

## CEO GENDER AND FIRM PERFORMANCE

by

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PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN FINANCE

In the Master of Science in Finance Program  
of the  
Faculty  
of  
Business Administration

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SIMON FRASER UNIVERSITY

(Fall) 2014

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## **Abstract**

Based on data collected from the Execucomp database concerning S&P 1,500 U.S. firms over the period 1992 to 2013, we evaluate whether CEO gender affects firm performance.

We also examine CEO performance in terms of company risk. Our research reveals that on average the gender of the CEO has no significant effect on firm performance.

Specifically, our research shows that the gender of CEO does not affect the firm risk level, and in terms of stock return, the difference is not significant between female and male CEOs. Furthermore, We divide firms into high risk and low risk groups based on their  $\beta$ , where  $\beta$  greater than one is considered high risk and  $\beta$  less than one is considered low risk. As a result of this analysis there is no evidence that CEO gender has a significant impact on firm performance regardless of the company risk level.

**Keywords:** CEO gender; Firm performance

## **Dedication**

This project is dedicated to our families and friend who have been our constant source of inspiration. Without their love and support, this project would not have been made possible.

## **Acknowledgements**

We would like to thank Prof. Amir Rubin for his support throughout this project.

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## **1. Introduction**

Based on statistics, although men still dominate top executive positions, the percentage of female CEOs has increased gradually from 0.23% to 4.05% in the past few decades (Figure 1). Much of the established literature shows that gender diversity in top management positions leads to better firm performance (Campbell and Vera 2008; Dezsö and Ross, 2012). However, the direct relationship between gender of the CEO and firm performance is a relatively new field of study. Using data obtained from the Execucomp, containing S&P 1500 U.S. firms from 1992 to 2013, this paper reviews the personal characteristics of female and male CEOs and then analyses whether the gender of the CEO has an impact on the firm performance. The analysis is based on comparing the performance of female and male CEOs that headed the same company. Generally, we select companies that had both female and male CEOs throughout their corporate history. Moreover, we evaluate firm performance based on the company's stock return during the first 3-4 years of a CEO's tenure. The final controlled sample enables us to examine the direct relationship between firm performance and CEO gender. In addition, we evaluate whether the company risk will affect the relationship between firm performance and CEO gender.

This paper is motivated by previous studies stating that there are biological differences between males and females, which lead to different leadership styles of females compared to males. For example, Huang and Kisgen (2012) state that from an investment aspect men are more aggressive and tend to engage in mergers and acquisitions and run

companies with higher leverage. This in turn leads to lower return of acquisition and a shorter firm survival period. Whereas firms run by female CEOs engage in fewer acquisitions, due to their less aggressive nature, and thus they have higher returns and a longer survival period.

Our results reveal that on average CEO gender has no significant effect on firm performance. After we divide companies in our sample by their risk levels (Table 2.2.2), we find that although companies are classified as high risk or low risk firms, there is still no significant difference in firm performance between female and male CEOs.

The paper is structured as follows. Section 2 provides a review of the literature related to the relationship between gender and firm performance. Specifically, it includes two main aspects: 1) the relationship between gender and firm performance, and 2) the relationship between gender and risk aversion levels. Section 3 discusses the methodology including research design, sample selection and variable definitions. Section 4 discusses sample description. Section 5 analyses whether CEO gender affects firm risk, the relationship between firm performance and gender, and examines the influence of company risk in the relationship between firm performance and CEO gender. Section 6 summarizes our findings and the limitations of our paper.



## **2. Literature review**

### **2.1 Gender and firm performance**

The relationship between gender and firm performance is a relatively new field of study (Khan and Vieito, 2013). Studies that examine the relationship between CEO gender and firm performance (e.g., Khan and Vieito, 2013; Peni, 2014) reveal that companies with female executives experience an increase in performance compared to those managed by their male counterparts. Krishnan and Parsons (2008) find that firms with high gender diversity in senior management are positively and significantly correlated with high earnings quality. They also find that firms with more females in senior management are more profitable and have higher stock returns after IPOs than those with fewer females in senior management team. Also Erhardt, Werbel, and Shrader (2003), based on 127 large US companies, find evidence that companies with a higher number of females on board have higher profitability compared to their average sector profitability. Moreover, Welbourne, Cychota and Ferrante (2007), using data from 534 IPO firms, find that having females in the top management team leads to better firm performance and greater shareholders wealth. Adler (2001), based on Fortune 500 companies, finds that companies with a greater number of female executives exceed industry median profitability. Catalyst, a research and advisory organization that studies issues of females and workplace, examines the profitability of Fortune 500 corporations from 1996 to 2000. They find that firms with higher gender diversity outperform those with less gender

diversity with respect to return on equity and return to shareholders. Smith, Smith, and Verner (2006), use data of 2,500 largest Danish firms, also find that a positive relationship between gender diversity and firm performance which is measured by several accounting-based performance measures. However, they caution that any effect is closely tied to the qualifications of individual female top managers. These studies show that having a mix of females and males in top management positions results in better firm performance and higher return to shareholders.

However, some studies show that the relationship between women executives and firm performance is not significant or negative. Campbell and Vera (2008), based on a sample of Spanish firms, find no clear relationship between female board members and firm value. Lee and Marvel (2013) investigate 4540 Korean firms in 2002 and conclude that gender of entrepreneurs is not a determinant of firm performance, while Adams and Ferreira (2008) find that the average effect of gender diversity on market value and operating performance is negative in companies with strong governance. Also Triana and Trzebiatowski (2013) illustrate that gender diversity on board can propel or impede strategic change of a company after they examine how firm performance and board gender diversity affect the strategic change of sample companies. Another study takes gender of top executives and companies stock price into account. Wolfers (2006) examines data on S&P 1500 firms from 1992 to 2004 and finds no systematic differences in stock returns in female CEO managed firms.

Another study works on shareholders' reaction when a company announces the appointment of either a female or male CEO. Lee and James (2003), based on a sample of 1,556 announcements for firms, find that shareholders respond more negatively to the announcement of female CEO appointments than to male CEO appointments. However, shareholders respond less negatively to female who takes on the CEO position from within the company than to those who are promoted externally.

## **2.2 Gender and governance risk**

Most of the studies indicate that females are more risk adverse than males. Huang and Kisgen (2012) find that companies with female executives are less likely to make mergers and acquisitions and issue debt than companies with male executives. Martin, Nishikawa and Williams (2009), find evidence that firms with high risk tend to appoint female CEOs in order to reduce risk. Elsaid and Ursel(2011), based on the data of 679 CEO successions in North American firms, conclude that a change in CEO gender, i.e. from male to female, reduces firm risk. Faccio, Marchica, and Murac (2012) document that corporations run by female executives have lower leverage, less volatile earning and a higher chance of survival than those run by male executives. The difference risk tolerance also exists in mutual fund investment. Niessen and Ruenzi (2006) find that female fund managers tend to invest in more stable investment and trade significantly less than their male counterparts do.

In contrast to findings for the population, Adams and Funk (2012) find that female directors are less tradition and security oriented and more risk loving than their male counterparts. Thus, having a female on board may not necessarily lead to more risk-adverse decision making.

### **3. METHODOLOGY**

In the sample description section, we utilize CEO information data from Execucomp database that includes all CEOs' information from 1992 to 2013 in U.S. firms. This CEO information data includes basic information of firms, such as cusip, permno, and basic information of CEOs, such as gender, fiscal year, employee ID, and age. We summarize the personal characteristics of female CEOs and male CEOs. Specifically, we compare average age, average tenure, average percentage of ownership, and average total compensation between female and male CEOs. We also show the growth of female CEOs in percentage from 1992 to 2013 (Figure 1).

In section 5 we merge the CEO information data with firm performance information from the CRSP database which includes monthly stock returns and monthly value-weighted returns with dividends. After this merge, we apply the following steps to obtain our final controlled sample. Firstly, we select CEOs who have tenure of at least 3 years. Secondly, for simplicity purposes, we delete the data after the fourth year of the CEOs' tenure. Therefore, after the second step, all CEOs have 36 to 48 months of data since they are appointed as CEO. The final step is to retain firms that have had both male and female

CEOs in their lifetime. Our final controlled sample includes 71 companies and 183 CEOs.

Some previous studies conclude that different CEO gender may affect firm risk (Elsaid and Ursel,2011), we verify whether appointment of a CEO with a different gender is associated with a change in systematic risk .

To determine whether CEO gender influences firm risk level, we run a regression of firm risk factor on gender in two steps. We first calculate firm risk factor during each CEO's tenure based on the following formula:

$$R_i = \alpha + \beta_0 R_s$$

where  $R_i$  is monthly stock return,  $\alpha$  is the abnormal return for CEO,  $\beta_0$  is the coefficient of value-weighted return including dividends, and  $R_s$  is value weighted return including dividend.

Given the abnormal return for each CEO, we calculate average mean of abnormal return for female and male CEOs respectively (Table 2.1.1). We first measure the firm's risk level during the tenure of a particular CEO ( $\beta_0$ ), and then run a new regression of firm risk level ( $\beta_0$ ) on CEO gender dummy ( $Gd$ ). This formula is shown below:

$$\beta_0 = Con_0 + \beta_1 Gd$$

where  $\beta_0$  is the firm risk level during each CEO's tenure that is obtained from the first step,  $Con_0$  is the constant given by the regression,  $\beta_1$  is the coefficient of gender dummy, and  $Gd$  is gender dummy which equals one for female CEO, and zero for male CEO.

After these two steps of regression, the coefficient of gender dummy  $\beta_1$  represents the average excess firm risk caused by female CEOs over male CEOs. This regression result is shown in Table 2.1.2.

In order to find the difference in firm performance of female CEOs and male CEOs, we run a regression for each company where the dependent variable is monthly stock return of the firm and the independent variables are gender dummy, the age of CEO and value-weighted return with dividends. This regression will directly give us the correlation between stock return and CEO gender. The general formula we use is:

$$R_i = Con_1 + \beta_2 GD + \beta_3 R_s + \beta_4 Age$$

where  $R_i$  is monthly stock return,  $Con_1$  is the constant given by regression,  $\beta_2$  is the coefficient of gender dummy,  $Gd$  is gender dummy which equals to zero for male and one for female,  $\beta_3$  is the coefficient of value-weighted return with dividend,  $R_s$  is the monthly value-weighted return with dividends,  $\beta_4$  is the coefficient of the age of CEO, and Age is the age of CEO.

It is notable that in our regression the coefficient of gender dummy  $\beta_2$  represents average excess return earned by female CEOs above male CEOs. The coefficient of value-weighted return with dividend  $\beta_3$  represents company risk.

After we run the regression of stock return on value-weighted return with dividends, age and gender dummy, we have data for 71 companies. We calculate average for each coefficient in the regression and show the t test result in table 2.2.1. According to the

coefficient of value-weighted return with divided ( $\beta_3$ ), we divide our companies into two different groups: high risk companies whose  $\beta_3$  is greater than one and low risk companies whose  $\beta_3$  is less than one. Within each group, we run t test for the coefficients of gender dummy ( $\beta_2$ ) (Table 2.2.2). The t mean of  $\beta_2$  represents average excess return made by female CEOs over male CEOs. Therefore, we can understand whether the risk level of a company will affect the relationship between firm performance and CEO gender.

#### **4. Sample description**

Table 1 is the statistical summary of personal characteristics for female and male CEOs. As we can see from the table, on average, female CEOs are approximately 3 years younger than male CEOs. As to tenure, we observe that the tenure of male CEOs is about 2 years longer than female CEOs. And in the case of ownership, there is no significant difference. This is also true for compensation, though on average female CEOs receive lower compensation than male CEOs; the difference is only 0.66% of total compensation of female CEOs.

Figure 1 shows that although the majority of CEOs are male, the percentage of female CEOs has increased significantly during the past decade. Specifically, the percentage of female CEOs increased from only 0.23% to 4.05% from 1992 to 2013.

## 5. CEO gender and firm performance

Table 2.1.1 shows the average of the abnormal return earned by female and CEOs. We can see that on average female CEOs have earned higher abnormal return than male CEOs. The difference is 0.00683%. At 5% significance level, the average abnormal returns of female CEOs and male CEOs are significant.

From table 2.1.2, the coefficient of female CEO is 0.725019, which means that on average female CEOs contribute excess risk to firm than male CEOs do. However, according to the p value, this difference is not significant at 5% significance level. Therefore, we can conclude that there is no significant relationship between CEO gender and firm risk level.

Table 2.2.1 shows that on average approximately 2.0734 basis points excess return is earned by male CEOs over female CEOs. However, at 5% significance level, this difference is insignificant and thus we cannot confirm that overall female CEOs outperform male CEOs. Combined with the conclusion from table 2.1.2, we find that there is no significant relationship between CEO gender and firm performance.

From Table 2.2.2, we can see that in both risk groups, though the coefficients of female CEO are different with different firm risk level, at 5% significance level, the performance of female and male CEOs is not significantly different regardless of the company is at the high or low risk level.



## **6. Summary**

Based on data collected from Execucomp database and the CRSP database concerning S&P 1,500 US firms over the period from 1992 to 2013, we analyse whether firms managed by female CEOs contribute to different firm risk level and performance from those managed by male CEOs. In addition, we examine whether company risk affects correlation between CEO gender and firm performance.

Our result reveals that there is no significant correlation between the CEO gender and firm performance. However, there are limitations of our findings. The total sample of female CEOs is relatively small and our data is only limited to U.S. firms. In addition, our final controlled samples contain only the first three to four years of CEOs' tenure. These limitations may affect our conclusion.

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## List of Figures

**Figure 1 Growth of female CEOs**

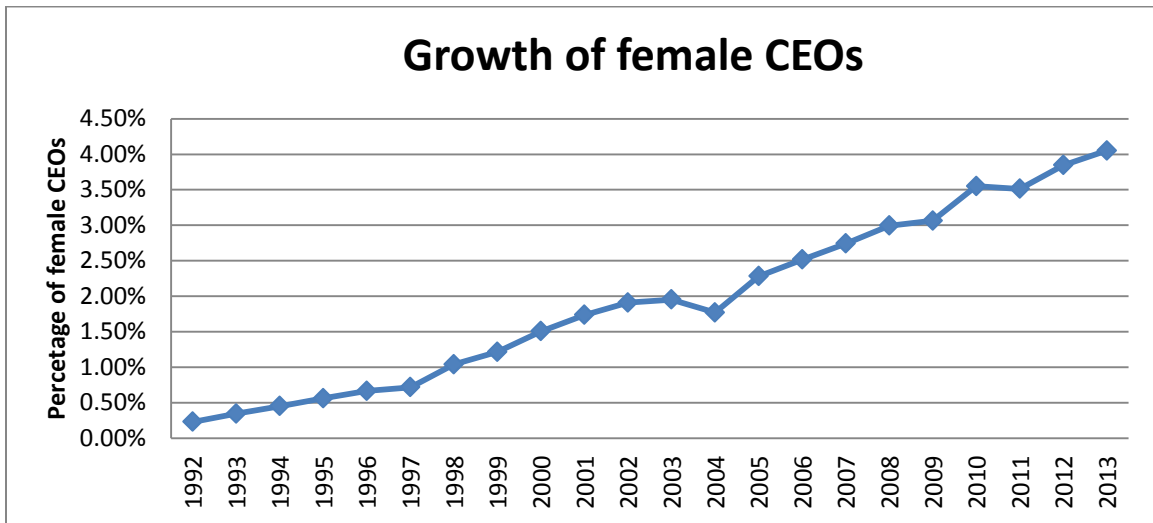


Figure 1 illustrates the growth of female CEOs from 1992 to 2013.

## List of Tables

**Table 1 Personal characteristic of female CEOs and male CEOs from 1992 to 2013**

Personal characteristics					
	Female CEOs		Male CEOs		T test-mean diff.
	N.obs.	Mean	N.obs.	Mean	
Age became CEO	157	52.27	6533	55.35	3.08***
Tenure	68	6.34	3631	8.44	2.10***
Ownership	67	0.33%	1515	0.37%	0.0004
Total compensation	123	5680.35	3406	5642.64	-37.71***

Age became CEO is the age when the executive became CEO. Tenure is the number of years since the CEO was appointed. Ownership is the percentage of total shares owned by CEO. Total compensation is the total annual compensation of executives in thousands. N.obs. is the number of CEOs in the sample. Mean is the t mean for each variable. \*\*\* represents significance level of 5%.

**Table 2.1.1 Average abnormal return of each gender in percentage**

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Gender	Average abnormal return	No. of Observations	p-value
Female	0.39031%	73	0.0373***
Male	0.38348%	110	0.0398***

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Abnormal return diff.	0.00683%
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Table 2.1.1 provides the t test result of monthly abnormal return of each gender in percentage. Abnormal return is the intercept of a first step regression where the dependent variable is the firm's monthly return and the independent variable is the value-weighted index. This first step regression is run only for companies that had at least one female CEO for at least 36 consecutive months. If that is the case, all male CEOs that ran the company for at least 36 months are also included in the calculation of alpha. That leads to a sample of 183 CEOs, of which 73 are females. \*\*\* represents significance level of 5%.

**Table 2.1.2 Correlation of firm risk level ( $\beta_0$ ) with CEO gender**

Dependent variable	Firm risk level	
Independent variables		p-value
Constant	1.114782	0.000
Female CEO	0.725019	0.541
No. observations	183	

The table provides regression results where beta is run on Female CEO, which is an indicator that equals one if the CEO is female, and zero if it is male. The dependent, beta, is the coefficient of value-weighted index from a first step regression where the dependent variable is the firm's monthly return and the independent variable is the value-weighted index. This first step regression is run only for companies that had at least one female CEO for at least 36 consecutive months and one male CEO for at least 36 months. If that condition is met, all male CEOs that ran the company for at least 36 months are also included in the calculation of alpha. That leads to a sample of 183 CEOs, of which 73 are females.



**Table 2.2.1 Correlation of stock ( $R_i$ ) return with CEO gender**

Dependent variable	Stock return	
Independent variables	Mean	p-value
Intercept	-.0098427	0.8640
Female CEO	-.0020734	0.7019
Market return	1.137336	0
Age	0.0002631	0.7598
No. of observation	71	

Table 2.2.1 provides the t test results of coefficients of each independent variable. These coefficients are obtained from the regression for each company where monthly stock return is run on monthly value-weighted index, Female CEO and CEO age. Female CEO is an indicator that equals one if the CEO is female, and zero if it is male. This regression is run only for companies that had at least one female CEO for at least 36 consecutive months. If that is the case, all male CEOs that ran the company for at least 36 months are also included in the regression. That leads to a sample of 71 companies.

**Table 2.2.2 Company risk and firm performance of female CEOs and male CEOs**

Dependent variable	Stock return	
Independent Variable	Mean	p-value
<b>High risk</b>		
Intercept	-0.0814649	0.4409
Female CEO	0.0061152	0.4133
Market return	1.616985	0
age	0.0013288	0.4032
No. of observation	37	
<b>Low risk</b>		
Intercept	0.6153651	0
Female CEO	-0.00109845	0.1639
Market return	0.6142531	0
Age	-0.0008966	0.0805
No. of observation	34	

The table provides the t test results of coefficients of each independent variable, according to the risk level of sample companies. These coefficients are obtained from the regression for each company where monthly stock return is run on monthly value-weighted index, Female CEO and CEO age. Female CEO is an indicator that equals one if the CEO is female, and zero if it is male. This regression is run only for companies that had at least one female CEO for at least 36 consecutive months. If that is the case, all male CEOs that ran the company for at least 36 months are also included in the regression. That leads to a sample of 71 companies. Sample companies are classified into high risk if the coefficient of value-weighted index is greater than one; and vice versa if the coefficient of value-weighted index is less than one. There are 37 companies with high company risk, while 34 companies with low company risk.