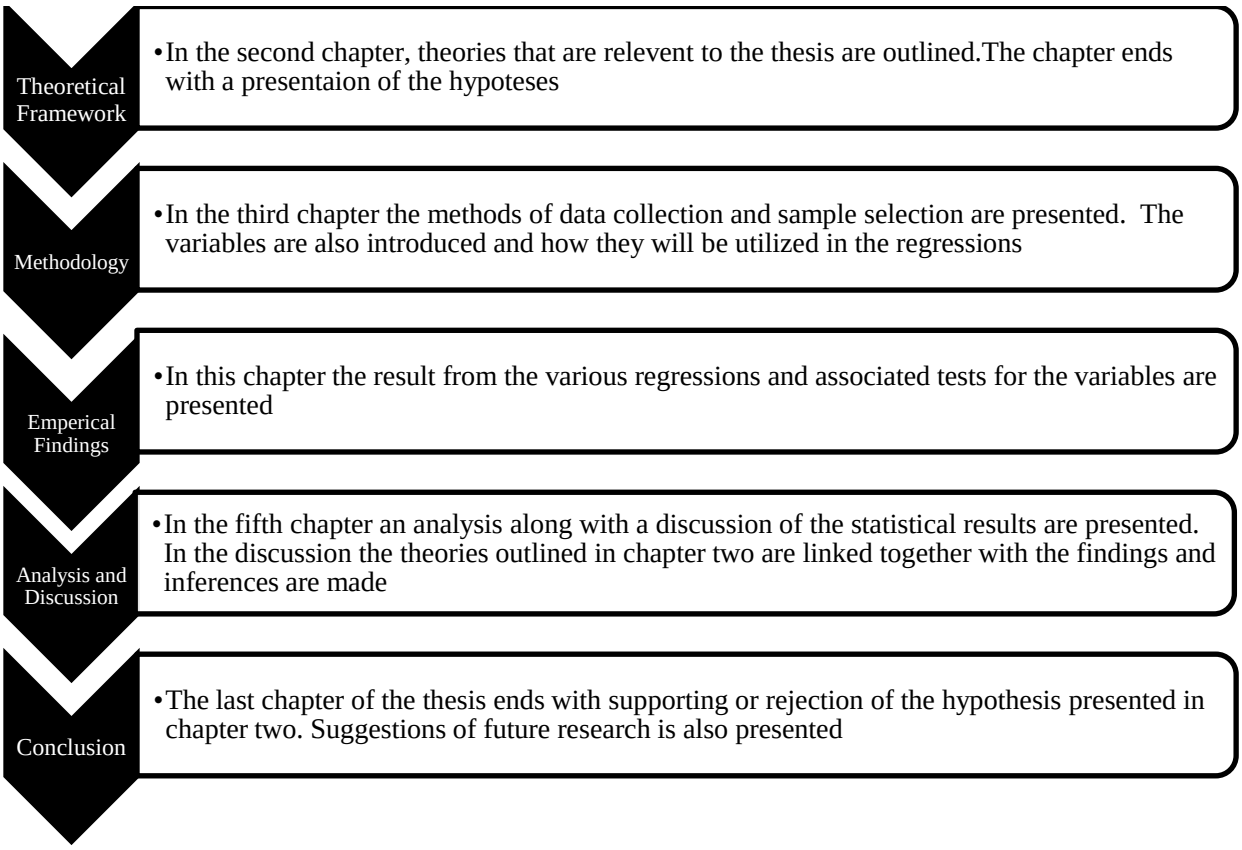
Information on the percentage of women serving on boards is not readily available. There is some information already compiled but it is mostly for fortune 500 companies and only for certain time periods. If one wants information on a certain country and or for a certain time period they have to accumulate the data themselves, a time consuming process. Because the process of collecting the data is time consuming small samples are used. These small samples are even more problematic when the main samples, the countries, are broken down into different industries.

The sample period only goes back to 2009. Because of time constraints a shorter time frame was needed and 2009 to 2011 seemed to be a logical choice. By 2009 all of the publicly listed companies in Norway were required to have 40% females on their board of directors.

1.6 Target Audience

The target audience of this paper are mainly students and tutors at the department of Business and Administration who have some prior knowledge of finance and financial theories, in particular corporate governance. This thesis could also be of interest to Canadian researchers that are investigating company board structure with regards to performance. This paper may also be of interest to those who are studying or have an interest in political science and/or social studies such as gender studies.

1.7 Disposition



2 Theoretical Framework

In this chapter different theories that the thesis bases its hypotheses on are introduced. Where the first theory is agency theory, followed by signaling theory, followed by the resource dependency theory, and finally board size theory. The chapter ends with introducing the hypotheses that will be tested.

2.1 Agency Theory

Most of the benefits that women bring to the board are tied to agency theory. One of the primary goals of the board of directors is to make sure that management is acting in the best interest of shareholders i.e. minimize agency costs. The board performs certain tasks to achieve this goal; they include replacing managers that are not performing well, designing compensation packages that motivate managers to act a certain way, and providing input into strategic decisions. Rosenstein and Wyatt (1990) have found that independent directors perform their duties more diligently than directors that are closer to management. Because of this it is important to make sure that the board of directors has a certain level of independence. Boards with a higher percentage of women have been found to be more independent than boards with a lower percentage (Carter et al., 2003). This could be because as firms face increasing social pressure to hire female directors they have to go outside the firm to find qualified candidates. This may change in the future as firms realize that women directors are not merely tokens and begin to groom internal female employees for directorships. As for now more woman directors usually relates to a more independent board.

There have also been studies that prove that when women directors are on the compensation committee the executive management salaries are lower. Core, Holthausen, and Larcker (1998), show that firms with stronger governance have fewer agency problems. Also, that CEO's at firms with fewer agency problems receive less compensation, and that firms with fewer agency problems perform better. Studies have also shown that when women are on the compensation committee executive pay is more linked to performance. Mehran (2005) shows that "firm performance is positively related to the percentage of equity held by managers and to the percentage of their compensation that is equity-based."

2.2 Signaling Theory

Signalling theory is when a firm makes a decision and there is a response from shareholders (negative or positive) based solely on the fact that they made the decision. An example is when management makes the decision to increase the dividend. Even though increasing the dividend has no effect of the company's profitability the share price goes up because shareholders view it as a positive signal. Oxelheim and Randøy (2002) have shown that signals can apply to the composition of the board, they have shown that when an Anglo-American is added to the board of a Scandinavian company this causes an increase in the share price. Adams and Ferrira 2008, show that women on the board and firm performance have a positive relationship. This positive relationship vanishes once they control for firm effect, but the fact that firms with more women on the board perform better may result in a potential positive signalling effect as other firms add women to their boards.

2.3 Resource Dependency Theory (RDT)

The central theme of the RDT is that for firms to be successful they need to maximize their power and they do this by attaining more control over their required resources, example; labour, capital and raw material. Hillman et al. (2007) state that the board of directors is an important link between a firm and their resources. The board of directors had at least four connections to resources, with respect to RDT: they provide the firm with useful information, they provide a channel for communication, they have connections with other firms and entities, and they can help legitimize the firm (Pfeffer and Salancik, 2003). With respect to RDT and the abilities of the board of directors, adding women to the board has the potential to increase firm value. The board can supply useful information. Stephenson (2004) states the women director have knowledge of certain consumer markets, which their male counterparts may lack, because of their extensive participation in these markets. The board provides connections to other firms and entities. Women directors come from a more professionally diverse background, the different connections that women have because of the different background may open up more opportunities for the firm. Also with regards to connections, on average individual female directors hold more directorships that their male counterparts (Kildens Journal, 2012). This will give the firm more connections to other firms. Projecting legitimacy can help a firm in many ways. Customers will

prefer to purchase goods or services from a firm that is legitimate and also suppliers would like to do business with legitimate firms. Since the issue of female board members is currently on the public's conscience, adding more women to the board may create goodwill.

2.4 Board Size and Performance

Previous studies about board size show that increasing the number of members on board does not increase the performance of a firm (Jensen, 1993). There is additional research where investigations about the ratios of having a board made up of outsiders and insiders are correlated to firm performance (Harries and Raviv, 2008). Their study came to the conclusion that having a board only made up by outsiders did not increase the firm value. Instead the optimal board is to be made up by both insiders and outsiders.

The actual size of the board is another topic. There are studies that show that the optimal number of board members is a range between 8-9 with a maximum of 10 (Lipton and Lorsch, 1992). In a board that is considered to be too large (above 10) it is hard to gauge the input and performance of the individual board members. The study made for this thesis shows that the median board size among the 60 Canadian companies were 12.32 in 2009 and 12.68 in 2011. This shows that the board size has increased during the time period. This should according to the mentioned theory above result in a decrease of firm performance. For this thesis the number of women on Canadian company boards shows an increase during the period 2009-2011 from 14.21% to 16.14%. Taking that into account together with the fact of the increasing size of board during the same time indicates a problem. Instead of replacing men for women on the board it is more common to increase the number seats of board by adding a new board member, in this case women.

2.5 Hypotheses

Some of the benefits that women on boards provide to their firms are likely to change little across all regions, like the unique knowledge of markets. Yet, some of the benefits that women bring will likely have different level of benefits depending on the country. For example, the benefit that firms get from being seen as legitimate when adding more women to the board will

have a greater effect if the country they are operating in values gender equality. Another difference would be that a country that already has very strong shareholder protection will benefit less from the increase in independence that female directors bring than a country that has relatively weak shareholder protection (Adams and Ferreira, 2008). Because of these potential geographical differences it is important that countries study how adding more women to the board could affect them specifically before making laws mandating a certain level of female participation on boards of directors.

Hypothesis 1: There is a significant relationship between the percentage of female directors on the boards of the largest Canadian companies and the performance of these companies.

If the hypothesis is confirmed there could be an argument for Canadian companies to increase the percentage of women that are serving on their boards. Over the years 2009 to 2011 the percentage of women on the boards on Canada's 60 largest companies has increased from 14.21% to 16.14%. This increase is promising and in line with resource dependency theory, but some politicians believe that the change is happening to slowly and have recommended the establishment of a quota not unlike Norway's.

Hypothesis 2: Norwegian companies have performed better over the time period 2009-2011 then their Canadian counterparts.

If the second hypothesis can be confirmed this leads to further support that Canada should adopt a quota system.

3 Methodology

The chapter begins with a description of what research approach is being used followed by the sample selection. The empirical method is the next step where the dependent, independent and control variables are explained. The chapter ends with an explanation of panel data together with the regressions that will be conducted followed by related tests.

3.1 Research Approach

In this thesis the deductive approach is applied. When using the deductive approach the goal is to test the hypotheses which are based on multiple theories. To test the hypotheses the collecting and analyzing part of the data is a major process. The hypotheses in this study will be tested by running a regression from the collected and analyzed data, where the outcome will either be to reject or accept the hypotheses.

The quantitative strategy emphasizes the amount of data that is being collected and analyzed in a study. For this thesis, where the deductive approach is the foundation of the study, the quantitative strategy has been chosen to analyze the data. By using the quantitative strategy it enables other researchers to replicate the study done in this thesis and test it for its reliability along with its validity (Bryman & Bell, 2008).

3.2 Sample Selection

In this thesis two countries are being investigated, Canada and Norway. From each country, data was collected from the largest traded companies. For Canada 60 companies were chosen to be in the sample, these 60 companies come from the S&P TSX60 (Toronto Stock Exchange), which is comprised of the largest traded companies in Canada. The same thing was done for Norway, where the largest companies from OBX (Oslo Bors Index) were chosen to be in the sample, summing the Norwegian companies to 25. In total the sample consists of 85 companies, 60 from Canada and 25 from Norway, all the companies are summarized in appendix 1.

To make sure that the selected companies for the sample can be used when running the regressions, two requirements are set. The first requirement is that the companies ought to have

completed annual reports which go back to the beginning of the test period, 2008. The additional requirement was that the companies must have been actively traded during the whole test period, 2009-2011, in order for the data to be complete. For this thesis the fulfilling of the second requirement is vital since the return of the companies´ stocks is used as one of the dependent variables in the regression. Due to these requirements, two companies from the Canadian sample and three from the Norwegian sample where lost. This resulted in 80 companies instead of the original 85 companies being included in the final sample.

The data needed for this thesis consist solely of secondary data. The data is mainly collected from annual reports and stock exchange indexes. The collected data consists of yearly observations such as total assets, liabilities, net income and the number of outstanding shares from each company. For the companies´ share prices, daily observations were collected and turned into yearly observations.

3.3 Dependent variables

Three performance measurements are being used as dependent variables in this study. The first dependent variable is the stock return for each company during the test period (2009-2011) named "Return" in the regression. It was calculated by taking the share price performance during one year, resulting in three observations for each company. The dependent variable Return was chosen since it is a simple tool to use when comparing performance between companies and industries and it shows how companies have increased (decreased) shareholders value during a specific time period. For this thesis it will then show if adding women onto the companies' boards has a significant impact on share price performance.

The second performance measurement that will work as dependent variable is the "Tobin's q". The Tobin's q is calculated by obtaining the market value along with the book value of liabilities and equity from a company. The formula is as follows:

(Equation #1) *Tobin´s q* = ———————————————

The q shows the ratio between the market value of a company against its replacements cost. To interpret the result from the formula above, receiving a q>1 means that the company's market value of assets is greater than the value of the company's stated value. This means that the share price of the company is overvalued. If receiving a value q<1 this means that the company's market value is less than the stated value of the company's assets. This can be interpreted that the share price of the company is undervalued. For this thesis a proxy of the Tobin's q similar to the one that Adams and Ferriera (2008) used has been conructed. Here the market value of each company is given by taking the number of outstanding shares multiplied with the share price at the end of each year and adding the book value of liabilities to it. This is then divided by the total assets of the company. The resulting values from this can be interpreted the same way as in equation #1.

The third and last dependent variable in this study is "Return on Assets" (ROA). The ROA is calculated by taking each company's net income and dividing it by its total assets for each year, hence three observations for each company are constructed. John Hagel III and Seely Brown state in their article (The best way to measure company performance, 2010) that ROA takes into account whether a company is able to generate an adequate return on assets used to support business activities. They further state that it is a better measure than Return on Equity (ROE) since company can artificially maintain a healthy ROE for some time. ROA is assumed to give more accurate and up to date figures which are hard to manipulate.

3.4 Independent variables

The independent variables are the variables that are used to explain the dependent variable. The first independent variable, and the focus of this paper, is the percentage of women on the board of directors. The percentage of women was obtained by dividing the number of women on the board by the total board size for each year of the test period.

The other independent variables can also be called the control variables. The first control variable is the size of the board, in the regressions this variable is named "Director". The size of the board was found by counting the number of board members that were disclosed in the annual report. This was done for each company and each year in the test period. There have been many

papers that link board size to performance. Shijun Cheng (2006) has shown that firms with larger boards have lower variability of corporate performance. Also, Jensen (1993) argues that larger boards, boards with more than 8 members, are likely to be less effective in their duties. Because of the link between board size and performance it is appropriate to include board size in the regression.

The next control variable is "Log Sales". Log sales is used to represent firm size. To calculate this variable the total revenue was obtained from each company's consolidated balance sheet for each year in the test period, and then the natural logarithm of the revenue was taken to obtain log sales. Fama and French (1992) have shown that firm size is related market returns. Firm size has been used in many papers as a control variable including Adams and Ferreira (2008).

Another control variable used is the age of the firm, called "Firm Age" in the regressions. The age of the firm was calculated by subtracting the year the company was founded by the year of the test period. Firm age could have an effect on firm performance. A younger firm may have many growth opportunities but more risk, while an older firm may be in the decline phase of its life cycle but face less risk (Fink et al., 2004). Therefore the age of the firm should be used as a control variable. The way that firm age is calculated is not perfect. There are some instances where two older firms merge to create a firm that is now considered by the calculation to be quite young.

The last control variable considered is the return on assets. The ROA is used as both an independent variable as well as a dependent variable. As an independent variable ROA is used to control for management efficiency in firm performance. Adams and Ferreira (2008) and Carter et al (2003), two papers on board diversity, have both used ROA as an explanatory variable.

3.5 Panel data

The data for this thesis contains both time-series and cross-sectional elements, hence it is panel data. By using panel data, one can address and handle more complex problems than using time-series or cross-sectional data alone. The increase of degrees of freedom is an additional factor that helps to increase the power of the test when using panel data. More specifically the degrees of freedom are useful when examining the relationship between the variables as they change over

time. Multicollinearity is an additional problem which can be mitigated using panel data (Brooks, 2008).

In this thesis three regressions are being estimated to show the relationship between adding women onto the company boards and the performance of the company. The three are the following:

(equation #2) $Return = \beta_0 + \beta_1 Women_t + \beta_2 Director_t + \beta_3 Log\_Sales_t + \beta_4 Firm\_Age_t + \beta_5 ROA_t + \varepsilon_t$

(equation #3) $Tobins\ q = \beta_0 + \beta_1 Women_t + \beta_2 Director_t + \beta_3 Log\_Sales_t + \beta_4 Firm\_Age_t + \beta_5 ROA_t + \varepsilon_t$

(equation #4) $ROA = \beta_0 + \beta_1 Women_t + \beta_2 Director_t + \beta_3 Log\_Sales_t + \beta_4 Firm\_Age_t + \varepsilon_t$

Here it is easy to see how the regressions are constructed and how the dependent variables are explained by the independent variables. The regressions are estimated by the Ordinary Least Squares (OLS) method. To analyze panel data two models can be applied, the fixed effects model and the random effects model. The fixed effects model and random effects model are two well used techniques in financial research for panel data. The fixed effects model lets the intercept of the regression vary cross-sectionally or in time series or through both diagonally. In the random effects model the intercept is allowed to differ as in the fixed effects model. The difference between the random model compared to the fixed effects model is that the intercept for each cross-sectional unit are assumed to arise from a common intercept plus a random error term that varies cross-sectionally but is constant over time (Brooks, 2008).

To test if the above effects are needed a likelihood test is done. A p-value under the 5% significance level indicates that effects are needed. To establish which effects are required the Hausman test is ran, where the H_0: random effects against alternative H_1: fixed effects. If H_0 is rejected at the 5% level it indicates fixed effects is more appropriate to use than random effects.

To make sure that the result from the regression is unbiased and correct there cannot be any correlation between the error terms. By using the white robust method on the regressions it removes the correlation and reduces the standard error estimates. There are three types of

approaches within the robustness method that can be applied to the regressions they are, the white period method, cross-sectional method and white diagonal method. For the regressions in this thesis, period fixed effects are used in all three regressions. The white-period (robustness method) is applied to two of the three regressions. This method takes care of error terms that are cross-section heteroscedastic and serially correlated (Brooks, 2008).

When the independent variable is correlated with the error term endogeneity occurs. This means that OLS method cannot be applied since the regression will lead to inconsistent and biased estimates. To overcome this, a TSLS (two stage least squares) regression is to be used. By introducing a new variable that is correlated with the endogenous variables and uncorrelated with the error term in the explanatory equation this new equation should give unbiased and more consistent estimates.

4 Empirical Findings

In this chapter multiple methods that test the collected data for its validity are presented. This is followed by the empirical findings from the conducted regressions.

4.1 Normality Test

After all of the data has been collected and it has been formatted into panel data, the validity of the data has to be checked. This is an important step, for if the regression is run with data that is not valid the results will be biased. The correlation between the independent variables needs to be checked. If one or more the variables are too highly correlated with each other the problem of multicollinearity will be present. The correlation can be checked by constructing a correlation matrix. For the Canadian companies, the correlation matrix for the five independent variables can be found below in table 2.

Table #2: Correlation Matrix of Independent Variables for Canada:

	WOMEN	DIRECTOR	LOG SALES	FIRM AGE	ROA
WOMEN	1	0,279	0,447	0,562	-0,039
DIRECTOR	0,279	1	0,524	0,544	-0,368
LOG SALES	0,447	0,524	1	0,585	-0,095
FIRM AGE	0,562	0,544	0,585	1	-0,258
ROA	-0,039	-0,369	-0,095	-0,257	1

By examining this matrix it can be found that there is slightly higher than desirable correlation between most of the variables. All of the variables are at least 44% to at most 58% correlated with at least two other variables, except for ROA. Firm Age has the most correlation while ROA has the least. Despite these results none of the variables are going to be removed, as the results seem consistent and there is no correlation above 80%. The correlation matrix for the Norwegian firms can be found in appendix 2A. By examining this matrix it can be found that the correlations between the variables in the Norwegian sample are less than the correlations in the Canadian sample. The correlation between log sales and directors is the highest at 52%; it is the only correlation above 50%. Considering no variables were removed from Canadian sample,

and that the Norwegian sample has lower correlations, no variables will be removed from the Norwegian sample because of high correlation.

The next step in determining the validity of the data is to test the data's normality. The regressions will yield truer results the closer the data is to being normal. By calculating the skewness and the kurtosis of the variables and then comparing them to the skewness and kurtosis of a normal distribution (0 and 3 respectively), an estimate of the normality of the data can be made. A table of the results of the normality calculations for the Canadian sample can be found in table 3.

Table #3: Normality Attributes of Variables for Canadian Data:

	WOMEN	DIRECTOR	LOG SALES	FIRM AGE	ROA
Mean	0,147	12,506	8,792	68,345	0,052
Median	0,143	12	9,057	57	0,043
Std. Dev.	0,090	2,812	1,140	48,889	0,059
Skewness	0,028	0,395	-0,049	0,610	-0,082
Kurtosis	2,226	2,974	2,521	2,379	9,262
Observations	174	174	174	174	174

It can be found that most of the variables are somewhat normal; women, board, log sales, and firm age all have kurtosis between 2,22 and 2,97. ROA's kurtosis is much higher with a value of 9,26 indicating that the distribution has fat tails. This is because of a few of the companies having extreme values for ROA, such as Kinross Gold in 2009 (-0,258) and Research in motion in 2011 (0,265). As for skewness; women, log sales, and ROA all have skewness less than 0,085. Board size has skewness of 0,394 while firm age is even higher at 0,610. Again, the high values are attributed to outliers. Specifically for firm age, there are many energy companies that make up the largest Canadian companies and these firms tend to be relatively young. When these firms are grouped with a handful of very old banks skewness to the left occurs. None of the companies are going to be removed. For the variables that have kurtosis and skewness values that are higher than desired, correcting to normality would require removing multiple values which would reduce the already small sample size. Also, to maintain balanced panel data all data for the offending company's would have to be removed which would reduce the sample size even

further. The data for the Norwegian companies is further from normal than the Canadian data, appendix 2B displays the results. As for kurtosis, only firm age has a value that is close to 3. With regards to skewness, three of the five variables have a value that is greater than 1. A reason for the degraded data could be from the small sample size, 66 observations for Norway compared to 174 for Canada. None the less, no companies were removed from the data for the same reasons as the Canadian data. It is relevant to note that there could be data collection errors that would distort the calculations performed.

4.2 Findings from Conducted Regressions

The regressions will begin by performing an ordinary least squares regression on return as well as Tobin's q and ROA, with the percentage of women directors as the only independent variable. The results will be noted and then control variables will be added and the effect of the control variables on the coefficient and probability of the "women" variable will be noted.

In Appendices 3A-C the results for the OLS regressions, of the relationship between the percentage of women serving on the board and the three performance measures, can be found. When the percentage of women is taken as the only independent variable, significant results at the 95 percent are found when the performance measures are return and Tobin's Q but not ROA. Somewhat surprisingly a negative relationship is found for all three performance measures. Though, these results yield very little information as more independent variables need to be added to the equation.

Appendix 4A displays the results from the regression on return with all independent variables using OLS. When all of the variables are included into the regression the effect of the percentage of women remains significant at the 95 percent level as well as negative. Appendix 4B displays the results from the regression on Tobin's q with all independent variables using OLS. In this case, when all variables are included, the percentage of women becomes insignificant. As well as the change from significance to insignificance, the sign of the coefficient changes from negative to positive. The results for the last regression for OLS, ROA, can be found in Appendix 4C. Just as with Tobin's Q, when all of the variables are added to the regression on ROA (less ROA), the

result for the percentage of women becomes insignificant and the sign of the coefficient changes to positive.

To improve upon the previous regressions certain tests are performed to make sure that the proper changes to the regressions are made. A Likelihood Ratio Test is performed to determine whether "effects" should be added to the regression. If the probabilities of the random cross-sections and/or period, in the likelihood ratio test, have a probability that is less than 0,05 then there could be a case to include the respective effects. After running the tests it was found that effects could be added to all three previous OLS regressions. To decide which type of effects to add, fixed or random, the Hausman test is performed. If the results of the Hausman test are significant then fixed effects should be used. The results are significant for all three OLS equations so fixed effects are used on all of them. The effects that can be added are cross-sectional effects, period effects, or both. Comparing the results of the Likelihood ratio tests it can be seen that the period fixed effects are more significant than the cross section effects. Therefore period fixed effect will be used instead of cross-section effects. As well as the Likelihood ratio tests and the Hausman tests, a test for heteroscedasticity is performed by running a regression on the squared residuals of the regression. If the errors are found to be heteroscedastic, then robust standard errors should be used. The robust standard errors that are used in this thesis are White period. After performing the test F-test it was found that there was heteroscedasticity present in the regressions when return and ROA were the dependent variables. Because of this result, and the results for the previous test, robust standard errors will be applied to those two regressions.

After applying the changes to the regressions, not surprisingly the results have changed. Appendix 5A gives the results for the return regression. Whereas in the previous OLS regression, where a simple pooling method was used, the effect of the percentage of women was significant, now when the fixed effects are added and robust standard errors are used, the results become insignificant at the 5% level. Using OLS the p-value was equal to 0,024 but after the changes the p-value has increased to 0,068. Though the percentage of women on the board is no longer significant at the 5% percent level, it is at the 10% level. The Coefficient itself has changed little. Using OLS it had a value of -1,2 and in the modified regression the value has changed to -1,05.

Appendix 5B displays the results of the fixed effects regression on Tobin's q. Unlike in the previous regression, robust standard errors are not needed for the regression on Tobin's q. When

examining the results it can be seen that the percentage of women variable remains insignificant but does improve, decreasing from a p-value value of 0,215 using OLS to 0,167 using fixed effects. The coefficient remains mostly unchanged with a value of 0,817 compared to OLS's 0,816.

Moving on to the ROA fixed effect regression requires the reinstatement of robust standard errors. The results of this regression can be found in Appendix 5C. Adding fixed effects to the OLS equation make the effect of the percentage of women on the board even more insignificant. The p-value value increases form 0,211 in OLS to 0,486. The coefficient remains positive at 0,062 which is down slightly from the OLS regression at 0,072.

As discussed earlier there is an endogeneity problem when performing these regressions. One way to help correct for this endogeneity is to solve two simultaneous equations. Where one of the equations has the desired performance measure as the dependent variable and the other has the percentage of women as the dependent variable. This can be done by using a two stage least squared regression. This is similar to the way Carter, Simkins and Simpson (2002) control for endogeneity. The following two equations represent the system of equations to be solved.

(Equation #5) $Performance\ measurement\ (Return,\ Tobin´s\ q,\ ROA) = \beta_0+\beta_1 Women_t +\beta_2 Diretor_t +\beta_3 Log\ Sales_t +\beta_4 Firm\ Age_t +\beta_5 ROA_t+\varepsilon_t$

(Equation #6) $Women=\alpha_0+\alpha_1(Return,\ Tobin´s\ q,\ ROA)+\alpha_2 Director+\alpha_3 Log\ Sales_t+\alpha_{4t} Firm\ Age_t+\alpha_5 Education_t+ v_t$

To properly apply the TSLS method a new variable is needed. This new variable needs to be correlated with the percentage of women serving on the board but uncorrelated, or nearly uncorrelated, with firm performance. The correlation matrices can be found in Appendices 6A-C. One reason for the lack of women on the board of directors could be that there are few qualified candidates. The new variable, called "Education", is an estimate of the percentage of qualified director candidates that are women. The education variable is calculated by first analyzing the education of the board of directors of the different industries. The directors of the

companies in the industry are then classified as having an education in one of following fields; Business, Arts (including economics), Engineering/Science, Law, or Medicine. The idea is that companies in certain industries have an optimal proportion of professionals on their board of directors and will hire directors with the required education, regardless of gender, to maintain this proportion. As well as needing a certain education to attain a board seat, it is also assumed that a certain amount of experience is required. The amount of experience is calculated by finding the average age of directors (62) and then subtracting a reasonable estimate of the age someone would begin employment (25), achieving a requirement of 37 years of experience. Now by subtracting 37 years from 2009, it is assumed that the students studying in the year 1972, in the required fields, will fulfill the requirements to be board members. This step is repeated for 2010 and 2011. By looking up the historical data from statistics Canada, the percentage of female students enrolled in the required field of studies can be found. Now by multiplying this percentage by the required proportions in each industry an estimate of the percentage of qualified persons that are women is made.

Now all of the information is available so that the TSLS regressions can be performed. The results for the TSLS regression on return can be found in appendix 7A. As can be seen in the table, after using TSLS to correct for endogeneity, the percentage of women on the board becomes even more insignificant. The variable is no longer even significant at the 10% level. As well as losing a lot of significance, the sign of the coefficient changes from negative to positive.

The results of the TSLS regression on Tobin's q can be found in appendix 7B. The results of using TSLS on Tobin's Q are similar to the results on return. The significance of the women variable is greatly reduced from a p-value of 0,167 to a value of 0,721. Also, just as with the previous regression the sign of the coefficient changes, but in this case it changes form a positive value to a negative value.

The final regression performed in this thesis is the TSLS regression on ROA. The results of this regression can be found in appendix 7C. As with the previous two TSLS regressions, the percent of women on the board of directors becomes more insignificant. Also, the sign of the coefficient changes from positive to negative.

The vast changes between the different regressions indicate a lack of robustness. A summary of all of the regressions done above can be found in appendix 8A-C.

5 Analysis and Discussion

In this chapter an analysis along with a discussion of the empirical findings are presented. The chapter begins by presenting the significant results followed by the insignificant results from the performed regressions. The findings are being linked with the theories outlined in chapter two. Some additional discussion regarding a comparison between Canada and Norway is presented. The chapter ends with a short summary.

After performing all of the regressions, one thing has become clear. The effect of having more women on the board of directors is inconclusive. Any significant results found in an individual regression are not robust across different dependent variables or regression techniques. Even if there was significant results found while using a specific regression technique and performance measure the results where no longer significant after changing the performance measure.

5.1 Significant Results

The most significant results are achieved when return is used as the performance measure. When using a simple pooled OLS regression, with all of the control variables included, the estimate of the coefficient of the women variable is significant at the 5% level. After applying fixed effects and robust standard errors to the regression the results remain significant at the 10% level. Both of these regressions yield an estimate of the coefficient that implies a negative relationship between the percentage of women serving on the board of directors and the company's average return. With respect to agency theory, this result provides some evidence that the potential monitoring benefits that women bring to the board do not translate into better firm performance. This could also mean that Canadian boards already have a satisfactory level of board independence and that firms that feel pressure to add unneeded independent female directors are actually hurting performance. With respect to resource dependency theory, this result could imply that firms are already hiring the best board members for the job and that the fact that there are so few female directors could be from a lack of qualified candidates. Also, the view that firms that hire more women to the board will be viewed as more socially conscious is drawn into question. It would appear that the new customers and well qualified employees drawn to the firm

because of its perceived social conscience do not contribute to an increase in the firm's annual return. The results from the OLS and fixed effect regressions on return are evidence supporting the view that a quota system would be detrimental to firm performance.

5.2 Insignificant Results

The negative relationship between women and firm performance is not a robust result. When Tobin's q is taken as the dependent variable, instead of return, a positive relationship is found. However, this relationship is not as significant as the previous results. When both the OLS and fixed effects regression are performed, the results are only significant at the 20% level, which is too insignificant to derive conclusions from the results. The results are even more insignificant when ROA is taken as the dependent variable. These insignificant results support the rejection of hypothesis 1. Overall the significance of the regressions decreased when fixed effects and robust standard errors are used. The exception is for the regression on Tobin's Q, which experienced an increase in significance when fixed effects were used.

After correcting for potential endogeneity there are no significant results found for any of the performance measures. This emphasizes the importance of considering endogeneity when performing the regressions. For example, if endogeneity was not accounted for, the OLS and fixed effects regressions on return would lead one to believe that there is in fact a negative relationship between the percentage of women on the board of directors and firm performance. When in actuality the results are not robust and conclusions should not be drawn on those results alone. These results support the rejection of hypothesis 1.

5.3 Other Results

Out of interest, all of the regressions were also performed on the Norwegian firms. The effect of having more women on the board of directors is a little more difficult to interpret for the Norwegian results. The small sample makes it more difficult, as well as the realization that Norway has already established their quota, and as a result most of the firms have approximately 40% female directors. Not all firms have 40% though, some have less and some have more, so some results can be achieved. None of the regressions yielded significant results. The most

significant result came from the OLS regression on ROA, in this regression the women variable was significant at the 50% level and had a negative coefficient. The negative coefficient for the OLS regression on ROA is a result that is not consistent with the other regressions. The majority of the regressions using the Norwegian data yielded a positive relationship between the percentage of women on the board and firm performance. A summary of the results can be found in appendix 8D-F.

5.4 Comparison

Analyzing the performance of the Norwegian firms over the test period and comparing them to the performance of the Canadian firms over the same period can help in the decision of whether or not Canada should implement a quota similar to Norway's. As whole the Canadian firms performed worse than the S&P 500 by 6.4% over the sample period, a result which can be observed in table 4. The Norwegian firms performed better, outperforming the S&P 500 by approximately 46%.

Table #4: Stock market return in comparison to S&P500

Index	Year	2009	2010	2011	Overall
OBX25		40,6%	1,7%	3,9%	46,2%
TSX60		4,8%	-1,3%	-10,0%	-6,4%

These results are difficult to accurately interpret because of the variability of return over the sample period. Canada and Norway were affected by the 2008 recession by different degrees and entered their recovery phases at different times. Also, there are many factors that could affect how well firms perform, the percentage of women on the board directors being one of them. The comparison between Norway and Canada is done regardless, simply to lend support to hypothesis one in deciding whether Canada should implement a quota system. Because the Canadian firms do not currently have to operate under the quota system and they performed worse in the market than the Norwegian firms this is not consistent with hypothesis 1 which supports the decision to not implement the quota. Because of the many problems with the test,

not much weight will be placed on it when deciding whether Canada should implement a quota system or not.

5.5 Education by Sector

An interesting table, which lends support to the resource dependency theory can be found below:

Table #5: Comparison Between the Percentage of Qualified Candidates that are Women and the Percentage of Directors that are Women:

Qualified				Actual			
Sector	2009	2010	2011	Sector	2009	2010	2011
Financial	22,76%	24,05%	25,84%	Financial	18,63%	19,38%	22,22%
Telecom	17,01%	18,43%	20,21%	Telecom	13,72%	17,31%	15,38%
Energy	12,68%	13,83%	15,40%	Energy	12,87%	13,87%	14,12%
Health	15,98%	17,21%	18,75%	Health	10,00%	20,00%	20,00%
Materials	15,08%	16,36%	18,03%	Materials	6,57%	7,69%	8,51%
Consumer D.	19,15%	20,61%	22,43%	Consumer D.	16,00%	15,58%	15,79%
Utilities	16,99%	18,22%	19,89%	Utilities	13,04%	18,18%	13,64%
Industrials	19,89%	21,26%	23,08%	Industrials	18,75%	19,61%	20,37%
Consumer S.	15,55%	17,19%	19,06%	Consumer S.	19,05%	18,03%	20,97%

As can be seen in the table, it is clear there is a positive correlation between the percentage of females on the board and the percentage of qualified persons that are women. It is visible that in most sectors of the economy, as more women become qualified to sit on the board, the percentage of women sitting on the boards increase. In the few cases where the percentage of women sitting on the board decreases, it can usually be attributed to a very small sample size where one women leaving would create a large percentage change. Another interesting observation is that it does appear that women are underrepresented, with regards to this measure. According to resource dependency theory one would expect that a 1% increase in the percentage of qualified potential board members that are women would translate to a 1% increase in the percentage of board member that are women. Looking at the industries which have a more observations; financials, energy, and materials, it can be seen that a 1% increase in qualified candidates does not translates into a 1% increase in directorships. In most cases the percentage of

directors which are women is increasing slower than what would be expected. These results are limited in significance due to small sample size and a more in-depth study on this particular topic would be needed to achieve significant results.

5.6 Summary

After analyzing all of the regressions, one thing has become clear. The effect of having more women on the board of directors is inconclusive. Any significant results found, in an individual regression, are not robust across different dependent variables or regression techniques. Even if there are significant results found while using a specific regression technique and performance measure the results where no longer significant after changing the performance measure.

6 Conclusions

In this chapter conclusions are drawn from the empirical findings, analysis and theoretical framework. The chapter ends with suggestions of future research for coming studies within the research field.

6.1 Conclusion

Gender equality has been making headlines for decades. Recently the focus of the debate has been centred on the participation of women on the board of directors. There seems to be a consensus that since women make up approximately 50% of the population there is an argument to add more women to boards for the sake of fairness. However there continues to be debate on the financial benefit for companies to increase the representation of women. Recent research has been inconclusive. Though it can be proven that adding more women to the board changes the behaviour of the board in certain and potentially beneficial ways, whether there is an increase in performance depends on the study read. This thesis has come to the conclusion that there is no observable performance benefit to adding more women to the board of directors. Out of all the regressions performed not a single one found a significant and positive relationship between the percentage of women on the board and performance.

In this thesis there are two hypotheses being tested:

Hypothesis 1: There is a significant relationship between the percentage of female directors on the boards of the largest Canadian companies and the performance of these companies.

Hypothesis 2: Norwegian companies have performed better over the time period 2009-2011 then their Canadian counterparts.

The empirical findings of this thesis support the rejection of hypothesis 1. Based on the previous research on how women on the board of directors affect corporate governance, we were expecting to find a positive relationship between the percentage of board members that are women and firm performance. In actuality our most significant results found that there is a negative relationship between the percentage of board members that are women and firm performance. However those results were not robust, after all regressions were performed it was

concluded that there was no significant relationship to be found. The rejection of hypothesis 1 leads us to believe that Canada should not implement a quota system at this time.

Unlike hypothesis 1, Hypothesis 2 has been confirmed. However the testing of hypothesis 2 was not as robust as for hypothesis 1. The acceptance of the second hypothesis lends some support for the accepting of a quota system in Canada. This is contradictory to the conclusion drawn from the rejection of the first hypothesis. However, because of the lack of robustness the acceptance of the hypothesis does not yield enough information for us to recommend that Canada implement a quota.

If Canada does decide to establish a quota system to increase the number of women serving on the boards of companies, the decision will be based on fairness and not an increase in firm performance.

6.2 Future Research

While conducting this thesis, we have come up with some ideas for future research. One way of improving on this thesis would be to redo it in a few years time, when hopefully the volatility of the market has been reduced. The recovery from the 2008 recession created larger than historically normal volatility in the variables and also made the comparison between Canada and Norway more difficult. Also better results may be achieved by increasing the sample size as well as adding more variables. A good addition would be the inclusion of an event study which would allow for the comparison between two different time periods.

While performing the TSLS regression we had to come up with a new variable that is correlated with the women variable but uncorrelated with the performance measures. This new variable is an estimate of the percentage of qualified director candidates that are women. There could be more research done to achieve better estimates. This could include increasing the sample size and increasing the accuracy of the type of education a director has.

If a quota is put in place it would be interesting to observe how the make up of the board changes with regard to other variables. It would be interesting to see if the board of directors becomes more independent or less independent. Also, one could observe how the size of the board

changes and whether the board becomes more international or not. A possible change in the type of education of the directors could also be observed, to see if the firm is changing their hiring patterns in response to the quota.

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8 Appendices

Appendix 1: *Companies listed on TSX60 and OBX25*

TSX 60

Agnico-Eagle Mines LTD
Agrium INC
Arc Resources LTD
Bank of Montreal
Bank of Nova Scotia
Barrick Gold Corp
BCE INC
Bombardier INC
Brookfield Asset Management INC
Cameco Corp
Canadian Imperial Bank of Commerce
Canadian National Railway Co
Canadian Natural Resources LTD
Canadian Oil Sands LTD
Canadian Pacific Railway LTD
Canadian Tire Corp LTD
Cenovus Energy INC
Eldorado Gold Corp
Enbridge INC
Encana Corp
Enerplus Corp
First Quantum Minerals LTD
Fortis INC
George Weston LTD
Gildan Activewear INC
Gold Corp
Husky Energy INC
Iamgold Corp
Imperial Oil LTD
Inmet Mining Corp
Kinross Gold Corp
Loblaw Companies LTD
Magna International INC
Manulife Finacial Corp
Metro INC
National Bank of Canada
Nexen INC
Penn West Petroleum LTD
Potash Corp
Power Corp of Canada
Research In Motion LTD
Rogers Communications INC
Royal Bank of Canada
Saputo INC
Shaw Communications INC
Shoppers Drug Mart Corp
Silver Wheaton Corp
SNC-Lavalin Group INC
Sun Life Financial INC
Suncor Energy INC
Talisman Energy INC
Teck Resources LTD
Telus Corp
Yamana Gold INC
Tim Hortons INC
Toronto-Dominion Bank
Transalta Corp
Transcanada Corp
Valeant Pharmaceuticals
Thomson Reuters Corp

OBX25

Aker Solution
Algeta
Cermaq
DNB
DNO International
Fred. Olsen Energy
Frontline
Gjensidige Forsikring
Golar LNG
Marine Harvest
Norsk Hydro
Orkla
Petroleum Geo-Service
Prosafe
Renewable Energy
Royal Caribbean Cruises
Schibsted
Seadrill
Statoil
Statoil Fuel & Retail
Storebrand
Subsea 7
Telenor
TGS-Nopec Geophysical Co
Yara International

Appendix 2A: *Correlation matrix of the variables included in the Norwegian regressions*

	WOMEN	DIRECTOR	LOG_SALES	AGE	ROA
WOMEN	1	-0,378	-0,199	0,175	-0,005
DIRECTOR	-0,378	1	0,525	0,335	-0,179
LOG_SALES	-0,199	0,525	1	0,424	0,259
AGE	0,175	0,335	0,424	1	0,049
ROA	-0,005	-0,179	0,259	0,049	1

Appendix 2B: *Normality test of the variables included in the Norwegian regressions*

	WOMEN	DIRECTOR	LOG SALES	FIRM AGE	ROA
Mean	0,385	8,393	9,517	69,36	0,034
Median	0,400	8	9,581	39	0,040
Std. Dev.	0,109	2,286	1,793	66,458	0,097
Skewness	-1,112	-0,048	-0,605	1,142	-2,321
Kurtosis	5,509	1,774	4,1885	3,248	10,676
Observations	66	66	66	66	66

Appendix 3A*: OLS regression, with only women as the independent variable and return as the dependent, for the Canadian companies*

Dependent Variable: RETURN
Method: Panel Least Squares
Date: 05/09/12 Time: 10:58
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.329200	0.074514	4.417984	0.0000
WOMEN	-0.957764	0.432312	-2.215447	0.0280

R-squared	0.027744	Mean dependent var	0.188336
Adjusted R-squared	0.022092	S.D. dependent var	0.518261
S.E. of regression	0.512505	Akaike info criterion	1.512414
Sum squared resid	45.17769	Schwarz criterion	1.548725
Log likelihood	-129.5800	Hannan-Quinn criter.	1.527144
F-statistic	4.908205	Durbin-Watson stat	1.391201
Prob(F-statistic)	0.028042		

Appendix 3B: *OLS regression, with only the women as the independent variable and Tobin`s Q as the dependent variable, for the Canadian companies*

Dependent Variable: TOBINS_Q
Method: Panel Least Squares
Date: 05/09/12 Time: 12:55
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.832062	0.107744	17.00391	0.0000
WOMEN	-1.398049	0.625106	-2.236501	0.0266

R-squared	0.028259	Mean dependent var	1.626444
Adjusted R-squared	0.022610	S.D. dependent var	0.749584
S.E. of regression	0.741061	Akaike info criterion	2.249961
Sum squared resid	94.45755	Schwarz criterion	2.286272
Log likelihood	-193.7466	Hannan-Quinn criter.	2.264691
F-statistic	5.001935	Durbin-Watson stat	0.540436
Prob(F-statistic)	0.026604		

Appendix 3C: *OLS regression, with only women as the independent variable and ROA as the dependent variable, for Canadian companies*

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/09/12 Time: 13:08
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.055539	0.008689	6.391615	0.0000
WOMEN	-0.025642	0.050414	-0.508618	0.6117

R-squared	0.001502	Mean dependent var	0.051768
Adjusted R-squared	-0.004303	S.D. dependent var	0.059638
S.E. of regression	0.059766	Akaike info criterion	-2.785336
Sum squared resid	0.614377	Schwarz criterion	-2.749025
Log likelihood	244.3243	Hannan-Quinn criter.	-2.770606
F-statistic	0.258692	Durbin-Watson stat	0.798333
Prob(F-statistic)	0.611672		

Appendix 4A: *OLS regression, with all the dependent variables included and return as the dependent variable, for the Canadian companies*

Dependent Variable: RETURN
Method: Panel Least Squares
Date: 05/10/12 Time: 17:26
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.223585	0.343462	3.562509	0.0005
WOMEN	-1.200716	0.525259	-2.285948	0.0235
DIRECTOR	-0.006978	0.017960	-0.388542	0.6981
LOG_SALES	-0.114237	0.044685	-2.556471	0.0115
FIRM_AGE	0.003144	0.001146	2.742026	0.0068
ROA	0.349515	0.704296	0.496261	0.6204

R-squared	0.087588	Mean dependent var	0.188336
Adjusted R-squared	0.060432	S.D. dependent var	0.518261
S.E. of regression	0.502357	Akaike info criterion	1.494864
Sum squared resid	42.39696	Schwarz criterion	1.603797
Log likelihood	-124.0532	Hannan-Quinn criter.	1.539054
F-statistic	3.225453	Durbin-Watson stat	1.450981
Prob(F-statistic)	0.008304		

Appendix 4B: *OLS regression, with all the dependent variables included and Tobin`s Q as the dependent variable, for the Canadian companies*

Dependent Variable: TOBINS_Q
Method: Panel Least Squares
Date: 05/17/12 Time: 14:57
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.149420	0.387376	10.71161	0.0000
WOMEN	0.762362	0.592418	1.286864	0.1999
DIRECTOR	-0.049736	0.020257	-2.455257	0.0151
LOG_SALES	-0.249339	0.050399	-4.947308	0.0000
FIRM_AGE	-0.000683	0.001293	-0.527878	0.5983
ROA	4.358561	0.794347	5.486977	0.0000

R-squared	0.445172	Mean dependent var	1.626444
Adjusted R-squared	0.428660	S.D. dependent var	0.749584
S.E. of regression	0.566588	Akaike info criterion	1.735506
Sum squared resid	53.93172	Schwarz criterion	1.844439
Log likelihood	-144.9890	Hannan-Quinn criter.	1.779696
F-statistic	26.95935	Durbin-Watson stat	1.167809
Prob(F-statistic)	0.000000		

Appendix 4C: *OLS regression, with all the independent variables included and ROA as the dependent variable, for the Canadian companies*

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/10/12 Time: 17:10
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.075308	0.037063	2.031894	0.0437
WOMEN	0.071667	0.057103	1.255038	0.2112
DIRECTOR	-0.007929	0.001864	-4.252935	0.0000
LOG_SALES	0.009495	0.004826	1.967701	0.0507
FIRM_AGE	-0.000269	0.000123	-2.179871	0.0307

R-squared	0.173149	Mean dependent var	0.051768
Adjusted R-squared	0.153578	S.D. dependent var	0.059638
S.E. of regression	0.054867	Akaike info criterion	-2.939481
Sum squared resid	0.508762	Schwarz criterion	-2.848704
Log likelihood	260.7349	Hannan-Quinn criter.	-2.902656
F-statistic	8.847465	Durbin-Watson stat	1.000169
Prob(F-statistic)	0.000002		

Appendix 5A: *OLS regression with Fixed Effects, with all the independent variables included and return as dependent variable, for the Canadian companies*

Dependent Variable: RETURN
Method: Panel Least Squares
Date: 05/17/12 Time: 12:42
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.967930	0.278404	3.476710	0.0006
WOMEN	-1.046841	0.570779	-1.834056	0.0684
DIRECTOR	-0.000858	0.012005	-0.071465	0.9431
LOG_SALES	-0.097534	0.032411	-3.009287	0.0030
FIRM_AGE	0.002825	0.000991	2.849998	0.0049
ROA	0.956491	0.713083	1.341346	0.1816

Effects Specification

Period fixed (dummy variables)

R-squared	0.237244	Mean dependent var	0.188336
Adjusted R-squared	0.205080	S.D. dependent var	0.518261
S.E. of regression	0.462073	Akaike info criterion	1.338698
Sum squared resid	35.44288	Schwarz criterion	1.483942
Log likelihood	-108.4667	Hannan-Quinn criter.	1.397618
F-statistic	7.375987	Durbin-Watson stat	1.454410
Prob(F-statistic)	0.000000		

Appendix 5B: *OLS regression with fixed effects, with all the independent variables are included and Tobin´s Q as the dependent variable, for the Canadian companies*

Dependent Variable: TOBINS_Q
Method: Panel Least Squares
Date: 05/19/12 Time: 14:07
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.056204	0.388296	10.44617	0.0000
WOMEN	0.817337	0.588795	1.388151	0.1670
DIRECTOR	-0.048090	0.020155	-2.386013	0.0182
LOG_SALES	-0.241940	0.050143	-4.824961	0.0000
FIRM_AGE	-0.000814	0.001285	-0.633611	0.5272
ROA	4.522657	0.801628	5.641842	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.460182	Mean dependent var	1.626444
Adjusted R-squared	0.437419	S.D. dependent var	0.749584
S.E. of regression	0.562228	Akaike info criterion	1.731068
Sum squared resid	52.47268	Schwarz criterion	1.876312
Log likelihood	-142.6030	Hannan-Quinn criter.	1.789988
F-statistic	20.21590	Durbin-Watson stat	1.148043
Prob(F-statistic)	0.000000		

Appendix 5C: *OLS regression with fixed effects, with all the independent variables included and ROA as the dependent variable*

Dependent Variable: ROA
Method: Panel Least Squares
Date: 05/17/12 Time: 12:38
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.084478	0.040589	2.081293	0.0389
WOMEN	0.062163	0.089064	0.697962	0.4862
DIRECTOR	-0.008001	0.002966	-2.697352	0.0077
LOG_SALES	0.008543	0.007384	1.156954	0.2489
FIRM_AGE	-0.000247	0.000160	-1.542899	0.1247

Effects Specification

Period fixed (dummy variables)

R-squared	0.200548	Mean dependent var	0.051768
Adjusted R-squared	0.171826	S.D. dependent var	0.059638
S.E. of regression	0.054273	Akaike info criterion	-2.950192
Sum squared resid	0.491903	Schwarz criterion	-2.823103
Log likelihood	263.6667	Hannan-Quinn criter.	-2.898637
F-statistic	6.982200	Durbin-Watson stat	0.967034
Prob(F-statistic)	0.000001		

Appendix 6A: *Correlation matrix for Return with the included instrument variable, education, for the Canadian companies*

	RETURN	WOMEN	EDUCATION	RESID1
RETURN	1	-0,167	-0,139	0,759
WOMEN	-0,167	1	0,343	-0,135
EDUCATION	-0,139	0,343	1	-0,087
RESID1	0,759	-0,135	-0,087	1

Appendix 6B*: Correlation matrix for Tobin´s Q with the included instrument variable, education, for the Canadian companies*

	TOBINS_Q	WOMEN	EDUCATION	RESID2
TOBINS_Q	1	-0,168	-0,266	0,276
WOMEN	-0,168	1	0,343	-0,044
EDUCATION	-0,266	0,343	1	-0,089
RESID2	0,276	-0,044	-0,089	1

Appendix 6C: *Correlation matrix for ROA with the included instrument variable, education, for the Canadian companies*

	ROA	WOMEN	EDUCATION	RESID3
ROA	1	-0,039	-0,122	-0,005
WOMEN	-0,039	1	0,343	-0,169
EDUCATION	-0,122	0,343	1	-0,138
RESID3	-0,005	-0,169	-0,137	1

Appendix 7A: *TSLS regression, with return as the dependent variable, for the Canadian companies*

Dependent Variable: RETURN
Method: Panel Two-Stage Least Squares
Date: 05/17/12 Time: 12:47
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174
White period standard errors & covariance (d.f. corrected)
Instrument specification: C DIRECTOR LOG_SALES FIRM_AGE EDUCATION ROA

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.207576	1.227792	0.983535	0.3268
WOMEN	8.377412	40.09995	0.208913	0.8348
DIRECTOR	0.020665	0.102114	0.202370	0.8399
LOG_SALES	-0.237902	0.601602	-0.395448	0.6930
FIRM_AGE	-0.006021	0.037566	-0.160284	0.8729
ROA	-0.129422	5.081903	-0.025467	0.9797

Effects Specification

Period fixed (dummy variables)

R-squared	-1.505553	Mean dependent var	0.188336
Adjusted R-squared	-1.611208	S.D. dependent var	0.518261
S.E. of regression	0.837470	Sum squared resid	116.4252
F-statistic	6.576397	Durbin-Watson stat	0.710057
Prob(F-statistic)	0.000001	Second-Stage SSR	36.37848
Instrument rank	8		

Appendix 7B: *TSLS regression with Tobin`s Q as the dependent variable, for the Canadian companies*

Dependent Variable: TOBINS_Q
Method: Panel Two-Stage Least Squares
Date: 05/17/12 Time: 12:46
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174
White period standard errors & covariance (d.f. corrected)
Instrument specification: C DIRECTOR LOG_SALES FIRM_AGE ROA EDUCATION

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.599276	2.032439	1.770914	0.0784
WOMEN	-17.15171	66.23046	-0.258970	0.7960
DIRECTOR	-0.089127	0.164233	-0.542686	0.5881
LOG_SALES	0.025697	0.975056	0.026355	0.9790
FIRM_AGE	0.016053	0.063025	0.254707	0.7993
ROA	6.593146	9.306877	0.708417	0.4797

Effects Specification

Period fixed (dummy variables)

R-squared	-2.568544	Mean dependent var	1.626444
Adjusted R-squared	-2.719025	S.D. dependent var	0.749584
S.E. of regression	1.445555	Sum squared resid	346.8784
F-statistic	19.93107	Durbin-Watson stat	0.509663
Prob(F-statistic)	0.000000	Second-Stage SSR	52.81512
Instrument rank	8		

Appendix 7C: *TSLS regression, with ROA as the dependent variable, for the Canadian companies*

Dependent Variable: ROA
Method: Panel Two-Stage Least Squares
Date: 05/17/12 Time: 12:46
Sample: 2009 2011
Periods included: 3
Cross-sections included: 58
Total panel (balanced) observations: 174
White period standard errors & covariance (d.f. corrected)
Instrument specification: C DIRECTOR LOG_SALES EDUCATION FIRM_AGE

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.025179	0.390618	0.064460	0.9487
WOMEN	-3.689063	21.02292	-0.175478	0.8609
DIRECTOR	-0.020114	0.070746	-0.284307	0.7765
LOG_SALES	0.068537	0.332183	0.206324	0.8368
FIRM_AGE	0.003192	0.019461	0.164009	0.8699

Effects Specification

Period fixed (dummy variables)

R-squared	-20.802253	Mean dependent var	0.051768
Adjusted R-squared	-21.585568	S.D. dependent var	0.059638
S.E. of regression	0.283424	Sum squared resid	13.41495
F-statistic	7.156640	Durbin-Watson stat	0.339963
Prob(F-statistic)	0.000001	Second-Stage SSR	0.489451
Instrument rank	7		

Appendix 8A: *Summary of the regressions made on the Canadian data, with return as the dependent variable*

(The coefficient value of each variable is the first value and the p-value is given within the brackets)

	Dependent variable		
Independent variable	Return (1)	Return (2)	Return (3)
Women	-1,201	-1,047	8,377
	(0,024)	(0,068)	(0,835)
Director	-0,007	-0,0001	-0,021
	(0,698)	(0,943)	(0,841)
Log Sales	-0,114	-0,097	-0,238
	(0,012)	(0,003)	(0,693)
Firm Age	0,003	0,003	-0,006
	(0,007)	(0,005)	(0,829)
ROA	0,349	0,956	-0,129
	(0,620)	(0,182)	(0,979)
Number of observations	174	174	174
R^2	0,087	0,237	-1,505
Firm fixed effects	No	No	No
Period fixed effects	No	Yes	Yes
Regression type	OLS	Fixed effect	TSLS

Appendix 8B: *Summary of the regressions made on the Canadian data, with Tobin´s Q as the dependent variable*

	Dependent variable		
Independent variable	Tobin´s q (1)	Tobin´s q (2)	Tobin´s q (3)
Women	0,762	0,817	-17,152
	(0,199)	(0,167)	(0,796)
Director	-0,049	-0,048	-0,089
	(0,015)	(0,018)	(0,588)
Log Sales	-0,249	-0,242	0,026
	(0,000)	(0,000)	(0,979)
Firm Age	-0,001	-0,001	0,016
	(0,598)	(0,527)	(0,799)
ROA	4,359	4,523	6,593
	(0,000)	(0,000)	(0,479)
Number of observations	174	174	174
R^2	0,445	0,460	-2,568
Firm fixed effects	No	No	No
Period fixed effects	No	Yes	Yes
Regression type	OLS	Fixed effect	TSLS

Appendix 8C: *Summary of the regressions made on the Canadian data, with ROA as the dependent variable*

	Dependent variable		
Independent variable	ROA (1)	ROA (2)	ROA (3)
Women	0,072	0,062	-3,689
	(0,211)	(0,486)	(0,861)
Director	-0,008	-0,008	-0,020
	(0,000)	(0,008)	(0,776)
Log Sales	0,009	-0,009	0,069
	(0,051)	(0,249)	(0,837)
Firm Age	-0,001	-0,001	0,003
	(0,031)	(0,125)	(0,869)
Number of observations	174	174	174
R^2	0,173	0,201	-20,802
Firm fixed effects	No	No	No
Period fixed effects	No	Yes	Yes
Regression type	OLS	Fixed effect	TSLS

Appendix 8D: *Summary of the regressions made on the Norwegian data, with return as the dependent variable*

(The coefficient value of each variable is the first value and the p-value is given within the brackets)

	Dependent variable		
Independent variable	Return (1)	Return (2)	Return (3)
Women	-0,284	0,585	10,498
	(0,836)	(0,640)	(0,541)
Director	-0,108	0,123	0,348
	(0,178)	(0,083)	(0,363)
Log Sales	-0,383	-0,362	-0,301
	(0,0002)	(0,001)	(0,067)
Firm Age	0,002	0,001	-0,005
	(0,381)	(0,497)	(0,615)
ROA	-0,648	-0,467	0,433
	(0,664)	(0,731)	(0,853)
Number of observations	66	66	66
R^2	0,256	0,425	-0,204
Firm fixed effects	NO	NO	NO
Period fixed effects	NO	YES	YES
Regression type	OLS	Fixed effect	TSLS

Appendix 8E*: Summary of the regressions made on the Norwegian data, with Tobin´s Q as the dependent variable*

	Dependent variable		
Independent Variable	Tobin`s Q (1)	Tobin`s Q (2)	Tobin`s Q (3)
Women	1,434	1,046	8,464
	(0,507)	(0,634)	(0,729)
Director	0,390	0,378	0,545
	(0,003)	(0,004)	(0,298)
Log Sales	-0,632	-0,636	-0,590
	(0,0001)	(0,0001)	(0,150)
Firm Age	-0,006	-0,005	-0,010
	(0,121)	(0,141)	(0,472)
ROA	-1,377	-1,764	-1,090
	(0,560)	(0,456)	(0,768)
Number of observations	66	66	66
R^2	0,364	0,386	0,263
Firm fixed effects	NO	NO	NO
Period fixed effects	YES	YES	YES
Regression type	OLS	Fixed effects	TSLS

Appendix 8F: *Summary of the regressions made on the Norwegian data, with ROA as the dependent variable*

	Dependent variable		
Independent Variable	ROA (1)	ROA (2)	ROA (3)
Women	-0,681	-0,077	0,594
	(0,493)	(0,521)	(0,691)
Director	-0,020	-0,020	-0,006
	(0,002)	(0,002)	(0,850)
Log Sales	0,026	0,026	0,032
	(0,001)	(0,001)	(0,047)
Firm Age	0,000	0,000	-0,0004
	(0,885)	(0,892)	(0,687)
Number of observations	66	66	66
R^2	0,364	0,235	-0,173
Firm fixed effects	NO	NO	NO
Period fixed effects	YES	YES	YES
Regression type	OLS	Fixed effects	TSLS