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GOOD CEO – FEMALE CEO?

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ABSTRACT

The purpose of this thesis is to study differences between female and male CEOs and to examine whether CEO's gender has explanatory power over firm performance. The prior research has documented a relationship between top management's gender diversity and firm performance (for example, Khan and Vieito 2013; Huang and Kisgen 2013; Levi, Li and Zhang 2014; Faccio, Marchica and Mura 2016), however, most of the studies consider firm performance only from one or two perspectives. This study contributes to the previous literature by examining simultaneously firm performance from four different perspectives – profitability, mergers and acquisitions, corporate risk-taking and valuation. The study focuses on S&P 1500 firms during the period of January 2005-December 2015, and applies the difference-in-differences approach as the main empirical methodology.

The empirical evidence of this thesis suggests that firms with a female CEO have higher overall profitability and lower earnings volatility than firms with a male CEO, on average. I measure firm's overall profitability as return on assets (ROA) and earnings volatility as the volatility of ROA and net income. Interestingly, I document also that female CEOs are not associated with higher operational profitability, measured as EBITD on total assets, even though CEO's gender is associated with the firm's overall profitability. This finding suggests that the difference between female and male CEOs' performance may result from three income statement items in which ROA and EBITD on total assets deviate from each other: interest, taxes and depreciations. Furthermore, I record that firms with a female CEO conduct less acquisitions, generate higher shareholder return in long-term and have lower Tobin's Q than firms with a male CEO, on average. This evidence, however, is weak and may suffer from endogeneity bias.

KEYWORDS: CEO gender, Profitability, Mergers and acquisitions, Risk-taking, Valuation

1. INTRODUCTION

According to the study of Catalyst (2016) there were only 23, or 4.6%, women among the S&P 500 Chief Executive Officers (CEOs) in September 2016. Even though the number of women CEOs has increased during the past decades, it still remains on a significantly low level (Catalyst 2016). Based on the recent studies, it seems that the gender gap in top management is not present only in the large listed U.S. companies, but also across the corporate universe. For example, during the period of 1999-2009 only 9.4% of small and mid-sized European companies[1] had a female CEO, and in 2014 only 7.4% of 1,175,505 Japanese companies had a female president (Faccio, Marchica and Mura 2016; Japan Times 2014). Furthermore, similar inequality is observed when studying other top management positions among the board of directors and top executive teams. In 2016, only 19.9% of the S&P 500 directors and 25.1% of the S&P 500 executives excluding CEOs were women (Catalyst 2016). Due to the persistency and extent of this phenomenon, it is meaningful to consider the possible reasons behind it. I identify four possible explanations for top management's gender gap: shortage of suitable candidates, male CEOs' superior managerial abilities, females' self-selection and discrimination.

Firstly, top management's gender gap might result from the shortage of suitable women candidates, for example in terms of education or work experience. In the light of statistics, the lack of potential women CEOs with suitable educational background explains partly the gender gap. According to Fortune (2016), the three most common degrees for Fortune 500 CEOs to hold are MBA degree (42.6%), only bachelor's degree (29.8%) and other than MBA master's degree (18.5%). In 1975, when the current S&P 1500 CEOs graduated on average, 45.4% of bachelor's degree graduates and 46.3% of master's degree graduates were women in the United States (National center for education statistics 1994: 245). The corresponding number of female MBA students in 1976 was only 21% (Reha 1979). These figures support the claim that the pool of prospective women CEOs is in fact smaller than the corresponding pool of men. However, the difference between gender pools is not as large as the difference between the acting women and men CEOs.

Secondly, women might not be hired as CEOs over men due to male CEOs' superior managerial abilities. However, in the light of the prior empirical evidence, male CEOs' superior managerial abilities explain poorly the phenomenon. For example, previous

[1] Faccio, Marchica and Mura's (2016) study sample consists of 338,397 firm-year observations during the period of 1999-2009.

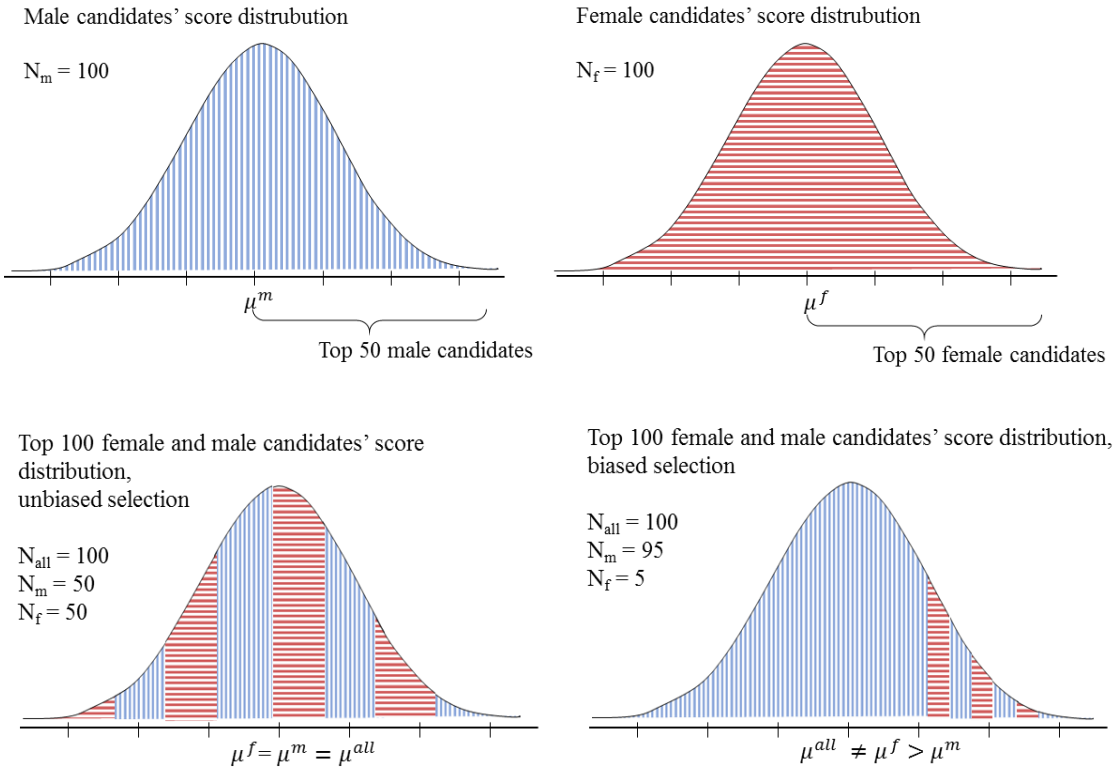
literature documents that female executives and directors are associated with better firm performance in terms of profitability, stock performance and corporate risk-taking (Erhardt, Werbel and Shrader 2003; Khan and Vieito 2013; Krishnan and Parsons 2008; Welbourne 1999; Faccio, Marchica and Mura 2016). Furthermore, previous literature reports that female executives conduct less-value destroying mergers and acquisitions than male executives (Huang and Kisgen 2013; Levi, Li and Zhang 2014).

Lastly, the reason for low female representation in top management may lie in females' self-selection or discrimination. That is, females may self-select different career paths and for example value more time with family than males. Alternatively, females might be discriminated by the board of directors or middle management already in an earlier point of their careers, and therefore miss the opportunity to obtain position in a top management. Unlike the previous explanations, possible self-selection and discrimination are not observed as easily in a numerical format. However, if the evidence of female executives and directors' positive association with firm performance is reliable, and simultaneously, there is significantly low number of female CEOs, it implies that females' self-selection and/or discrimination may explain part of the gender gap. This is because female executives' better firm performance should lead to a greater number of female CEOs rather than a lower number, while the low number of female CEOs should imply that females are less competent as leaders than their male counterparts. The latter, however, contradicts with the prior empirical evidence.

As the low number of female CEOs and their association with better firm performance are observed simultaneously, I conjecture that somehow biased executive selection process may lead to an "improved quality" of female CEOs. That is, due to biased selection process, male candidates obtain position as a CEO more likely than female candidates. Therefore, female candidates need to outperform their male counterparts to become selected, and as a result only the best female candidates will obtain position as a CEO. The ultimate reason(s) behind the possibly biased selection process I leave for further research.

To illustrate this conjecture, consider the following example. There is a group of 200 CEO candidates of which 100 are women and 100 men. All candidates are ranked based on their score in performance measure X. If female and male candidates are equally good in X on average (and their score distributions are similar, for example, close to normal distribution), the top 100 candidates should include around 50 women and 50 men. That is, when the selection process is not biased.

Figure 1. Hypothetical female and male candidates' score distributions.



When these top 100 candidates become CEOs and they are again evaluated based on performance measure X next year, there is no difference between female and male CEOs, assuming none of them have improved their skills. Thus, CEO's gender does not explain the performance score.

However, when the selection process is biased, and the group of top 100 candidates does not include 50 women and 50 men, but rather 5 women and 95 men, the result is different. When the best 5 female and the best 95 male candidates become CEOs, they are again evaluated one year after the first evaluation. Only this time, the female CEOs have higher score than male CEOs on average, and hence they are better than male CEOs on average. This is because their selected population had a higher average score in the first place (assuming the selected women are among the top female candidates). Therefore, a biased selection process leads to an "improved quality" of female CEOs, and thus, gender has explanatory power over the performance measure X.

1.1. Purpose of the study

The purpose of this thesis is to study differences between female and male CEOs and to examine whether CEO's gender has explanatory power over firm performance. The study considers firm performance from four different perspectives – profitability, mergers and acquisitions, corporate risk-taking and valuation.

Firstly, this thesis aims to study whether firms with a female CEO tend to outperform firms with a male CEO by examining firms' profitability in terms of return on assets (ROA), and earnings before interest, taxes and depreciations (EBITD) on total assets. Secondly, the thesis aims to study the relationship between CEO gender and firm's acquisition activity as well as firm's long-term performance after the acquisition. The purpose is to find out whether female CEOs conduct less acquisitions than male CEOs, and whether acquisitions conducted by female CEOs create more long-term value for shareholders than acquisitions conducted by male CEOs. Thirdly, the thesis aims to study the difference between genders' risk-taking behavior in corporate finance context by examining firm leverage and earnings volatility. Lastly, the thesis aims to study female CEOs' impact on firms' valuation measured as Tobin's Q as well as firms' long-term stock performance.

This study contributes to the previous literature by studying the four different fields of firm performance simultaneously. To the best of my knowledge, there are no other studies that examine top executive's gender's impact on all four firm performance measures by applying the same data and same empirical methodologies. This study also contributes to the existing literature by considering a wide range of dependent variables, and by demonstrating new information in the light of dependent variables that have not been used by the previous literature. For example, I show that gender's association with profitability is significant only on firm's overall profitability level (ROA) but not on operational level (EBITD on total assets). Furthermore, I study gender's impact on firm's long-term share price performance after an acquisition in contrast to previous literature that focuses only on market reaction of the acquisition announcement. Finally, I contribute the previous literature by examining more recent data sample from the period of 2005-2015.

1.2. Structure of the study

This thesis is organized as follows. Chapter two presents financial theories that help to explain why executive's gender may have an impact on firm performance. The chapter

considers the differences in genders' decision-making process and their implications for the four different fields of firm performance – profitability, mergers and acquisitions, corporate risk-taking and valuation. The chapter provides an overview of agency theory, overconfidence, managerial hubris and risk aversion, as well as considers the theories' sensitivity to executive's gender.

Chapter three provides an overview on the previous literature that focuses on top executives' gender diversity. The chapter is divided into three subsections: gender diversity and firm performance, gender diversity and mergers and acquisitions, as well as gender diversity and risk-taking. The previous literature regarding gender diversity, profitability and valuation are combined as many researches investigate these dimensions together.

Chapter four outlines the research hypotheses and sample data used in the study, as well as provides a summary of the data refining process. The chapter presents the dependent variables used in the study and justifies their use. Furthermore, the chapter considers possible endogeneity bias and its implications for the empirical research. Finally, the chapter outlines the applied empirical models.

Chapter five presents the empirical results of the study. The results are divided into four subsections based on the firm performance field they represent. Finally, chapter six concludes the thesis.

2. THEORETICAL FRAMEWORK

Why should CEO's gender help explain firm profitability, risk-taking, acquisitions activity or valuation? After all, under perfect capital markets, executives should make only decisions that aim to maximize firm's shareholder value irrespective of their personal interest or characteristics (Faccio, Marchica and Mura 2016). Hence, executives' genders should not have an impact on their decision-making process and the firm performance.

Agency theory propose explanations that rationalize executives' personal characteristics' impact on their investment decisions. According to the agency theory, the separation of firm ownership and control gives a CEO an opportunity to maximize his/her personal interest over shareholders' interest (Jensen and Meckling 1976). In such situation, CEO's decisions may reflect his/her own preferences, personal strengths and characteristics rather than be based on rational shareholder value maximizing reasoning (Faccio et al. 2016).

Agency theory suggests also explanations how CEO's gender may have an impact on firm's performance in all four fields of this thesis – profitability, mergers and acquisitions, corporate risk-taking and valuation. For example, agency problems may decrease firm's profitability or impact negatively its shareholder value, and hence its valuation level. Agency problems may also have an impact on corporate risk-taking and acquisition activity when CEO acts against the shareholders' interest. (Brealey, Myers and Allen 2011: 291-292.)

The previous financial literature has widely studied the relationship between agency problems, firm performance and corporate governance mechanisms. For example, Bruton, Keels and Scifres (2002) study the association between firm performance and ownership concentration throughout the buyout cycle (public-private-public cycle of ownership) of the firm. They conclude that agency costs have explanatory power over firm performance as the level of managerial ownership is positively correlated with a firm's performance variables. In accordance with agency theory, when managerial ownership increases, agency costs decrease and firm performance improves. (Bruton et al. 2002.)

The previous literature has also recorded some evidence of the difference between genders' agency costs. For example, Jurkus, Park and Woodard (2011) examine top management's gender diversity's impact on agency costs, and conclude that firms with

high gender diversity have lower agency costs than firms with low gender diversity. However, the result is not robust for possible endogeneity bias. Therefore, it might be that top management's gender diversity decreases firm's agency costs, or alternatively low agency cost firms tend to attract more diversified management teams.

In addition to agency theory, there are other hypothesis and theories that help explain genders' differences in firm performance. Additional explanations include for example the differences between genders' overconfidence (Huang and Kisgen 2013; Malmendier and Tate 2005, 2008), managerial hubris (Roll 1986), risk aversion (Powell and Ansic 1997; Olsen and Cox 2001) and compensation structure (Khan and Vieito 2013). Overconfidence and hubris are often associated to explain executives' motivation to pursue mergers and acquisitions, while the difference between gender's risk aversion and compensation structure may offer explanations for CEO's impact on for example corporate risk-taking. Moreover, one possible explanation for the genders' differences in firm performance might results from the biased selection process as discussed above.

2.1. Agency theory

Typically, when a firm grows and ages, its owners hire outside executives to manage the company for them, and simultaneously they separate the ownership and control of the firm. This separation may cause interest contradictions between the owner and the executive, referred as an *agency problem* (Berle and Means 1932). The core difficulty of the agency problem is the asymmetric information between the owner (principal) and executive (agent). Since the executives manage the company on a daily basis, they have more information about the firm and its actions than the owners have. (Brealey, Myers and Allen 2011: 460.) Consequently, the executives have an opportunity to act in their own interest at the owners' costs.

According to Berle and Means (1932),

> "*Agency problems may, and often do, produce a condition where the interest of the owner and the ultimate executive conflicts and where the checks which formerly limited the use of the power disappear*".

A large, publicly listed company stands as a classical example of agency problem. When the ownership of the company is distributed among hundreds of thousands of investors, of which most hold insignificant stake of the firm, the information asymmetry between the owners and management grows significant and management monitoring becomes

inefficient. (Brealey et al. 2011: 5.) Board of directors are usually elected to monitor the management (Brealey et al. 2011: 292), however, the board of directors are another hired agents, at least for the minority shareholders.

Agency problem can be classified into two different types. Type I occurs between the owners and executives, while the type II occurs between the majority and minority shareholders. Type I agency problem arises when the interest of the owners and management are not aligned, and the management acts in their own interest at the owners' expense. Type II agency problem occurs when large shareholders use their power to drive corporate policies that reduce the value of small shareholders' ownership. (Ratnawati, Abdul-Hamid and Popoola 2016.)

Agency costs

Agency problems cause agency costs (Jensen and Meckling 1976). The costs occur in two ways: (1) when management does not maximize the shareholder value and (2) when the owners try to mitigate agency problems for example through monitoring. (Brealey et al. 2011: 13.) According to Brealey et al. (2011: 291-292), management can cause agency costs for example by reducing effort, taking private benefits, building an empire, entrenching investment or by avoiding risk.

Reducing effort – As top executives' job description includes complicated and hard-to-measure tasks, such as finding and executing shareholder value increasing projects, board of directors may not notice if the executives reduce their effort. The core problem of executives' reduced effort is the asymmetric information between principal and agent: board of directors are unable to verify whether the executives are making genuinely their best effort or not. For example, board of directors do not know if the project recommended by the management is truly the most shareholder value increasing alternative, or whether the executives reduced their effort and recommend only a sufficient project. By reducing effort, an executive may cause agency costs through ignored value increasing opportunities, that in turn may have a negative impact on the firm's performance. (Brealey et al. 2011: 291-292.)

Taking private benefits – In addition to their formal compensation, executives may take private benefits at the company's expense. For example, an executive may take private benefits by buying first-class flight tickets instead of sufficient economy class tickets. In some cases, of course, first-class flight tickets are justified, however, the owners may not know when. The issue of private benefits is thus the asymmetric information between

principal and agent of what is sufficient. By taking private benefits, executives cause unnecessary costs for the company. (Brealey et al. 2011: 291-292.)

Building an empire – According to Brealey et al. (2011: 291), executives prefer to manage large companies rather than small ones. Therefore, executives may advocate mergers and acquisitions that increase the size of the firm they manage. Such behavior is referred as empire building (Brealey et al. 2011: 291). In empire building, executives pursue for mergers and acquisitions that are against shareholder's interest and that destroy shareholder value. Empire building has negative net present value for the company as the acquisition costs do not exceed the potential synergy gains. (Brealey et al. 2011: 291.) This in turn may have negative implications for the firm's performance, for example profitability and valuation (Fu 2010). In addition to executing unnecessary investments such as mergers and acquisitions, executives may also be reluctant to do disinvestments that decrease the size of their company (Brealey et al. 2011: 291).

Entrenching investment – Entrenching investments refer to projects that are especially designed to require or reward the firm managements' abilities and characteristics. In order to secure company's need for the executive, she/he may promote projects that require the characteristics and abilities she/he has. Similarly as in the previous agency problems, entrenching investment may not be the best alternative for the company, or they may even have negative net present value and decrease the shareholder value. The investments are made in the interest of executives rather than shareholders. (Brealey et al. 2011: 291.)

According to Brealey et al. (2011: 291-292) entrenching investments and empire building are typical symptoms of executives' desire to overinvest. Brealey at al. (2011: 291-292) define overinvesting as an investing level where the net present value of the investments turn negative. In his seminal study, Jensen (1986) argues that firms with excess cash flow and limited investments opportunities are more likely to overinvest, and therefore execute acquisitions that destroy shareholder value. Jensen (1986) refers this as the *free-cash-flow* problem.

Avoiding risk – The underlying problem of executives' risk aversion is their contradicting interest with shareholders' interest. An executive with fixed compensation has not much to win but a lot to lose in high-risk investment projects. This is because executive's fixed compensation does not reward the executive's when the project is successful but in case of an unsuccessful project the executive might be dismissed. Furthermore, executives cannot distribute their risk position as well as shareholders can: they can work only in one firm at the time, while shareholder may distribute their investments among hundreds of

firms. For these reasons, executives may avoid risk at shareholders' expense. (Brealey et al., 2011: 291-292.)

Risk aversion may cause agency costs if value increasing investment opportunities are ignored. By choosing low-risk investment projects, the executive anchor the firm's expected returns also low. This might be inefficient for shareholders as they can distribute their risk among hundreds of firms with thousands of projects. From the shareholders' point of view, executives should maximize their firms' risk-return relation, and thus executive's risk aversion may not be in the interest of the shareholders. (Brealey et al. 2011: 9-10.)

Solutions to mitigate agency problems

Agency problems arise from the interest contradiction and asymmetric information between the principal and agent (Brealey et al. 2011: 5, 460). Therefore, the solution to agency problem is to align agent's interest with principal's interest, and keep the principal informed about the agent's actions. In other words, agency problem can be mitigated with correct incentives and monitoring (Brealey et al. 2011: 292-298).

Executives' incentives should be designed in such way that it motivates them to act in the shareholders' interest. Especially the structure of the compensation is crucial for right incentives. Executives' compensation may consist of base salary, performance-based bonuses, equity-based compensation such as stock options, as well as other long-term incentives. (Brealey et al. 2011: 294-297.) According to Brealey et al. (2011: 294, 297), in many countries bonus and long-term incentives accounts for the most of the compensation in such way that the executives' pays are linked to their performance. Executives' performance is often measured as a firm value, however, the value is also effected by factors that are beyond executives' control. Therefore, the fluctuation in firm value is shared among executives and shareholders: executives are willing to bear some firm value fluctuation that is beyond their control, and shareholder are willing to bear some firm value fluctuation caused by agency costs, that is, the executive's failure to maximize the firm value. As a result, agency costs are mitigated but not eliminated. (Brealey et al. 2011: 296-297.)

In addition to compensation structuring, agency cost can be mitigated with management's monitoring. Typically, firms have a board of directors who represents the shareholders' interest and monitor the management for them. However, the management is also monitored by the independent auditor, lenders such as banks as well as security analyst

(Brealey et al. 2011: 14, 292-293). Typically, board of directors delegate the monitoring of firm's financials' accuracy to the independent auditors, as they might not have the required skills and/or resources to do it themselves (Brealey et al. 2011: 292-293). According to Brealey et al. (2011: 292) efficient monitoring may reduce agency costs significantly.

2.2. Overconfidence and managerial hubris

Overconfidence

Overconfidence is a common judgemental pattern in which a person is excessively confident in the precision of his/her beliefs and estimates (Bazerman and Moore 2009: 36). Alpert and Raiffa (1969/1982) were first to record evidence on this confirmation heuristic bias by studying the accuracy of estimate ranges. Alpert and Raiffa (1969/1982) requested 100 persons to give estimate ranges of 10 predetermined quantities in such way that the person is 90 percent confident that the actual quantity is within the estimate range. They find that 42.6 percent of the quantities were outside the estimate ranges implying that test persons' precision was 57.4 percent instead of the instructed 90 percent (Alpert and Raiffa 1969/1982).

Overconfidence bias is based on confirmation heuristic (Bazerman and Moore 2009: 37). In this heuristic, people search for conforming evidence for their beliefs and conclusions, and give contradictive evidence less attention (Nickerson, 1998). When people assess their confidence in the estimate range, they generate more supporting than opposing evidence for their estimates. Based on the supporting evidence, they make conclusion that their estimates are good, and therefore end up being excessively confident of the precision of the estimate range. (Bazerman and Moore 2009: 37.)

While overconfidence is beneficial for our endeavours, it also distorts our professional judgement. This is because overconfident persons ignore new evidence and alternative perspectives. (Bazerman and Moore 2009: 37.) Previous literature finds evidence of overconfidence's disadvantages in financial context. For example, Odean (1999) proposes that overconfident investors are too optimistic of their ability to assess over- and underperforming securities and therefore lose more money on transaction costs than they win by active trading. According to Odean (1999), overconfident investors lose on average more than four percentage points of their annually return due to trading costs. Furthermore, Malmendier and Tate (2005, 2008) conclude that executives'

overconfidence has explanatory power over the value destroying mergers and acquisitions. That is, the overconfident executives are more likely to conduct value-destroying acquisitions due to their misevaluation.

The previous literature has also found evidence on genders' different tendencies to be overconfident. For example, Odean (1999) record the difference between female and male investors' trading activity – men trade 45 percent more actively than women. This implies that men are more overconfident than women if active trading is considered as a sign of an overconfidence. In addition, Huang and Kisgen (2013) find supporting evidence that female executives are less overconfident than male executives. They document the difference in female and male executives' overconfidence by studying their confidence in earnings estimate ranges and early option exercise (Huang and Kisgen 2013).

Managerial hubris

Managerial hubris refers to management's excessive optimism of their abilities as well as arrogance (Horton 1990) and is therefore associated closely with overconfidence. In his seminal study, Roll (1986) introduces the term of *Hubris Hypothesis* to explain corporate takeover phenomenon. According to the hypothesis, over-optimistic executives pursue for mergers and acquisitions because they overestimate the possible acquisition synergies and the overall value of the target company (Roll 1986).

Roll (1986) suggests that over-optimistic executives believe that the value of the target company is underestimated, and that under their management, the value of the company will increase. They believe that target company's management is inefficient, and that with their abilities potential synergy gains will materialise. For this reason, over-optimistic executives are likely to pay too much of the target company, especially when they are competing with other bidding party. This overpayment in turn may result in *winner's curse* and the firm's value destruction. (Roll 1986.) Winner's curse refers to bid-winning party's overpayment of a certain asset due to value overestimation (Capen, Clapp and Campbell 1971).

Hubris Hypothesis assumes that financial markets are efficient and consistent with the strong-form of *Efficient Market Hypothesis* (Roll 1986). The strong-form of Efficient Market Hypothesis implies that all available information is incorporated into the security prices, and hence, abnormal returns do not exist (Fama 1965). In addition, the Hubris Hypothesis assumes that product and labour markets are efficient in a sense that

reorganization of the target company will not improve operational efficiency and that its management's abilities are employed as well as possible (Roll 1986).

In case of a strong market efficiency, the security prices reflect their underlying assets' fair value. Rational shareholders will not accept a bid that is under the fair value, and therefore, a bidder must offer the market value exceeding price of the target company. However, this price will make sense for the bidder only in the case of potential synergy gains, which in turn, are elusive under efficient product and labour markets. As a result, the selling shareholders end up enjoying overvaluation at the bidder's expense. In managerial hubris, over-optimistic executives destroy firm shareholder value by executing overestimated corporate takeovers, and hence, cause agency costs for the bidding company. (Roll 1986.)

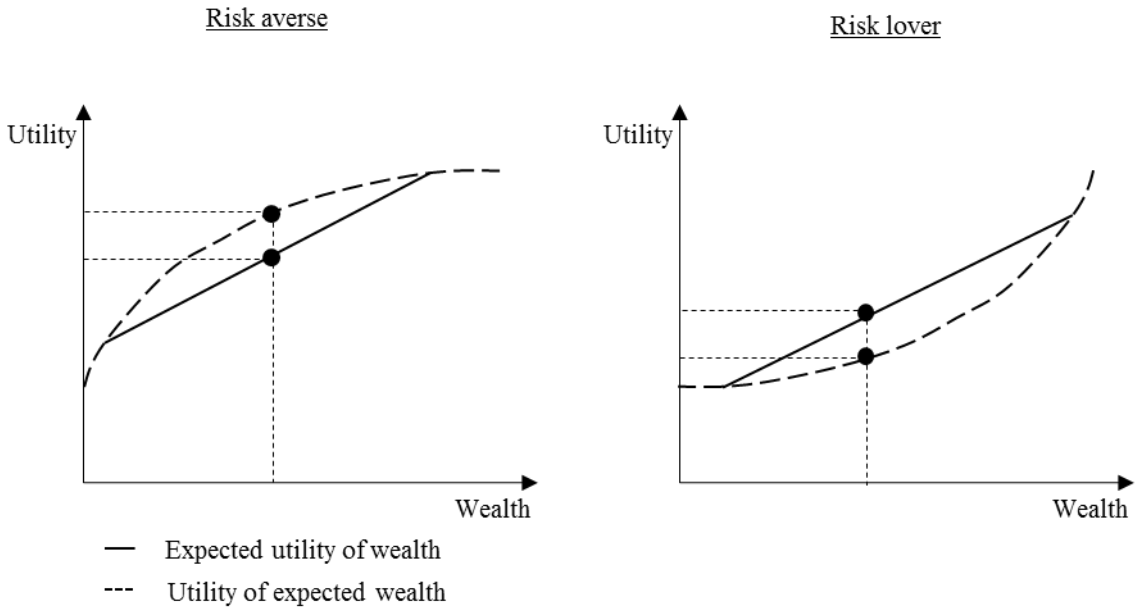
2.3. Risk aversion

Traditionally, economists have explained risk aversion with *expected utility theory* (Rabin and Thaler 2001). According to the theory, a person's preferences under uncertainty can be expressed with an expected utility function. The function describes the change in the level of utility the person experiences when his/her wealth changes. The function is concave for risk averse persons and convex for risk lovers. In contrast, risk neutral persons have linear expected utility functions. A concave function suggests that risk averse persons are not willing to take risk since their utility of the expected value of wealth is greater than the expected utility of wealth. The opposite is true for risk lovers, while risk neutral persons are indifferent between the two. (Varian 2010: 223-229.) Figure 2 presents the expected utility functions of risk averse and risk loving persons.

In contrast, Rabin and Thaler (2001) argue that expected utility theory is not plausible to explain risk aversion exhaustively. They argue that the theory captures the intuition behind the large wealth changing gambles, but not the most risk attitudes faced in the smaller choices (Rabin and Thaler 2001). According to Rabin and Thaler (2001), expected utility theory assumes that people's risk aversion decreases when the wealth change is relative small compared to their lifetime wealth, and increases when the wealth change is relative large. They present opposite evidence and propose that this assumption is not credible in practice. Furthermore, they reason that the expected utility theory fails to explain the difference between people's risk attitudes towards an independent gamble and an aggregation of independent gambles. (Rabin and Thaler 2001.) That is, a person

is more likely to refuse a single bet than a large number of same bets due to risk diversification (Samuelson 1963).

Figure 2. Expected utility functions of risk averse and risk loving persons.



Instead of expected utility theory, Rabin and Thaler (2001) suggest that *loss aversion* and *mental accounting* may help to explain risk aversion. Loss aversion, the essence of Kahneman and Tversky's (1979) prospect theory, refers to the people's tendency to experience a loss more dramatically than equal-sized gain, while mental accounting refers to people's propensity to assess and note financial transactions. Rabin and Thaler (2001) argue that loss aversion explains risk aversion when the expected values are considered as gains and losses: risk averse persons refuse even small bets with positive expected value because they weight more the probability of losing than the probability of winning. Mental accounting in turn, explains risk aversion since people tend to evaluate risk in isolation. For example, risk averse persons who do not accept a bet in which they win €150 and lose €75 with equal probabilities, are likely to accept a bet that increases their home's equity by €150 or decreases it by €75 with equal probabilities. This is because they do not consider the risk to be the same due to mental accounting. (Rabin and Thaler 2001.) According to Rabin and Thaler (2001), people would not be as risk averse as they are, if they considered the risk with a wider perception.

The previous literature has widely documented that women differ from men in their risk-taking behavior not only in general, but also in economic and financial context. For example, Olsen and Cox (2001), Powell and Ansic (1997) and Fehr-Duda, De Gennaro and Schubert (2006) conclude that women are more cautious and risk averse than men in financial decisions. In more specific, Olsen and Cox (2001) examine gender's impact on risk aversion among professional investors. They conclude that female investors tend to weight more the probability of loss and uncertainty than their male counterparts. Female investors are also more sensitive to construct investment portfolios with less risk. The findings are consistent after controlling for investors' expertise and experience. (Olsen and Cox 2001.) Olsen and Cox (2001) conclude also that non-professional female investors are more risk averse than male investors when investor age, education, wealth and experience are controlled.

Furthermore, Powell and Ansic (1997) conduct an experimental study to analyze the difference between female and male business school students' risk aversion in financial decision-making and strategy construction. They document that female students are more risk averse in their financial decision-making than male students after controlling for investor's familiarity, situation framing, trading costs and investment uncertainty (Powell and Ansic 1997). In addition, Powell and Ansic (1997) show that female student use different kind of financial strategies than male students, and that both genders' strategies perform equally well.

Finally, Fehr-Duda, De Gennaro and Schubert (2006) investigate gender's difference in risk-taking behaviour, and document that women and men tend to process probabilities of gain and loss differently. They find that women are more likely to underestimate large probabilities of profit than men are. Based on this finding, they conclude that women are on average more pessimistic than men, and therefore possibly also more risk averse. (Fehr-Duda et al. 2006.)

3. PRIOR EMPIRICAL EVIDENCE

This chapter provides an overview of the prior studies that examine the impact of top management's gender diversity on firm's profitability, merger and acquisitions, corporate risk-taking and valuation. The earlier studies in this research field mainly focus on executive teams' or board of directors' gender diversity on a group level, while the more recent studies consider the gender of individual senior executives, such as CEOs or CFOs. Both group-focused and individual-focused studies are presented to provide comprehensive overview on prior empirical evidence. In addition, studies considering top management's other personal characteristics and abilities in similar context is presented to complement the gender diversity research. This chapter is divided into three subsections based on the four different fields of firm performance. The first subsection – gender diversity and firm performance – presents the previous literature considering firm's profitability and valuation as many studies investigated these dimensions together.

3.1. Gender diversity and firm performance

The previous literature focusing on top managements' gender diversity and firm performance is to some extent contradictive. While most of the gender diversity studies conclude that female executives, directors and employees have positive impact on firm performance in terms of profitability and valuation (Erhardt, Werbel and Shrader 2003; Welbourne 1999; Catalyst 2004; Dwyer, Richard and Chadwick 2003; Smith, Smith and Verner 2006; Farrell and Hersch 2005; Krishnan and Parson 2008; Khan and Vieito 2013), few studies find negative or neutral association between the two (Adams and Ferreira 2009; Haslam, Ryan, Kulich, Trojanowski and Atkins 2010; Chapple and Humphrey 2014). However, most of the opposing researches focus on the firm's board of directors rather than management teams or individual executives.

In most studies firm performance is defined as profitability, often measured as return on assets (ROA) or return on investments (ROI), and valuation, often measured as Tobin's Q or the market value of equity. This section presents firstly the studies related to profitability, secondly the studies related to firm valuation and lastly the studies related to profitability, valuation and other personal characteristics than gender.

Among first studies, Erhardt, Werbel and Shrader (2003), Welbourne (1999) and Catalyst (2004) conclude that gender diversity among firm's top management has a positive impact on its profitability and valuation. In more specific, Erhardt et al. (2003) document

that female and other minority board members have positive impact on firm's profitability by studying profitability of 127 large U.S. companies in years 1993-1998. Erhardt et al. (2003) measure firm's profitability with return on assets (ROA) and return on investment (ROI) ratios. Catalyst (2004) and Welbourne (1999) in turn study top management's gender diversity and measure firm profitability with return on equity (ROE) and earnings per share (EPS), respectively, as well as firm valuation as the long-term share price performance.

However, Erhardt et al. (2003), Catalyst (2004) and Welbourne (1999) use only simple correlation and regression analyses to empirically study the relationship, and therefore ignore the possible endogeneity bias related to the data. That is, firms with higher gender diversity might be associated with higher profitability and valuation because they tend to attract more diversified management teams, and not because the more diversified management teams improve the firm's profitability and valuation. In other words, by ignoring possible endogeneity issues, they are unable to investigate the causality of the association.

Smith, Smith and Verner (2006) find similar results as Erhardt et al. (2003) after controlling for causality direction and taking into account possible endogeneity bias. Smith et al. (2006) investigate female executives' and directors' impact on firm's profitability by studying 2,500 Danish firms during the period of 1992-2001, and show that each additional woman in top management and the first female board member improve firm's profitability. Smith et al. (2006) control causality with instrumental variable approach, and they measure firm's profitability with four different variables: (i) gross value added on net turnover, (ii) profit on ordinary operations divided by net turnover, (iii) ordinary result on net assets and (iv) net income on net assets. Smith et al. (2006) document that especially female CEOs with university degree have significant and positive impact on firm's profitability.

Farrell and Hersch (2005) also report that females tend to serve as directors in better performing firms. They complement the findings of Smith et al. (2006) by showing that adding a director into a board is not gender neutral. Farrell and Hersch (2005) document that the likelihood of adding a female director into a board is negatively associated with the number of current female directors. That is, the firms tend to favor male candidates over female candidates when there already are one or more women in the board. (Farrell and Hersch 2005.)

Dwyer, Richard and Chadwick (2003) contribute to the existing literature by examining a wide group of managers instead of only focusing on the top management of the firm. They document that gender diversity's impact on firm's profitability depends on the organizational context − growth orientated firms are more likely to benefit gender diversity. In addition, they show that an "appropriate" organizational culture enables the full utilization of the benefits of gender diversity. (Dwyer et al. 2003.) Dwyer et al. (2003) use hierarchical regression analysis as a methodology in their empirical study.

Furthermore, Krishnan and Parson (2008) report that top management's gender diversity has a positive impact on profitability and on post-IPO (Initial Public Offering) returns. They show that firms with more female executives tend to be more profitable and have higher stock returns after an IPO than companies with fewer female executives (Krishnan and Parson 2008). Krishnan and Parson (2008) also show that the quality of the earnings is higher for companies with more female executives. High quality of earnings refers to earnings that reflect accurately the financial state of the company (Krishnan and Parson 2008). These findings are in line with previous studies which conclude that females are less likely to conduct financial crimes and frauds than males (Steffensmeier, Schwartz and Roche 2013; Cumming, Leung and Rui 2015).

In contrast, Adams and Ferreira (2009) report opposing results. They document that gender diversity's positive impact on firm performance is not robust for possible endogeneity bias. Instead, they show that the relationship between gender diversity, firm's profitability and valuation is on average negative. (Adams and Ferreira 2009.) Adams and Ferreira (2009) argue that this negative impact is driven by firms that have strong shareholder rights, as female directors are able to provide value mainly for firms with weak shareholder rights. Based on these findings, Adams and Ferreira (2009) conclude that female directors improve board of directors' monitoring abilities rather than firm profitability − in weakly monitored firms female directors improve firm monitoring in such way that it reaches the appropriate level, while in well monitored firms they increase it to a level which decreases efficiency. Dobbin and Jung (2010) find similar results, and conclude that diverse boards have no impact on firm's profitability but they have a significant and negative impact on Tobin's Q.

In line with the results of Adams and Ferreira (2009), Haslam, Ryan, Kulich, Trojanowski and Atkins (2010) document that there is no relationship between female board members and firm performance by studying FTSE100 companies. Instead, they find that firms with male board members trade with a valuation premium of 37% in comparison to firms with female board members (Haslam et al. 2010). The findings imply that firm's profitability

and valuation are not aligned, and therefore Haslam et al. (2010) argue that female directors tend to serve in firms with worse performance, and that investors undervalue those firms due to females' presence in the board room.

In addition, Chapple and Humphrey (2014) do not find a significant relationship between board diversity and firm stock performance by studying stock portfolios. However, they document a weak association between board of directors' gender diversity and some industries, and a weak negative association between multiple female directors and firm valuation (Chapple and Humphrey 2014). Carter, D'Souza, Simkins and Simpson (2010) conclude also that there is no significant relationship between board of directors' gender diversity and firm performance measured as ROA and Tobin's Q.

In a more recent study, Khan and Vieito (2013) investigate the relationship between CEO gender and firm performance by examining S&P 1500 firms over the period of 1992-2004. Khan and Vieito (2013) contribute to the existing literature by studying female CEOs instead of other female executives. In order to control causality, Khan and Vieito (2013) investigate the relationship between women CEOs and firm performance by applying instrumental variable approach. They use CEO's tenure as well as board of directors' meeting activity as instrumental variables based on Vafeas' (1999) evidence of inverse relationship between the number of annual board meetings and firm performance. Khan and Vieito (2013) study CEO's gender's impact on firm's profitability and risk-taking, and conjecture that the difference between genders' compensation may explain female CEOs association with lower corporate risk-taking. They measure firm's performance as return on assets (ROA), firm's risk level as the natural logarithm of share price volatility and CEO's total compensation as of the sum of compensation components such as bonus, stock options, restricted stocks, long-term incentive plan and other compensations.

Khan and Vieito (2013) conclude that firms managed by a female CEO tend to outperform firms managed by a male CEO. That is, firms with a female CEO are more profitable than firms with a male CEO on average. They also conclude that female CEOs tend to take less risk even though there is no significant difference between genders' risk taking incentives such as stock option compensation. They reason these findings with the females' greater risk aversion behavior documented by the previous research such as Vandergrift and Brown (2005) and Niessen and Ruenzi (2006). (Khan and Vieito 2013.)

Instead of gender, Kaplan, Klebanov and Sorensen (2012) study CEO's other personal characteristics' impact on firm performance. They investigate private equity funds' CEO

candidates during the period of 2000-2006 to uncover which CEO characteristics and abilities are positively associated with performance. They measure performance with three survey questions that are (1) whether the CEO candidate was hired, (2) whether the private equity fund invested in the company, and (3) whether the CEO and the portfolio company was successful (Kaplan et al. 2012). As private equity funds are reluctant to share any financial information of their portfolio companies, Kaplan et al. (2012) give values of 1, 0.5 and 0 for the survey answers regarding the performance. Value 1 represents a successful, 0.5 a mediocre and 0 an unsuccessful CEO or a company. They document that a CEO who is efficient, persistent, aggressive, proactive, organized and committed, and who has high standards for performance and leadership abilities, is positively associated with success and firm performance. (Kaplan et al. 2012.) Kaplan et al. (2012) conclude that firm performance correlates with CEO's abilities related to execution, resoluteness and overconfidence.

3.2. Gender diversity and mergers and acquisitions

The previous literature related to mergers and acquisitions is extensive, however, there are only few studies considering the impact of top management's gender diversity on mergers and acquisitions. This section presents the prior studies in this field of research. In addition, this section presents the study of Malmendier and Tate (2008) to complement the findings related to gender diversity.

Levi, Li and Zhang (2014) examine board of directors' gender diversity and mergers and acquisitions by studying S&P 1500 firms over the period of 1997-2009. They focus on female directors' impact on the firms' acquisition activity and paid bid premium (Levi et al. 2014). Levi et al. (2014) use negative binomial regression with time and industry fixed effects, propensity-score matching and instrumental variable approaches as their empirical methodologies. They define instrumental variable as the fraction of firm's male directors who are also directors in other firms' boards with female directors. Levi et al. (2014) conjecture that boards with large fraction of male directors, who have female colleagues in other firms' boards, are more likely to have more female directors than boards with small fraction of male directors with female colleagues.

Levi et al. (2014) conclude that boards with female directors tend to make less acquisitions than all-male boards. They find that each additional female director decreases firm's acquisition activity by 7.6 percentage points, and paid bid premium by 15.4 percentage points (Levi et al. 2014). Levi et al. (2014) rationalize their findings with

males' greater overconfidence. They conjecture that males tend to overestimate acquisition synergies more often than female directors due to their greater overconfidence (Levi et al. 2014).

Furthermore, Huang and Kisgen (2013) examine the association between executive's gender and the firm's corporate finance decisions such as asset growth, acquisitions, leverage and debt issuance. They study NYSE-, Amex- and Nasdaq-listed firms with total assets greater than $500m during the period of 1993-2005. Due to the small number of female CEOs, they include also CFOs in their sample. (Huang and Kisgen 2013.) In order to mitigate possible endogeneity issues, Huang and Kisgen (2013) use a difference-in-differences approach as their main methodology and complement it with a traditional panel data regression, a propensity score matching approach and an instrumental variable approach.

Huang and Kisgen (2013) report that female executives differ from male executives in their corporate financial decision-making. They document that firms with a female CEO or CFO are less likely to conduct acquisitions and issue debt than firms with a male executive. They also show that market reaction for female executives' acquisition and debt issuance announcements is positive, that female executives are more likely to retain their position longer, and that female executives are less overconfident than male executives in terms of earnings estimate spread and early option exercise on average. (Huang and Kisgen 2013.) Huang and Kisgen (2013) rationalize their findings with male executives' greater overconfidence and conclude that gender should be taken into account when studying firm's behavior in capital structure and acquisitions decision-making.

Malmendier and Tate (2008) investigate the relationship between CEO overconfidence and mergers and acquisitions by studying 477 large publicly traded U.S. companies during the period of 1980-1994. They measure CEO overconfidence by using CEO's personal investment in the firm and CEO's popularity in media as proxies (Malmendier and Tate 2008). Malmendier and Tate (2008) find evidence that overconfident CEOs are more likely to conduct acquisitions, especially if they are able to use internal financing and the acquisition is diversifying. Moreover, they show that the market reaction for acquisitions conducted by overconfident CEOs are more negative than for acquisitions conducted by non-overconfident CEOs (Malmendier and Tate 2008).

3.3. Gender diversity and risk-taking

The previous literature has widely documented that women differ from men in their risk-taking behavior not only in general, but also in economic and financial context. For example, Olsen and Cox (2001), Powell and Ansic (1997), Fehr-Duda, de Gennaro and Schubert (2006), and Borghans, Golsteyn, Heckman and Meijers (2009) conclude that women are more cautious and risk averse than men in their financial decisions.

Furthermore, the prior literature has demonstrated an association between firm risk level and top management's gender diversity. For example, Weber and Zulehner (2010), Elsaid and Ursel (2011), Cole (2013), Palvia, Vähämaa and Vähämaa (2015) and Faccio, Marchica and Mura (2016) report evidence of negative relationship between firm risk level and female leaders, while Ahern and Dittmar (2012), Berger, Kick and Schaeck (2014), Sila, Gonzalez and Hagendorff (2016) as well as Peltomäki, Swidler and Vähämaa (2016) obtain opposing results.

In more specific, Elsaid and Ursel (2011) study the relationship between newly appointed CEO's gender and firm's risk-taking behaviour in 679 North American firms during the period of 1992-2005. By applying instrumental variable approach, Elsaid and Ursel (2011) find that firm's risk level decreases when CEO is changed from male to female CEO. Cole (2013), in turn, document evidence that small private U.S. firms that are owned by women are, on average, less leveraged than their counterpart companies owned by men. Moreover, Weber and Zulehner (2010) document that a female among the first employees increases the likelihood of the company to survive.

In a more recent study, Palvia, Vähämaa and Vähämaa (2015) examine the influence of CEO and Chairperson's gender to the risk level of U.S. commercial banks in years 2007-2010. They measure banks' risk level with capital ratios and default risk, and use panel and logistic regressions as their main empirical methodologies. In order to mitigate possible endogeneity and reverse causality issues, Palvia, Vähämaa and Vähämaa (2015) apply also instrumental variable approach. Palvia, Vähämaa and Vähämaa (2015) find evidence that banks with female CEOs or female board Chairs are associated with more conservative level of capital ratios, and that gender does not have impact on the likelihood of a bank to default except for smaller banks. Palvia, Vähämaa and Vähämaa (2015) suggest that female leaders' conservatism is especially vital for smaller banks as they are less able to absorb external shocks.

Faccio, Marchica and Mura (2016) contribute to the previous literature by examining the relationship between CEO's gender, corporate risk-taking and capital allocation

efficiency. They study a large sample of both private and public European firms during the period of 1999-2009. In order to study the difference between female and male CEOs' corporate risk-taking, Faccio et al. (2016) consider three measures: leverage, earnings volatility and the likelihood of survival. They find that firms with a female CEO are less leveraged, have smaller volatility in their earnings and are more likely to survive than firms with a male CEO. Faccio et al. (2016) conclude that female executives are more risk averse and therefore not as efficient to allocate capital as male executives.

In contrast to Faccio et al. (2016), Ahern and Dittmar (2012) report opposing results. They find a positive association between female directors and Norwegian companies' risk-taking behaviour (Ahern and Dittmar 2012). Ahern and Dittmar (2012) conclude that the Norwegian gender quota, introduced in 2003, led Norwegian companies to hire younger and more unexperienced directors in their boards, which in turn led companies to increase their leverage and acquisitions activity resulting to decreased level of operational performance.

Peltomäki, Swidler and Vähämaa (2016) complement the findings of Ahern and Dittmar (2012) by studying top managements' age and genders' impact on firm risk-taking behaviour in S&P 1500 firms during the period of 2004-2014. They measure firm's total risk with the volatility of daily stock return, systematic risk with market model estimated beta and idiosyncratic risk with the volatility of market model regression residuals. Peltomäki, Swidler and Vähämaa (2016) use fixed-effects panel regression as their main empirical methodology as well as instrumental variable, propensity score matching and difference-in-difference approaches in order to mitigate possible endogeneity issues.

Peltomäki, Swidler and Vähämaa (2016) show that female CEOs and CFOs are positively associated with firm's risk level after firm-specific characteristics and compensation incentives are controlled. However, they further document that older CEOs and CFOs are associated with lower risk level than their younger counterparts, and that female CEOs and CFOs are, on average, younger than males. Therefore, Peltomäki, Swidler and Vähämaa (2016) suggest that positive association between female leaders and firm risk may be confounded by the age-effect.

In contrast to Palvia et al. (2015), Berger, Kick and Schaeck (2014) show that female directors are positively associated with financial firms' risk level. Berger et al. (2014), however, focus on female directors' effect on financial firms' portfolio risk, rather than capital ratios or default risk. Berger et al. (2014), study the large sample of German banks during the period of 1994-2010 by employing difference-in-differences approach. They

conclude that bank's portfolio risk tends to increase when the number of female directors increase (Berger et al. 2014).

Lastly, Sila, Gonzalez and Hagendorff (2016) examine whether board of directors' gender diversity has an impact on the non-financial firm's risk level by considering U.S. companies in years 1996-2010. They use dynamic panel system GMM estimator to mitigate endogeneity issues and the challenge to find a strong instrumental variable (Sila et al. 2016). Sila et al. (2016) find that female representation in board have neither positive nor negative association with firm's risk level when taking possible endogeneity issues into consideration. Moreover, they document that unobservable firm-level factors cause gender-risk relationship to be negative, yet spurious, as they have significant influence on both firm's risk level and board of directors' gender diversity (Sila et al. 2016). Therefore, Sila et al. (2016) conclude that female directors of non-financial firms are willing to bear as much risk as their male counterparts.

3.4. Conclusions from the prior empirical evidence

The prior empirical evidence regarding gender diversity and firm performance suggests that firms with more diversified management teams are associated positively with firm profitability, valuation level and long-term share price performance, as well as negatively with corporate risk-taking. For example, Krishnan and Parson (2008), Welbourne (1999) and Dwyer et al. (2003) find that more diversified management teams have statistically significant and positive relation with firm profitability, Tobin's Q and share price return, while Weber and Zulehner (2010) document a negative relationship between management team's gender diversity and the company's likelihood of survival.

Furthermore, the previous literature suggests that individual executives are also associated with higher firm profitability and valuation as well as with lower risk level. For example, Khan and Vieito (2013) find that female CEOs are associated with higher firm profitability, and Faccio et al. (2016) conclude that firms with a female CEO have lower risk level than firms with a male CEO. In contrast, the previous literature suggests that board of director's gender diversity is associated negatively with firm performance, and positively with corporate risk-taking (for example Adams and Ferreira 2009; Ahern and Dittmar 2012; Berger et al. 2014). Peltomäki et al. (2016) find also opposing results regarding the individual executives and corporate risk-taking.

As the literature regarding individual executive's gender and firm performance is limited, it is important to study whether the prior empirical evidence regarding top management and board of directors is applicable also for individual executives. For this reason, I examine whether the association between higher firm valuation, long-term share price performance and female executives is in line with the prior evidence after controlling for possible endogeneity bias. Furthermore, the prior literature tends to study only one or few firm performance measures simultaneously. In order to obtain a comprehensive view on CEO gender's impact on firm performance, I study firm performance from four different perspectives.

Finally, the prior literature measures firm profitability with net income based profitability measures, such as ROA or ROI. These measures however indicate only the firm's overall profitability but not the firm's operational profitability. In order to examine why top management's gender diversity is associated positively with firm profitability, it is important to study whether gender is associated with firm profitability also on operational level. I conjecture that if gender is positively associated with firm's operational profitability, the positive relation with firm's overall profitability is driven by the firm's more efficient operations rather than inoperative income statement items such as depreciations and financing costs. To address this issue, I study both overall and operational firm profitability measures, ROA and EBITD on total assets.

4. DATA AND METHODOLOGY

This chapter presents the research hypotheses of the empirical study. Furthermore, it provides an overview of the applied sample data and a summary of the data refining process. In order to define appropriate empirical methodologies for the study, the chapter first considers possible endogeneity issues related to the data and then discusses the advantages and limitations of the applied empirical methodologies. Finally, applied methodologies are presented in more detail.

4.1. Research hypotheses

The purpose of this thesis is to study the relationship between CEO gender and firm performance in terms of firm profitability, mergers and acquisitions, corporate risk-taking and valuation. To study the difference between female and male CEOs on four different fields of firm performance, I outline seven hypotheses and group them based on the field of firm performance they represent.

Profitability

Khan and Vieito (2013) report that female CEOs are positively associated with profitability. Based on the findings of Khan and Vieito (2013), I form the first and second research hypotheses as follows:

H1: Firms with a female CEO have higher operational profitability (EBITD on total assets) than firms with a male CEO on average

H2: Firms with a female CEO have higher overall profitability (ROA) than firms with a male CEO on average

Mergers and acquisitions

Levi, Li and Zhang (2014) document that female directors are more risk averse, and therefore they consider acquisitions more carefully: they are not as overconfident of acquisition's synergies as male directors. Thus, female directors are not willing to pay as much acquisition premium and they do not bid as eagerly as male directors. They conclude that female directors affect positively on the shareholder value through avoiding bad acquisitions. (Levi, Li and Zhang 2014.)

Furthermore, Huang and Kisgen (2013) show that female executives tend to conduct less acquisitions, and that the acquisitions they conduct are less value-destroying in short-term in comparison to male executives. Huang and Kisgen (2013) suggest that female executives' lower corporate finance activity results from females' weaker overconfidence. Based on these findings, I form the third and fourth research hypotheses as follows:

H3: Female CEOs conduct less acquisitions than male CEOs on average

H4: Acquisitions conducted by female CEOs offer more long-term value for shareholders than acquisitions conducted by male CEOs on average

Risk-taking

Faccio, Marchica and Mura (2016) document that firms with a female CEO tend to be less risky than firms with a male CEO. They show that female CEOs' firms are less leveraged, their earnings are less volatile and they are more likely to survive than firms with male CEOs (Faccio et al. 2016). Based on these findings, I form the fifth and sixth research hypotheses as follows:

H5: Firms with a female CEO are less leveraged than firms with a male CEO on average

H6: Firms with a female CEO have less volatile earnings than firms with a male CEO on average

Valuation and long-term stock performance

If female CEOs are associated with better firm performance, and their companies are less risky, I expect to find that firms managed by a female CEO have also higher valuation level and that they have higher stock returns than firms managed by a male CEO. Therefore, I form the seventh and eighth research hypotheses as follows:

H7: Firms with a female CEO have higher long-term stock return than firms with a male CEO on average

H8: Firms with a female CEO have higher Tobin's Q than firms with a male CEO on average

4.2. Descriptive statistics

I study S&P 1500 firms during the period of January 2005- December 2015 to empirically examine the difference between female and male CEOs. The study focuses on non-financial firms, and hence I exclude firms with Standard Industrial Classification code between 6000 and 6999. I include in the sample all firms that have been on one of the three S&P1500 indices (S&P600, S&P500 or S&P400) during the period to increase the sample size and the number of female CEOs under study. The total sample consists of 1,721 firms with 15,163 firm-year observations. 545, or approximately 3.6% of the firm-year observations are observations with a female CEO.

The sample used with the difference-in-differences approach consists of firms with executive transition. I focus on firms with male-to-female executive transition because the number of firms with female-to-male executive transition is too small for meaningful analysis. I use firms with male-to-male executive transition as the control group for the male-to-female transition firms. I require the transiting CEOs to be in office at least two years to ensure that the CEO has enough time to impact the corporate policy and firm performance. The difference-in-differences sample consists of 9,803 firm-year observations with 346 female CEO observations, corresponding approximately 3.5% of the sample.

Executives' personal information, such as gender, age and total compensation is collected from Compustat Execucomp database. I require the CEO to be in office most of the year in order to match the firm's annual financial data with the CEO that has had most impact on it. Moreover, I exclude 69 firm-year observations from the sample in order to ensure that the CEO is not paid only a nominal compensation. The largest excluded nominal compensation is little less than $10,000 including annual fixed salary, bonuses, option awards, stock awards and other annual compensation. I collect daily stock return data from Center for Research in Security Prices (CRSP) database. The returns are adjusted for dividends representing the total return of the security.

Annual financial data and information regarding mergers and acquisitions are collected from Thomson Reuters database. An acquisition is included into the sample, if the acquirer is from U.S. and the transaction is fully completed. I consider only acquisitions in which majority of the ownership is acquired. Both international and domestic acquisitions are included in the sample.

Table 1 presents the descriptive statistics of the study sample. The study variables are divided into four groups based on the firm performance field their present, as well as two

control variable groups. The number of variables' observations ranges from 6,109 to 15,163. All other variables have at least 12,242 observations except the post-acquisition abnormal return variable which has only 6,109 observations. The number of post-acquisition return observations are limited for two reasons: first, the variable is calculated only for firms that have made acquisitions, and second, the observations with less than two years of post-acquisition share price quotes are excluded due to the interest towards long-term share price performance.

Table 1. Descriptive statistics of the study sample.

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Observations
Executive specific characteristics								
CEO Age	55.85	56.00	96.00	27.00	7.17	0.34	4.09	15,002
Ln Compensation	6.76	6.75	11.26	2.96	0.61	0.62	7.51	14,997
CEO gender	0.04	0.00	1.00	0.00	0.19	4.99	25.86	15,163
Firm specific characteristics								
Ln Assets	14.51	14.40	20.50	7.79	1.63	0.29	2.88	15,068
Ln Mcap	14.57	14.44	20.29	3.40	1.65	0.16	3.53	14,939
Ln Sales	14.39	14.33	20.00	0.00	1.59	0.11	3.75	15,077
Profitability								
ROA	0.06	0.06	1.58	-1.27	0.11	-1.29	23.89	14,968
EBITD on TA	0.13	0.13	3.44	-2.96	0.14	-2.69	77.94	14,719
Acquistions								
No. of acquisitions	0.99	0.00	29.00	0.00	1.68	4.00	31.60	15,163
M&A abnormal return	-0.05	-0.06	6.20	-5.09	0.67	0.79	10.98	6,109
Risk								
ROA volatility	2.23	0.33	607.19	0.00	16.05	24.10	688.20	14,671
Net income volatility	3.56	0.41	3098.82	0.00	45.27	51.04	3176.68	15,008
Gearing	0.37	0.33	171.50	-86.36	1.82	58.36	6713.01	12,361
Debt Ratio	0.26	0.23	4.05	0.00	0.23	5.12	68.92	15,040
Valuation								
Tobin's Q	1.68	1.29	15.90	-0.08	1.33	3.06	17.91	14,844
Abnormal return	0.01	-0.02	30.96	-4.60	0.80	12.24	355.10	12,242

Table 2 presents the mean differences between male and female CEOs regarding the study variables. The table indicates that firms with a female CEO are significantly larger than firms with a male CEO in terms of total assets and sales. Firms with a female CEO are also less leveraged in terms of debt ratio, however, when measuring firm leverage with gearing ratio, firms with a female CEO are found to be as leveraged as firms with a male CEO. Furthermore, female-led firms' average valuation level is on discount relatively to firms led by males, and they do significantly less acquisitions per year. Female-led firms are as profitable as firms with a male leader. Table 2 implies also that female CEOs are significantly younger than male CEOs and that their total compensation is higher on average.

Table 2. Test of mean differences.

	Male CEO	Female CEO	Test of Difference	
	Mean	Mean	Mean difference	t-statistic
Executive specific characteristics				
CEO Age	55.92	54.10	-1.82	-8.11 ***
Ln Compensation	6.75	6.82	0.06	2.50 **
Firm specific characteristics				0.00
Ln Assets	14.50	14.72	0.22	4.36 ***
Ln Mcap	14.56	14.61	0.05	0.88
Ln Sales	14.38	14.65	0.27	5.29 ***
Acquistions				
No. of acquisitions	0.99	0.85	-0.14	-2.72 ***
M&A abnromal return	-0.05	-0.06	-0.01	-0.46
Profitability				
ROA	0.06	0.06	0.00	-0.53
EBITD on TA	0.13	0.13	0.00	-0.51
Risk				
ROA volatility	2.27	1.25	-1.01	-1.45
Net Income Volatility	3.58	2.85	-0.74	-0.43
Gearing	0.37	0.47	0.10	1.20
Debt Ratio	0.26	0.19	-0.07	-14.95 ***
Valuation				
Tobin's Q	1.69	1.52	-0.17	-3.95 ***
Abnormal return	0.01	-0.03	-0.04	-1.58

4.3. Dependent variables

In order to measure firm's profitability, I use return on assets (ROA) and EBITD on total assets as dependent variables. ROA is defined as the net income divided by total assets. EBITD on total assets is defined as earnings before interest, taxes and depreciations divided by total assets. ROA measures firm profitability by taking into account most of the income statement items, while EBITD on total assets focus on the operational items measuring only the operational efficiency of the firm. I include both measures to study whether the difference between female and male CEOs' firm profitability results from more efficient use of operational resources such as labor and raw materials, or from resources related to financing costs and earnings management.

I study female executives' association with firm's risk level by using gearing ratio, debt ratio, ROA volatility and net income volatility as the independent variables. Gearing ratio is defined as long-term debt to total capital employed, and debt ratio as total debt to total assets. ROA and net income volatility are defined as the standard deviation of logarithmic changes of ROA and net income, respectively.

I measure firm's acquisition activity with the number of executed acquisitions during a year, and the long-term post-acquisition stock price performance with the post-acquisition abnormal return of 24 months. I calculate abnormal returns by applying Buy and Hold Abnormal Return (BHAR) model. I choose to use BHAR methodology as it resembles investor's actual investment experience better than approaches in which portfolios are rebalanced frequently.

The abnormal return is defined as:

$$(1) \quad BHAR_i(t,T) = \prod_{t=1 to\ T}(1 + R_{i,t}) - \prod_{t=1\ to\ T}(1 + R_{B,t})$$

Where $R_{i,t}$ is the total return of event firm *i* at time *t* and R_B is the total return of a non-event firm portfolio matched with event firm *i*. Event firm *i* is defined as a firm that has executed an acquisitions within the year *t*. I match non-event firms with event firms based on their annual market capitalization reflecting the size of the company, book-to-market ratio and the past share price performance one year before time *t*. I choose these three characteristics to define securities' abnormal returns based on Fama and French's (1996) as well as Carhart's (1997) empirical evidence of asset pricing.

I first divide all non-event firms into four portfolios based on the quartiles they represent. Quartiles are defined for all three characteristics for every year. After obtaining 120 (3 x 4 x 10) quartile portfolios, I form index portfolios from quartile portfolios. An index portfolio represents a group of firms that are in the same market capitalization, book-to-market and past performance quartiles. Next, I match index portfolios with the corresponding event firms, and calculate the difference between the index portfolio's return (non-event firm portfolio) and the event firm's return. This way I am able to compare event firms with their peer firms matched based on market capitalization, book-to-market ratio and past performance. As such data refining requires a lot computing power, I use statistical software R studio to program the calculations.

In order to measure firm valuation and stock performance, I use Tobin's Q as well as long-term abnormal return as dependent variables. Tobin's Q is defined as the ratio of the market value of capital divided by the book value of assets. The market value of capital is a sum of market value of equity minus deferred taxes, plus book value of debt. Abnormal stock price return is calculated by applying Buy and Hold Abnormal Return (BHAR) model, and it is defined as the difference between the total return of firm *i* and the total return of a peer firm portfolio matched with firm *i*. I match firms with their peer firm portfolios based on the companies' annual market capitalization, book-to-market

ratio and one year past share price performance. Abnormal return is calculated from the two-year period.

4.4. Endogeneity

As pointed out by Huang and Kisgen (2013), an executive's selection to a firm is unlikely to be random – the selection is most likely affected by the executive's own characteristics and desires. Such deliberate selection may cause endogeneity issues in the data, which in turn may affect the findings of the study (Huang and Kisgen 2013).

Huang and Kisgen (2013) argue that the endogeneity issues may rise as a result of biased selection patterns such as board of directors' discrimination, overcrowding phenomena (Bergmann 1974) and executives' self-selection. Furthermore, Kaplan et al. (2012) suggest that omitted variable and dynamic reverse causality may lie behind the issue. Kaplan et al. (2012) argue that omitted variable may cause endogeneity issue if an omitted uncontrolled firm characteristic has simultaneously impact on both executive's selection process and firm performance measure. Dynamic reverse causality, in turn, can cause similar issues if executive selection process is influenced by the past firm performance.

As the data used in this thesis is likely to suffer similar issues, I apply difference-in-differences approach to mitigate possible endogeneity bias. I consider to use also instrumental variable approach to mitigate endogeneity bias, however, I am unable to find a strong instrument for female CEOs. For example, the state-level gender equality applied by Huang and Kisgen (2013) is too weak for my sample. In addition to the difference-in-differences methodology, I use traditional panel data regression as a complimentary methodology to increase the robustness of the results. The difference-in-differences approach mitigates endogeneity issues as it compares differences between two different event types during a fixed time period. In this study, I compare a firm's performance measure before and after an executives' transition − the difference between a male-to-female executive transition and a male-to-male executive transition. Male-to-male executive transitions form the control group of the study.

I choose to use the difference-in-differences approach because it has three advantages. Firstly, the approach requires executives to hold their position for a significant period of time, in this case, two years. A significant time period confirms that the executives have time to implement their decisions and to make an impact on the corporate policy. Secondly, the approach excludes unique factors related to time period that may affect the

executive transition. For example, a first-year executive may not make as good decisions as an experienced executive, however, the inferior decisions are more likely to result from the lack of experience rather than gender. By excluding such factors, inaccurate conclusions can be avoided. Lastly, this approach reduces noise. (Huang and Kisgen 2013.)

On the other hand, the long time period requirement can be also seen as a limitation. That is, the tighter requirements do not only improve the quality of the observations but also exclude certain types of observations from the sample. This in turn may compromise the credibility of the study as the exclusion of an observation type may lead to a situation where potentially significant information is ignored. For example, the empirical study of this thesis could be compromised if all female-to-male transition observations would be excluded from the sample and this observation type would have significant explanatory power over firm performance. For this reason, I use panel data regressions as a complimentary methodology to show that all excluded observations are insignificant and do not have explanatory power over firm performance. In addition, I use panel data regressions to verify the robustness of the difference-in-difference approach.

4.5. Empirical models

I use two empirical methodologies in this study: difference-in-differences approach and panel data regressions. I include time and firm fixed effects in both difference-in-differences and panel data regressions to control time and firm specific factors. Furthermore, I include industry fixed effects in panel data regressions. I choose to use fixed effects model instead of random effect because the data represents whole population (stock indices) rather than a randomly selected sample (Brooks 2014: 537).

Difference-in-differences model used in this study is defined as:

$$(2) \quad Firm\ performance\ measure_{i,t} = \beta_0 + \beta_1 After + \beta_2 Female \times After + v_i + \tau_t + \gamma_i Controls_{i,t} + e$$

Where $Firm\ performance\ measure_{i,t}$ is the measure of either profitability, risk level, acquisition activity, abnormal return or valuation level of a firm *i* at time *t*; $Female_i$ is male-to-female transition dummy that obtain value 1 when CEO transition is from male to female, and 0 when transition is from male to male; $After_{i,t}$ is a dummy variable for post-transition period that obtain value 1 when CEO transition is after time *t* and 0

otherwise; v_i are firm fixed effects; τ_t are time fixed effects and $Controls_{i,t}$ are control variables for firm size, profitability, capital structure, valuation, CEO age and CEO compensation for a CEO that works in firm *i* during the year *t.*

In the footsteps of Huang and Kisgen (2013), the first $Female_i$ dummy variable of traditional difference-in-differences model is not included in the equation. According to Huang and Kisgen (2013) the first $Female_i$ dummy variable is unnecessary, since the equation also includes firm fixed effects. By including both elements to the regression, the regression becomes dummy variable trapped.

I use panel data regression to study whether CEO gender has explanatory power over firm performance among the full study sample. The panel data regression model used in the study is defined as:

(3) $$Firm\ performance\ measure_{i,t} = \beta_0 + \beta_1 Female + \gamma_i Controls_{i,t} + \tau_t + v/\rho_i + e$$

Where, $Firm\ performance\ measure_{i,t}$ is the measure of either profitability, risk level, acquisition activity, abnormal return or valuation level of a firm *i* at time *t*; $Female_i$ is a dummy variable which obtain value 1 if CEO is female and 0 otherwise; τ_t are time fixed effects; v/ρ_i are either firm fixed effects or industry fixed effects; and $Controls_{i,t}$ are control variables for firm size, profitability, capital structure, valuation, CEO age and CEO compensation for a CEO that works in firm *i* during the year *t*. A firm's industry is defined based on its first SIC-code number.

5. EMPIRICAL RESULTS

In this chapter, I present the empirical results of the study. The chapter is divided into four subsections based on the four dimensions of the study: profitability, mergers and acquisitions, corporate risk-taking and valuation. In each section, I present first the empirical results of difference-differences approach, and second the empirical results of panel data regressions.

5.1. Female CEOs and profitability

Table 3 presents the difference-in-differences regression analysis of firm profitability and CEO gender. Models (1) and (2) present the difference-in-differences regressions with time and firm fixed effects without control variables. Models (3) and (4) present the corresponding regressions with additional firm specific controls for firm size, valuation, and leverage, as well as executive specific controls for CEO age and CEO total compensation. *After*Female* coefficient indicates the relationship between the dependent variable and a female CEO that has taken a male CEO's place in a firm at least two years ago. *After* coefficient implies the association between the dependent variable and an executive transition in general.

Table 3 suggests that CEO gender does not have impact on firm's operational profitability measured as EBITD on total assets. All *After*Female* coefficients for EBITD on total assets are positive, yet statistically insignificant. Instead, firm size and valuation, as well as CEO age and total compensation have relation with firm operational profitability even after adjusting for time fixed effects. Firm size and valuation are positively associated with firm's operational profitability at 1% significance level, while CEO age and compensation are positively associated with firm's operational profitability at 5% significance level. Furthermore, Table 3 implies that a new CEO in general has negative impact on firm's operational profitability. However, the result is not robust for time fixed effects.

Even though CEO's gender is not significant for operational profitability, I record that it is significant for firm's overall profitability measured as return on assets, ROA. Table 3 implies that after a male-to-female executive transition, the firm's overall profitability increases by 1.4-1.5 percentage points on average. The finding is significant at 5% significance level and robust for time fixed effects. Interestingly, the effect is opposite for executive transitions in general – the firm's profitability decreases by 0.5-2.4 percentage

points on average after a male-to-female or a male-to-male executive transition. The finding is significant at 1% level when firm fixed effects are controlled (Model 3), however, insignificant after adjusting for time fixed effects as well. The results suggest that the new CEO in general has negative impact on ROA, however, when the CEO is woman, the impact is positive. Table 3 indicates also that CEO's total compensation has significant impact on firm's overall profitability level, while CEO's age has not after time fixed effects have been included into the equation. CEO's total compensation is positively associated with firm's profitability at 1% significance level.

Table 3. Difference-in-differences regressions of firm profitability.

Table 3 presents the results of difference-in-differences regressions of EBITD on total assets and ROA. EBITD on total assets is defined as earnings before interest, taxes and depreciations divided by total assets. ROA is defined as the net income before extraordinary items and discounted operations divided by total assets. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	EBITD on TA				ROA			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.137 ***	0.130 ***	-0.650 ***	-0.859 ***	0.066 ***	0.062 ***	-0.653 ***	-0.789 ***
	(15.553)	(49.954)	-(6.399)	-(6.677)	(7.967)	(34.864)	-(6.880)	-(7.152)
After	-0.016 *	-0.005	-0.027 ***	0.002	-0.013 *	-0.005 *	-0.024 ***	-0.003
	-(1.919)	-(1.119)	-(4.224)	(0.395)	-(1.821)	-(1.787)	-(5.571)	-(1.150)
After*Female	0.009	0.010	0.011	0.011	0.009	0.009	0.015 **	0.014 **
	(0.870)	(0.872)	(1.252)	(1.232)	(1.083)	(1.093)	(2.516)	(2.509)
Ln Mcap			0.048 ***	0.058 ***			0.046 ***	0.052 ***
			(7.801)	(6.478)			(7.584)	(6.971)
Gearing			0.000 *	0.000			0.000	0.000
			-(1.668)	-(1.640)			-(0.918)	-(0.899)
Tobin's Q			0.018 ***	0.018 ***			0.013 ***	0.013 ***
			(3.584)	(3.510)			(2.723)	(2.648)
Age			0.000 *	0.000 **			0.000 **	0.000
			-(1.922)	(2.274)			-(2.076)	(0.079)
Ln Compensation			0.011 **	0.012 **			0.009 **	0.010 ***
			(2.020)	(2.290)			(2.525)	(3.213)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	8,588	8,588	8,353	8,353	8,711	8,711	8,475	8,475
R-squared	0.49	0.50	0.55	0.57	0.44	0.46	0.51	0.53
F-statistic	7.38	7.68	9.05	9.48	6.03	6.43	7.88	8.28
Prob(F-stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The dependent variables, EBITD on total assets and ROA, deviate from each other only by three income statement items: interest, taxes and depreciations. Therefore, it is interesting to notice that the dependent variables' results are significantly different. The results indicate that female CEOs are not associated with better operational profitability

(EBITD on total assets), but simultaneously with better overall profitability (ROA). This finding suggests that female CEOs are as efficient as male CEOs to use their firm resources, such as labor force and raw materials, however there are some material differences between female and male CEOs when considering firm's financial costs, taxation and depreciation policies. It might be that firms with a female CEO have smaller capital costs than firms with a male CEO, or they have different depreciation policies. Furthermore, as it is fair to assume that the taxation is equal for all companies, there might be some gender specific differences in the utilization of tax advantages.

The mean difference between female and male CEO firms' leverage supports the conjecture that female CEOs' better overall profitability is driven by their smaller financing costs. Table 2 suggests that firms with a female CEO are less leveraged in terms of debt ratio, and therefore they most likely have smaller financing costs than firms with a male CEO. However, as presented in the following sections I record ambiguous evidence of CEO gender's impact on the firm's leverage by studying the relationship with the difference-in-differences approach and panel data regressions. Alternatively, one possible explanation for female-led firms' lower financing costs might be their lower cost of debt, which in turn could encourage the firms to rely more on debt financing, yet still result to smaller financing costs. Female CEOs' association with lower earnings volatility (as presented in section 5.3.) supports this conjecture, however, no comprehensive conclusions can be made without a further more specific research on genders' differences in financing costs.

Table 4 presents the panel data regressions of firm profitability measures, EBITD on total assets and ROA. Model (1) includes time fixed effects, Model (2) time and firm fixed effects, as well as Model (3) time and industry fixed effects. The table suggests that CEO's gender is not significant for neither firm's operational nor overall profitability. That is, firms with a female CEO are as profitable as firms with a male CEO in terms of EBITD on total assets and ROA. Instead, firm size, valuation level and CEO compensation are positively and significantly associated with firm's profitability at 5% and 1% levels. Furthermore, CEO's age is positively and significantly associated with both profitability measures at 5% and 1% levels when firm fixed effects are not controlled. This implies that the large firms with high valuation as well as old and well compensated CEOs are more profitable, on average.

The insignificant *Female CEO* coefficients of Table 4 support the results presented in Table 3. This is because, the data used in panel data regressions include also firms with female-to-female and female-to-male executive transitions. Insignificant coefficients

imply that the difference-in-differences approach does not ignore any significant information by leaving the female-to-female and female-to-male transition firms out of the sample.

Table 4. Profitability panel data regressions.

Table 4 presents the results of panel data regressions of EBITD on total assets and ROA. EBITD on total assets is defined as earnings before interest, taxes and depreciations divided by total assets. ROA is defined as the net income before extraordinary items and discounted operations divided by total assets. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	EBITD on TA			ROA		
	(1)	(2)	(3)	(1)	(2)	(3)
C	-0.178 ***	-0.746 ***	-0.182 ***	-0.216 ***	-0.694 ***	-0.219 ***
	-(10.494)	-(6.494)	-(10.361)	-(14.628)	-(7.251)	-(15.046)
Female CEO	0.000	0.006	-0.002	0.004	0.005	0.002
	(0.006)	(0.933)	-(0.364)	(1.189)	(0.912)	(0.698)
Ln Mcap	0.015 ***	0.051 ***	0.015 ***	0.014 ***	0.044 ***	0.014 ***
	(5.516)	(5.676)	(5.446)	(6.952)	(6.424)	(6.842)
Tobin's Q	0.037 ***	0.022 ***	0.037 ***	0.028 ***	0.017 ***	0.028 ***
	(13.539)	(5.146)	(13.462)	(14.067)	(4.220)	(13.937)
Gearing	0.000	-0.001 *	0.000	0.000	0.000	0.000
	-(0.250)	-(1.899)	-(0.338)	-(0.747)	-(1.144)	-(0.762)
Age	0.000 **	0.000	0.001 **	0.000 ***	0.000	0.000 ***
	(2.467)	(0.389)	(2.549)	(4.966)	(0.176)	(4.660)
Ln Compensation	0.000	0.011 **	0.000	0.001	0.011 ***	0.001
	-(0.040)	(2.133)	(0.024)	(0.240)	(3.549)	(0.264)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	No	Yes	No
Industry fixed effects	No	No	Yes	No	No	Yes
Observations	11,739	11,739	11,739	11,901	11,901	11,901
R-squared	0.17	0.53	0.18	0.20	0.50	0.21
F-statistic	154.62	7.23	128.94	188.01	6.45	153.24
Prob(F-stat)	0.00	0.00	0.00	0.00	0.00	0.00

Based on the results of Table 3 and Table 4, I reject the first research hypothesis H1 and accept the second research hypothesis H2 – firms with a female CEO do not have higher operational profitability (EBITD on total assets) than firms with a male CEO, however they have significantly higher overall profitability (ROA) on average. The results regarding firm's overall profitability is in line with the previous literature, for example with Khan and Vieito (2013). To the best of my knowledge, there are no previous

literature regarding the relationship between CEO gender and firm's operational profitability measured as EBITD on total assets.

5.2. Female CEOs and mergers and acquisitions

Table 5 presents the results of difference-in-differences regression analysis of acquisition activity and post-acquisition abnormal return. In contrast to previous literature such as Levi, Li and Zhang (2014), and Huang and Kisgen (2013), I record evidence that CEO gender is insignificant for firm's acquisition activity. All *After*Female* coefficients in acquisition activity column are insignificant suggesting that CEO's gender does not have impact on the number of acquisitions the firm executes during a year. Instead, I record that CEO's age and compensation matter – CEO's age is negatively and CEO's compensation positively associated with the number of acquisitions the firm executes. The result suggests that old CEOs are less eager to acquire firms than young CEOs, and that well compensated CEOs are more eager to acquire firms than CEOs with low compensation. Firm specific factors, such as profitability, size and valuation, are also significant for a firm's acquisition activity at 1% level.

Table 5 implies also that firms with a female CEO destroy shareholder value 28.9 percentage points more than firms with a male CEO during the two-year period after an acquisition. This finding is significant at 1% level, however, not robust for time fixed effects suggesting that time specific factors have significant explanatory power over the abnormal return. After controlling for time fixed effects, the *After*Female* coefficient is negative (-21.5 percentage points) but insignificant. Furthermore, the regression's R-squared value increases from 39% to 81% after fixed time effects are included, implying that time fixed effects capture significant amount of additional information. Firm size is also negatively associated with the two-year abnormal return at 5% and 1% significance levels, with and without time fixed effects, respectively.

Table 6 presents the results of panel data regressions of acquisition activity and post-acquisition abnormal return. Model (1) include time fixed effects, Model (2) time and firm fixed effects, as well as Model (3) time and industry fixed effects. Panel data regressions indicate that CEO's gender is associated negatively with firm's acquisitions activity at 5% significance level when time and industry fixed effects are controlled. The table indicates that firms with a female CEO execute annually 0.2 fewer acquisitions than firms with a male CEO. The evidence, however, is weak as the *Female CEO* coefficient is significant only in Model (3) in which the firm specific factors are not controlled.

Furthermore, I document that CEO's gender does not have impact on firm's post-acquisition abnormal return. The findings are in line with the difference-in-differences approach as well as the tests of mean differences.

Table 5. Difference-in-differences regressions of acquisition activity and post-acquisitions abnormal return.

Table 5 presents the results of difference-in-differences regressions of acquisition activity and abnormal return. Acquisition activity is measured as the number of completed mergers and acquisitions during a calendar year. Abnormal return is calculated by applying Buy and Hold Abnormal Return (BHAR) model, and it is defined as the difference between the total return of event firm *i* and the total return of a non-event firm portfolio matched with event firm *i*. I match non-event firms with event firms based on the companies' annual market capitalization, book-to-market ratio and one year past share price performance. Abnormal return is calculated from the two-year period after the acquisition. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	No. of acquisitions				Post-acquisition abnormal return			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.997 ***	0.887 ***	-1.150	-2.860 ***	-0.042 **	-0.074	5.746 ***	6.308 **
	(14.558)	(36.913)	-(1.124)	-(5.217)	-(1.977)	-(1.503)	(5.834)	(2.506)
After	-0.059	0.118 ***	-0.151 ***	0.095 **	-0.005	0.058	0.123 **	0.042
	-(1.172)	(3.143)	-(3.042)	(2.099)	-(0.129)	(0.576)	(2.444)	(0.313)
After*Female	0.060	0.068	0.093	0.102	-0.241 **	-0.227	-0.289 ***	-0.215
	(1.013)	(1.047)	(1.171)	(1.174)	-(2.417)	-(0.997)	-(2.747)	-(0.840)
ROA			0.007 ***	0.004 ***			-0.002	-0.009 *
			(3.442)	(2.832)			-(0.690)	-(1.710)
Ln Mcap			0.148 ***	0.225 ***				
			(2.577)	(8.083)				
Ln Sales							-0.435 ***	-0.407 **
							-(6.637)	-(2.522)
Gearing			-0.001 *	-0.001			-0.054	-0.319
			-(1.802)	-(0.788)			-(0.399)	-(1.144)
Age			-0.012 ***	-0.005 *			0.003	0.001
			-(3.463)	-(1.732)			(0.831)	(0.134)
Ln Compensation			0.113 **	0.122 ***			0.078 *	-0.025
			(2.235)	(2.917)			(1.737)	-(0.250)
Tobin's Q			-0.051 ***	-0.059 ***				
			-(2.693)	-(3.852)				
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations:	8,806	8,806	8,475	8,475	3,217	3,217	3,134	3,134
R-squared:	0.50	0.51	0.51	0.52	0.37	0.80	0.39	0.81
F-statistic:	7.88	8.05	7.88	8.09	2.39	1.78	2.57	1.83
Prob(F-stat):	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

In contrast, firm's profitability, size, valuation level and CEO's compensation are significant for firm's acquisition activity on at least 5% level after adjusting for firm fixed effects. Table 6 implies that profitable, large firms with relatively high valuation and well compensated CEOs are more likely to do acquisitions than unprofitable, small firms with

poor valuation and low CEO compensation. Models (1) and (3) suggest similar results, however, in these models CEO age is also associated negatively with the firm's acquisition activity at 1% significance level. Furthermore, I record that firm size and acquisitions activity are significant for firm's post-acquisition abnormal return at 1% level in Models (2) and (3), respectively. The association between post-acquisition abnormal return and firm size is negative, implying that larger firms destroy more shareholder value in mergers and acquisitions than small firms. This evidence is in line with the agency theory's empire building suggesting that executives prefer to manage large firms rather than small firms, and therefore they advocate shareholder value destroying mergers and acquisitions.

Based on the results of Table 5 and 6, I accept the third research hypothesis H3 and reject the fourth research hypothesis H4. I conclude that female CEOs conduct less mergers and acquisitions than male CEOs on average, and that the acquisitions conducted by female CEOs offer equal long-term value for shareholders with acquisitions conducted by male CEOs on average. The results regarding firm's acquisition activity, however, is considered weak as is not robust for firm specific factors and the difference-in-difference approach does not support the results. Furthermore, the result may suffer from endogeneity bias as the causality of the relationship is not controlled. Nevertheless, the evidence is in line with the previous literature, for example Levi, Li and Zhang (2014) and Huang and Kisgen (2013). The evidence regarding female CEOs and post-acquisitions abnormal return is rejected as it is not robust time fixed effects. To the best of my knowledge, the previous literature does not consider CEO gender's impact on the long-term post-acquisition stock performance.

Table 6. Panel data regressions of acquisition activity and post-acquisition abnormal return.

Table 6 presents the results of panel data regressions of acquisition activity and post-acquisition abnormal return. Acquisition activity is measured as the number of completed mergers and acquisitions during a calendar year. Post-acquisition abnormal return is calculated by applying Buy and Hold Abnormal Return (BHAR) model, and it is defined as the difference between the total return of event firm *i* and the total return of a non-event firm portfolio matched with event firm *i*. I match non-event firms with event firms based on the companies' annual market capitalization, book-to-market ratio and one year past share price performance. Abnormal return is calculated from the two-year period after the acquisition. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	No. of acquisitions			Post-acquisition abnormal return		
	(1)	(2)	(3)	(1)	(2)	(3)
C	-2.615 ***	-3.675 ***	-3.656 ***	0.054	8.147 ***	-0.026
	-(8.958)	-(7.210)	-(12.063)	(0.256)	(5.044)	-(0.117)
Female CEO	-0.159	-0.125	-0.199 **	-0.142	-0.178	-0.144
	-(1.603)	-(1.081)	-(2.009)	-(1.472)	-(0.846)	-(1.492)
ROA	0.006 ***	0.006 ***	0.005 ***	0.002	-0.001	0.002
	(5.315)	(4.338)	(4.696)	(0.937)	-(0.337)	(0.929)
Ln Mcap	0.275 ***	0.290 ***	0.321 ***			
	(30.580)	(10.102)	(32.911)			
Ln Sales				-0.018	-0.556 ***	-0.019
				-(1.207)	-(5.090)	-(1.275)
Tobin's Q	-0.001	-0.067 **	-0.074 ***			
	-(0.067)	-(2.276)	-(5.242)			
Gearing	-0.014 **	-0.001	-0.011 **	-0.012	0.097	0.006
	-(1.963)	-(1.384)	-(2.083)	-(0.141)	(0.448)	(0.068)
Age	-0.011 ***	-0.002	-0.010 ***	-0.002	-0.007	-0.002
	-(6.486)	-(0.599)	-(6.466)	-(0.782)	-(1.118)	-(0.780)
Ln Compensation	0.031	0.096 ***	0.005	0.030	0.064	0.033
	(0.831)	(4.031)	(0.134)	(1.029)	(0.996)	(1.130)
No. of acquisitions				0.015 ***	0.009	0.015 ***
				(3.189)	(0.890)	(3.072)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	No	Yes	No
Industry fixed effects	No	No	Yes	No	No	Yes
Observations:	11,901	11,901	11,901	4,899	4,899	4,899
R-squared:	0.08	0.55	0.12	0.46	0.73	0.46
F-statistic:	59.92	7.75	77.34	1.19	1.75	1.19
Prob(F-stat):	0.00	0.00	0.00	0.00	0.00	0.00

5.3. Female CEOs and corporate risk-taking

Table 7 presents the results of difference-in-differences regression analysis of firm leverage, measured as debt ratio and gearing. Models (1) and (2) present the difference-in-differences regressions with time and firm fixed effects without control variables. Models (3) and (4) present the corresponding regressions with additional executive and firm specific controls for firm profitability, size, valuation level, CEO's age and CEO's total compensation.

Table 7. Difference-in-differences regressions of firm leverage.

Table 7 presents the results of difference-in-differences regressions of debt ratio and gearing. Debt ratio is defined as total debt to total assets, and gearing ratio as long-term debt to total capital employed. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	Debt ratio				Gearing			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.264 ***	0.262 ***	0.075	0.808 ***	0.303 ***	0.339 ***	-0.140	-0.027
	(98.526)	(122.061)	(1.575)	(13.785)	(6.141)	(7.448)	-(0.138)	-(0.022)
After	0.003	0.002	0.005	0.004	0.055	-0.004	0.009	-0.044
	(0.622)	(0.580)	(1.144)	(0.878)	(1.190)	-(0.046)	(0.105)	-(0.372)
After*Female	-0.031 ***	0.015	-0.033 ***	0.008	-0.066	-0.065	-0.051	-0.048
	-(6.709)	(1.521)	-(7.854)	(1.108)	-(0.575)	-(0.563)	-(0.420)	-(0.398)
ROA			-0.001	-0.002 ***			-0.003	-0.002
			-(1.019)	-(4.576)			-(0.894)	-(0.812)
Ln Mcap			-0.003 *	-0.039 ***			0.053	0.054
			-(1.687)	-(12.039)			(0.544)	(0.493)
Tobin's Q			0.011 *	0.002			0.002	0.004
			(1.737)	(0.507)			(0.081)	(0.149)
Age			-0.001 ***	0.000			-0.003	-0.004
			-(4.069)	(0.560)			-(0.469)	-(0.587)
Ln Compensation			0.039 ***	0.004			-0.018	-0.024
			(4.896)	(0.546)			-(0.702)	-(1.049)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	7,641	7,641	7,419	7,419	8,738	8,738	8,475	8,475
R-squared	0.01	0.80	0.02	0.82	0.06	0.06	0.06	0.06
F-statistic	8.80	28.17	11.09	30.47	0.50	0.50	0.47	0.47
Prob(F-stat)	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00

Table 7 implies that there is no statistically significant relationship between CEO's gender and firm leverage. CEO's gender is only significant for firm's debt ratio when time fixed effects are not controlled. In such case, female CEOs are associated with more conservative capital structure at 1% significance level. The *After* Female* coefficient in debt ratio's Model (3) suggests that firms in which a female CEO has followed a male

CEO have 3.3 percentage points lower debt ratio than firms in which a male CEO has followed another male CEO. That is, female CEOs tend to decrease firms' debt ratio on average. However, after controlling for time specific factors the effect dilutes insignificant and turns positive.

In addition to CEO gender, CEO age and total compensation are also significant for firm's debt ratio. However, this is true only when time fixed effects are not controlled. CEO's age is negatively associated with firm's debt ratio at 1% significance level implying that a firm with one year older CEO has on average 0.1 percentage point lower debt ratio than a firm with younger CEO. Furthermore, CEO's total compensation is positively associated with the firm's debt ratio at 1% significance level. After controlling for time fixed effects, only firm profitability and size are statistically significant for debt ratios at 1% level. Both control variables are negatively associated with the debt ratio implying that large and profitable firms tend to be less indebted than small firms with poor profitability.

Interestingly, all *After*Female* coefficients and all other independent variables are insignificant for firm's gearing ratio, with and without time fixed effects. The results imply that firms in which a female CEO has followed a male CEO do not have significantly different gearing ratio than firms in which a male CEO has followed another male CEO. In other words, neither CEO gender nor firm and executive specific controls have impact on firm's gearing ratio. This might be because the equations do not capture firm's gearing variability well as suggested by the equations' low F-statistics.

Table 8 presents the results of difference-in-differences regressions of ROA and net income volatility. All *After*Female* coefficients are statistically significant on at least 10% level, and negatively associated with both ROA and net income volatility. This finding implies that CEO's gender has explanatory power over firm's risk level measured as earnings volatility. The effect is robust for time fixed effects.

For example, the *After*Female* coefficient of ROA volatility Model (4) in Table 8, indicates that firms which have experienced a male-to-female CEO transition have on average 0.9 percentage point lower ROA volatility than firms that have experienced a male-to-male CEO transition instead. The result suggests that after the new female CEO has been in office at least two years, the firm's earnings volatility decreases significantly.

The net income volatility column suggests also similar results – after the new female CEO has been in office at least two years, the net income volatility decreases on average by 173.8 percentage points. I conjecture that the decrease in net income volatility is more

dramatic than in ROA volatility because ROA is less volatile for two reasons. First, ROA is defined as the ratio between net income and total assets implying that a change in net income is smaller for ROA than for pure net income figure. Second, the increase (decrease) in net income also increases (decreases) the total assets through retained earnings diluting the change in ROA even further.

Table 8. Difference-in-differences regressions of earnings volatility.

Table 8 presents the results of difference-in-differences regressions of ROA volatility and net income volatility. ROA and net income volatility are defined as the standard deviation of logarithmic changes of ROA and net income, respectively. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	ROA volatility				Net income volatility			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	0.018 ***	0.015 ***	0.203 ***	0.122 *	2.256 ***	3.101 ***	18.411	28.922 **
	(7.092)	(5.928)	(3.709)	(1.719)	(5.750)	(7.401)	(1.542)	(2.413)
After	0.009 ***	0.014 ***	0.011 ***	0.017 ***	1.649 **	0.278	2.095 ***	0.533
	(2.953)	(3.538)	(2.826)	(3.125)	(2.381)	(0.396)	(3.778)	(0.883)
After*Female	-0.011 ***	-0.011 ***	-0.009 **	-0.009 **	-2.231 ***	-2.126 ***	-1.846 **	-1.738 **
	-(3.403)	-(3.270)	-(2.506)	-(2.427)	-(3.325)	-(2.935)	-(2.570)	-(2.239)
ROA			-0.001 *	-0.001 *			-0.257 **	-0.252 **
			-(1.678)	-(1.872)			-(2.354)	-(2.397)
Ln Mcap			-0.009 **	-0.005			-1.574 **	-1.990 **
			-(2.563)	-(1.156)			-(2.158)	-(2.540)
Gearing			0.001 ***	0.001 ***			0.086	0.081
			(4.005)	(5.048)			(1.599)	(1.612)
Tobin's Q			0.006 ***	0.006 ***			1.804 **	1.851 **
			(3.746)	(4.200)			(2.438)	(2.523)
Age			0.000	0.001 *			0.108 **	0.069
			(1.527)	(1.750)			(2.302)	(1.446)
Ln Compensation			-0.011 *	-0.010 *			-0.095	-0.299
			-(1.929)	-(1.743)			-(0.121)	-(0.410)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations	8,622	8,622	8,403	8,403	8,735	8,735	8,468	8,468
R-squared	0.21	0.22	0.22	0.22	0.18	0.18	0.19	0.19
F-statistic	2.09	2.09	2.10	2.09	1.71	8.19	1.74	1.74
Prob(F-stat)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 9 presents the results of panel data regressions of firm leverage measured as debt ratio and gearing. Model (1) includes time fixed effects, Model (2) time and firm fixed effects, as well as Model (3) time and industry fixed effects. Table 9 indicates that the relationship between female CEOs and firm leverage is positive. I record that the *Female CEO* coefficients of Models (1) and (3) are statistically significant for firm leverage at 1% level. This implies that firms with a female CEO have higher leverage than firms with

a male CEO, on average, after adjusting for time and industry specific factors. The relationship, however, turns negative and statistically insignificant when the firm fixed effects are controlled instead of industry fixed effects. By including firm fixed effects to the model, the equation's R-squared increases from 0% to 6%. Nevertheless, all three models have low F-statistic values implying that the models do not capture well the variability of firm leverage.

Table 9. Panel data regressions of firm leverage.

Table 9 presents the results of panel data regressions of debt ratio and gearing. Debt ratio is defined as total debt to total assets, and gearing ratio as long-term debt to total capital employed. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	Debt ratio			Gearing		
	(1)	(2)	(3)	(1)	(2)	(3)
C	-0.472 ***	-0.120	-0.494 ***	-0.019	0.507	0.121
	-(5.855)	-(0.172)	-(6.767)	-(0.205)	(0.501)	(1.204)
Female CEO	0.048 ***	-0.012	0.049 ***	0.095 ***	-0.039	0.091 ***
	(3.596)	-(0.259)	(3.788)	(4.150)	-(0.628)	(4.257)
ROA	-0.001	-0.002	-0.001	-0.002	-0.003	-0.002
	-(0.909)	-(1.077)	-(0.887)	-(0.792)	-(1.236)	-(0.816)
Ln Mcap	0.009	0.021	0.010	-0.005	0.003	-0.011
	(1.351)	(0.369)	(1.478)	-(0.563)	(0.043)	-(1.292)
Tobin's Q	-0.002	0.002	-0.003	0.022 *	0.025	0.033 **
	-(0.279)	(0.117)	-(0.473)	(1.836)	(1.308)	(2.561)
Age	-0.002	-0.002	-0.002	-0.001 **	-0.002	-0.001
	-(1.472)	-(0.597)	-(1.448)	-(2.014)	-(0.486)	-(1.512)
Ln Compensation	0.065 ***	-0.012	0.066 ***	0.073 ***	-0.016	0.082 ***
	(4.263)	-(0.826)	(4.380)	(2.737)	-(0.978)	(3.235)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	No	Yes	No
Industry fixed effects	No	No	Yes	No	No	Yes
Observations	14,451	14,451	14,451	11,901	11,901	11,901
R-squared	0.00	0.06	0.00	0.00	0.06	0.00
F-statistic	0.78	0.47	0.68	1.20	0.41	1.47
Prob(F-stat)	0.71	1.00	0.85	0.26	1.00	0.08

Table 10 presents the results of panel data regressions of firm's earnings volatility measured as the volatility of ROA and net income volatility. Models (1) and (3) suggest that female CEOs are associated negatively with ROA volatility at 1% significance level. The results imply that when a firm has a female CEO, its ROA volatility is, on average, 0.8 and 0.7 percentage point lower than a firm's that has a male CEO, respectively.

However, the association turns positive and statistically insignificant after firm specific factors are controlled. By including firm fixed effects to the model, the equation's R-squared increases from 1% to 21%. Table 10 suggests also that CEO's gender does not have explanatory power over firm's net income volatility. Furthermore, the insignificant firm fixed effects *Female CEO* coefficients in Tables 9 and Table 10 imply that the difference-in-differences approach does not ignore any significant information by leaving the female-to-female and female-to-male transitions firms out of the sample.

Table 10. Panel data regressions of earnings volatility.

Table 10 presents the results of panel data regressions of ROA volatility and net income volatility. ROA and net income volatility are defined as the standard deviation of logarithmic changes of ROA and net income, respectively. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	ROA volatility			Net income volatility		
	(1)	(2)	(3)	(1)	(2)	(3)
C	0.113 ***	0.183 **	0.108 ***	8.109 **	26.030 **	8.069 *
	(6.074)	(2.316)	(5.683)	(1.997)	(2.515)	(1.864)
Female CEO	-0.008 ***	0.002	-0.007 ***	-0.652	0.307	-0.625
	-(3.535)	(0.727)	-(3.263)	-(0.959)	(0.282)	-(0.920)
ROA	-0.001 **	-0.001	-0.001 **	-0.211 ***	-0.194 **	-0.211 ***
	-(2.180)	-(1.327)	-(2.162)	-(2.949)	-(2.123)	-(2.981)
Ln Mcap	-0.004 ***	-0.010 **	-0.004 ***	-0.666 ***	-1.367 **	-0.657 ***
	-(5.353)	-(2.078)	-(4.763)	-(4.196)	-(2.000)	-(4.072)
Tobin's Q	0.003	0.006 ***	0.002	1.027 *	1.042 **	1.037 *
	(1.600)	(3.882)	(1.306)	(1.891)	(2.154)	(1.910)
Gearing	0.001 ***	0.001 ***	0.001 ***	0.053	0.071 *	0.059
	(2.858)	(4.975)	(3.549)	(1.568)	(1.847)	(1.634)
Age	-0.001 ***	-0.001 **	-0.001 ***	-0.006	-0.018	-0.010
	-(3.498)	-(2.307)	-(3.495)	-(0.348)	-(0.446)	-(0.553)
Ln Compensation	0.001	0.001	0.000	0.711	-0.324	0.622
	(1.172)	(0.268)	(0.568)	(1.317)	-(0.458)	(1.172)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	No	Yes	No
Industry fixed effects	No	No	Yes	No	No	Yes
Observations:	11,745	11,745	11,745	11,889	11,889	11,889
R-squared:	0.01	0.21	0.01	0.01	0.22	0.01
F-statistic:	9.05	1.69	7.82	5.02	1.77	4.71
Prob(F-stat):	0.00	0.00	0.00	0.00	0.00	0.00

Based on evidence presented in Tables 7 and 9, I conclude that firms with a female CEO are as leveraged as firms with a male CEO on average, and thus, I reject the fifth research hypothesis H5. I reject the fifth hypothesis as I find weak and ambiguous evidence on CEO gender's effect on firm leverage. I consider the evidence weak and ambiguous, as it not robust for the alternative panel data regression Model (2) and it is inconsistent with the difference-in-differences approach when time fixed effects are not controlled. Furthermore, panel data regressions' F-statistics are significantly low. This conclusion contradicts with the previous literature, for example Faccio et al. (2016), who conclude that firms with a female CEO are associated with lower leverage. I conjecture that I may find contradicting results relatively to Faccio et al. (2016) as I study only large, publicly traded U.S. firms, while Faccio et al. (2016) focus on private European firms. Furthermore, they investigate significantly larger sample with different empirical methodologies – probit regression and instrumental variable approach (Faccio et al. 2016). The sample of Faccio et al. (2016) consists of 338,397 firm-year observations.

Nevertheless, the evidence regarding gender's impact on firm's earnings volatility supports the evidence of Faccio et al. (2016), despite the different samples and empirical methodologies. I find that female CEOs are associated negatively and significantly with firm's earnings volatility, and that the evidence is robust for firm's industry and time fixed effects. Therefore, I conclude that firms with a female CEO have less volatile earnings than firms with a male CEO on average, and hence, I accept the sixth research hypothesis H6.

5.4. Female CEOs and valuation

Table 11 presents the results of difference-in-differences regressions of Tobin's Q and two-year abnormal share price return. The table suggests that CEO's gender has no impact on firm's valuation level measured as Tobin's Q. Furthermore, the table suggests that CEO's gender does not have explanatory power over the firm's long-term share price performance as all the *After*Female* coefficients in Table 11 are insignificant.

Instead, firm's profitability and CEO's compensation have explanatory power over firm's Tobin's Q, as well as firm's profitability and size have explanatory power over long-term abnormal return. Firm's profitability is associated positively with both dependent variables, while CEO compensation is associated positively with Tobin's Q and firm's size is associated negatively with the abnormal return. That is, profitable firms with well compensated CEOs tend to offer higher shareholder return and have higher valuation than

firms that are less profitable and which CEOs have lower compensation, on average. The table indicates that when a firm's ROA increases by one percentage point, its abnormal share price return increases by 0.4 percentage point on average. Furthermore, the table suggests that smaller companies tend to have higher abnormal return than larger companies. These findings are robust for time fixed effects. Firm's profitability and CEO's compensation are found to be significant for firm's Tobin's Q at 1% significance level, and firm size is found to be significant for firm's share price performance at 1% significance level.

Table 11. Difference-in-differences regressions of firm valuation.

Table 11 presents the results of difference-in-differences regressions of Tobin's Q and two-year abnormal share price return. Tobin's Q is defined as the ratio of the market value of capital divided by the book value of assets. The market value of capital is a sum of market value of equity minus deferred taxes, plus book value of debt. Abnormal share price return is calculated by applying Buy and Hold Abnormal Return (BHAR) model, and it is defined as the difference between the total return of firm *i* and the total return of a peer firm portfolio matched with firm *i*. I match firms with their peer firm portfolios based on the companies' annual market capitalization, book-to-market ratio and one year past share price performance. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	Tobin's Q				Abnormal return			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
C	1.599 ***	1.600 ***	3.416 *	4.348 ***	0.036	-0.001	5.229 ***	6.817 ***
	(13.267)	(77.540)	(1.751)	(2.631)	(1.478)	-(0.053)	(6.027)	(4.357)
After	-0.035	-0.037	0.051	-0.024	-0.054 ***	0.005	-0.009	0.000
	-(0.322)	-(1.026)	(0.523)	-(0.643)	-(3.775)	(0.284)	-(0.597)	-(0.005)
After*Female	-0.034	-0.031	-0.061	-0.061	-0.116	-0.110	-0.148	-0.126
	-(0.457)	-(0.413)	-(1.088)	-(1.081)	-(0.598)	-(0.571)	-(0.711)	-(0.631)
ROA			0.022 ***	0.020 ***			0.004 **	0.004 *
			(5.952)	(4.887)			(1.977)	(1.679)
Ln Sales			-0.172	-0.207 *				
			-(1.492)	-(1.865)				
Ln Assets							-0.362 ***	-0.479 ***
							-(5.455)	-(4.066)
Gearing			0.002	0.002			0.313	0.444 *
			(1.163)	(1.154)			(1.558)	(1.827)
Age			0.001	-0.001			-0.002	-0.001
			(0.342)	-(0.479)			-(0.897)	-(0.667)
Ln Compensation			0.064 **	0.028 ***			0.008	0.024
			(2.328)	(3.299)			(0.264)	(0.680)
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	Yes	No	Yes	No	Yes	No	Yes
Observations:	8,681	8,681	8,475	8,475	8,681	8,681	8,475	8,475
R-squared:	0.70	0.73	0.73	0.75	0.70	0.73	0.73	0.75
F-statistic:	18.20	20.37	20.10	22.21	18.20	20.37	20.10	22.21
Prob(F-stat):	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 12 presents the results of panel data regressions of Tobin's Q and two-year abnormal share price return. Table 12 suggests that CEO's gender has statistically significant relationship with the firm's valuation level measured as Tobin's Q when time and industry fixed effects are controlled. Models (1) and (3) indicate that firms with a female CEO are valuated on relatively lower level than firms with a male CEO. For example, Model (3) suggests that female-led firms have 0.14 multiples lower Tobin's Q than male-led firms. This finding is significant at 1% significance level, however, it is not robust for firm specific factors. When firms fixed effects are included into the equation instead of industry fixed effects, the relationship becomes statistically insignificant, yet it remains negative. I consider the evidence weak as it is not robust for firm specific factors, and because the difference-in-difference approach does not support the evidence. In addition to CEO gender, firm's profitability and compensation are also associated positively with Tobin's Q at 1% significance level. Moreover, firm's size and CEO age are associated negatively with the firm's valuation level at 1% significance levels.

Furthermore, the Table 12 indicates that firms with a female CEO have on average 6.8 percentage points higher two-year total shareholder return than their peer companies with a male CEO. This finding is statistically significant at 10% level when firm's profitability, size, leverage, as well as CEO's age and compensation are controlled. Firm's profitability, size and leverage are also found significant for firm's two-year abnormal share price return at 1%, 1% and 10% significance levels, respectively.

Based on the evidence presented in Table 11 and 12, I accept the seventh research hypothesis H7 and reject the eighth research hypothesis H8. I record weak evidence on that firms with a female CEO have lower Tobin's Q than firms with a male CEO, when time and industry fixed effects are controlled. Furthermore, I document weak evidence of a positive relationship between female CEOs and firms' long-term stock price return. The findings however may suffer from endogeneity bias, and hence, the causality might be reversed. That is, firms with a female CEO may have lower Tobin's Q and higher long-term stock price return than firms with a male CEO because of the CEO's gender, or alternatively, because firms with lower Tobin's Q and higher stock returns tend to attract more female CEOs than male CEOs. Insignificant difference-in-differences coefficients support the later explanation assuming the approach captures all significant information. However, it might be also that female-to-female and female-to-male observations that are excluded from the difference-differences sample have statistically significant explanatory power over the firm's long-term stock price performance.

Table 12. Panel data regressions of firm valuation.

Table 12 presents the results of panel data regressions of Tobin's Q and two-year abnormal share price return. Tobin's Q is defined as the ratio of the market value of capital divided by the book value of assets. The market value of capital is a sum of market value of equity minus deferred taxes, plus book value of debt. Abnormal share price return is calculated by applying Buy and Hold Abnormal Return (BHAR) model, and it is defined as the difference between the total return of firm *i* and the total return of a peer firm portfolio matched with firm *i*. I match firms with their peer firm portfolios based on the companies' annual market capitalization, book-to-market ratio and one year past share price performance. Numbers in parentheses indicate White cross-section t-statistics. Statistically significant differences at the 1% (***), 5% (**), and 10% (*) levels are indicated.

	Tobin's Q			Abnormal return		
	(1)	(2)	(3)	(1)	(2)	(3)
C	3.887 ***	3.714 ***	3.311 ***	0.146	5.929 ***	0.195 **
	(18.790)	(3.475)	(16.820)	(1.295)	(5.788)	(2.191)
Female CEO	-0.121 ***	-0.029	-0.138 ***	-0.010	0.068 *	-0.024
	-(2.600)	-(0.711)	-(2.897)	-(0.255)	(1.699)	-(0.645)
ROA	0.045 ***	0.020 ***	0.044 ***	0.004 ***	0.001	0.004 ***
	(6.762)	(5.846)	(6.903)	(4.033)	(0.225)	(3.545)
Ln Assets	-0.154 ***	-0.175 **	-0.144 ***	-0.031 *	-0.430 ***	-0.032 **
	-(13.469)	-(2.296)	-(14.471)	-(1.820)	-(5.490)	-(2.057)
Gearing	0.008	0.002	0.010	0.007	0.288 *	-0.005
	(1.040)	(1.341)	(1.077)	(0.150)	(1.647)	-(0.094)
Age	-0.010 ***	0.002	-0.011 ***	0.000	0.002	-0.001
	-(6.728)	(1.601)	-(7.851)	-(0.227)	(1.254)	-(0.346)
Ln Compensation	0.029 **	0.017	0.033 ***	0.046	0.038	0.051
	(2.272)	(0.919)	(3.181)	(1.354)	(1.283)	(1.617)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	No	Yes	No	No	Yes	No
Industry fixed effects	No	No	Yes	No	No	Yes
Observations:	11,900	11,900	11,900	9,796	9,796	9,796
R-squared:	0.20	0.76	0.23	0.01	0.27	0.01
F-statistic:	191.12	20.20	180.22	5.00	2.30	5.57
Prob(F-stat):	0.00	0.00	0.00	0.00	0.00	0.00

The empirical evidence regarding Tobin's Q is in line with the evidence of Adams and Ferreira (2009), Dobbin and Jung (2010) and Haslam et al. (2010). Adams and Ferreira (2009) and Dobbin and Jung (2010) document that board diversity is negatively associated with firm's Tobin's Q, and Haslam et al. (2010) find that firms with female directors trade on discount relative to firms with male directors. Furthermore, the evidence of Krishnan and Parson (2008) supports my evidence of female CEOs' positive association with long-term stock performance. Krishnan and Parson (2008) conclude that

firms with more female executives tend to have higher stock returns after an IPO than companies with fewer female executives.

Summary of the empirical results

Table 13 summarises the main female CEO coefficients of the study regressions. Columns (1) and (2) present the *After*Female* coefficients of difference-in-differences regressions. Column (1) includes only firm fixed effects, while column (2) includes both firm and time fixed effects. Columns (3) and (4) present the *Female CEO* coefficients of panel data regressions. Column (3) includes firm and time fixed effects, while column (4) includes industry and time fixed effects.

The main empirical methodology of this study, difference-in-differences approach, suggests that female CEOs are associated with

(i) higher profitability measured as ROA,
(ii) lower post-acquisition stock price return,
(iii) lower risk level in terms of earnings volatility and
(iv) lower risk level in terms of leverage.

In addition, panel data regressions suggest that female CEOs are associated with

(i) lower acquisition activity,
(ii) higher risk level in terms of leverage,
(iii) higher long-term stock price return and
(iv) lower valuation level measured as Tobin's Q.

The evidence regarding female CEOs, ROA and earning volatility is robust for firm and time fixed effects. Furthermore, the panel data regressions support the earnings volatility findings, however, only when industry specific factors are controlled instead of firm specific factors. Based on this evidence, I accept the second and sixth research hypotheses H2 and H6, and conclude that firms with a female CEO have higher overall profitability measured as ROA and lower earnings volatility than firms with a male CEO, on average.

Interestingly, I document also that female CEOs are not associated with higher operational profitability, EBITD on total assets, even though CEO's gender is associated with the firm's overall profitability, ROA. This finding suggests that the difference between female and male CEOs' performance may result from three income statement items in which EBITD on total assets and ROA deviate from each other: interest, taxes

and depreciations. Based on this evidence, I reject the first research hypothesis H1, and conclude that CEO gender has no impact on firm's operational profitability.

The evidence regarding gender's association with acquisitions activity, long-term abnormal return and valuation level is significant only with panel data regression when firm or industry fixed effects are controlled. I consider the findings weak as they are not robust for neither the alternative panel data regression model nor the difference-in-difference approach. Furthermore, the evidence might suffer from endogeneity bias, since the panel data regression does not consider the causality between the dependent and independent variables. Nevertheless, I conclude that firms with a female CEO conduct less acquisitions, generate higher long-term shareholder return and that their valuation level is on discount relative to firms with a male CEO. Furthermore, I conclude that firms with a female CEO are as leveraged as firms with a male CEO since I record ambiguous and weak evidence of the relation between gender and leverage. That is, I accept the third and seventh research hypotheses H3 and H7, and reject fifth and eighth research hypotheses H5 and H8.

Finally, I document a negative relationship between female CEOs and post-acquisition stock price return. However, the evidence is not robust for time fixed effects, and therefore I reject the fourth research hypothesis H4. Thus, I conclude that CEO gender has no impact on firm's long-term post-acquisition abnormal return.

Table 13. Summary of female CEO coefficients.

	Difference-in-differences		Panel data regression	
	(1)	(2)	(3)	(4)
Profitability				
EBITD on TA	0.011	0.011	0.006	-0.002
ROA	0.015 **	0.014 **	0.005	0.002
Mergers and acquisitions				
No. of acquisitions	0.093	0.102	-0.125	-0.199 **
Post-acquisition abnormal return	-0.289 ***	-0.215	-0.178	-0.144
Corporate risk-taking				
Debt ratio	-0.033 ***	0.008	-0.012	0.049 ***
Gearing	-0.051	-0.048	-0.039	0.091 ***
ROA volatility	-0.009 **	-0.009 **	0.002	-0.007 ***
Net income volatility	-1.846 **	-1.738 **	0.307	-0.625
Valuation				
Abnormal return	-0.148	-0.126	0.068 *	-0.024
Tobin's Q	-0.061	-0.061	-0.029	-0.138 ***
Firm fixed effects	Yes	Yes	Yes	No
Time fixed effects	No	Yes	Yes	Yes
Industry fixed effects	No	No	No	Yes
Controls	Yes	Yes	Yes	Yes

6. CONCLUSIONS

The purpose of this thesis is to study differences between female and male CEOs and to examine whether CEO's gender has explanatory power over firm performance. The study considers firm performance from four different perspectives – profitability, mergers and acquisitions, risk-taking and valuation. The study focuses on S&P 1500 firms during the period of January 2005-December 2015, and applies the difference-in-differences approach as the main methodology of the empirical research.

The empirical evidence of this thesis suggests that firms with a female CEO have higher overall profitability than firms with a male CEO on average. I measure firm's overall profitability as return on assets, ROA. The finding is robust for firm and time fixed effects, and it is in line with the prior empirical evidence, for example Khan and Vieito (2013).

Interestingly, I document also that female CEOs are not associated with higher operational profitability, measured as EBITD on total assets, even though CEO's gender is associated with the firm's overall profitability. This finding suggests that the difference between female and male CEOs' performance may result from the three income statement items in which ROA and EBITD on total assets deviate from each other: interest, taxes and depreciations. That is, female CEOs are as efficient as male CEOs to use their firm resources, such as labour force and raw materials, however, there are some material differences between female and male CEOs when considering firm's financial costs, taxation and depreciation policies.

The test of mean differences suggests that firms with a female CEO are less leveraged. By assuming that less leveraged firms have also lower financing costs, the finding supports the conjecture that female CEOs are associated with higher overall firm profitability due to their firms' lower financing costs. However, by applying traditional panel data regression, I record also that firms with a female CEO are, in contrast, more leveraged than firms with a male CEO. In other words, the evidence is not unambiguous, and hence, no comprehensive conclusions can be made without a further research.

In addition to firm profitability, I document that female CEOs are associated with lower corporate risk-taking and acquisition activity. I find that firms with a female CEO have lower earnings volatility and they conduct less mergers and acquisitions than firms with a male CEO on average. I reason these findings based on the prior empirical evidence of females' greater risk aversion and lower overconfidence (Olsen and Cox 2001; Powell

and Ansic 1997; Fehr-Duda et al. 2006; Odean 1999; Huang and Kisgen 2013), as well as the possible difference between genders' tendencies to be hubristic.

I conjecture that due to females' greater risk aversion they are more likely to advocate investments and projects that offer more stable earnings for the firm, and hence decrease the earnings volatility. Furthermore, I conjecture that female CEOs promote less acquisitions than male CEOs as they are less overconfident of the acquisition synergies and less arrogant of their abilities to run the target company more efficiently than its original management, as suggested by Roll's (1986) Hubris Hypothesis.

Finally, I record that firms with a female CEO generate higher shareholder return in long-term and have lower Tobin's Q than firms with a male CEO, on average. That is, female-led firms are undervalued by the financial markets even though they are simultaneously associated with higher profitability and lower risk level than male-led firms. The evidence is in line with the prior empirical evidence, for example Krishnan and Parson (2008) and Adams and Ferreira (2009).

In conclusion, I find that CEO gender has explanatory power over firm performance. I record that gender explains firm performance in all four study fields, although the evidence regarding acquisition activity, share price performance and valuation is weak and may suffer from endogeneity bias.

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