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Gender And Decision-Making In The C-Suite

Trang Doan
Wayne State University, trang.doan@wayne.edu

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TRANG DOAN

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CHAPTER 1: INTRODUCTION

1.1. Background and Motivation

The past two decades have witnessed a gradual increase in women joining the upper echelons of public corporations which have been conventionally dominated by men (Fortune 2004). This phenomenon has led to greater attention from researchers regarding the impact of female executives on firm outcomes. Considering the systematic behavioral differences in gender and the crucial role of top management, the increased female participation in the upper echelons may reflect not only a trend towards gender equality but also a growing recognition of specific benefits uniquely associated with female executives (e.g., Huang & Kisgen, 2013; Khan & Vieito, 2013; Liu, Wei, & Xie, 2016). Given the important financial and strategic decisions made by top management (Chava & Purnanandam, 2010), the gender structure in the upper echelons could influence firm outcomes.

However, much of prior research in the business literature has focused predominantly on the effect of gender diversity in the board of directors (e.g., Adams & Ferreira, 2009; Gul, Hutchinson, & Lai, 2013; Strobl, Rama, & Mishra, 2016) and in the top management team (TMT) (Francoeur, Labelle, & Sinclair-Desgagné, 2008) rather than the gender of a single top executive. A smaller number of researchers have examined the influence of female Chief Executive Officers (CEOs) on the firm (Faccio, Marchica, & Mura, 2016; Khan & Vieito, 2013; Wolfers, 2006). To the extent that gender-based differences in behavior have been studied comprehensively in the psychology and gender literatures but less so in accounting and finance literatures, there is a gap in our understanding of the gender impact on decision-making made by a specific C-Suite member other than the CEO. In this research, I investigate the differential

gender effect of the Chief Financial Officer (CFO) position, which has gained in prominence in recent years and whose importance is next only to the CEO.

Recently, researchers have begun to recognize the importance of the CFO to firm outcomes. Current empirical research comparing male and female CFOs in terms of accounting and financial decision-making has found a number of differences. Specifically, female CFOs are believed to display less tax aggressiveness (Francis, Hasan, Wu, & Yan, 2014), pursue more conservative accounting policies (Francis, Hasan, Park, & Wu, 2015), are less likely to manipulate earnings (Liu et al., 2016), provide higher quality of earnings (Peni & Vähämaa, 2010), report higher quality of accruals (Barua, Davidson, Rama, & Thiruvadi, 2010), and tend to undertake fewer and less risky acquisitions (Huang & Kisgen, 2013) than their male counterparts.

In this study, I take a three-pronged approach to empirically explicate a number of theories of gender-based differences in business. First, I investigate whether participants in financial markets respond differently to the appointment of a female CFO than to that of a male CFO and what the response implies regarding their views on the efficacy of female executives relative to male executives. To the extent that investors are either more skeptical about female executives' abilities due to perceived gender stereotypes (Powell & Ansic, 1997), confident about their flexible style of leadership (Eagly & Carli, 2003), or convinced that their skills are more valuable to certain business environments, the impact of female CFO hiring announcements on the stock market reaction can give us clues as to how investors consider female executives' effectiveness compared to that of their male counterparts.

Second, I investigate whether the gender of an executive affects post-hiring firm performance. Despite the considerable involvement of CFOs in firm decision-making, the overall

influence of CFO gender on firm performance remains unexplored in the literature. Since a CFO's influence on the firm's accounting reporting and financial decisions is distinct from that of a CEO (Chava & Purnanandam, 2010; Francis, Hasan, & Wu, 2013; Jiang, Petroni, & Wang, 2010), the extent to which CFO gender has economic impact on firm performance is of interest to corporate boards, financial analysts, and investors. Because the effect of CFOs' behavioral tendencies may vary with the uncertainty firms face, I also consider the relevance of gender to firms with varied growth opportunities. For example, prior literature shows that women are less overconfident and/or more risk-averse than men, their behavioral tendencies may make them more appropriate for firms operating in less volatile environments, i.e., low growth firms.

Finally, I examine the impact of CFO gender on the firm's cash holdings. On the one hand, determining the level of cash holdings is one of the most important decisions made by the management, and the rise of corporate cash holdings in U.S. corporations is a major concern for investors and researchers (Bates, Kahle, & Stulz, 2009). On the other hand, recent studies document a strong relation between the cash reserves and managers' attributes such as age, experience, managerial ownership, and founder status, among small and medium-sized enterprises (e.g., Orens & Reheul, 2013; Steijvers & Niskanen, 2012). Due to the significant behavioral differences between men and women, I expect that the gender of the CFO may also influence the firm's cash holdings.

Two of the five theories that I investigate, overconfidence and risk-aversion, have similar predictions in certain situations (Barber & Odean, 2001; Huang & Kisgen, 2013). Particularly, both less risk-averse and highly overconfident managers are expected to take on more risk and to be less conservative in their policies (e.g. leverage, dividends, acquisitions, etc.). My research design allows me to distinguish the impact of these two behavioral tendencies.

Among all C-Suite members, I choose to study the CFO for several reasons. First, the CFO has become the second most important member of the TMT after the CEO with most firms having a CFO (Nath & Mahajan, 2008). In addition, the number of female CFOs in S&P 1500 companies has been on an upward trend over the last three decades (Francis et al., 2013), allowing for strong statistical tests. Third, of all the upper echelon members, the Securities and Exchange Commission (SEC) requests only the CEO and CFO to certify the firm's financial statements. Fourth, as the one who is mainly responsible for the financial reporting process and financial strategies (Aier, Comprix, Gunlock, & Lee, 2005), the CFO possesses superior insights into the firm's financial health and performance, perhaps even more than the CEO (Wang, Shin, & Francis, 2012).

Further, since CFOs are believed to assume full responsibility for the financial and treasury functions of the organization, as well as for preparing internal and external reports, they are in a good position to exert influence on cash holdings (Campello, Graham, & Harvey, 2010). Also, CFOs are expected to contribute to value creation through involvement in financial and investment decisions (Graham & Harvey, 2002) as well as play a decisive role in the firm's success or failure (Mian, 2001). Finally, unlike other members of the TMT, the responsibilities of CFOs are relatively more consistent and homogenous across firms, making results more generalizable.

The total sample (including performance period) spans the period 1994–2016 and is composed of 1,349 CFO appointments. To separate the impact of gender on decision-making quality from other determining factors such as education (Becker, 1964; Palia, 2001) and work experience (Cline & Yore, 2016), I control for these CFO credentials in my analysis by hand collecting data on the CFO's characteristics.

First, I document that investors respond relatively more negatively (positively) to the appointments of female CFOs at firms with high (low) growth opportunities. Second, the evidence suggests an improvement in operating performance of firms hiring female CFOs, especially among those characterized by low uncertainty. In addition to firm characteristics, the analysis also controls for a host of variables such as CFO's characteristics, CEO's characteristics, board size, and gender diversity in the TMT and in the board. The enhanced firm performance can be attributed to reduction in costs and improved working capital management.

Finally, I find that female CFOs are more likely to reduce the excess cash holdings than their male counterparts, leading to a reduction in the agency costs of free cash flow. The combination of the findings on stock price response, firm performance, and cash holdings is consistent with the overconfidence hypothesis, suggesting that women are less overconfident than men and that lower overconfidence confers benefits only in cash-rich firms and those with lower uncertainty. The results do not support the risk-aversion, androgyny, self-selection, or the gender bias hypotheses.

My results are corroborated when using an alternative measure of performance, namely, the change in buy-and-hold returns. Additionally, the findings are robust to various methods that address potential endogeneity concerns such as the propensity score technique, Heckman's (1979) two-stage model, the mover dummy variable method (MDV) (which extracts the relevance of gender from executive fixed-effect), and the difference-in-differences method.

The insights from this study make important empirical contributions to the literature on upper echelons by providing evidence on the impact of a top executive's gender on firm outcomes (e.g. Faccio et al., 2016; Khan & Vieito, 2013; Wolfers, 2006). I also complement and extend prior findings related to female CFOs' accounting and financial decisions (Francis et al.,

2015; Liu et al., 2016; Peni & Vähämaa, 2010; Huang & Kisgen, 2013) by exploring the overall influence of female CFOs on firm performance while controlling for other important factors such as CFOs' educational credentials and experience. I also contribute to the literature on investors' viewpoints of a top executive's gender. Further, I contribute to the cash holdings and agency cost literatures by showing that female CFOs tend to relatively reduce excess cash reserves and thus mitigate the agency costs of free cash flow compared to their male counterparts. Finally, I contribute to the growing literature on overconfidence by demonstrating the effect of gender-based overconfidence on firm performance.

1.2 Organization of the Dissertation

The remainder of this paper is structured as follows. In Chapter 2, I review the current literature and develop hypotheses. Chapter 3 describes my data and sample selection process. Empirical findings are presented in Chapter 4. Chapter 5 concludes. Appendices and tables are included at the end of the dissertation.

CHAPTER 2: LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Literature Review

The psychology, gender, and the medical literatures report several gender-based differences in behavior between men and women, which can be attributed to a number of factors, such as biology, the cognitive process, or social bias. For example, the difference in hormone testosterone level is an important biological difference between men and women. Since there is a negative link between risk-aversion and testosterone, and because men tend to have significantly higher levels of testosterone than women, women are usually perceived as more risk-averse than men (Sapienza, Zingales, & Maestripieri, 2009). On the other hand, studies on the cognitive process suggest that overconfidence is a result of self-serving attribution bias, i.e., the tendency to take too much credit for success and avoid blame for failure. Given that self-serving attribution bias is greater in men than in women, another perceived gender-based difference is that men are more overconfident than women (e.g., Beyer, 1990). Finally, social bias – gender stereotyping — identifies women as lacking the masculine stereotypical competencies (such as task-orientation, aggressiveness, and ambition) to become successful managers (Powell & Butterfield, 1989).

Due to such gender differences, we propose five hypotheses to explain the reaction of investors to a CFO appointment and the post-hiring firm performance. These are: the overconfidence, risk-aversion, self-selection, androgyny, and gender bias hypotheses, described in more detail below.

2.2. Hypotheses Development

2.2.1. Hypotheses on Investors' Response

Previous studies employing samples of CEOs show that the stock price response to a female CEO appointment is either significantly lower (Lee & James, 2007) or insignificantly different (Martin, Nishikawa, & Williams, 2009) than that to a male CEO appointment. However, these results are either based on a small sample (only 17 female CEOs in the case of Lee and James (2007)) or do not account for the knowledge disparities among top executives such as educational credentials and experience (Martin et al., 2009). One of the contributions of this study is that I control for these two key factors that can influence performance while utilizing a large sample.

To explain the reaction of investors to a female CFO appointment, I propose five different hypotheses. The overconfidence theory, which is increasingly attracting attention from academics and practitioners alike, refers to the cognitive bias of individuals to overestimate the accuracy of their knowledge and judgments (Griffin & Tversky, 1992). Some recent researchers also consider overconfidence to include the belief that outcomes will be favorable (Malmendier & Tate, 2008). Previous studies show that overconfidence is linked to a firm's acquisition frequency (Billett & Qian, 2008; Huang & Kisgen, 2013, Levi, Li, & Zhang, 2014), size of acquisition premiums (Levi, Li, & Zhang, 2014; Malmendier & Tate, 2008), reporting quality (Schrand & Zechman, 2012), innovation (Hirshleifer, Low, & Teoh, 2012), and overinvestment (Goel & Thakor, 2008; Malmendier & Tate, 2008).

Overconfidence may either reduce or increase firm value depending on the firm's characteristics and prospects (Goel & Thakor, 2008). For example, to the extent that high growth firms want to reduce the underinvestment problem while firms in low growth industries are more

likely to suffer from overinvestment (Goel & Thakor, 2008; Heaton, 2002), overconfidence confers benefits in dynamic environments but could lead to diminishing benefits in more stable settings. Accordingly, firms with lower growth opportunities may appreciate a moderate level of overconfidence in their executives, which would be enough to mitigate the overinvestment problem (Goel & Thakor, 2008). Conversely, firms in high growth industries, which tend to be adversely impacted by underinvestment, would value executives with a high level of overconfidence.

Prior literature documents that while both women and men exhibit overconfidence, men are likely to be more overconfident than women (Barber & Odean, 2001). For example, Barber and Odean (2001) provide supporting evidence indicating that men trade more excessively than women. Huang and Kisgen (2013) document that male managers exhibit relative overconfidence in corporate decision making compared with female managers, represented by the higher likelihood of making value destroying acquisitions. Levi et al. (2014) find that female directors less overestimate merger gains. Hence, firms with female directors are less likely to make acquisitions and will pay lower bid premia if they do. Taken together, the above arguments lead us to conclude that investors would respond relatively more positively (or less negatively) to female CFO appointments at firms characterized by low growth opportunities, and vice versa. Appendix A presents a summary of predictions of all hypotheses.

> **H1a:** *To the extent that women are less overconfident than men, the stock price response to the appointment of a female CFO will be relatively less favorable than that of a male CFO at firms with high growth opportunities.*

Regarding the gender-based difference in risk appetite, the predominant view is that women have a lower preference for risk in decision-making compared to men (Barsky et al., 1997; Ittonen, Vähämaa, & Vähämaa, 2013). Accordingly, the risk-aversion hypothesis projects female executives not as less competent but as more risk-averse than their male counterparts.

This body of literature posits that high managerial risk-aversion reduces firm value as it can lead to underinvestment relative to the shareholders' risk preferences by forgoing risky but positive NPV projects (Easterbrook, 1984; Goel & Thakor, 2008; Jensen & Meckling, 1976).[1] Hence, reflecting the inclination to avoid uncertainty, risk-aversion is expected to have a monotonically negative impact on firm value (Goel & Thakor, 2008). In other words, a female executive's decisions are expected to be detrimental, though the degree of severity depends on the type of firm in which the executive works; more specifically, the underinvestment problem caused by managers' risk-aversion would be more exacerbated at firms with high growth opportunities (Goel & Thakor, 2008). Consequently, the risk-aversion hypothesis predicts a negative response towards a female CFO appointment in both types of firms with a relatively more pronounced negative reaction when female CFO appointments are in high growth industries.

> **H1b:** *To the extent that women are more risk-averse in their decision-making than men, the stock price response to the appointment of a female CFO will be relatively less favorable than that of a male CFO in both high and low growth environments, with a more pronounced negative response at firms with high growth prospects.*

The self-selection hypothesis suggests that gender differences among top executives are small or even non-existent. The rationale is that since only outstanding women can break the glass ceiling and get to the top positions, female executives thus are not representative of the female population at large (Kumar, 2010). Some empirical studies also document no differences in risk-taking behavior, decision quality, or competitiveness between male and female managers (Atkinson et al., 2003) and show that gender is not the determining factor in selecting top management executives (Jordan, Clark, & Waldron, 2007). In sum, the self-selection theory predicts that investors' response to the hiring decision will not be based on gender.

[1] While diversified investors are concerned only with non-diversifiable risk, managers have a substantial part of their personal wealth tied up in their firms, leading to lower tolerance for risk than shareholders.

H1c: *To the extent that there are no gender differences among top executives, the stock price response to the appointment of a female CFO will be similar to that of a male CFO.*

Advocates of the androgyny hypothesis propose that because both high masculinity and high femininity are positive traits, their combination would not only be better but would also produce a unique hybrid that goes beyond either masculinity or femininity. An androgynous leader is thus predicted to be competitive and assertive as well as compassionate and caring (Kark, Waismel-Manor, & Shamir, 2012). While the traditional leadership style, which emphasizes rational processes, values stereotypes of masculinity such as instrumentality and assertiveness, the transformational style, which highlights emotions and values, advocates androgyny due to its greater flexibility as well as adaptability (Berkery et al., 2013). Given that the latter is superior to the former and that women are more androgynous than men in nature (Berkery et al., 2013; Kark et al., 2012), the androgyny theory postulates that firms could benefit more from female executives. A female CFO hiring announcement, therefore, would be received favorably regardless of the type of firm the CFO joins.

H1d: *To the extent that women are more androgynous, the stock price response to the appointment of a female CFO will be relatively more favorable than that of a male CFO regardless of the firm's environment.*

Finally, the theory of gender bias posits that, although the idea of a female leader has gained traction today, it is still not widely accepted. Indeed, because men are assumed to possess more characteristics required from a competent leader compared to women, investors may be more skeptical about the appointment of a female executive than that of a male executive. Studies in support of this view find that women are presumed to lack confidence in their financial abilities (Powell & Ansic, 1997), exert less influence than men (Wagner, Ford, & Ford, 1986), and are perceived as less effective than men in similar positions (Powell & Butterfield, 1989). Sociology theories also reveal that, in general, men are more influential than women

(Wagner et al., 1986), casting doubt on female executives' competency. Further, because female executives are viewed as new and different than investors' traditional notion of leaders, the appointment of a female executive may be met less favorably by investors than that of a male executive regardless of the firm's environment.[2]

> **H1e:** *In the presence of gender bias, the stock price response to the appointment of a female CFO will be relatively less favorable than that of a male CFO regardless of the firm's environment.*

2.2.2. Hypotheses on Firm Performance

While the two hypotheses of overconfidence and risk-aversion both predict that the attributes of female CFOs are more suitable in less risky environments, the implications for firm performance are not similar across the two hypotheses. According to the overconfidence framework, female CFOs, with their moderate level of overconfidence, would outperform their male counterparts in firms with lower growth opportunities while male CFOs, with their high level of overconfidence, are expected to be more successful in firms characterized by higher growth prospects.[3] On the other hand, the risk-aversion theory suggests that because female executives are more risk-averse, they would underperform their male counterparts in both settings, though the underperformance would be less acute among low uncertainty firms.

> **H2a:** *To the extent that women are less overconfident, firms hiring female (male) CFOs will exhibit a greater improvement in performance than those hiring male (female) CFOs in low (high) growth settings.*

[2] I note that a negative market reaction at the hiring of female CFOs for the whole sample cannot distinguish between inherent bias against women executives and the perception that they lack leadership qualities.

[3] Goel and Thakor (2008) argue that the threshold level of confidence above which overconfidence will adversely affect firm value will be higher for firms in riskier industries. Also, to the extent that competition for positive NPV projects is more intense within high growth industries (Gervais, Heaton, & Odean, 2007), overconfident executives who are more likely to underinvest in information gathering (Goel & Thakor, 2008) will have time advantage over their rivals.

H2b: *To the extent that women are more risk-averse in their decision-making, firms hiring female CFOs will exhibit a lesser improvement in performance than those hiring male CFOs relatively more so in high growth settings.*

Alternatively, given the argument that gender differences among top executives in an organization may be non-existent, the self-selection hypothesis posits no difference in firm performance between female and male CFOs.

H2c: *In the presence of no gender differences among top executives, firm hiring female CFOs will perform similarly to those hiring male CFOs.*

Conversely, based on the argument that a combination of masculinity and femininity would be superior to either individually and that women are naturally more androgynous than men (Berkery et al., 2013), the androgyny hypothesis predicts firms hiring female CFOs would experience better performance than those hiring male CFOs.

H2d: *To the extent that women are more androgynous, firms hiring female CFOs will exhibit a greater improvement in performance than those hiring male CFOs.*

Finally, as noted earlier, the gender bias theory views business leadership as a masculine job requiring the leader to be self-reliant, aggressive, competitive, and decisive while women are considered nurturing, sympathetic, gentle, and sensitive to the needs of others (Powell & Butterfield, 1989). Accordingly, women are perceived as lacking competence and influence to become a successful manager,[4] which leads to the following hypothesis.

H2e: *To the extent that business leadership requires exclusively masculine traits, firms hiring female CFOs will exhibit a lesser improvement in performance than those hiring male CFOs.*

[4] It can be argued that firms are able to match on all criteria and hire the optimal executive, in which case there will be no significant association between CFO gender and firm performance. However, evidence in the literature indicates that boards do not always match executives on characteristics that fit the firm, which can be attributed to information asymmetry, adverse selection, and boards' lack of the strategic understanding of the business (Zajac & Westphal, 1996; Wiersema, 2002; Zhang, 2008).

2.2.3. Hypotheses on Cash Holdings

Determining the level of cash holdings is one of the most important decisions made by the management, which has attracted considerable attention from academics and practitioners for a long period of time. Previous studies on corporate finance have provided a comprehensive analysis of determinants and implications of corporate cash holdings. A prevailing argument in the cash holdings literature is that, since cash is the most liquid asset and can be easily converted into private benefits, excessively accumulating cash can lead to an adverse impact on corporate performance. This is due to the relatively lower return on cash compared to real assets as well as the problem of managerial discretion, i.e., entrenched managers stockpile cash to increase their discretion and to avoid the discipline of capital markets at the expense of shareholders (Myers & Rajan, 1998; Eisenhardt, 1989). Jensen's (1986) free cash flow theory posits that, even when the firm has poor investment opportunities, entrenched managers would rather retain cash than distribute it to shareholders, which is referred to in the literature as the agency motive. On the other hand, proponents of the precautionary motive argue that the prominent benefit of holding excess cash is to avoid underinvestment due to potentially costly external financing, e.g., when information asymmetry is high, equity is undervalued, or economic environment is highly volatile (Myers & Majluf, 1984; Almeida, Campello, & Weisbach, 2004; Acharya, Almeida, & Campello, 2007).

Prior empirical work in the US documents mixed evidence on whether large cash reserves could be harmful to shareholders. For example, Opler et al. (1999) find evidence suggesting that precautionary motive, rather than managerial discretion, appears to be a valid explanation for the managers' behavior of accumulating cash, i.e., to ensure that firms have enough internal funds to finance investment opportunities when external funds are expensive.

Their results are supported by Mikkelson and Partch (2003) who show that persistent policies of large cash reserves neither lead to poor performance nor represent a conflict between managers and stockholders' interests, but instead are accompanied by greater growth in assets and investment, which enhance firm value.

On the contrary, Harford (1999) find that cash-rich firms are more likely to make value-destroying acquisitions, which is consistent with the free cash flow theory. In a later study, Harford et al. (2008) go further by pointing out that the combination of excess cash and weak governance leads to suboptimal investment decisions, lowering profitability and valuations. Supportively, Faulkender and Wang (2006) document that the marginal value of cash declines with larger cash holdings, while Dittmar and Mahrt-Smith (2007) show that this is a problem only of firms with weak corporate governance.

Arguing that the mixed evidence in the US is the result of the lack of sufficient variation in the agency conflict across firms, some researchers examine the link between cash holdings and agency conflict from an international perspective. Cross-country evidence indicates a negative relation between shareholder rights and cash holdings (Dittmar, Mahrt-Smith, & Servaes, 2003; Pinkowitz, Stulz, & Williamson, 2006). More importantly, in countries where shareholder rights are weak, firm value decreases with cash holdings (Kalcheva & Lins, 2007). Overall, cross-country evidence supports the free cash flow hypothesis and agency motive, suggesting shareholders should be concerned about large cash reserves.

Since overconfident managers tend to overestimate future returns, they believe their firms are undervalued by the market. As a result, overconfident managers prefer relying on internally generated cash flows and accumulate excess cash because they perceive external financing as expensive (Malmendier & Tate, 2008). Prior empirical studies provide supporting evidence

showing a positive link between overconfidence and cash reserves. For example, Hirshleifer et al. (2012) document that firms lead by overconfident CEOs have relatively higher cash to assets. Huang-Meier, Lambertides, and Steeley (2016) also show that overconfident managers hold more cash, especially in bad times, than rational managers.

In contrast, Deshmukh, Goel, and Howe (2017) find that overconfident CEOs hold relatively less cash than rational CEOs. They argue that overconfidence CEOs, who believe that external financing is overly costly but expect this cost to reduce over time, delay raising outside funds and use internal cash to fund investment opportunities, resulting in lower cash reserves. Therefore, I must be cautious when interpreting the results. Taken together, I expect male CFOs to hold more excess cash than female CFOs on average, which can be attributed to the precautionary motive.

On the other hand, whether women have different ethical sensitivities and standards than men is a controversial topic in the gender literature. A popular strand of the gender-ethics theory documents that women are more concerned about ethical issues such as disclosure, integrity, and conflict of interests than men (Ho, Li, Tam, & Zhang, 2015; Tyson, 1990). Other researchers further argue that women do not only adopt higher ethical standards but also apply a different moral reasoning process than men (French & Weis, 2000). In particular, women tend to employ "ethics of care," emphasizing nurturing, empathy, and caring for others, while men tend to employ "ethics of justice", emphasizing equality, principles, and results (Lee, Pillutla, & Law, 2000). For example, women are more likely to exhibit ethical behavior in the workplace than men (Bernardi & Arnold 1997; Lund 2008). Tyson (1990) and Larkin (2000) also show that female managers and female internal auditors are also more conservative in their ethical viewpoints than their male counterparts. Studying the impact of female top managers on agency

costs, Jurkus, Park, & Woodard (2011) find that female officers help alleviate the agency problem in firms operating in less competitive markets. Ho et al. (2015) find that female CEOs improve financial reporting quality, which can be partly attributed to their stronger ethical disposition.

Agency conflicts arise when managers do not act in the best interests of shareholders (Eisenhardt, 1989). If the gender-ethics hypothesis holds, (i.e., women have higher ethical sensitivities), female managers may extract less in private benefits than male counterparts such that their decisions are more in line with shareholders' interests, thereby mitigating the agency problems. Particularly, since accumulating cash is considered a problem of managerial discretion (Jensen, 1986), I expect female managers, with a weaker agency motive for holding cash, to have relatively less excess cash reserves than their male counterparts. I note that while both the overconfidence hypothesis and gender-ethics hypothesis predict a negative relation between female manager presentation and excess cash holdings, the motives behind them are different.

> **H3a:** *To the extent that women are less overconfident or women have higher ethical sensitivities than men, firms hiring female CFOs will exhibit a greater reduction in excess cash holdings than those hiring male CFOs.*

Given that greater managerial risk-aversion leads to the adoption of safer corporate policy by holding greater cash balances (Chava & Purnanandam, 2010), if female managers exhibit preference for less risk, they should be more likely to increase cash balances or maintain more

excess cash than their male counterparts. In their empirical study of Chinese listed firms, Zeng and Wang (2015) show that firms led by female CEOs hold a higher level of cash holdings compared to those led by male CEOs. They argue that female CEOs are more concerned with the precautionary motive and care less about the opportunity cost of cash. Overall, the risk-aversion hypothesis predicts a positive relation between female CFO representation and cash holdings.

H3b: *To the extent that women are more risk-averse in their decision-making, firms hiring female CFOs will exhibit a greater increase in excess cash holdings than those hiring male CFOs.*

Finally, self-selection hypothesis posits no difference in the changes in cash holdings between firms hiring female CFOs and those hiring male CFOs.

H3c: *In the presence of no gender differences among top executives, the changes in cash holdings at firms with excess cash following the appointment of female CFOs should be similar to that of male CFOs.*

CHAPTER 3: SAMPLE, DATA, AND RESEARCH METHOD

3.1. Sample Formation and Data Sources

The data collection process starts with the universe of S&P 1500 firms in ExecuComp during the period 1994–2016 (including performance period). A manager is classified as a CFO if his/her title is composed of phrases such as "chief financial officer," "chief finance officer," "CFO" and other similar titles. I also verify from various sources the first year an executive became the CFO for a specific company. I eliminate all interim or acting CFOs and CFOs for whom the information available from public sources contradicted that available in ExecuComp. To remain in the sample, the new CFO must stay with the firm at least two years subsequent to the appointment. I exclude financial firms (SIC codes 6000-6999) because they tend to have distinct structure of expense, investment, and financial policies (Almeida, Cunha, Ferreira, & Restrepo, 2017; Banker, Basu, Byzalov, & Chen, 2016).

In order to conduct the event-study (stock price response) analysis, I identify the earliest date of a CFO appointment announcement by searching articles related to the company in the financial press. Finally, firms are required to have financial information and stock return data in the COMPUSTAT database and the Center for Research in Security Prices (CRSP) files, respectively. The final sample is composed of 1,349 CFO appointments over a 21-year period; firm performance data is required for two years following appointment. Thus, the sample data covers 1994-2016.

3.2. Stock Market Response Method

Dependent variable. To measure the stock market response to a CFO hiring announcement, I apply event-study analysis and examine the cumulative abnormal returns (*CARs*) around the appointment. I utilize the standard market model estimated for 200 trading

days from day -250 to day -51. Daily abnormal stock return for each sample firm is calculated by taking the difference between the firm's observed return and the estimated return from the estimated market model. Three-day *CARs* (-1, +1) is calculated for each firm by cumulating these daily abnormal returns. I exclude firms with confounding corporate events (such as mergers and acquisitions, earnings announcements, etc.). In the multivariate analysis, I estimate cross-sectional regressions explaining the three-day announcement period CARs (-1, +1) using various specifications of the following model.

$$CARs_{i,t} = \beta_0 + \beta_1(Female\ CFO)_{i,t} + \beta_{2\text{-}7}(CFO\ controls)_{i,t} + \beta_8 Assets1_{i,t\text{-}1} + \beta_9 Perf_{i,t\text{-}1} + \beta_{10\text{-}13}(Reasons\ for\ prior\ CFO\ departure)_{i,t} + \varepsilon_{i,t} \quad (1)$$

The variable *Female CFO* is the test variable, which equals one if the gender of the new CFO is female, and zero otherwise.

Firm control variables. Year fixed-effects are included in all models to control for macroeconomic effects. I also control for firm characteristics such as *Assets1* (measured as the natural logarithm of total assets) to proxy for firm size and *Perf*, which is measured as net cash flow less extraordinary items scaled by the previous year's total assets, to proxy for firm performance. Variables are winsorized at one percent cutoff at both tails to limit the influence of outliers and industry adjusted to control for industry effects. Specifically, I subtract the industry-median calculated annually using the Global Industry Classifications Standard (GICS) system (Bhojraj, Lee, & Oler, 2003) from the sample firm value to control for the industry effects for each firm-year.

CFO control variables. To control for CFOs' characteristics, I collect their biographical information, such as educational profile, prior job experience, age of the executive, and whether the CFO comes from inside the firm. These variables are collected from multiple sources such as Businessweek.com, Zoominfo.com, and other publicly available information. First, I create the

variable *MBA*, which takes a value of one if the CFO has an MBA, and zero otherwise. Second, CFOs are recorded as having broad managerial experience if they had previously served in any of the following roles: CEO, Chief Operating Officer, President, Executive Vice President, Senior Vice President, General Manager, Deputy President, Executive Director, Corporate Vice President, Managing Director, Executive Director, Vice Chairman with administration duties, or any C-Suite executive, including General Counsel. The variable *MGT-EXP* thus denotes presence or absence of managerial experience based on the description above.

I create two variables that reflect whether the CFO has an accounting or finance background. The variable representing an accounting background, *ACC-BKG*, takes a value of one if the CFO had previous accounting experience, a Certified Public Accountant certification (CPA), a Certified Management Accountant (CMA), or a degree specialized in accounting, and zero otherwise. A CFO is considered to have accounting experience is he previously held the following positions – Principal Accounting Officer, Chief Accounting Officer, Treasurer, Controller, Senior Auditor, Auditor, Vice President of Accounting, Director of Corporate Accounting, etc. The second variable reflects a finance background, *FIN-BKG*, and takes a value of one if the CFO had previous finance experience, a Chartered Financial Analyst certification (CFA), or a finance degree, and zero otherwise. A CFO is also considered to have finance experience if he held positions such as Vice President of Finance, Financial Analyst, Director of Financial Planning, Finance Manager, Finance Director, etc.

Additional CFO characteristic variables that I include are *Was-CFO*, *CFO Age*, and *Insider*. The variable *Was-CFO* indicates whether the executive held a CFO position previously. *CFO Age* proxies for the executive's years of experience. *Insider* denotes whether the CFO was hired from inside the firm.

I also collect information on the reason for the departure of the previous CFO from financial press articles. I incorporate four indicator variables that denote whether the prior CFO – (i) retired, (ii) took another job, (iii) was fired, or (iv) was promoted within the firm. I define fired as those CFOs who were outright fired due to fraud or resigned due to other reasons apart from obtaining another job.

Finally, I separate my sample into high and low growth opportunities firms based on the industry-median market-to-book (*MTB*) for the year prior to the appointment (Hutchinson & Gul, 2004) classified according to the Global Industry Classifications Standard (GICS) system. First, for all nonfinancial firms in COMPUSTAT and for the year prior to the appointment, I compute a median *MTB* for each industry (industry-median *MTB*) based on six-digit GICS codes. Second, from the sample of all 63 industry-median *MTBs*, I obtain a year-median *MTB*. Firms that belong to the industries whose industry-median *MTB*s lies above the year-median *MTB* are considered high growth firms, and low growth firms otherwise.

3.3. Firm Operating Performance Method

To assess the link between female CFOs and firm performance, I employ the following equation that also includes year fixed-effects to rule out the impact of potential unobservable year-specific effects. Different versions of this model are utilized to test the different hypotheses.

$$\Delta Perf_{i,t} = \beta_0 + \beta_1(Female\ CFO)_{i,t} + \beta_{2\text{-}8}(CFO\ controls)_{i,t} + \beta_{9\text{-}17}(Firm\ controls)_{i,t\text{-}1} + \varepsilon_{i,t} \quad (2)$$

Dependent variable. I compute the dependent variable *ΔPerf* as the change in corporate performance from the year prior to the CFO appointment (*t*-1) to two years subsequent to the appointment (*t*+2). *Performance* is measured as net cash flow less extraordinary items scaled by the previous year's total assets. My cash flow measure of performance takes into account

changes to net working capital and other items (Banker, Huang, & Natarajan, 2009) because it is less subject to distortion than earnings.

Control variables. I control for firm characteristics that may influence performance such as assets, leverage, growth opportunity, liquidity, research and development (R&D), dividends, capital expenditure, firm volatility, and firm complexity (Bhagat & Bolton, 2008; Cazavan-Jeny, Jeanjean, & Joos, 2011; Jensen, Lundstrum, & Miller, 2010). *Assets1* measures firm size, calculated as the natural logarithm of total assets. *Leverage1* represents the ratio of long-term debt to total assets. I utilize MTB as a proxy for growth opportunities. *MTB1* is computed as the book value of assets less the book value of equity plus the market value of the equity, scaled by total book value of assets. *Liquidity* is reflected by the proportion of cash and marketable securities to total assets and is a measure for internal funds available for investment. *R&D*, representing firm's innovation strategy, is computed as the ratio of research and development expenditure to sales. *Div*, measured as the sum of dividends from preferred and common stock scaled by total assets, gauge the degree of financial constraints (where the higher the ratio, the lower the financial constraints the firm is subject to). *Capex1* represents the ratio of capital expenditure to total assets and reflects the degree to which the firm relies on fixed assets. To control for firm complexity, I use the variable, *No_SIC*, which is the number of primary SIC codes assigned to the firm. In addition, I also include a measure of risk, namely, idiosyncratic risk (*Vol*), which is defined as the sum of the squared residual from the Fama-French's (1993) three-factor model using the daily return data from CRSP. My results are robust to the use of different measures of volatility.

All firm control variables are measured as of the fiscal year-end prior to the CFO appointment and winsorized at one percent cutoff at both tails to limit the influence of outliers. I

also industry-adjust firm control variables and the performance metric to control for industry effects. P-values are calculated using White's heteroskedasticity-corrected standard errors.

3.4. Excess Cash Holdings Method

Following Opler et al. (1999), I estimate a firm's excess cash holdings as the residual from the following model.

$$Cash_{i,t} = Assets2_{i,t} + NWC_{i,t} + MTB2_{i,t} + Cf_{i,t} + Capex2_{i,t} + Acq_{i,t} + Leverage2_{i,t} + Div\_dummy_{i,t} \quad (3)$$

Given that cash holdings vary considerably across industries, I estimate Equation 3 for each industry (three-digit SIC code) and control for macroeconomic effects using the year fixed-effects (Harford, 1999). A firm with positive excess cash holdings (positive residual) is the one that holds more cash than the optimal level estimated by Equation 3 in that year. In contrast, a firm with negative excess cash holdings (negative residual) is the one that has less cash than necessary to operate. I define cash-rich (cash-poor) firms as those having greater than one standard deviation of the time-series of the firm's cash holdings above (below) that predicted by Equation 3 for any year. The remains are normal firms.

Next, I examine the impact of the new CFO gender on cash holding policies using Equation 4, including year and industry dummies to control for potential year and industry effects. *ExCash* is the residual from the regression of Equation 3. The dependent variable *ΔExCash* thus represents the change in excess cash holdings from the year prior to the CFO appointment (*t*-1) to two years subsequent to the appointment (*t*+2). All firm control variables are measured as of the fiscal year-end prior to the CFO appointment and winsorized at one percent cutoff at both tails to limit the influence of outliers. P-values are calculated using White's heteroskedasticity-corrected standard errors.

$$\Delta ExCash_{i,t} = \beta_0 + \beta_1(Female\ CFO)_{i,t} + \beta_{2\text{-}8}(CFO\ controls)_{i,t} + \beta_{9\text{-}16}(Firm\ controls)_{i,t\text{-}1} + \varepsilon_{i,t} \quad (4)$$

3.5. Robustness Checks

3.5.1. Propensity Score Matching Technique

To the extent that female CFOs may not be randomly appointed if they self-select into certain types of firms, I need to correct for this potential selection bias. One of the primary methods I use is the propensity score matching method (Faulkender & Yang, 2010; Iskandar-Datta & Jia, 2013, Lawrence, Minutti-Meza, & Zhang, 2011). In this approach, for each female CFO firm in my sample, I identify a matched firm that is as similar to the firm hiring the female CEO with the exception that it hired a male CFO. I begin with a logistic regression (Equation 5), which includes firm characteristics that may explain the decision to hire a female versus a male CFO.

$$\begin{aligned} \text{Prob}_{i,t}\,(Female\ CFO = 1) = {} & \beta_0 + \beta_1 Assets1_{i,t\text{-}1} + \beta_2 Leverage1_{i,t\text{-}1} + \beta_3 Liquidity_{i,t\text{-}1} \\ & + \beta_4 R\&D_{i,t\text{-}1} + \beta_5 MTB1_{i,\,t\text{-}1} + \beta_6 Dividends_{i,t\text{-}1} + \beta_7 No\_SIC_{i,t\text{-}1} \\ & + \beta_8 Capex1_{i,t\text{-}1} + \beta_9 Vol_{i,t\text{-}1} + \varepsilon_{i,t} \end{aligned} \quad (5)$$

I use a matching algorithm that does not allow for replacement to avoid the potential issue that replaced observations with extreme propensity scores are matched many times and thus, heavily weighted (Lawrence et al., 2011; Shipman, Swanquist, & Whited, 2016).[5] Particularly, I match the male CFO firms (the control firms) with the female CFO firms (the treated firms) using the estimated propensity scores. The propensity score matching sample is expected to circumvent effects of sample selection bias on my results.

3.5.2. Heckman's Two-Stage Model

To address the potential self-selection concern in which female CFOs may not be randomly assigned to firms, I conduct an alternative robustness test utilizing Heckman's (1979)

[5] The results hold when I match with replacement.

two-stage model (Francis et al. 2013).[6] The first stage is a probit regression examining the likelihood of appointing a female CFO as in Equation 5.

In the second stage, I estimate an OLS regression as described in Equations 2 and 4 but include the Inverse Mills Ratio, obtained from the first stage, as an extra explanatory variable, thereby removing the part of the error term correlated with the explanatory variable and avoiding the bias. The main purpose of this approach is to control for the endogeneity of a female CFO appointment by ensuring that unobservables in the first stage and those in the second stage are unrelated. An insignificant Inverse Mills Ratio indicates that the data does not suffer from selection bias. On the other hand, a significant coefficient on this ratio implies that a sample selection bias would have been an issue without the Heckman procedure.

3.5.3. Difference-in-Differences Approach

Another robustness test to evaluate whether female CFOs exert significant influence on firm performance is the difference-in-differences approach (Equations 6 and 7). Following Huang and Kisgen (2013), my test sample (dif-in-dif sample) includes firm years three years before and three years after an appointment, excluding the year of the appointment, thereby increasing the sample size and alleviating serial correlation bias (Bertrand, Duflo, & Mullainathan, 2004).

$$Perf_{i,t} = \beta_0 + \beta_1(Post_t \times Female\ CFO_{i,t}) + \beta_2(Female\ CFO)_{i,t} + \beta_3 Post_t + \beta_{4\text{-}10}(Firm\ controls)_{i,t\text{-}1} + \varepsilon_{i,t} \quad (6)$$

Post is a dummy variable, which takes the value of one if year *t* is after the appointment, and zero otherwise. The test variable, *Post * Female CFO*, reflects the impact of female CFOs on post-hiring firm performance.

[6] According to Bascle (2008), the self-selection bias is best addressed by using Heckman's two-stage model.

3.5.4. Mover Dummy Variable Method

I also adopt the mover dummy variable (MDV) method to verify the impact of the CFO on firm performance (Bertrand & Schoar, 2003; Graham, Li, & Qiu, 2012). First, I create a subsample which is restricted only to movers, i.e., executives who have changed firms. This subsample is composed of all firms an executive had worked for previously (as a TMT member), collected from ExecuComp, and the CFO hiring firms. I exclude firms that have missing data on COMPUSTAT and those in which the executive stayed less than two years. The final subsample has 308 observations (referred to as the mover sample). Second, I investigate whether the executive plays a significant role in explaining the change in firm performance by comparing the adjusted R^2 between two specifications, one without the executive fixed effects (Equation 8) and one with the executive fixed effects (Equation 9). Year fixed effects are included in both models.

$$\Delta Perf_{i,t} = \beta_0 + \beta_1 Assets1_{i,t-1} + \beta_2 Leverage1_{i,t-1} + \beta_3 Liquidity_{i,t-1} + \beta_4 R\&D_{i,t-1} + \beta_5 Div_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

$$\Delta Perf_{i,t} = \beta_0 + \beta_1 Assets1_{i,t-1} + \beta_2 Leverage1_{i,t-1} + \beta_3 Liquidity_{i,t-1} + \beta_4 R\&D_{i,t-1\mathrm{m}} + \beta_5 Div_{i,\,t-1} + \gamma_{CFO} + \varepsilon_{i,t} \quad (8)$$

where γ_{CFO} are executive fixed effects, which capture the time-invariant or slow-moving CFO heterogeneity. The change in corporate performance is as defined earlier. The results from the second regression test whether executive attributes have a bearing on firm performance. To examine the impact of gender on firm performance, I go further by regressing the previously estimated fixed effects (γ_{CFO}) on the CFO gender and other time-invariant (slow-moving) CFO traits such as education, year of birth, and the year of appointment (Graham et al., 2012) as shown in Equation 10. A significant coefficient on *Female CFO* variable would imply the important contribution of female CFOs to the change in firm performance.

$$\textit{Executive fixed effects in performance} = \beta_0 + \beta_1(Female\ CFO)_{i,t} + \beta_{2\text{-}6}(CFO\ Controls)_{i,t} + \beta_7(Birth\ year)_{i,t} + \beta_8(Appointed\ year)_{i,t} + \varepsilon_{i,t} \quad (9)$$

3.5.5. Buy-and-Hold Returns Method

In an additional test of firm performance, I compare the change in buy-and-hold returns (*ΔBHR*) between firms hiring female CFOs and those hiring male CFOs. The, *ΔBHR* is measured as the difference between 12-month buy-and-hold returns starting from the month after the appointment, and 12-month buy-and-hold returns prior to the appointment (ending in the month prior to the appointment).

$$BHR = \prod_{t=1}^{T}\left(1 + R_{i,t}\right) - 1, \quad T = 12 \tag{10}$$

where $R_{i,t}$ is the monthly return of *i*, period *t*.

Further, to address the potential concern that firms hiring female CFOs may differ in attributes from those hiring male CFOs, I compare the change in buy-and-hold returns of female CFO firms with the propensity score matched sample of male CFO firms. To do so, I utilize the sample of control firms obtained from the propensity score methodology (described earlier) that minimizes the difference between female CFO firms and control male CFO firms on multiple dimensions.

Finally, following Barber and Lyon (1997), I also examine the change in industry-adjusted buy-and-hold returns (*ΔBHAR*) for the two groups of firms—those hiring female CFOs and those hiring male CFOs. To calculate *BHAR*, I subtract the return of the benchmark, the 49 Fama and French (1997) industry groupings returns, R_{FF}, from the raw returns.

$$BHAR = \left[\prod_{t=1}^{T}\left(1 + R_{i,t}\right)\right] - \left[\prod_{t=1}^{T}\left(1 + R_{FF,t}\right)\right], \quad T = 12 \tag{11}$$

CHAPTER 4: EMPIRICAL RESULTS

4.1. Sample and Descriptive Statistics

Table 1 displays descriptive statistics of CFO characteristics and firm characteristics as of the fiscal year-end prior to the appointment. For our sample of CFOs, we find that approximately 9.6% are female, similar to Francis et al. (2015). In general, on a univariate basis, female CFOs tend to be younger than male CFOs, join firms that have greater cash holdings, lower leverage, lower capital expenditure, and are less complex.

With regards to the educational credentials, approximately a half of the male (51.52%) and female CFOs (49.23%) hold MBA degrees. The proportions of CFOs who previously have top managerial experience and/or held a CFO position in the female group (33.85% and 49.23%, respectively) are smaller than in the male group (35.03% and 52.75%, respectively). On the other hand, the percentages of female CFOs with accounting and/or finance experience (71.54% and 56.15%, respectively) are higher than those of male CFOs (65.55% and 50.04%). However, these differences are not statistically significant.

4.2. Stock Market Response and CFO Gender

In this section, I investigate investors' response to the appointment of a female CFO by conducting a multivariate analysis (see Equation 1) that controls for CFO qualifications and experience, firm characteristics, and the reason behind the departure of the previous CFO. Results are presented in Table 2. For the full sample, the negative coefficients on *Female CFO* in Models 1 and 2 (p-values of 0.10 and 0.12, respectively) indicate that market participants appear to respond more negatively to the appointment of a female CFO than to that of a male CFO (although the economic magnitude is relatively small). This evidence rules out the self-selection hypothesis (H1c) which predicts no difference in the positive stock response between male and

female CFOs and the androgynous hypothesis (H1d) which predicts a more positive reaction to female hiring announcements.

Next, when I estimate regressions separately for the two sub-samples of high growth (Models 3 and 4) and low growth firms (Models 5 and 6), I find the coefficients on Female CFO are negative and significant in all models for high growth firms (each with a p-value of 0.01) but insignificant in all models for low growth firms (p-values of 0.53 and 0.52). These findings suggest that investors react differently to the appointment of a female CFO depending on the firm's operating environment. Even though the price response to female appointment is negative for the whole sample, the fact that the same is not true for both subsets of firms does not support the gender bias hypothesis (H1e) nor the risk-aversion hypothesis (H1b). The above results are consistent with the overconfidence hypothesis (H1a) which implies that investors respond negatively to female CFO appointments at high growth firms if they believe female CFOs, with their moderate level of overconfidence, will not take enough risks to alleviate the underinvestment deficiency). In other words, investors view male CFOs with overconfidence as more suitable in volatile environments.

Evidence from the propensity score sample (Models 7–9) shows that while the impact of CFO gender on stock price reaction is insignificant for the full sample and the low growth sub-sample, investors respond relatively more negatively to a female CFO hiring announcement (coefficient of -0.015 and p-value of 0.05) at firms in high growth industries, supporting the notion that female CFOs' low level of overconfidence is perceived as more appropriate for firms with low growth prospects. Overall, the results demonstrate that investors perceive female CFOs as less overconfident than their male counterparts.

4.3. CFO Gender and Firm Performance

To examine the association between CFO gender and firm performance, I estimate Equation 2 and present the results in Table 3. Evidence for the whole sample (Model 1) demonstrates a positive and significant link (p-value of 0.05) between the female CFO hiring decision and subsequent firm performance. This finding does not corroborate H2b, H2c and H2e, implying that the risk-aversion, self-selection, and gender bias hypotheses cannot explain the link between CFO gender and firm performance.

In Models 4 and 7, which distinguish between overconfidence (H2a) and androgyny (H2d), evidence shows a significantly positive association between female CFO appointments and firm performance in low growth firms (p-value of 0.06), but an insignificant relation in the high growth sub-sample (p-value of 0.27). These findings do not support the androgyny hypothesis, which predicts enhanced performance in both growth environments. However, the results corroborate H2a.

This result may be due to the fact that some CFO appointments do not reflect a change in gender (i.e., a new male CFO replaces an outgoing male CFO).[7] To further explore the impact of male CFO on firm performance among high growth firms, I create a variable *Female_to_Male*, which equals one if the CFO appointment reflects a transition from a female to a male executive, and zero otherwise. The untabulated results show that a newly appointed male CFO, when replacing a female CFO, significantly helps enhance operating performance of high growth firms, consistent with H2a. In sum, these findings support the overconfidence hypothesis only.

To address the concern that the results may be due to the benefits of gender-diverse TMTs or gender-diverse boards and not the gender of the CFO, I disentangle the influence of

[7] I note that a very small portion of sample (<1%) experience a female to female appointment. This is true for the whole sample and for each of the two subsamples.

CFO gender from that of gender diversity by creating two new variables: (i) *TMT-GD* takes the value of one if there is at least one female member in the TMT (excluding the CFO), and zero otherwise, and (ii) *Board-GD* equals one if there is at least one female director (excluding the CFO), and zero otherwise. Results presented in Models 2, 5, and 8 of Table 3 show that the coefficients on Female CFO are still significantly positive for all firms and for low growth firms (p-values of 0.03 and 0.10, respectively), but insignificant for high growth firms (p-value of 0.14), supporting H2a.

I also control for the impact of the board and the CEO on firm performance by incorporating *Boardsize* (the number of directors in the board) and CEO Tenure (the number of years the CEO has been in the position). CEO tenure is a measure of entrenchment (Berger, Ofek, and Yermack 1997) since long-tenured CEOs may focus on accumulating managerial power rather than maximizing shareholders' wealth. Results are presented in Models 3, 6, and 9 of Table 3. The significantly positive coefficients on Female CFO in Models 3 and 9 (p-values of 0.03 and 0.08, respectively) again confirm the improvement in operating performance achieved by female CFOs at low growth firms.[8]

For robustness, I employ another proxy for dynamism of firm's environment, namely, research and development expenditures. I re-estimate Equation 2 for two sub-samples categorized based on the median R&D to sales ratio (Hagedoorn, 2002). The unreported results indicate robustness to this classification of uncertainty. Moreover, all my findings are invariant to using the SIC for industry adjustment instead of GICS.

[8] In unreported tests, I replace *TMT-GD* by the percentage of female members in the TMT (excluding the CFO) and replace *Board-GD* by the percentage of female directors in the board (excluding the CFO). I also include the variable Female CEO and CEO-MBA to control for the impact of CEO gender and education on firm performance. The results hold in all cases.

As an additional robustness check, I employ market capitalization instead of assets as a proxy for firm size, and the number of business segments instead of The number of primary SIC codes assigned to the firm as a proxy for complexity. The results (untabulated) are consistent with those from Table 3.

Prior studies suggest that women tend to show higher anxiety in circumstances of uncertainty (Fehr-Duda, De Gennaro, & Schubert, 2006) which may adversely impact their performance perhaps due to underinvestment (Barsky, Juster, Kimball, & Shapiro, 1997). However, Rost and Osterloh's (2010) argument that such situations can lead to less biased financial decision-making, combined with a female (male) attribute of paying more (less) attention to current state would result in females outperforming male counterparts.

To examine performance in situations of great uncertainty, we take advantage of the financial crisis (2007-2009) by creating a dummy variable which equals one for 2007-2009 period, and zero otherwise. The coefficient on the interaction term between this variable and *Female CFO* (unreported) indicates that female CFOs significantly underperformed male CFOs during the financial crisis, suggesting that female CFOs perform worse when uncertainty increases (Barsky et al., 1997).

4.4. CFO Gender and Excess Cash Holdings

To examine the effect of the new CFO gender on the change in excess cash holdings, I estimate regressions (Equation 4) separately for each type of firms (cash-rich, cash-poor, and normal firms). Table 4 shows that the newly appointed female CFOs tend to relatively reduce the excess cash holdings in cash-rich firms relative to their male counterparts (coefficient of -0.387 and p-value of 0.04), consistent with H3a. The gender of the CFO does not have statistically significant impact on excess cash holdings among cash-poor firms and normal firms (p-values of

0.92 and 0.57, respectively). However, this result does not allow me to distinctly attribute the impact of female CFO on excess cash holdings to either her being less overconfidence, having more ethical sensitivities, or both.[9]

4.5. Robustness Checks

4.5.1. Probability of Hiring a Female CFO

There is a potential concern that female CFOs may not be randomly hired; for example, there is a possibility that female CFOs may be hired by more successful firms or firms that have been doing poorly and are at the cusp of improvement. To address this unobserved hiring orientation, I apply a logistic model to identify the connection between the hiring decision and firm characteristics and, in particular, include firm performance prior to hiring of the CFO. I also include a number of variables that proxy for uncertainty such as the market-to-book ratio, R&D intensity, and firm volatility.

In addition to various firm characteristic variables, I also include *CEO Tenure* and *TMT-GD-Yr-1*, a dummy variable that takes a value of one if there is at least one female member in the TMT in the year prior to the appointment, and zero otherwise.

Table 5 reveals some interesting information regarding the CFO hiring decision. First, the decision to appoint a female CFO is not related to past performance as exhibited in the coefficients on *Perf* which are statistically insignificant. This applies to the whole sample as well as in high and low growth sub-samples. These findings imply that better post-hiring performance of female CFOs is not driven by firm's ability to generate profits or a poorly performing firm at the cusp of a turnaround. Second, the logistic regression for the full sample shows no evidence

[9] It can be argued that female CFOs reduce the excess cash holdings because they are risk-averse and make suboptimal decisions, e.g., reduce capital expenditure or lower leverage. However, I find no evidence indicating that firms hiring female CFO subsequently decline capital expenditure or decrease leverage compared to those hiring male CFOs.

that the risk profile of firms has any bearing on the hiring decision as all the coefficients on the three proxies of uncertainty (market-to-book ratio, R&D intensity, and firm volatility) are insignificant. The results are similar and robust when I use alternative variables such as replacing *Perf* with *ROA* (returns on total assets) and *Vol* with systematic risk.[10]

While the results show that firms are more likely to appoint a female CFO when there is at least a female member in the TMT (with p-values of 0.01 or better), my findings for the whole sample support the notion that the change in firm performance subsequent to the appointment can be attributed to the new CFO's value and ability rather than joining a certain type of firm.[11]

Next, I address potential endogeneity concerns through a variety of alternative approaches such as the propensity score technique, Heckman's two-stage model, MDV, and difference-in-differences method.

4.5.2. Propensity Score Matching Technique and Heckman's Two-Stage Model

I re-estimate Equation 2 using the propensity score sample. After matching firms that hired female CFOs with firms that have almost identical characteristics but hired male CFOs, I find that female CFOs outperform in firms that operate in low uncertainty environments. Evidence from Models 1–3 of Table 6A is very similar to earlier results, and is supportive of H2a.

In line with Francis et al. (2013), I employ Heckman's (1979) two-stage model as an alternative method to address the concern that female CFOs may not be randomly assigned to firms. The first stage is a probit regression examining the likelihood of appointing a female CFO

[10] I also examined the impact of gender-diverse boards on the CFO hiring decisions and found no significant relation between female director representation and the likelihood of appointing a female CFO.

[11] I also estimate another model that includes a dummy variable that reflects whether the firm had at least one accounting restatement in the two years prior to the appointment (obtained from Audit Analytics). I find no association between a firm's past accounting restatements and the hiring decision which implies that hiring female CFOs is not undertaken to signal an improvement in reporting quality.

(Table 6A – Stage 1). In the second stage, I estimate Equation 2 using an OLS regression that also includes the Inverse Mills Ratio obtained from the first stage. The results in Table 6A reaffirm my findings that the female CFO appointment has a positive link with subsequent firm performance as the coefficient on *Female CFO* is positive and significant (p-value of 0.08) even after including the Inverse Mills Ratio. The insignificant Inverse Mills Ratio indicates that there is no systematic selection bias in my sample. The results from the Heckman two-stage model are preserved after controlling for CEO tenure, CEO gender, and TMT gender diversity (unreported).

To control for the influence of the CEO on firm performance, I conduct an additional robustness test by deleting from the full sample firms that replaced their CEOs during the period year *t* to year *t*+2. My measure of change in firm performance for this subsample (which includes CEOs who have been at the firm from year *t*-1 to year *t*+2) thus controls for the CEO's influence on firm performance. The results, presented in Models 4, 5, and 6 of Table 6A, remain supportive of the overconfidence hypothesis (H2a) as the coefficients on *Female CFO* are significantly positive in Models 4 and 6 with p-values of 0.06 and 0.02, respectively.

I also employ the Heckman two-stage model to estimate the impact of female CFOs on the change in excess cash holdings. The results from Table 6B confirm my previous results indicating that new female CFOs relatively reduce the excess cash reserves in cash-rich firms.

4.5.3. Difference-in-Differences Approach

Table 7 presents the results of difference-in-differences regressions. Model 1 shows that post-hiring firm performance increases with a female CFO appointment as the coefficients on (*Post * Female CFO*) are positive and statistically significant (p-value of 0.04). When I take a closer look at the operating environments (growth opportunities), the evidence is supportive of

the overconfidence story since female CFOs enhance the performance of only firms characterized by low uncertainty (coefficient of 1.673) (Model 3) while, in high growth firms, female CFOs exert no discernable influence (Model 2). Generally, the results of Table 7 are consistent with H2a.

4.5.4. Mover Dummy Variable Method

I verify the impact of CFO attributes on firm performance using the MDV method (Equations 7 and 8) on the mover sample (Bertrand & Schoar, 2003; Graham et al., 2012). Panel A shows that the adjusted R^2 of the pooled OLS regression (without executive fixed effects) is 4.2%. When the regression model is augmented with the executive fixed effects to take into account the time-invariant CFO characteristics, the adjusted R^2 increases to 10.2%. This large increase in adjusted R^2 suggests a substantial role to executive traits in determining firm performance and is consistent with Bertrand and Schoar (2003).

Next, I go one step further by investigating whether gender has any contribution to firm performance by regressing the previously estimated executives fixed effects on the CFO gender as per Equation 9. In Models 1 and 2 in Panel B, the coefficients on *Female CFO* are always positive and significant (p-values of 0.02 and 0.01, respectively), indicating that female executives are positively associated with the performance fixed effects estimated. Overall, Table 6 demonstrates an important role of time-invariant (slow-moving) CFO attributes on the change in firm performance following the appointment. Furthermore, among those attributes, the contribution of the CFO gender is significant, corroborating my earlier results.

4.5.5. Overconfidence vs. Ethical Sensitivities

So far, the evidence shows that female CFOs are more likely to lower the excess cash in cash-rich firms compared to their male counterparts. Though the results are consistent with H3a,

the impacts of overconfidence and ethical sensitivities are indistinguishable. Hence, this section aims to distinguish the impact of these two behavioral tendencies.

According to Bjuggren and Elert (2016), while women are less overconfident (optimistic) than men in general, gender differences in overconfidence disappear in sharp economic downturns for two reasons. First, people tend to process bad information more thoroughly than good information (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). Second, people are more confident when information is absent or ambiguous (Lenney, 1977; Barber and Odean, 2001). However, in times of economic crisis, since information about the economy is abundant, men relatively lower their expectations about the present and future. Therefore, to distinct the impact of overconfidence and ethical sensitivities, I examine the relation between female CFO representation and cash holdings in both normal and crisis times. Accordingly, if the overconfidence hypothesis holds, female CFOs will relatively reduce excess cash holdings in cash-rich firms during normal times, but will behave in the same way as their male counterparts during the financial crises. In contrast, if the ethical sensitivities hypothesis holds, female CFOs will consistently lower excess cash in cash-rich firms compared to male CFOs in any situations.

Table 9 compares cash-rich firms' excess cash holdings between those with female CFOs and those with male CFOs segmented by the type of economic conditions (all situations, normal situation, and financial crisis). I define the crisis period as 2007–2009, and the normal period (no crisis period) as 1994–2006 and 2010–2016. Panel A shows that in normal times, cash-rich firms with female CFOs have relatively lower excess cash reserves than those with male CFOs (significant at 1% level). However, during the financial crisis, the excess cash holding by firms with female CFOs is similar to those with male CFOs. Taking a closer look, I find that the disappearance of gender differences in holding excess cash in the financial crisis comes from the

change in behavior of both male and female CFOs. Particularly, male CFOs tend to reduce excess cash holdings while female male CFOs tend to increase excess cash holdings. As a robustness check, in Panel B of Table 9, I perform the analysis using the propensity score matching technique and the results hold. Overall, evidence in Table 9 is in support of the overconfidence hypothesis rather than the ethical sensitivities hypothesis as female CFOs' behavior is not consistent across different economic conditions.

4.6. CFO Gender and Buy-And-Hold Returns

As an additional measure of firm performance, I examine the impact of newly appointed CFO gender on the change in buy-and-hold returns following the appointment. The results in Table 10 show that firms in low growth industries with female CFOs experience a relatively better improvement in performance, represented by *ΔBHR*, than those hiring male CFOs. Particularly, firms hiring female CFOs enjoy an average increase of 13.2 percent in 12-month *BHR* compared to -1.6 percent at firms hiring male CFOs. The difference in the *ΔBHR* between firms hiring female CFOs and those hiring male CFOs is statistically significant. This result holds when I perform the analysis for the propensity score matching sample and when utilizing an industry-adjusted measure of the buy-and-hold returns (*ΔBHAR*), confirming the robustness of my main findings from firm operating performance.

4.7. Female CFOs and Decision-Making that Affects Firm Performance

I examine potential channels through which female CFOs' decisions are behind the improvement in firm performance—cost efficiency and working capital efficiency. Since women are considered more knowledgeable about price and more concerned about spending (Estelami, Lehmann, & Holden, 2001), better firm performance could be due to greater cost efficiency (Baik, Chae, Choi, & Farber, 2013). Firms can achieve target sales with a lower cost of inputs,

especially at low growth firms which are characterized by high levels of stability, strong detail-orientation, and intense price competition (Chatman & Jehn, 1994). The two measures of cost efficiency that I employ are selling, general, and administrative expense (*SG&A*) and cost of goods sold (*COGS*), both scaled by total sales (winsorized and industry adjusted). These two variables are then formulated as the change in SG&A expense and the change in COGS from the year prior to the appointment of the CFO (*t*-1) to two years subsequent to the appointment (*t*+2).

The results from Models 1–6 in Table 11 show that firms hiring female CFOs experience a significant reduction in *SG&A* relative to those hiring male CFOs in both high and low growth firms. I also find that female CFOs significantly reduce *COGS* which seems to be driven by improvements at high growth firms. Overall, the evidence supports the view that female CFOs increase firm performance by promoting cost efficiency.

Second, working capital management (WCM) is one of the most fundamental decisions made by financial managers and is widely recognized to affect profitability. Prior studies have found a positive relation between WCM efficiency and profitability (e.g., Deloof, 2003; Lazaridis, 2006) and confirmed that benefits accrue to firms with a short cash conversion cycle.[12] To measure WCM efficiency, I employ two variables: days sales outstanding (*DSO*) and days inventory outstanding (*DIO*) (Deloof, 2003; Lazaridis, 2006), winsorized and industry adjusted. According to the traditional view of WCM (i.e., the shorter the cash conversion cycle, the greater is firm profitability), *DSO* and *DIO* are expected to be negatively associated with profitability. Hence, I predict a negative relation between *Female CFO* and the two dependent variables *ΔDSO* and *ΔDIO*, which are defined as the changes in *DSO* and *DIO* from the year prior to the appointment of the CFO to two years subsequent to hiring. Following Deloof and Jegers (1996),

[12] A very instructive example illustrating the importance of WCM efficiency (Shin & Soenen, 1998) is the decline of Kmart (compared to Wal-Mart), which was attributed to its inefficient of WCM.

I control for firm size (*Assets*), days payable outstanding (*DPO*), the length of production time (*Turnover*), and short-term borrowing (*Stborrow*)—all measured as of the fiscal year-end prior to the CFO joining the firm.

In Models 7–12 of Table 11, I find that female CFOs indeed lead to enhanced WCM efficiency by relatively shortening *DSO*. The coefficients on *Female CFO* are negative and significant for low growth firms (each with a p-value of 0.09) but not for high growth firms (p-value of 0.94). However, CFO gender does not affect *DIO*. Robustness tests (unreported) using the propensity score sample or employing alternative measures of DSO and DIO (Deloof, 2003; Lazaridis, 2006) provide similar results. In sum, Table 11 shows that female CFOs improve low growth firms' performance through the enhancement of cost efficiency (through *SG&A*) and WCM efficiency (through *DSO*).

Huang and Kisgen (2013) document that female executives (CEOs and CFOs) tend to undertake fewer acquisitions and conclude the result is consistent with lower female overconfidence. In this study, I go one step further and examine the impact of gender-based differences in overconfidence on acquisitive behavior, while accounting for the operating environment. Data on acquisitions is obtained from SDC Platinum Mergers & Acquisitions database. I compute the number of acquisitions and the relative acquisition value made (or intended to be made) in the first two years following the appointment (t+1 and t+2). Relative acquisition value is measured as total deal value divided by the acquirer's size, winsorized and industry adjusted. The t-test in Table 12 shows that firms with female CFOs tend to make fewer acquisitions and smaller acquisitions in terms of value than those hiring male CFOs only in low uncertainty industries. All the differences are statistically significant.

The differences in acquisitive behavior, which can be attributed to female CFOs' lower overconfidence, is one factor that could have contributed to the better performance in low growth firms. Given that firms with low growth opportunities are more likely to engage in value-destroying acquisitions (Lang, Stulz, & Walkling, 1991; Servaes, 1991), the results show low growth firms (versus high growth firms) can benefit more from female CFOs' lower overconfidence through the reduction in acquisitions. I also examine the difference in divestiture behaviors between male and female CFOs. However, most of the results are insignificant, which may be partly due to the tendency of female CFOs tend to join firms that are less complex in terms of the number of business segments (Tables 1 and 5).

CHAPTER 5: CONCLUSIONS

Using hand-collected data for a large cross-section of newly appointed CFOs over a period of 23 years, I investigate which of five theories – overconfidence, risk-aversion, self-selection, androgyny, or gender bias – may explain the rationale behind investors' response towards a female CFO appointment and CFO gender's influence on post-hiring firm performance.

First, I find that the stock price response to the hiring announcement is consistent with the overconfidence hypothesis as investors react more positively to a female CFO appointment at firms operating in low growth industries. This is a key point, indicating that investors do not show gender bias towards female executives while appreciating their appropriate level of overconfidence in certain environments.

Second, this study is the first to examine and document that female (male) CFOs help improve the post-hiring performance of firms operating in low (high) growth industries, which also supports the overconfidence theory. Finally, I document that female CFOs tend to relatively lower excess cash holdings in cash-rich firms compared to their male counterparts, which can be attributed to the precautionary motive and is also consistent with the overconfidence hypothesis. Unlike much of the prior research, my multivariate regressions control for important factors such as CFO qualifications and prior experience. I also control for the impact of CEO and for gender diversity in the board and in the TMT.

Interestingly, I also find that female CFOs perform worse when uncertainty increases, i.e., during the financial crisis, which may be due to the negative impact of women being less overconfident in combination with high-pressure environments.

My results are robust to employing different methods—the propensity score method, Heckman's (1979) two-stage model, MDV approach (which extracts the relevance of gender from executive fixed effects), and difference-in-difference regressions. Moreover, I examine the buy and hold returns as an additional measure of performance. The results confirm the findings from operating performance.

Overall, evidence supports the view that female executives are less overconfident than male executives but is not supportive of the risk-aversion, androgyny, self-selection, and gender bias hypotheses. My findings are buttressed by the fact that female CFOs are able to improve performance at low growth firms even though the firms they joined had a bigger asset base, where it would be more challenging to enhance firm outcomes. Further, the results may understate female CFO performance given the evidence in Peni and Vähämaa (2010) that firms with female CFOs are associated with income-decreasing discretionary accruals. I acknowledge that there may be some elements of truth to all of the hypotheses under certain situations (i.e., some female executives may be more risk averse, some may make their decisions similar to male CFOs, while some environments may have gender biases); however, the net effect that I observe supports the overconfidence story.

This research makes several important empirical contributions. First, my analysis contributes to the literature on investors' viewpoints of female executives in terms of abilities and behavior, complementing Lee and James's (2007) and Martin et al.'s (2009) studies. Second, I contribute to the literature that examines the impact of C-Suite executive characteristics on firm outcomes (e.g. Faccio et al., 2016; Khan & Vieito, 2013; Wolfers, 2006). Third, I complement prior findings related to female CFOs' accounting and financial decisions (Francis et al., 2015; Liu et al., 2016; Peni & Vähämaa, 2010; Huang & Kisgen, 2013) by showing the overall

influence of female CFOs on firm performance. Fourth, I contribute to the agency cost literature by showing that female CFOs tend to relatively reduce excess cash reserves and thus mitigate the agency costs of free cash flow compared to their male counterparts. Finally, I enrich the emerging literature on overconfidence by documenting the effect of CFO overconfidence on firm performance, complementing Ben-David, Graham, and Harvey's (2013) and Huang and Kisgen's (2013) research.

APPENDIX A: HYPOTHESES SUMMARY

Hypotheses	**Predicted stock response to female CFO appointment**	**Predicted performance of firms appointing female CFOs**	**Predicted excess cash holdings of firms appointing female CFOs**
Overconfidence	-ve for high growth firms	+ve for low growth firms	-
Risk-aversion	-ve for high & low growth firms but more so for high growth firms	-ve for high & low growth firms but more so for high growth firms	+
Self-selection	No difference	No difference	No difference
Androgyny	+	+	N/A
Gender bias	-	-	N/A

APPENDIX B: VARIABLE DEFINITIONS

Variable	Definition
	CFO characteristics variables
ACC-BKG	Equals one if the CFO had previous accounting experience, a CPA, or a degree specialized in accounting, and zero otherwise.
CFO Age	The age of the new CFO.
Female CFO	Equals one if the new CFO is female, and zero otherwise.
FIN-BKG	Equals one if the CFO had previous finance experience, a CFA, or a finance degree, and zero otherwise.
Insider	Equals one if the new CFO is an insider, and zero otherwise.
MBA	Equals one if the new CFO have an MBA, and zero otherwise.
MGT-EXP	Equals one if the new CFO has management experience, zero otherwise.
Was-CFO	Equals one if the new CFO held a CFO position previously, zero otherwise.
	Firm characteristics variables
Acq	The ratio of expenditures on acquisitions to the book value of net assets (#129 / (#6 - #1)).
Assets1	The natural log of total assets (item #6).
Assets2	The natural log of net assets (item #6 - #1).
Capex1	[Capital expenditure (item #30) divided by total assets (item #6)] * 100.
Capex2	[Capital expenditure (item #30) divided by net assets (item #6 - #1)] * 100.
Cash	The natural log of cash / net assets
Cashflow	The ratio of earnings after interest, dividends, and taxes but before depreciation to the book value of net assets ((#13 - #15 - #16 - #21) / (#6 - #1)).
COGS	[Cost of goods sold (item #41) divided by net sales (item #12)] * 100
DIO	Days inventory outstanding. Average inventory (item #3) divided by daily COGS (item #131)/365), where Average inventory = (beginning inventory + ending inventory)/2
Div_dummy	Equals one if the firm paid a common dividend, and zero otherwise.
Div	[Dividends of common and preferred stocks (item #21 + #19) divided by total assets (item #6)] * 100
DPO	Days payable outstanding. Average AP (item #70) divided by daily COGS (item #131)/365), where Average AP = (beginning AP + ending AP)/2
DSO	Days sales outstanding. Average AR (item #2) divided by daily net sales (item #12)/365), where Average AR = (beginning AR + ending AR)/2

APPENDIX B (cont.)

Variable	Definition
	Firm characteristics variables
ExCash	The residual from Equation 3
Leverage1	[Total long-term debt (item #9 + #44) divided by total assets (item #6)] * 100
Leverage2	[Total long-term debt (item #9 + #44) divided by net assets (item #6 - #1)] * 100
Liquidity	[Cash (item #1) divided by total assets (item #6)] * 100
MTB1	Total Assets (item #6) less common equity (item #6) less deferred taxes balance sheet (item #74) plus market value of equity (item #199 * #25) divided by total assets (item #6).
MTB2	Net Assets (item #6 - #1) less common equity (item #6) less deferred taxes balance sheet (item #74) plus market value of equity (item #199 * #25) divided by net assets (item #6 - #1).
No_SIC	The number of primary SIC codes assigned to the firm.
NWC	The ratio of net working capital minus cash plus marketable securities to the book value of net assets ((#179 - #1) / (#6 - #1)).
Perf	[Operating activities net cash flow (item #308 - #124) divided by lagged total assets (item #6)] * 100
R&D	[Research and development expense (item #46) divided by net sales (item #12)] * 100.
ROA	[Operating Income after depreciation (item #178) divided by total assets (item #6)] * 100
SG&A	[Selling, general and administrative expense (item #132) divided by net sales (item #12)] * 100.
Stborrow	[Short-term borrowings (item #206) divided by net sales (item #12)] * 100
Turnover	Net sales (item #12) divided by net total assets (item #6 – item#2)
Vol	The sum of the squared residuals from the Fama-French three-factor model
	Dependent variables
CARs	Three-day cumulative abnormal returns (-1, +1) around the announcement of CFO appointments
ΔCOGS	Calculated as $COGS_{t+2} - COGS_{t-1}$
ΔDIO	Calculated as $DIO_{t+2} - DIO_{t-1}$
ΔDSO	Calculated as $DSO_{t+2} - DSO_{t-1}$
ΔPerf	Calculated as $Perf_{t+2} - Perf_{t-1}$
ΔSG&A	Calculated as $SG\&A_{t+2} - SG\&A_{t-1}$
ΔExCash	Calculated as $ExCash_{t+2} - ExCash_{t-1}$

APPENDIX B (cont.)

Variable	Definition
	Other variables
Board-GD	Equals one if there is at least one female director in the board (excluding the CFO), zero otherwise.
Boardsize	The number of directors in the board
CEO Tenure	The number of years the CEO has been in the position.
Post	Equals one if the year is after the appointment, and zero otherwise
Prior CFO fired	Equals one if the old CFO was fired, and zero otherwise.
Prior CFO retired	Equals one if the old CFO retired, and zero otherwise.
Prior CFO took another job	Equals one if the old CFO got another job, and zero otherwise.
Prior CFO promoted	Equals one if the old CFO was promoted, and zero otherwise.
TMT-GD	Equals one if there is at least one female member in the TMT (excluding the CFO), zero otherwise.
TMT-GD-Yr-1	Equals one if there is at least one female member in the TMT in the year prior to the appointment, and zero otherwise.

APPENDIX C: CORRELATION TABLE

This table contains Pearson correlation coefficients for the sample of 1,349 firm-year observations during the period 1994-2016. All firm variables are measured as of the fiscal year-end prior to the CFO appointments and are not industry adjusted. See Appendix B for variable definitions.

Variables	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1. *Female CFO*	-0.01	-0.02	-0.01	0.04	0.04	-0.04	-0.06[b]	0.02	-0.05[c]	0.00	-0.01	0.08[a]	-0.01	-0.02	-0.04	-0.05[b]	0.04
2. *MBA*	1	0.03	0.07[a]	-0.07[a]	0.08[a]	-0.11[a]	0.10[a]	0.09[a]	0.06[b]	-0.01	0.01	-0.05[c]	0.00	0.01	-0.01	0.01	-0.03
3. *Was-CFO*		1	0.06[b]	0.06[b]	0.07[a]	-0.22[a]	0.25[a]	0.01	0.04[c]	-0.02	-0.04	-0.01	0.02	0.04	-0.01	-0.04	0.01
4. *MGT-EXP*			1	0.03	0.27[a]	-0.23[a]	0.16[a]	0.05[c]	0.07[a]	-0.09[a]	-0.01	-0.02	0.06[b]	0.03	-0.06[b]	0.05[c]	-0.11[a]
5. *ACC-BKG*				1	0.12[a]	0.03	0.05[c]	-0.05[c]	0.01	-0.02	0.02	0.01	0.03	0.00	-0.03	-0.01	-0.02
6. *FIN-BKG*					1	-0.18[a]	0.01	0.01	0.10[a]	-0.01	0.01	-0.01	0.03	0.00	-0.01	-0.04	0.05
7. *Insider*						1	-0.13[a]	0.09[a]	-0.05[c]	0.00	0.02	-0.03	-0.01	-0.06[b]	0.03	0.06[b]	0.02
8. *CFO Age*							1	0.09[a]	0.00	-0.04	0.02	0.01	0.01	-0.01	-0.06[b]	0.14[a]	-0.03
9. *Assets1*								1	0.21[a]	-0.09[a]	-0.07[a]	-0.29[a]	0.05[b]	-0.30[a]	-0.11[a]	0.22[a]	0.11[a]
10. *Leverage1*									1	-0.10[a]	-0.03	-0.20[a]	0.11[a]	0.05[c]	-0.06[b]	-0.04	-0.05[b]
11. *MTB1*										1	0.03	0.25[a]	0.05[c]	-0.04	0.19[a]	-0.14[a]	0.42[a]
12. *R&D*											1	0.15[a]	0.00	0.05[a]	-0.03	-0.01	-0.14[a]
13. *Liquidity*												1	-0.01	0.03	-0.03	-0.11[a]	0.02
14. *Div*													1	-0.04	-0.03	0.03	0.05[c]
15. *Vol*														1	-0.03	-0.07[a]	-0.14[a]
16. *Capex1*															1	-0.09[a]	0.28[a]
17. *No_SIC*																1	-0.11[a]
18. *Perf*																	1
19. *ExCash*																	

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 1. Descriptive Statistics

This table summarizes descriptive statistics for CFOs and firm characteristics in my sample. All firm variables are measured as of the fiscal year-end prior to the CFO appointments and are not industry adjusted. See Appendix B for variable definitions.

	Male CFOs (N = 1,219)		**Female CFOs (N = 130)**		**Test of difference (M-F)**
	Mean/Frequency	**Median**	**Mean/Frequency**	**Median**	**t-statistics**
1. MBA	51.52%	N/A	49.23%	N/A	0.50
2. Was-CFO	52.75%	N/A	49.23%	N/A	0.76
3. MGT-EXP	35.03%	N/A	33.85%	N/A	0.27
4. ACC-BKG	65.55%	N/A	71.54%	N/A	-1.37
5. FIN-BKG	50.04%	N/A	56.15%	N/A	-1.33
6. Insider	33.85%	N/A	31.54%	N/A	1.30
7. CFO Age	46.24	46.00	44.95	45.00	2.72[a]
8. Assets1	7.31	7.21	7.37	7.46	-0.40
9. Leverage1	21.10	19.17	16.80	14.90	2.74[a]
10. MTB1	2.09	1.57	2.11	1.71	-0.12
11. Perf	11.26	10.22	12.80	11.97	-1.46
12. R&D	6.79	0.43	5.17	0.35	0.96
13. Liquidity	15.25	7.55	20.39	14.17	-2.88[a]
14. Div	1.36	0.24	1.10	0.09	1.28
15. Vol	0.17	0.10	0.18	0.09	-0.10
16. Capex1	5.94	4.42	5.11	3.73	2.01[b]
17. No_SIC	2.00	1.00	1.78	1.00	2.02[b]
18. Acq	0.034	0.000	0.042	0.003	-0.008
19. NWC	0.064	0.058	0.078	0.094	-0.014
20. Cf	0.095	0.089	0.122	0.103	-0.027
21. CAR (%)	0.38	0.08	-0.43	-0.02	1.94[c]
22. ΔPerf	0.14	0.00	1.81	0.90	-1.67 [c]
23. ΔExCash	0.064	0.019	-0.096	-0.028	0.160

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 2. Announcement Returns for CFO Appointments

This table presents regression results from Equation 1. The dependent variable is the three-day cumulative abnormal announcement returns (*CARs*) around announcements of CFO appointments. All firm variables are measured as of the fiscal year-end prior to the CFO appointment and are industry adjusted. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	Full Sample					
	All Firms		**High MTB**		**Low MTB**	
Independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Female CFO	**-0.007[c]**	**-0.007**	**-0.015[a]**	**-0.014[a]**	**0.005**	**0.005**
	(0.10)	**(0.12)**	**(0.01)**	**(0.01)**	**(0.53)**	**(0.52)**
CFO Controls						
MBA	0.005[c]	0.005[c]	0.011[a]	0.010[a]	-0.002	-0.002
	(0.07)	(0.08)	(0.01)	(0.01)	(0.61)	(0.60)
Was-CFO		0.002		0.003		-0.001
		(0.62)		(0.51)		(0.77)
MGT-EXP		-0.002		-0.003		-0.003
		(0.65)		(0.68)		(0.56)
ACC-BKG		-0.002		-0.002		0.000
		(0.64)		(0.67)		(0.96)
FIN-BKG		-0.002		-0.001		-0.007
		(0.47)		(0.88)		(0.13)
CFO Age		0.000		0.000		0.000
		(0.79)		(0.60)		(0.92)
Firm Controls						
Assets1	-0.001	-0.001	0.000	0.000	-0.002	-0.002
	(0.49)	(0.54)	(0.88)	(0.94)	(0.29)	(0.32)
Perf	0.000	0.000	0.000	0.000	0.000	0.000
	(0.35)	(0.36)	(0.69)	(0.67)	(0.16)	(0.16)
Prior CFO fired	0.006	0.006	0.007	0.006	0.006	0.007
	(0.65)	(0.65)	(0.54)	(0.57)	(0.85)	(0.82)
Prior CFO retired	-0.010[a]	-0.010[a]	-0.008[c]	-0.008	-0.011[b]	-0.012[b]
	(0.01)	(0.01)	(0.10)	(0.12)	(0.05)	(0.03)
Prior CFO took another job	-0.001	0.000	0.012	0.012	-0.012[c]	-0.013[c]
	(0.91)	(0.95)	(0.13)	(0.11)	(0.08)	(0.07)
Prior CFO promoted	-0.002	-0.002	0.002	0.002	-0.008[c]	-0.009[c]
	(0.56)	(0.59)	(0.69)	(0.64)	(0.07)	(0.07)
Intercept	0.006	0.007	-0.009	-0.015	0.016	0.025
	(0.48)	(0.70)	(0.49)	(0.52)	(0.18)	(0.22)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.029	0.030	0.052	0.054	0.072	0.077
N	1,136	1,136	705	705	431	431

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 2. (Continued)

	Propensity Score Sample		
	All Firms	**High MTB**	**Low MTB**
Independent variables	**(7)**	**(8)**	**(9)**
Female CFO	**-0.003**	**-0.015[b]**	**0.000**
	(0.59)	**(0.05)**	**(0.97)**
CFO Controls			
MBA	0.014[b]	0.023[b]	0.011
	(0.05)	(0.02)	(0.15)
	-0.010		-0.019[a]
Was-CFO		0.014[c]	
	(0.14)	(0.09)	(0.01)
MGT-EXP	-0.005	-0.002	0.006
	(0.51)	(0.85)	(0.55)
ACC-BKG	0.007	-0.010	0.022[a]
	(0.45)	(0.24)	(0.01)
FIN-BKG	-0.009	0.006	-0.011
	(0.13)	(0.44)	(0.28)
CFO Age	0.001	0.000	0.001[b]
	(0.18)	(0.81)	(0.04)
Firm Controls			
Assets1	-0.002	-0.002	0.003
	(0.36)	(0.49)	(0.36)
Perf	0.000	0.000	0.000
	(0.28)	(0.77)	(0.53)
Prior CFO fired	-0.036	-0.011	-0.042[c]
	(0.12)	(0.35)	(0.08)
Prior CFO retired	0.003	-0.004	-0.016[c]
	(0.66)	(0.69)	(0.10)
Prior CFO took another job	0.004	0.003	0.002
	(0.75)	(0.86)	(0.83)
Prior CFO promoted	-0.011	0.004	-0.036[a]
	(0.19)	(0.74)	(0.00)
Intercept	-0.029	-0.002	-0.045
	(0.49)	(0.97)	(0.33)
Year fixed effects	Yes	Yes	Yes
R^2	0.153	0.255	0.404
N	222	126	96

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 3. Multivariate Analysis of the Influence of CFO Gender on Firm Performance

This table reports the OLS results (Equation 2) explaining the impact of the new CFO on firm performance. The dependent variable is *ΔPerf*. All firm variables are measured as of the fiscal year-end prior to the CFO appointment and are industry adjusted. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	All Firms			**High MTB**		
Independent variables	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Female CFO	**1.712[b]**	**1.976[b]**	**1.921[b]**	**1.382**	**1.934**	**1.725**
	(0.05)	**(0.03)**	**(0.03)**	**(0.27)**	**(0.14)**	**(0.18)**
CFO Controls						
Insider	0.665	0.593	0.557	1.595[c]	1.373	1.301
	(0.33)	(0.40)	(0.42)	(0.08)	(0.14)	(0.16)
MBA	0.836	0.987	0.924	1.134	1.277	1.182
	(0.19)	(0.13)	(0.15)	(0.20)	(0.16)	(0.19)
Was-CFO	-0.390	-0.307	-0.414	-0.552	-0.457	-0.542
	(0.56)	(0.66)	(0.56)	(0.55)	(0.63)	(0.57)
MGT-EXP	2.371[a]	2.335[b]	2.314[b]	3.728[a]	3.823[a]	3.624[a]
	(0.01)	(0.02)	(0.02)	(0.00)	(0.00)	(0.00)
ACC-BKG	-0.523	-0.393	-0.407	-0.535	-0.446	-0.534
	(0.43)	(0.56)	(0.55)	(0.54)	(0.62)	(0.54)
FIN-BKG	-0.631	-0.669	-0.765	-0.336	-0.420	-0.503
	(0.37)	(0.36)	(0.29)	(0.73)	(0.67)	(0.62)
CFO Age	0.070	0.077	0.080	0.054	0.065	0.058
	(0.26)	(0.21)	(0.20)	(0.52)	(0.45)	(0.50)
Firm Controls						
Assets1	-0.598[a]	-0.648[a]	-0.608[a]	-1.004[a]	-1.112[a]	-1.064[a]
	(0.01)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Leverage1	0.018	0.014	0.012	0.008	0.005	0.004
	(0.31)	(0.46)	(0.51)	(0.73)	(0.82)	(0.88)
Liquidity	0.013	0.018	0.016	0.014	0.018	0.018
	(0.67)	(0.57)	(0.61)	(0.68)	(0.62)	(0.60)
R&D	-0.063[a]	-0.063[a]	-0.063[a]	-0.064[a]	-0.065[a]	-0.064[a]
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
MTB1	-1.031[a]	-1.010[a]	-1.004[a]	-1.345[a]	-1.335[a]	-1.307[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Div	-0.041	-0.035	-0.044	-0.010	0.027	-0.049
	(0.21)	(0.30)	(0.19)	(0.96)	(0.91)	(0.83)
No_SIC	-0.297	-0.369[c]	-0.365[c]	-0.245	-0.320	-0.403
	(0.11)	(0.06)	(0.07)	(0.37)	(0.29)	(0.19)
Capex1	-0.311[a]	-0.323[a]	-0.326[a]	-0.346[a]	-0.360[a]	-0.367[a]
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Vol	2.908	3.036	3.134	3.467	3.691	3.864
	(0.22)	(0.20)	(0.18)	(0.18)	(0.15)	(0.12)
TMT-GD		-1.686[a]			-2.831[a]	
		(0.01)			(0.00)	
Board-GD		0.627			1.103	
		(0.41)			(0.28)	
CEO Tenure			-0.151[a]			-0.159[a]
			(0.00)			(0.00)
Board Size			-0.013			0.121
			(0.92)			(0.53)
Intercept	-4.812	-4.832	-4.040	-5.183	-4.616	-4.082
	(0.14)	(0.13)	(0.23)	(0.23)	(0.28)	(0.36)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.142	0.150	0.154	0.183	0.197	0.195
N	1,349	1,285	1,285	876	839	839

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 3. (Continued)

	Low MTB		
Independent variables	**(7)**	**(8)**	**(9)**
Female CFO	**2.116[c]**	**1.943[c]**	**2.056[c]**
	(0.06)	**(0.10)**	**(0.08)**
CFO Controls			
Insider	-1.314	-1.143	-1.188
	(0.15)	(0.23)	(0.21)
MBA	0.605	0.666	0.628
	(0.41)	(0.39)	(0.41)
Was-CFO	-0.911	-1.020	-1.092
	(0.27)	(0.24)	(0.21)
MGT-EXP	-0.618	-0.719	-0.677
	(0.55)	(0.50)	(0.52)
ACC-BKG	0.018	0.247	0.300
	(0.98)	(0.77)	(0.73)
FIN-BKG	-0.988	-1.092	-1.156
	(0.23)	(0.20)	(0.18)
CFO Age	0.088	0.087	0.101
	(0.21)	(0.23)	(0.17)
Firm Controls			
Assets1	-0.160	-0.241	-0.219
	(0.59)	(0.44)	(0.50)
Leverage1	0.035	0.030	0.026
	(0.20)	(0.31)	(0.39)
Liquidity	-0.055	-0.068	-0.073
	(0.35)	(0.27)	(0.24)
R&D	0.116	0.128[c]	0.125[c]
	(0.11)	(0.09)	(0.09)
MTB1	-0.273	-0.224	-0.222
	(0.56)	(0.63)	(0.64)
Div	-0.067[a]	-0.064[b]	-0.064[b]
	(0.01)	(0.02)	(0.02)
No_SIC	-0.162	-0.178	-0.174
	(0.51)	(0.48)	(0.49)
Capex1	-0.262[a]	-0.268[a]	-0.267[a]
	(0.01)	(0.01)	(0.01)
Vol	-3.234	-5.065	-4.609
	(0.37)	(0.20)	(0.24)
TMT-GD		-0.285	
		(0.73)	
Board-GD		0.221	
		(0.84)	
CEO Tenure			-0.103
			(0.11)
Board Size			-0.029
			(0.88)
Intercept	-2.121	-3.514	-3.455
	(0.60)	(0.40)	(0.43)
Year fixed effects	Yes	Yes	Yes
R^2	0.122	0.122	0.128
N	473	446	446

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 4. Multivariate Analysis of the Influence of CFO Gender on Excess Cash Holdings

This table reports the OLS results (Equation 4) explaining the impact of the new CFO on excess cash holdings. The dependent variable is *ΔExCash*. All firm variables are measured as of the fiscal year-end prior to the CFO appointment. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	Cash-rich firms	**Cash-poor firms**	**Normal firms**
Independent variables	**(1)**	**(2)**	**(3)**
Female CFO	**-0.387[b]**	**0.063**	**0.069**
	(0.04)	**(0.92)**	**(0.57)**
CFO Controls			
Insider	0.160	-0.184	0.058
	(0.22)	(0.52)	(0.59)
MBA	0.046	0.848[a]	-0.050
	(0.73)	(0.00)	(0.62)
Was-CFO	0.095	-0.236	0.049
	(0.53)	(0.40)	(0.65)
MGT-EXP	0.131	-0.565[c]	-0.073
	(0.47)	(0.09)	(0.59)
ACC-BKG	-0.163	0.049	0.047
	(0.25)	(0.87)	(0.66)
FIN-BKG	-0.042	-0.467[c]	0.007
	(0.78)	(0.08)	(0.95)
CFO Age	0.007	0.022	-0.009
	(0.60)	(0.34)	(0.32)
Firm Controls			
NWC	0.221	-1.679	-0.352
	(0.34)	(0.26)	(0.39)
MTB2	0.013	-0.082	0.000
	(0.24)	(0.54)	(0.98)
Cf	-0.294	1.431	-0.509
	(0.53)	(0.36)	(0.25)
Assets2	0.173[a]	-0.121	0.033
	(0.00)	(0.29)	(0.36)
Capex2	-0.477	-1.689	-0.980
	(0.69)	(0.51)	(0.26)
Acq	-0.590	-1.139	-1.278[c]
	(0.23)	(0.30)	(0.10)
Leverage2	-0.243[b]	-2.741[a]	0.094
	(0.05)	(0.00)	(0.74)
Div_dummy	-0.308[c]	-0.357	0.009
	(0.10)	(0.37)	(0.94)
Intercept	-2.790[a]	2.113	0.467
	(<.0001)	(0.26)	(0.51)
Year and industry fixed-effects	Yes	Yes	Yes
R^2	0.506	0.752	0.262
N	287	169	604

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 5. Robustness Check: Logistic Regression of Hiring a Female CFO

This table presents regression analysis of the likelihood of hiring a female CFO. The dependent variable is a binary variable that equals one if a firm hires a female CFO and zero otherwise (*Female CFO*). All independent firm variables are measured as of the fiscal year-end prior to the CFO appointments. See Appendix B for variable definitions. Numbers in parentheses are P-values.

Independent variables	**All firms**	**High MTB**	**Low MTB**
	(1)	(2)	(3)
TMT-GD-Yr-1	0.919[a]	0.694[a]	1.769[a]
	(<.0001)	(0.01)	(<.0001)
CEO Tenure	0.020	0.021	0.025
	(0.12)	(0.21)	(0.31)
Perf	0.016	0.014	0.033
	(0.11)	(0.21)	(0.19)
Assets1	0.142[b]	0.145	0.437[a]
	(0.05)	(0.11)	(0.01)
Leverage1	-0.014[b]	-0.014[a]	-0.017
	(0.04)	(0.00)	(0.27)
Liquidity	0.021[a]	0.018[b]	0.028
	(0.00)	(0.02)	(0.15)
R&D	-0.001	-0.001	0.018
	(0.79)	(0.75)	(0.69)
MTB1	-0.100	-0.121	-0.149
	(0.18)	(0.19)	(0.37)
Div	-0.055	-0.073	0.009
	(0.30)	(0.27)	(0.84)
No_SIC	-0.179[b]	-0.296[b]	-0.186
	(0.04)	(0.02)	(0.18)
Capex1	-0.052[c]	-0.051	-0.057
	(0.06)	(0.14)	(0.24)
Vol	-0.012	0.142	-0.835
	(0.98)	(0.78)	(0.69)
Intercept	-3.152[a]	-2.175[c]	-15.235
	(0.00)	(0.06)	(0.97)
Year fixed effects	Yes	Yes	Yes
R^2	0.125	0.129	0.290
N	1,349	876	473

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 6A. Robustness Check on Firm Performance: Propensity Method and Heckman's Two-Stage Models

This table reports results of the propensity method and the Heckman two-stage regressions explaining the impact of the new CFO on firm performance. The dependent variable is *ΔPerf*. All firm variables are measured as of the fiscal year-end prior to the CFO appointment and are industry adjusted. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	Propensity Score Sample			**Full Sample**	
	All Firms	**High MTB**	**Low MTB**	**Heckman Two-Stage Model**	
Independent variables	**(1)**	**(2)**	**(3)**	**Stage 1**	**Stage 2**
Female CFO	**1.726[c]**	**1.066**	**2.737[b]**		**1.537[c]**
	(0.09)	**(0.52)**	**(0.04)**		**(0.08)**
CFO Controls					
Insider	-2.157[c]	1.317	-2.226		0.425
	(0.08)	(0.53)	(0.24)		(0.49)
MBA	3.008[a]	0.233	-0.515		0.708
	(0.01)	(0.89)	(0.67)		(0.23)
Was-CFO	0.061	-1.637	-2.548[c]		-0.099
	(0.96)	(0.29)	(0.09)		(0.87)
MGT-EXP	0.626	2.597	-4.868[a]		1.163
	(0.69)	(0.25)	(0.01)		(0.15)
ACC-BKG	0.650	1.155	-0.006		-0.226
	(0.59)	(0.54)	(1.00)		(0.72)
FIN-BKG	-2.093	-3.454[c]	-0.016		-0.792
	(0.11)	(0.06)	(0.99)		(0.21)
CFO Age	-0.084	-0.177	0.120		0.006
	(0.46)	(0.26)	(0.43)		(0.92)
Inverse Mills Ratio					-18.148
					(0.55)
Firm Controls					
Assets1	-0.983[a]	-0.427	0.310	0.084[b]	-1.708
	(0.01)	(0.46)	(0.69)	(0.02)	(0.43)
Leverage1	0.070[b]	0.036	0.061	-0.007[b]	0.138
	(0.02)	(0.49)	(0.36)	(0.04)	(0.45)
Liquidity	0.069	0.080	0.054	0.012[a]	-0.151
	(0.20)	(0.21)	(0.49)	(0.00)	(0.61)
R&D	-0.039[c]	-0.010	0.937[c]	-0.002	-0.034
	(0.07)	(0.83)	(0.07)	(0.42)	(0.52)
MTB1	-0.938[c]	-0.768	-0.708	-0.018	-0.354
	(0.07)	(0.11)	(0.46)	(0.58)	(0.49)
Div	0.273	-0.323	0.308	-0.030	0.507
	(0.49)	(0.40)	(0.62)	(0.26)	(0.57)
No_SIC	0.965[b]	-0.694	-0.386	-0.100[b]	1.285
	(0.03)	(0.39)	(0.57)	(0.02)	(0.62)
Capex1	-0.147	-0.161	-0.437	-0.020	0.071
	(0.20)	(0.39)	(0.13)	(0.11)	(0.89)
Vol	-0.044	2.026	-7.678	-0.037	3.630
	(0.99)	(0.57)	(0.40)	(0.88)	(0.17)
Intercept	3.258	11.723	-4.429	-1.167[a]	29.174
	(0.65)	(0.19)	(0.51)	(<.0001)	(0.56)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
R^2	0.288	0.253	0.452	0.072	0.119
N	260	160	100	1,349	1,349

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 6A. (Continued)

	Controlling for CEO effects		
	All Firms	**High MTB**	**Low MTB**
Independent variables	**(4)**	**(5)**	**(6)**
Female CFO	**2.111[c]**	**1.319**	**4.024[b]**
	(0.06)	**(0.36)**	**(0.02)**
CFO Controls			
Insider	0.237	0.977	-1.417
	(0.79)	(0.42)	(0.23)
MBA	-0.547	-0.206	-1.097
	(0.50)	(0.85)	(0.29)
Was-CFO	-1.104	-1.093	-2.261[b]
	(0.21)	(0.34)	(0.05)
MGT-EXP	3.122[a]	3.892[a]	0.681
	(0.01)	(0.01)	(0.68)
ACC-BKG	-0.553	-0.222	-1.172
	(0.52)	(0.84)	(0.33)
FIN-BKG	-1.010	-0.915	-1.263
	(0.26)	(0.45)	(0.22)
CFO Age	0.068	0.038	0.220[b]
	(0.36)	(0.69)	(0.02)
Inverse Mills Ratio			
Firm Controls			
Assets1	-0.794[a]	-1.016[a]	-0.578
	(0.00)	(0.00)	(0.18)
Leverage1	0.021	0.010	0.052
	(0.39)	(0.73)	(0.15)
Liquidity	-0.062[c]	-0.055	-0.153[b]
	(0.09)	(0.18)	(0.03)
R&D	-0.010	-0.012	0.202
	(0.75)	(0.72)	(0.61)
MTB1	-0.848[b]	-1.142[b]	0.455
	(0.05)	(0.03)	(0.52)
Div	-0.075[b]	-0.320	-0.095[a]
	(0.02)	(0.15)	(0.00)
No_SIC	-0.191	-0.097	-0.295
	(0.42)	(0.75)	(0.42)
Capex1	-0.411[a]	-0.426[a]	-0.372[a]
	(<.0001)	(0.00)	(0.00)
Vol	4.430	4.471	2.108
	(0.13)	(0.17)	(0.47)
Intercept	-3.139	-1.375	-7.449
	(0.43)	(0.78)	(0.16)
Year fixed effects	Yes	Yes	Yes
R^2	0.122	0.148	0.184
N	875	594	281

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 6B. Robustness Check on Excess Cash Holdings: Heckman's Two-Stage Models

This table reports results of the propensity method and the Heckman two-stage regressions explaining the impact of the new CFO on excess cash holdings. The dependent variable is *ΔExCash*. All firm variables are measured as of the fiscal year-end prior to the CFO appointment. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	Cash-rich firms		**Cash-poor firms**		**Normal firms**	
	Stage 1	**Stage 2**	**Stage 1**	**Stage 2**	**Stage 1**	**Stage 2**
Independent variables						
Female CFO		**-0.391[b]**		**0.068**		**0.107**
		(0.04)		**(0.91)**		**(0.39)**
CFO Controls						
Insider		0.160		-0.251		0.046
		(0.22)		(0.41)		(0.67)
MBA		0.046		0.831[a]		-0.065
		(0.73)		(0.01)		(0.51)
Was-CFO		0.094		-0.257		0.040
		(0.54)		(0.35)		(0.71)
MGT-EXP		0.131		-0.544[c]		-0.057
		(0.47)		(0.10)		(0.67)
ACC-BKG		-0.161		0.041		0.059
		(0.26)		(0.89)		(0.58)
FIN-BKG		-0.041		-0.444		0.008
		(0.79)		(0.11)		(0.95)
CFO Age		0.007		0.024		-0.008
		(0.60)		(0.29)		(0.35)
Inverse Mills Ratio		0.171		-1.626		-8.677[b]
		(0.91)		(0.43)		(0.04)
Firm Controls						
NWC	0.931	0.363	2.718	-5.653	-0.363	2.344[c]
	(0.17)	(0.78)	(0.17)	(0.27)	(0.46)	(0.08)
MTB2	-0.042	0.007	0.057	-0.177	-0.059	0.455[b]
	(0.16)	(0.89)	(0.82)	(0.35)	(0.32)	(0.04)
Cf	1.88	-0.010	1.619	-0.703	0.769	-6.275[b]
	(0.06)	(1.00)	(0.64)	(0.82)	(0.40)	(0.02)
Assets2	0.090	0.186	-0.168	0.130	0.029	-0.174[c]
	(0.27)	(0.13)	(0.37)	(0.71)	(0.59)	(0.09)
Capex2	-0.167	-0.487	4.066	-7.397	-0.494	2.795
	(0.94)	(0.68)	(0.39)	(0.35)	(0.70)	(0.18)
Acq	0.689	-0.477	-13.588	19.995	1.971[b]	-15.455[b]
	(0.60)	(0.66)	(0.20)	(0.46)	(0.04)	(0.03)
Leverage2	-0.458	-0.311	1.457	-4.947	-0.586	4.404[b]
	(0.42)	(0.61)	(0.288)	(0.11)	(0.19)	(0.03)
Div_dummy	-0.439	-0.370	0.709	-1.368	0.011	-0.064
	(0.15)	(0.52)	(0.23)	(0.31)	(0.95)	(0.63)
Intercept	-5.722	-3.800	-5.002	10.467	-5.672	50.906[b]
	(0.99)	(0.66)	(0.99)	(0.33)	(0.99)	(0.04)
Year and industry fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.089	0.506	0.133	0.753	0.050	0.268
N	287	287	169	169	604	604

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 7. Robustness Check on Firm Performance: Difference-in-Differences Method

This table reports results of the difference-in-differences regressions (Equation 6) explaining the impact of new female CFOs on firm performance. The dependent variable is *Perf*. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	Dif-in-dif Sample		
Independent variables	**All Firms**	**High MTB**	**Low MTB**
	(1)	**(2)**	**(3)**
Post * Female CFO	**1.819[b]**	**1.653**	**1.673[c]**
	(0.04)	**(0.17)**	**(0.09)**
Female CFO	-0.088	-0.062	-0.220
	(0.90)	(0.95)	(0.78)
Post	-0.018	-0.086	0.066
	(0.95)	(0.84)	(0.85)
Assets1	1.185[a]	1.243[a]	0.565[a]
	(<.0001)	(<.0001)	(<.0001)
Leverage1	-0.034[a]	-0.026[b]	-0.053[a]
	(0.00)	(0.03)	(<.0001)
Liquidity	0.003	0.010	-0.036
	(0.89)	(0.66)	(0.22)
R&D	-0.074[a]	-0.070[a]	-0.121[a]
	(0.01)	(0.01)	(0.01)
MTB1	3.204[a]	2.703[a]	0.733
	(<.0001)	(<.0001)	(0.22)
Div	0.108[a]	0.072[b]	-0.174
	(0.01)	(0.04)	(0.52)
Capex1	0.565[a]	0.596[a]	0.418[a]
	(<.0001)	(<.0001)	(<.0001)
Intercept	-6.326[a]	-0.608	-8.499[a]
	(<.0001)	(0.68)	(<.0001)
Year and industry fixed effects	Yes	Yes	Yes
R^2	0.307	0.286	0.137
N	5,486	3,391	2,095

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 8. Robustness Check on Firm Performance: Mover Dummy Variable Method

This table reports results of the MDV approach on the CFO mover sample. Panel A reports the regression results on the determinant of firm performance with and without the CFO fixed effects (Equations 7 and 8). Panel B reports the results from regressing CFO fixed effects in firm performance (from Panel A) on observable time-invariant executive characteristics (Equation 9). All firm variables are measured as of the fiscal year-end prior to the CFO appointment and are industry adjusted. See Appendix B for variable definitions. Numbers in parentheses are P-values.

Panel A		
Dependent variable*: *ΔPerf		
	Pool OLS (No CFO fixed effects)	**CFO fixed effects**
Firm Controls		
Assets1	-0.709	-0.098
	(0.17)	(0.88)
Leverage1	0.026	0.041
	(0.59)	(0.45)
Liquidity	-0.024	-0.074
	(0.84)	(0.41)
R&D	0.123	0.028
	(0.16)	(0.69)
Dividends	-0.683[c]	0.090
	(0.09)	(0.81)
Intercept	0.198	-9.059[a]
	(0.94)	(0.01)
Year fixed effects	Yes	Yes
Adj. R^2	0.042	0.102
N	308	308
Panel B		
***Dependent variable*:** CFO fixed effects in firm performance		
	Model 1	**Model 2**
Female CFO	**3.804[b]**	**4.360[a]**
	(0.02)	**(0.01)**
MBA	1.598	2.342[c]
	(0.27)	(0.08)
Was-CFO		-2.016
		(0.28)
MGT-EXP		6.285[a]
		(0.00)
ACC-BKG		4.673[a]
		(0.00)
FIN-BKG		-2.601
		(0.12)
Year of Birth	-0.281[b]	-0.293[a]
	(0.02)	(0.01)
Year of Appointment	0.233[c]	0.013
	(0.10)	(0.94)
Intercept	89.182	551.579
	(0.66)	(0.14)
R^2	0.024	0.092

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 9. Distinguish the Impacts of Overconfidence and Ethical Sensitivities

This table compares cash-rich firms' excess cash holdings (*ExCash*) between those with female CFOs and those with male CFOs in different categories of economic conditions

Panel A: Full sample					
Economic conditions	**Male CFO**		**Female CFO**		**Diff.**
	Mean	**N**	**Mean**	**N**	
All time	1.4714	5,692	1.3563	477	0.115[a]
No crisis	1.4801	4,701	1.3475	397	0.1326[a]
Crisis	1.4298	991	1.4001	80	0.0297

CFO gender	**No crisis**		**Crisis**		**Diff.**
	Mean	**N**	**Mean**	**N**	
Male CFO	1.4801	4701	1.4298	991	0.0503[a]
Female CFO	1.3475	397	1.4001	80	-0.0526

Panel B: Propensity score subsample					
Economic conditions	**Male CFO**		**Female CFO**		**Diff.**
	Mean	**N**	**Mean**	**N**	
All time	1.4946	477	1.3563	477	0.1382[a]
No crisis	1.5056	393	1.3475	397	0.1581[a]
Crisis	1.4428	84	1.4001	80	0.0427

CFO gender	**No crisis**		**Crisis**		**Diff.**
	Mean	**N**	**Mean**	**N**	
Male CFO	1.5056	393	1.4428	84	0.0628
Female CFO	1.3475	397	1.4001	80	-0.0526

Table 10. Firm Performance Based on Buy-and-Hold Returns

This table compares the change in buy-and-hold returns (*ΔBHR*) and the change in industry-adjusted buy-and-hold returns (*ΔBHAR*) for firms hiring female CFOs and those hiring male CFOs. *ΔBHR* is measured as the difference between 12-month buy-and-hold returns following the appointment (starting the month post appointment) and 12-month buy-and-hold returns prior to the appointment (ending in the month prior to the appointment). To calculate *BHAR*, I subtract the return of the benchmark, the 49 Fama and French (1997) industry groupings returns, from the raw buy-and-hold returns. I report the means and perform a t-test to examine the significance of the difference.

	All Firms			High MTB			Low MTB		
Different measures of buy-and-hold returns	**Male CFOs**	**Female CFOs**	**Diff.**	**Male CFOs**	**Female CFOs**	**Diff.**	**Male CFOs**	**Female CFOs**	**Diff.**
BHR (Full sample)									
Post-app. 12-month BHR	0.188	0.175	0.013	0.227	0.165	0.062	0.127	0.187	-0.060
Pre-app. 12-month BHR	0.133	0.135	-0.002	0.126	0.194	-0.068	0.143	0.055	0.088[b]
Difference (M-F)	0.055	0.040	0.015	0.101	-0.029	0.130	-0.016	0.132	-0.148[c]
BHR (Propensity Score Sample)									
Post-app. 12-month BHR	0.084	0.175	-0.091	0.325	0.165	0.160	0.079	0.187	-0.108
Pre-app. 12-month BHR	0.088	0.135	-0.047	0.130	0.194	-0.064	0.211	0.055	0.156
Difference (M-F)	-0.004	0.040	-0.044	0.195	-0.029	0.224	-0.132	0.132	-0.264[b]
BHAR (Full sample)									
Post-app. 12-month BHAR	0.098	0.115	-0.017	0.141	0.142	-0.001	0.031	0.079	-0.049
Pre-app. 12-month BHAR	0.006	0.031	-0.025	-0.001	0.093	-0.094	0.017	-0.053	0.070[c]
Difference (M-F)	0.092	0.084	0.008	0.142	0.049	0.093	0.013	0.132	-0.119[c]

Table 11. Impact of CFO Gender on Cost Efficiency and WCM Efficiency

This table reports results of OLS regressions explaining the difference in decision making between male and female CFOs. The dependent variables are *ΔSG&A*, *ΔCOGS*, *ΔDSO*, and *ΔDIO*. All firm variables are measured as of the fiscal year-end prior to the CFO appointment and are industry adjusted. See Appendix B for variable definitions. Numbers in parentheses are P-values.

	ΔSG&A			***ΔCOGS***		
Independent variables	**All Firms**	**High MTB**	**Low MTB**	**All Firms**	**High MTB**	**Low MTB**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Female CFO	**-4.595[a]**	**-4.176[c]**	**-5.232[c]**	**-2.935[c]**	**-4.747[c]**	**0.869**
	(0.01)	**(0.09)**	**(0.08)**	**(0.10)**	**(0.09)**	**(0.44)**
CFO Controls						
Insider	-4.768	-6.248	0.327	0.279	-0.719	1.855[b]
	(0.29)	(0.31)	(0.60)	(0.92)	(0.88)	(0.02)
MBA	-2.788	-4.612	0.008	-0.552	-1.657	0.889
	(0.28)	(0.24)	(0.99)	(0.78)	(0.60)	(0.22)
Was-CFO	2.256	3.562	0.707	0.880	1.569	-0.358
	(0.42)	(0.40)	(0.43)	(0.64)	(0.57)	(0.64)
MGT-EXP	5.211	6.872	-0.682	1.449	1.545	0.735
	(0.43)	(0.41)	(0.46)	(0.57)	(0.65)	(0.51)
ACC-BKG	-0.472	-1.152	0.167	0.352	-0.021	0.772
	(0.58)	(0.38)	(0.78)	(0.87)	(0.99)	(0.44)
FIN-BKG	-3.659	-5.201	-0.700	-3.159	-4.826	-0.171
	(0.16)	(0.20)	(0.36)	(0.16)	(0.19)	(0.89)
CFO Age	-0.337[c]	-0.446	-0.171[c]	-0.003	0.046	-0.117[c]
	(0.10)	(0.16)	(0.08)	(0.99)	(0.90)	(0.10)
Firm Controls						
Assets1	-0.251	-0.147	0.384[c]	-0.276	-0.417	0.004
	(0.46)	(0.72)	(0.06)	(0.64)	(0.66)	(0.99)
ROA	0.739	0.897	0.064[c]	0.488[b]	0.437[c]	0.677[a]
	(0.14)	(0.13)	(0.10)	(0.03)	(0.09)	(0.01)
MTB	-2.389	-2.741	-0.002	-1.156	-0.968	-2.067[b]
	(0.19)	(0.19)	(0.99)	(0.32)	(0.49)	(0.03)
Intercept	17.213[b]	24.419[c]	7.014	4.618	6.277	7.270[c]
	(0.03)	(0.07)	(0.19)	(0.70)	(0.73)	(0.10)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.057	0.074	0.159	0.029	0.027	0.273
N	1,169	804	365	1,338	868	470

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 11. (Continued)

	ΔDSO			*ΔDIO*		
Independent variables	**All Firms**	**High MTB**	**Low MTB**	**All Firms**	**High MTB**	**Low MTB**
	(7)	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
Female CFO	**-4.052**	**0.384**	**-7.265[c]**	**-2.443**	**-2.851**	**1.300**
	(0.23)	**(0.94)**	**(0.09)**	**(0.51)**	**(0.61)**	**(0.68)**
CFO Controls						
Insider	-6.132[c]	-7.486	-0.349	-2.765	-4.356	-1.133
	(0.09)	(0.15)	(0.88)	(0.29)	(0.25)	(0.65)
MBA	-0.922	-1.603	0.207	-0.742	-1.837	-0.153
	(0.82)	(0.78)	(0.93)	(0.76)	(0.61)	(0.94)
Was-CFO	-2.526	-3.221	-1.273	2.544	1.758	2.294
	(0.41)	(0.45)	(0.56)	(0.27)	(0.58)	(0.29)
MGT-EXP	3.099	-1.076	5.010[b]	1.551	-1.643	8.351[c]
	(0.40)	(0.80)	(0.06)	(0.63)	(0.66)	(0.07)
ACC-BKG	-3.719	-6.026	-0.558	-0.643	-2.541	3.404[c]
	(0.23)	(0.16)	(0.79)	(0.78)	(0.46)	(0.08)
FIN-BKG	-5.067[a]	-4.235	-3.129	-0.945	1.477	-5.354[a]
	(0.01)	(0.14)	(0.22)	(0.70)	(0.67)	(0.01)
CFO Age	-0.091	0.252	-0.123	-0.650[a]	-0.748[b]	-0.321[c]
	(0.75)	(0.60)	(0.36)	(0.01)	(0.02)	(0.10)
Firm Controls						
Assets1	0.380	0.524	0.461	1.534[c]	1.996[c]	-0.250
	(0.63)	(0.71)	(0.67)	(0.07)	(0.06)	(0.76)
DPO	-0.129[c]	-0.154[b]	0.016	-0.142[c]	-0.151[c]	-0.011
	(0.09)	(0.05)	(0.81)	(0.09)	(0.08)	(0.52)
Turnover	0.455	-0.174	1.552	-0.635	-1.023	0.020
	(0.65)	(0.89)	(0.17)	(0.39)	(0.26)	(0.98)
Stborrow	-231.408	-335.400	-61.428[c]	-31.262	-45.554	0.183
	(0.15)	(0.13)	(0.06)	(0.20)	(0.13)	(0.99)
Intercept	13.766	7.227	6.061	33.762[a]	39.080[b]	14.722
	(0.21)	(0.69)	(0.45)	(0.00)	(0.02)	(0.12)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.180	0.244	0.071	0.168	0.199	0.109
N	1,341	875	466	1,325	864	461

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

Table 12. Impact of CFO Gender on Acquisitions and Divestitures

This table compares the number of acquisitions and divestitures, and total acquisition and divestiture values in year (t+1) and year (t+2) for firms hiring male CFOs and firms hiring female CFOs for the whole sample and for high and low growth subgroups. I perform a t-test to examine the significance of the difference.

	All Firms			**High MTB**			**Low MTB**		
	Male CFOs	**Female CFOs**	**Diff.**	**Male CFOs**	**Female CFOs**	**Diff.**	**Male CFOs**	**Female CFOs**	**Diff.**
Acquisitions									
No. of Acquisitions	1.184	0.946	0.238	1.402	1.238	0.165	0.772	0.469	0.303[c]
Total deal value / market assets	9.190	5.726	3.464	10.540	6.630	3.910	4.572	1.077	3.495[c]
Total deal value / market equity	13.078	8.873	4.205	14.671	10.198	4.473	7.628	2.055	5.573[c]
Divestitures									
No. of Divestitures	0.703	0.731	-0.028	0.758	0.675	0.083	0.601	0.820	-0.220
Total deal value / market assets	1.268	0.867	0.401	1.615	0.867	0.748	1.646	2.241	-0.595
Total deal value / market equity	2.972	1.859	1.113	3.676	1.620	2.056[c]	0.615	0.867	-0.252

[a] Significant at the 0.01 level.
[b] Significant at the 0.05 level.
[c] Significant at the 0.10 level.

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ABSTRACT

GENDER AND DECISION-MAKING IN THE C-SUITE

by

TRANG DOAN

August 2018

Advisor: Dr. Mai Iskandar-Datta

Major: Business Administration (Finance)

Degree: Doctor of Philosophy

This study empirically tests the implications of five theories on the importance of gender in the C-Suite. Specifically, I examine the impact of the Chief Financial Officer (CFO) gender on the stock price response at the appointment of the executive and on post-hiring firm performance. The results from both tests are in support of the notion that female executives are less overconfident, but not less risk-averse, than their male counterparts. Particularly, I find that investors respond relatively less favorably to the appointment of female CFOs compared to that of male CFOs at firms characterized by high uncertainty. Further, the evidence also shows that female CFOs significantly improve performance, represented by cash flow and returns, at firms operating in low volatility settings. The enhanced firm performance can be attributed to reduction in costs and enhanced efficiency of working capital management. Finally, I document that female CFOs are more likely to reduce the excess cash reserves than their male counterparts and mitigate the agency costs of cash holdings, which are also best explained by the overconfidence hypothesis. The findings are robust to a battery of robustness checks.

AUTOBIOGRAPHICAL STATEMENT

TRANG DOAN

EDUCATION

Wayne State University

Detroit, US

Ph.D. in Business Administration (Finance)

2018

RMIT University

Vietnam

MBA

2010

University of Economics – Ho Chi Minh City

Vietnam

B.A. in International Business

2007

RESEARCH INTERESTS

Corporate Governance, Executive Compensation, Mergers and Acquisitions, Analyst Forecast

DISSERTATION

Topic: "Gender and decision-making in the C-Suite."

TEACHING EXPERIENCE

Bank Management, Undergraduate	Winter 2018
Business Finance, Undergraduate	Winter 2018
Bank Management, Undergraduate	Fall 2017
Business Finance, Undergraduate	Fall 2017
Bank Management, Undergraduate	Spr/Summer 2017
Business Finance, Undergraduate	Spr/Summer 2017
Business Finance, Undergraduate	Spr/Summer 2016
Business Finance, Undergraduate	Winter 2016
Business Finance, Undergraduate	Fall 2015