

**The Impact of Chief Financial Officer Overconfidence on Corporate
Decisions**

by

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Abstract

This thesis investigates the effects of Chief Financial Officer (CFO) overconfidence on corporate decisions. The thesis specifically explores: if overconfident CFOs use earnings management, what influence CFO overconfidence has on conditional accounting conservatism, and how overconfident CFOs impact stock price crash risk. Through the lens of upper echelons and overconfidence theories and based on a large sample size of U.S.-listed firms, this thesis finds that overconfident CFOs use accrual-based earnings management (AEM) due to their high risk-taking incentives and low career concern. Overconfident CFOs engage in real earnings management (REM) as they underestimate the cost of deviating from optimal business strategies by using REM and overestimate their managerial ability to mitigate this cost of REM (Paper 1). Moreover, overconfident CFOs, particularly those with significant power, tend to reduce conditional accounting conservatism (Paper 2). Furthermore, firms led by overconfident CFOs increase future stock price crash risk (Paper 3). To increase the robustness of these findings, this thesis carries out a series of robustness tests, including using the entropy balance method, conducting difference-in-difference tests based on the propensity score matching sample, and changing the measure of main variables. After that, each paper, relying on power circulation and false consensus effect theories, further discusses the effect of overconfident CEOs on the relationship between CFO overconfidence and corporate decisions. Therefore, this thesis makes incremental contributions to the literature, theory, and practice. Specifically, these findings add a new determinant, CFO overconfidence, to earnings management, conditional accounting conservatism, and stock price crash risk literature. Besides, this study responds to calls from prior studies for more research to provide a deeper insight into CFO overconfidence and the joint effect of CEO overconfidence and CFO overconfidence, extending the overconfidence literature. The thesis also demonstrates the applicability of upper echelons, overconfidence, power circulation, and false consensus effect theories in the CFO overconfidence study. Lastly, this thesis has important implications for academia and practice in recognizing the pros and cons of CFO overconfidence in corporate decision.

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Publications and conferences papers from this thesis

(i) Published papers:

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DEDICATION

DEDICATION

To my dear parents. All my achievements originated with you and are entirely yours FOREVER.

To all the people who helped me. Your support motivates me to keep going.

Abbreviations and Definitions

Abbreviations	Definitions
CFO	Chief Financial Officer
CEO	Chief Executive Officer
TMT	Top Management Team
AEM	Accrual-based Earnings Management
REM	Real Earnings Management
SOX	Sarbanes–Oxley Act
R&D	Research and Development
FASB	Financial Accounting Standards Board
IASB	International Accounting Standards Board
NPV	Net Present Value
FERC	Future Earnings Response Coefficient
GAAP	Generally Accepted Accounting Principles
Non-GAAP	Non-Generally Accepted Accounting Principles
CSR	Corporate Social Responsibility
ESG	Environmental, Social, and Corporate Governance
IPO	Initial Public Offering
SEO	Seasoned Equity Offering
OLS	Ordinary Least Squares
VIFs	Variance Inflation Factors
LM test	Breusch-Pagan Lagrange Multiplier test

Chapter 1 Introduction

1.1 Introduction

1.1.1 Background to the research

Considering that C-suite managers play a vital role in firm decision-making, many studies through the lens of upper echelons theory proposed by [Hambrick and Mason \(1984\)](#) investigate the impact of executives' cognitive biases in corporate decisions. Since cognitive biases are difficult to measure, early empirical studies, following the suggestions made by [Hambrick and Mason \(1984\)](#), use demographic traits to capture managers' cognitive biases. They find that managers' observable characteristics, such as gender, age, experience, and educational backgrounds, significantly affect their decisions (e.g., [Francis et al., 2008](#); [Huang, Rose-Green, and Lee, 2012](#); [Ho et al., 2015](#); [Faccio, Marchica, and Mura, 2016](#); [Nguyen and Soobaroyen, 2022](#)). However, some studies argue that managers' demographic traits have low explanation power for their cognitive biases ([Ge, Jamil, and Yu, 2020](#)).

Given that overconfidence is known as the root of all cognitive biases ([Bazerman & Moore, 2013](#); [Meikle et al., 2016](#); [Malmendier, Pezone, and Zheng, 2022](#)) and [Malmendier and Tate \(2005\)](#) propose the option-based measurement to measure overconfidence, empirical studies shed light on Chief Executive Officer (CEO) overconfidence. They find that firms managed by overconfident CEOs are more likely to make risky investments ([Malmendier and Tate, 2005](#)), invest more in Research and Development (R&D) ([Galasso and Simcoe, 2011](#); [Hirshleifer, Low, and Teoh, 2012](#)), reduce dividend payout ([Deshmukh, Goel, and Howe, 2013](#)), hold more cash for future investment ([Chen, Ho, and Yeh, 2020](#)), issue optimistic forecasting ([Hribar and Yang, 2016](#)), manipulate earnings ([Schrand and Zechman, 2012](#); [Hsieh, Bedard, and Johnstone, 2014](#)), lower accounting conservatism ([Ahmed and Duellman, 2013](#)), engage in more tax avoidance ([Hsieh, Wang, and Demirkan, 2018](#); [Chyz et al., 2019](#)), use short-term debt ([Huang, Tan, and Faff, 2016](#)), and hoard bad news ([Kim, Wang, and Zhang, 2016](#)).

The above studies focus on CEO overconfidence as CEOs set the tone at the top. However, the power circulation theory argues that CEO influence erodes and evaporates with time since the number of rivals and adversaries and

other executives grows (Ocasio, 1994). As Chief Financial Officers (CFOs) are strong candidates for the future CEO position, CFO overconfidence attracts people's attention.

The deputy editor of *CFO Magazine*, McCann (2014), states that "Because CFOs are not actually superhuman, but just people like everyone else, they too are subject to a lengthy list of cognitive biases that influence our decisions and actions. In the corporate finance context, these biases, if unchecked, can have devastating consequences for company performance." Besides, a growing number of studies shed light on the effect of CFO overconfidence. They find that overconfidence is a prevalent trait among CFOs and significantly affects CFOs' decisions, such as financing choice, tax strategies, and cost management (Ben-David, Graham, and Harvey, 2013; Hsieh et al., 2018; Chen et al., 2022; Malmendier et al., 2022). However, surprisingly, the impact of CFO overconfidence on areas in which CFOs play a vital role, such as financial reporting and timely news disclosure, and the consequences of CFO overconfidence are unclear in the current literature, which has inspired the explorations in this thesis.

In addition, based on the false consensus effect theory, prior studies suggest that only studying one type of managerial overconfidence might underestimate the effects of top management teams (TMT)' overconfidence. Thus, Black and Gallemore (2013) and Malmendier et al. (2022) call for papers to study the joint effect of CEO and CFO overconfidence on corporate decisions. In response to their calls, Hsieh et al. (2018) discover that firms with both overconfident CEOs and CFOs are more likely to engage in tax-avoidance activities. Chen et al. (2022) find that overconfident CFOs working with overconfident CEOs are more likely to increase cost stickiness. Nevertheless, the joint impacts of CEO and CFO overconfidence on financial reporting and information disclosure are largely unexplored, motivating this thesis.

1.1.2 Research aims and objectives

The aim of this thesis is to investigate the influence of CFOs' cognitive bias by identifying the impact of CFO overconfidence on financial reporting choices and analyzing the possible consequences of this characteristic. To achieve this aim, the thesis adopts a series of theories during the exploration.

Informed by upper echelons and overconfidence theories (Weinstein, 1980; Hambrick and Mason, 1984), the thesis first studies the relationship between CFO overconfidence and two earnings management methods, namely accrual-based earnings management (AEM) and real earnings management (REM). Relying on the same theoretical strand, this thesis further investigates the influence of CFO overconfidence on another financial reporting attribute, accounting conservatism. Subsequently, the thesis examines the potential consequences of CFO overconfidence, that is, whether CFOs' cognitive bias affects firm stock price crashes. In addition to investigating the effect of individual managers' overconfidence on earnings management, accounting conservatism, and stock price crash risks, this thesis, through the lens of the false consensus effect and power circulation theories (Ross, Greene, and House, 1977; Ocasio, 1994), considers the joint effect of CEO and CFO overconfidence. Besides that, to provide insight into the influence of CFOs' cognitive bias on their decision-making, the thesis, based on the updated upper echelons theory (Hambrick, 2007), tests the other CFOs' traits, such as power, educational background, and job concern, on the influence of overconfident CFOs' decisions.

This thesis is organized according to the three-paper pattern (paper-based PhD thesis). These papers are intended to answer the following research questions:

1. What is the relationship between CFO overconfidence and earnings management? (*Paper 1*)
2. What is the relationship between CFO overconfidence and conditional accounting conservatism? (*Paper 2*)
3. What is the relationship between CFO overconfidence and stock price crash risk? (*Paper 3*)

1.1.3 Motivation for the research

There are several reasons to investigate the influence of CFO overconfidence on earnings management, accounting conservatism, and stock price crash risk. These are outlined further below.

Although overconfidence is a common trait among CFOs (Chen et al., 2022), current literature pays much attention to the influence of CEO overconfidence on corporate decisions (e.g., Malmendier and Tate, 2005; Galasso and Simcoe, 2011; Deshmukh et al., 2013; Chen et al., 2020; Ge et al., 2020) and largely ignores the effect of CFO overconfidence, which might result in biased conclusions. Plenty of studies document that CFO overconfidence dominates CEO overconfidence in some decisions, such as financial choices and low loan loss provisions (Black and Gallemore, 2013; Malmendier et al., 2022). However, whether and how CFO overconfidence affects earnings management, accounting conservatism, and stock price crash risk is largely unknown, motivating this thesis to fill these gaps.

The first paper investigates the relationship between CFO overconfidence and earnings management. The motivation for studying earnings management comes from concerns that aggressive earnings management leads to financial scandals, affecting financial reporting users' interests. Enron's financial fraud caused serious damage to stakeholders and the American economy (Davis, 2002). In addition to Enron, Lucent, Cendant, and MicroStrategy abused earnings management, resulting in more than 34 billion dollars in stock market losses in three days (Magrath and Weld, 2002). These scandals have revealed the importance of earnings management research. Plenty of studies through the lens of agency theory find that CFOs use aggressive earnings management to pursue their own benefits, such as high compensation and career concern (Jiang, Petroni, and Wang, 2010; Feng et al., 2011). These studies assume that CFOs are able to make rational and accurate judgments about their behaviors and benefits. However, the different aims of rational (i.e., non-overconfident) and overconfident CFOs on earnings management decisions are unknown.

The second paper explores the association between CFO overconfidence and accounting conservatism. Whether accounting information should be conservatism is a heated debate in the current literature. From the contracting efficiency perspective, plenty of studies state that timely bad news disclosure help increases contract efficiency (Ahmed et al., 2002; Wittenberg-Moerman, 2008; Zhang, 2008). However, some studies argue that postponed gain recognition gives less valuable information, affecting the investors' judgment

(Holthausen and Watts, 2001). The Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) were opposed to conservative accounting and withdrew the requirement from the joint conceptual framework in 2010 because they considered that neutrality was a suitable financial quality aim (FASB, 2010; IASB, 2010). Thus, adopting conservative accounting largely depends on managers' discretion. Given that CFOs are responsible for information disclosure, it is worth investigating how their cognitive biases (i.e., overconfidence) affect accounting conservatism.

The first two studies find that firms led by overconfident CFOs are more likely to engage in more earnings management and less accounting conservatism due to CFOs' cognitive biases about firm performance and their own abilities. It is not clear whether this cognitive bias has any long-term consequences. Thus, the third paper sheds light on the influence of CFO overconfidence on future stock price crash risk. This study concentrates on tail risk as it has attracted much attention since the 2008 financial crisis (Li and Zeng, 2019). Besides, stock price crash risk is a critical concern for investors since a sharp drop in stock prices may result in severe losses for their portfolios (Hong and Stein, 2003).

1.2 Research philosophy

Derived from the ontology that assumes that the world exists irrespective of individual viewpoints (Burrell and Morgan, 1979), epistemology is the study of the nature and boundaries of knowledge, as well as how humans acquire and receive information about the world (Burrell and Morgan, 1979; Blackburn, 2005). There are three types of epistemology: objectivism, constructionism, and subjectivism (Crotty, 1998). Objectivism asserts that meaning and meaningful reality exist independently of any consciousness' action, and it reflects the idea that social things exist in reality independent of social players (Saunders, Lewis, and Thornhill, 2009). Constructionism explains the nature of knowledge and how people learn (Crotty, 1998). Subjectivism states that meaning derives from somewhere other than the object to which it belongs, implying that the object contributes nothing to the subject's imposed meaning (Crotty, 1998). This thesis leans more towards an objectivist epistemology.

Research philosophy (theoretical perspective) is how researchers think about knowledge development (Saunders et al., 2009), including four types: positivism, interpretivism, realism, and pragmatism. Positivism ensures a complete and correct comprehension of the world. Positivism is concerned with the formation of a complete society, which entails the application of scientific techniques to the study of societal and individual interests. Researchers dealing with problems objectively without changing the perception of the genuine problem being examined are adherents of the positivist philosophy. As a result, positivism requires a highly well-structured methodology, quantifiable observations, and statistical analysis (Remenyi et al., 2005). Different from positivism, the interpretative method seeks culturally generated and historically contextual interpretations of the social environment. This interpretive philosophy creates knowledge in a unique manner by emphasizing a subjective and descriptive approach to dealing with complex problems rather than an objective and statistical one (Remenyi et al., 2005).

Realist philosophy refers to a reality in the universe that is apart from human thoughts and opinions, which is opposed to idealism. Realism is a form of epistemology that is similar to positivism in that it posits a scientific method for knowledge development (Saunders et al., 2009). Pragmatism asserts that reality exists in the world and supports science's objective character. Furthermore, this ideology implies that uniqueness influences how individuals interpret the environment, making research subjective. Both objective and subjective criteria are used in this philosophy. As a result, pragmatic philosophy is intermediate between positivism and interpretivism research philosophy, implying that there is no single acceptable philosophy and that researchers may use more than one (Saunders et al., 2009).

Researchers not only choose qualitative, quantitative, or mixed methods but also design one type of inquiry within these methods (Creswell, 2014). These are three common types of research design: exploratory study, descriptive study, and explanatory study (Saunders et al., 2009). The exploratory study is concerned with determining what is occurring, asking questions, gaining new insights, reevaluating phenomena, and also providing ideas and hypotheses for future research. This type of study is beneficial for clarifying and comprehending an unclear topic; it may be undertaken in three primary ways:

via a review of the literature, expert interviews, and focus group interviews (Saunders et al., 2009). Descriptive research accurately describes people, situations, or events. This type requires gathering much information about the situation to be studied. Descriptive research is conducted to identify and describe the characteristics of variables in a situation. Therefore, descriptive research aims to provide researchers with a profile or description of different aspects of the phenomenon being studied. This type is considered part of or before exploratory research, so it is necessary to have a clear understanding of the phenomenon before exploratory research is carried out (Saunders et al., 2009). The explanatory study seeks to explain the situation or problem under study and patterns associated with the phenomenon under study. The explanatory study, also known as a hypothesis test, is usually done to explain the nature of a particular relationship (Sekaran and Bougie, 2016). This thesis conducts explanatory studies to explain the relationship between CFO overconfidence and corporate decisions.

Research approaches can be divided into inductive and deductive. Inductive methods should be used to develop hypotheses or theories. Deductive methods should be used when testing hypotheses or theories (Saunders et al., 2009).

In general, this thesis follows the dimension of epistemological philosophy and uses positivist beliefs to verify the truth of the theory (Hempel, 1967). Therefore, the three papers use the “hypothetico-deductive” method to examine causation. This method has been widely used in accounting research (Chua, 1986). The details of how the research was constructed to examine the impact of CFO overconfidence on firm decision-making are discussed in the methodology section.

1.3 Research theories

1.3.1 Upper echelons theory

Hambrick and Mason (1984) propose the upper echelons theory that managerial cognitive biases affect managers’ decisions. As cognitive biases are difficult to measure directly, Hambrick and Mason (1984) suggest that it is possible to use the demographic traits of top executives as proxies for their

cognitive biases and ideals. Because of this, many empirical studies have examined the effect of managerial characteristics on corporate decisions.

These studies mainly focus on CEOs' characteristics, such as gender, age, and educational background, as CEOs set the tone at the top. They find that female CEOs are more risk-averse than their male counterparts. Thus, firms led by female CEOs are more likely to have low leverage (Faccio et al., 2016), smooth earnings (Faccio et al., 2016), less earnings manipulation (Na and Hong, 2017), a low litigation risk (Dadanlar and Abebe, 2020), and effective say-on-pay regulation in curtailing pay ratio (Joura, Xiao, and Ullah, 2022). Some studies suggest that younger or early-career CEOs have more incentive to take risks than older or near-retirement ones. They suggest that firms with younger CEOs tend to engage in earnings manipulation (Huang et al., 2012), experience stock price crashes (Huang et al., 2012), pursue acquisitions (Yim, 2013), invest more in R&D (Serfling, 2014), lower operating leverage (Serfling, 2014), reduce tax burden (James, 2020), and face more lawsuits (Malm et al., 2021). A few studies shed light on the effect of CEO educational background on firm decisions. Miller and Xu (2019) find that MBA CEOs tend to make more short-term decisions, such as using income-increasing earnings management and suppression of R&D than their non-MBA counterparts. However, firms whose CEOs have financial expertise are less likely to have internal control weaknesses (Oradi, Asiaei, and Rezaee, 2020), and are more likely to pay low audit fees (Kalelkar and Khan, 2016) and raise funds (Custódio and Metzger, 2014).

In addition to CEO demographic traits, many studies investigate the influence of CFO gender, age, and educational background. They find that firms led by female CFOs have a high earnings quality (Barua et al., 2010; Peni and Vähämaa, 2010; Liu, Wei, and Xie, 2016; Liao, Smith, and Liu, 2019; Gupta et al., 2020; Luo, Peng, and Zhang, 2020), more conservative reporting (Francis et al., 2015), less tax aggressiveness (Francis et al., 2014; Liu, Li, et al., 2022), and low stock price crash risk (Li and Zeng, 2019). Some studies document that older CFOs are more likely to increase the readability of financial reports (Xu, Fernando, and Tam, 2018). Besides, some studies suggest that firms whose CFOs have financial backgrounds have the ability to identify inappropriate reporting. For instance, firms with CFOs with financial experience and

professional certification increase financial reporting (Aier et al., 2005; Sun, Johnson, and Rahman, 2015) and internal control quality (Li, Sun, and Ettredge, 2010). However, Enzenhoefer, Reimer, and Schaeffer (2019) argue that earnings quality is mainly affected by the CFOs' generalist skills, not their accounting certification.

Hambrick (2007) offers two moderators of the association between managerial traits and corporate decisions, namely managerial discretion and executive job concern, to supplement classic upper echelons theory (Hambrick and Mason, 1984). To be specific, managerial discretion refers to top managers' ability to affect firms' strategic decisions. When managerial discretion is strong, managerial traits are better predictors of firm decisions than when it is weak.

Empirical studies support this notion. For example, Friedman (2014) finds that powerful CEOs can pressure CFOs to manipulate earnings. Korkeamäki, Liljeblom, and Pasternack (2017) demonstrate that powerful CEOs' personal leverage is more likely to be associated with firm leverage. Chen, Ezzamel, and Cai (2011) find that CEOs' structural and prestige powers significantly affect their remuneration. Al Mamun, Balachandran, and Duong (2020) suggest that powerful CEOs are more able to hoard bad news and increase future stock price crash risk. Regarding CFO studies, Baker et al. (2019) suggest that powerful CFOs are able to inhibit the powerful CEOs' AEM preferences. Similarly, Florackis and Sainani (2021) find that powerful CFOs can resist the pressure from CEOs to manipulate earnings. Beck and Mauldin (2014) find that CFO power outweighs the audit committee's power to reduce audit fees. Chen et al. (2022) indicate that overconfident CFOs are more likely to affect cost decisions when they are powerful.

The second moderator, managers' job concerns, relates to challenges faced by executives. Hambrick (2007) assumes that senior managers facing high-level challenges will have less time to think about decisions and are more likely to make decisions psychologically. It means that the association between management traits and organizational results would be stronger when the degree of management challenge is higher. A few empirical studies have examined this notion. For example, Choi, Karim, and Tao (2022) find that outsider CEOs are more likely to conceal negative information than insider CEOs because outsider CEOs face more pressure from the board and the market, leading them to be

more attentive to firm performance. Thus, [Choi et al. \(2022\)](#) further suggest that outsider CEOs have more incentive to withhold bad news when they have a high turnover risk, resulting in stock price crashes. In addition, prior studies suggest that managers have incentives to beat or meet analyst forecasts ([Jiang et al., 2010](#); [Mande and Son, 2012](#)) as they might have career penalties if they miss analyst forecasts ([Mergenthaler, Rajgopal, and Srinivasan, 2012](#)).

Since [Malmendier and Tate \(2005\)](#) proposed the option-based overconfidence measure, a growing number of empirical studies shed light on managerial overconfidence, as overconfidence is the root of all cognitive bias and has more explanatory power regarding managers' behaviors ([Bazerman and Moore, 2013](#); [Meikle, Tenney, and Moore, 2016](#); [Malmendier et al., 2022](#)). Thus, this thesis will rely on traditional and updated upper echelon theories to explore the influence of CFO overconfidence on corporate decisions and how other CFOs' traits moderate their influence.

1.3.2 Overconfidence theory

The overconfidence theory derives from psychological theory. It consists of four branches: miscalibration, unrealistic optimism, the better than average effect, and the illusion of control.

Miscalibration implies that people might overestimate their ability to reduce future uncertainty and make accurate predictions ([Alicke, 1985](#)), which is similar to the "illusion of control". The latter suggests that people have a false illusion about their ability to influence an event, even if the event is purely accidental ([Taylor and Brown, 1988](#)). Over-optimism represents the notion that people have confidence that the probability of positive and lucky events outweighs the probability of negative and unfortunate events ([Weinstein, 1980](#)). The better than average effect means that people believe their abilities are more excellent compared with others' ([Svenson, 1981](#)).

Applying overconfidence theory, many studies document the different levels of confidence in CEOs' decision-making. They find that overconfident CEOs overestimate their ability and firms' future return (i.e., the notions of over-optimism, the illusion of control, and better than average effect); thus firms with these CEOs are more likely to make risky investments ([Malmendier and Tate, 2005](#)), invest more in R&D ([Galasso and Simcoe, 2011](#); [Hirshleifer et al.,](#)

2012), reduce dividend payout (Deshmukh et al., 2013), hold more cash for future investment (Chen et al., 2020), manipulate earnings (Schrand and Zechman, 2012; Hsieh et al., 2014), reduce accounting conservatism (Ahmed and Duellman, 2013), engage in more tax avoidance (Hsieh et al., 2018; Chyz et al., 2019), use short-term debt (Huang et al., 2016), and hoard bad news (Kim, Wang, et al., 2016). Adopting the notions of over-optimism and miscalibration, Hribar and Yang (2016) find that overconfident CEOs are more likely to make optimistic forecasting and issue narrower-range forecasts. Kim (2019) suggests that overconfident CEOs are less likely to hedge risks.

Regarding the CFO studies, Ben-David et al. (2013), based on the notion of miscalibration, find that overconfident CFOs are more likely to overestimate firms' prospects, making more aggressive decisions. According to the notion of over-optimism, Malmendier et al. (2022) find that the over-optimistic opinions of CFOs have strong predictive power in explaining financing decisions. Firms with overconfident CFOs are more likely to issue debt rather than equity when they need external financing. These CFOs believe that the market underestimates their firm value and view the equity cost as higher. Chen et al. (2022) demonstrate that firms led by overconfident CFOs are less likely to adjust costs when sales reduce, increasing cost stickiness. This thesis will further explore the influence of CFO overconfidence on other corporate decisions based on the overconfidence theory.

1.3.3 Power circulation theory

To explain political dynamics among social elites, the power circulation theory was developed (Michels, 1962), and subsequent scholars applied this theory to the study of senior executives (Ocasio, 1994; Shen and Cannella Jr, 2002b). According to this idea, the management team is a continually shifting alliance with a constant power struggle (Ocasio, 1994). This power circulation theory calls into question the concept that CEOs may keep their positions of power indefinitely (Ocasio, 1994). It shows that CEO influence erodes and evaporates with time since the number of rivals and adversaries grows as one advances up the ranks of a corporation, generating political difficulties.

As CFOs compete for future CEO positions, an increasing number of studies show that CFOs outperform CEOs in reporting and finance choices for

which CFOs are accountable. In deciding on earnings management, for example, [Peni and Vähämaa \(2010\)](#) find that female CFOs tend to use more conservative earnings management strategies (i.e., income-decreasing discretionary accruals) than male CFOs. They further indicate that there is no significant association between CEO gender and earnings management. [Francis, Hasan, and Wu \(2013\)](#) find that only CFO gender dominates the gender of other executives in influencing the cost of debt. CFO equity incentives dominate CEO equity incentives ([Jiang et al., 2010](#)). In making the external funding decision, CFO overconfidence is more important than CEO overconfidence ([Malmendier et al., 2022](#)). Thus, this thesis, through the lens of power circulation theory, will compare the CEO and CFO overconfidence in other corporate decisions.

1.3.4 False consensus effect theory

The false consensus effect notion is proposed by [Ross et al. \(1977\)](#). They conduct a survey to pose two types of questions to students. The first type asked students whether they engage in a certain behavior (e.g., watching at least 30 hours of television per month). The second type asked students to estimate the percentage of other students who engage in the same behavior. They discover that students overestimate their similarities to others. Subsequently, [Bahns et al. \(2017\)](#) suggest that the false consensus effect is that people are more likely to connect with those with similar personalities and share similar opinions and values.

When this psychological theory is applied to management research, several studies suggest that managers with similar characteristics can attain a consensus. For instance, [Hsieh et al. \(2018\)](#) suggest that firms tend to engage in tax avoidance when both the CEO and CFO are overconfident. Besides, [Black and Gallemler \(2013\)](#) find the joint influence of overconfident CEOs and CFOs on delayed expected loan loss recognition. Furthermore, overconfident CFOs collaborating with overconfident CEOs are more likely to increase cost stickiness ([Chen et al., 2022](#)). Thus, this thesis will, relying on the false consensus effect theory, investigate the interactive effect of CEO and CFO overconfidence on other corporate decisions.

Overall, this thesis adopts the upper echelons and overconfidence theories to investigate the impact of CFO overconfidence on corporate decisions.

Based on the notion of power circulation, it compares the various effects of CEO and CFO overconfidence. Moreover, the interaction effect of CEO and CFO overconfidence is discussed, underpinning the false consensus effect theory.

1.4 Research methodology

1.4.1 Choice of methodology

As described in the research philosophy section, based on epistemological philosophy, this thesis adheres to the positivism view and adopts the “hypothetico-deductive” method that puts forward a series of hypotheses after overviewing prior studies and theoretical propositions (Saunders et al., 2009).

Saunders et al. (2009) suggest that the deductive approach is related to quantitative research using data to test theories. Given that previous studies construct valid measures to calculate CFO overconfidence (Malmendier and Tate, 2005; Campbell et al., 2011), earnings management (Dechow, Sloan, and Sweeney, 1995; Roychowdhury and Watts, 2007; Banker et al., 2019; Srivastava, 2019), accounting conservatism (Basu, 1997; Khan and Watts, 2009), and stock price crash risk (Chen, Hong, and Stein, 2001; Hutton, Marcus, and Tehranian, 2009; Kim, Li, and Zhang, 2011a), this thesis adopts a quantitative technique to examine relationships between variables.

To mitigate the effects of time-invariant firm characteristics and factors common to all firms for a given fiscal year, the three papers employ two-way fixed-effect models: firm-fixed effect and year-fixed effect (Gow, Ormazabal, and Taylor, 2010; Ball, Kothari, and Nikolaev, 2013). Besides, according to Wooldridge (2010), compared to random effect and pooled Ordinary Least Squares regression (OLS) models, the F, Breusch-Pagan Lagrange Multiplier (LM), and Hausman tests show that fixed-effect models are the best choice for the three papers’ investigation. In addition to considering the firm-fixed and year-fixed effects, each paper controls other factors, such as firm and managerial characteristics, that might affect inference following prior studies. The details will be presented in the model design of each paper.

To further mitigate the endogeneity concerns in the models, each paper conducts a series of robustness tests, for instance, using alternative measures, including additional controls, and adopting entropy balancing and the

Difference-in-Difference method based on the Propensity Score Matching sample (PSM-DID). The details will be discussed in each paper's robustness tests section.

1.4.2 Data collection and analysis

This thesis collects data from several databases. Specifically, as the thesis uses the option-based measure to capture CFO and CEO overconfidence following prior studies ([Malmendier & Tate, 2005](#); [Campbell et al., 2011](#)), the compensation data are collected from the ExecuComp database. To calculate the proxies of earnings management ([Dechow et al., 1995](#); [Roychowdhury and Watts, 2007](#); [Banker et al., 2019](#); [Srivastava, 2019](#)), the first paper collects data from Center for Research in Security Prices (CRSP)/Compustat Merged database (CCM). Given that stock information is also needed to calculate proxies of accounting conservatism and stock price crash ([Basu, 1997](#); [Chen et al., 2001](#); [Hutton et al., 2009](#); [Khan and Watts, 2009](#); [Kim et al., 2011a](#)), the second and third papers collect data from the CRSP and CCM databases. These papers collect accounting information to construct firm-level controls (e.g., firm size, leverage, and market-to-book ratio), and other managerial traits (i.e., gender, tenure, and equity incentives) from CCM, ExecuComp, and BoardEx databases. To consider the monitoring effect of governance, these papers gather board information from the BoardEx database, institutional investors' information from the Thomson-Reuters 13F database, and analyst information from the I/B/E/S database.

Regarding the sample periods, the valid sample is from 1992 to 2019, as CFO and CEO compensation information has been available in the ExecuComp database since 1992. However, the sample period for each paper varies slightly depending on the sample size of the control variables. Since operational and financial structures of financial firms (SIC: 6000-6999) and utility firms (SIC: 4900-4999) vary from that of other businesses, these firms are excluded in each paper. In addition, each paper winsorizes all continuous variables (except for absolute value) at the 1st and 99th percentiles and all absolute values of continuous variables at the 99th percentiles to eliminate the impact of outliers following previous studies ([Hribar and Nichols, 2007](#)).

This thesis uses powerful and widely used statistical software, Stata, to calculate variables, perform data analysis, and output data results.

1.5 Contribution of the research

This thesis makes a substantial contribution to the literature and theory regarding cognitive biases of CFOs, financial reporting, and information disclosure in the context of U.S.-listed firms.

Firstly, this thesis has incremental literature contributions. To be specific, it contributes to the CFO studies. Current literature focuses on the effect of CFO demographic traits. For instance, studies find that firms with female CFOs are more likely to increase earnings quality (Barua et al., 2010; Peni and Vähämaa, 2010; Liu et al., 2016), provide conservative financial reporting (Francis et al., 2004; Janahi, Millo, and Voulgaris, 2021), reduce the possibility of financial statement irregularities (Liao, et al., 2019; Luo, et al., 2020), and adopt less aggressive tax and investment strategies (Francis et al., 2014; Liu, Li, et al., 2022; Liu, Neely, and Karim, 2022). Besides, CFOs' educational background and experience significantly affect firms' financial reporting (Aier et al., 2005; Sun et al., 2015; Enzenhoefer et al., 2019) and internal control quality (Li et al., 2010).

However, Ge, Matsumoto, and Zhang (2011) argue that these demographic characteristics (i.e., gender, age, and educational background) have limited explanatory powers for CFOs' style, which means that these characteristics might not be good proxies of cognitive bias. This thesis uses overconfidence to capture CFOs' cognitive bias, as overconfidence is the root of all cognitive biases (Bazerman and Moore, 2013; Meikle et al., 2016; Malmendier et al., 2022), and prior studies provide valid overconfidence measurement (Malmendier & Tate, 2005; Campbell et al., 2011). The thesis provides robust findings that firms with overconfident CFOs increase earnings management (including AEM and REM) (Paper 1), reduce conditional accounting conservatism (Paper 2), and lead to high stock price crash risk (Paper 3).

Besides, this thesis is related to Ham et al. (2017), who link CFO narcissism with financial reporting quality. However, narcissism and overconfidence have significant differences. Contrary to narcissistic managers,

overconfident managers are devoid of exploitative traits that may cause interpersonal conflicts (Schaefer et al., 2004). Consistent with this argument, Ham et al. (2017) suggest that narcissistic CFOs reduce financial reporting quality to pursue their own benefits by exploiting others. This thesis finds that overconfident CFOs tend to be optimistic in reporting earnings information to persuade investors that their firms have a bright future. Overall, the findings of this thesis add to empirical evidence on the impact of CFOs' cognitive bias on corporate decision-making.

In addition, the thesis contributes to overconfidence studies. A majority of overconfidence studies focus on CEOs. They find that overconfident CEOs, due to overestimating their own ability and firms' performance, tend to make aggressive decisions, such as overinvestment (Malmendier and Tate, 2005), issuing optimistic forecasting (Hribar and Yang, 2016), and engaging in more tax avoidance (Hsieh et al., 2018; Chyz et al., 2019). One potential limitation is these studies ignore the influence of CFO overconfidence, which might provide biased interference (Malmendier et al., 2022). This deficiency is much more apparent in accounting and financing studies because these are the areas where CFOs are largely accountable. Consistently, this thesis finds that CFO overconfidence, rather than CEO overconfidence, affects earnings management and stock price crash risk. Overconfident CFOs have an independent effect on conditional accounting conservatism, regardless of their CEOs' level of confidence.

Moreover, Black and Gallemore (2013) and Malmendier et al. (2022) suggest that merely investigating one type of managerial overconfidence would underestimate the impact of the TMT's overconfidence on corporate decisions. Thus, this thesis further finds the joint effect of CEO and CFO overconfidence on earnings management and stock price crash risk. Overall, the findings of the thesis complement the overconfidence research.

Furthermore, this thesis contributes to the literature on determinants for earnings management, accounting conservatism, and stock price crashes. From the standpoint of the agency problem, a growing amount of recent theoretical and empirical research has identified numerous managerial attributes to explain earnings management, accounting conservatism, and stock price crashes. For example, researchers suggest that firms whose CFOs have high equity

incentives are more likely to engage in earnings management (Jiang et al., 2010), reduce timely bad news disclosure (Bao et al., 2019), and increase stock price crash risk (Kim et al., 2011a). Unlike these previous studies, which assumed that managers could rationally observe the intrinsic value of projects and choose to manipulate earnings and conceal bad news for personal gain, this thesis finds that CFOs' cognitive biases (i.e., overconfidence) on firm decisions. In sum, this thesis provides new and important determinants for earnings management, accounting conservatism, and stock price crashes.

Secondly, this thesis provides empirical evidence to support a series of theories. Specifically, it contributes to the upper echelons theory. Traditional upper echelons theory contends that managerial cognitive biases influence their decision-making (Hambrick and Mason, 1984). Because cognitive biases are difficult to capture directly, Hambrick and Mason (1984) propose that top executives' demographic traits can be used as proxies for their cognitive biases. Following their suggestions, major CFO studies find that CFOs' demographic characteristics and background affect corporate decisions (Barua et al., 2010; Jiang et al., 2010; Kim et al., 2011a; Francis et al., 2013; Sun and Rakhman, 2013; Billings, Gao, and Jia, 2014; Sun et al., 2015; Liu et al., 2016; Fu and Zhang, 2019; Liao et al., 2019; Muttakin, Khan, and Tanewski, 2019; Xu et al., 2019; Gupta et al., 2020; Liu, Li, et al., 2022). However, Ge et al. (2011) challenge whether demographic traits can measure cognitive biases as they find that these factors could not adequately explain cognitive biases. This thesis recognizes this limitation in the previous studies and investigates the influence of CFO overconfidence as it is the root of all cognitive bias (Bazerman & Moore, 2013; Meikle et al., 2016; Malmendier et al., 2022). Thus, the main findings of this thesis on the positive relationship between CFO overconfidence and aggressive corporate decisions (i.e., more earnings management, less accounting conservatism, and high stock price crash risk) provide more empirical evidence to support the traditional upper echelons theory.

Besides, Hambrick (2007) provides two moderators, managerial discretion and executive job concern, of the association between managerial traits and corporate decisions, complementing standard upper echelons theory (Hambrick and Mason, 1984). This thesis finds that there is a moderating effect of CFO power on the relationship between CFO overconfidence and their

decisions (e.g., earnings management and timely bad news disclosure) and the interactive effect of CFO career concern and overconfidence on earnings management. These findings supplement the classic upper echelons theory.

Moreover, the thesis contributes to the overconfidence theory. Different from most empirical studies that focus on CEO overconfidence ([Malmendier and Tate, 2005](#); [Galasso and Simcoe, 2011](#); [Deshmukh et al., 2013](#); [Hsieh et al., 2014](#); [Hribar and Yang, 2016](#); [Huang et al., 2016](#); [Kim, Wang, et al., 2016](#); [Chen et al., 2020](#); [Ge et al., 2020](#); [Lin et al., 2020](#); [Pierk, 2021](#)), this thesis sheds light on the impact of CFO overconfidence, as CFOs are increasingly involved in corporate decision-making ([Jiang et al., 2010](#); [Chen et al., 2022](#); [Liu, Neely, et al., 2022](#); [Malmendier et al., 2022](#)). More interesting, the thesis finds that overconfident CFOs, rather than overconfident CEOs, affect earnings management and stock price crash risk. These findings contradict the conclusions of prior studies that CEO overconfidence affects these decisions, as those studies ignore the effect of CFO overconfidence ([Schrand and Zechman, 2012](#); [Hsieh et al., 2014](#); [Kim, Wang, et al., 2016](#)). Thus, the findings of this thesis add new empirical evidence to support the overconfidence theory.

Furthermore, this thesis contributes to the power circulation theory. In addition to discussing the effect of individual managers' overconfidence, this thesis also considers the influence of CEO overconfidence. To mitigate the concern that the findings related to the significant influence of CFO overconfidence are affected by CEO overconfidence, each study includes controlling the effect of CEO overconfidence in the regression. After controlling CEO overconfidence, the coefficient of CFO overconfidence remains significant, indicating that the findings of this thesis are not affected by CEO overconfidence. Interestingly, some coefficients of CEO overconfidence become insignificant when including CFO overconfidence, suggesting that CFO overconfidence dominates CEO overconfidence in earnings management and stock price crashes. These findings are in line with the argument made by power circulation theory that CEO influence erodes and evaporates with time since the number of rivals and adversaries grows as one advances up the ranks of a corporation, generating political difficulties ([Ocasio, 1994](#)).

Additionally, this thesis contributes to the false consensus effect theory. Applying false consensus effect theory to management studies, [Bahns et al.](#)

(2017) suggest that managers are more likely to connect with those with similar personalities and share similar opinions and values. A growing number of studies shed light on the interactive effect of CEO and CFO overconfidence on tax strategy (Hsieh et al., 2018) and cost management (Chen et al., 2022). These studies document that the overconfidence effect is magnified when CEOs and CFOs are both overconfident. Consistent with their conclusion, this thesis finds that firms with overconfident CEOs and CFOs are more likely to engage in earnings management and increase stock price crash risk. These findings further support applying the false consensus effect theory in management studies.

In addition to contributing to the literature and theories, this thesis also has substantial implications for investors, the board of directors, regulators, and policymakers, which will be presented in the conclusion section.

1.6 Structure of the thesis

This thesis follows the paper-based Ph.D. thesis format. Specifically, it consists of five chapters. The current chapter (chapter 1: introduction) has shown an overview of the thesis, including research background, aims and objectives, and motivations. The introduction chapter also presents an overall discussion of the research philosophy, theory, methodology, and contributions.

Chapters 2 and 3 focus on the association between CFO overconfidence and two accounting decisions, earnings management (Paper 1) and conditional accounting conservatism (Paper 2), respectively. In chapter 4, paper 3 discusses the consequences of CFOs' cognitive biases (i.e., overconfidence). In each paper, baseline results are presented after showing the literature review, hypotheses development, and model design. Following the main result analysis, a series of robustness tests are performed to increase the validity of the main result. After that, each paper has a number of additional tests to provide a deeper understanding of the main result.

Chapter 5 concludes the thesis by highlighting the findings, implications, and limitations, and proposing future study prospects.

Chapter 2: Paper 1 Chief Financial Officer Overconfidence and Earnings Management

2.1 Abstract

This study explores whether overconfident CFOs are more engaged in earnings management. Through the lens of upper echelons, overconfidence, and false consensus effect theories and using a large sample of 11,321 observations of U.S. firms from 1999 to 2019, this study finds that overconfident CFOs are positively associated with earnings management. In addition, the findings of this study suggest that overconfident CFOs use AEM as they underestimate the detection risks and have low career concern. Furthermore, overconfident CFOs engage in REM when they underestimate the cost of deviating from optimal business strategies by using REM and overestimate their managerial ability to mitigate the cost of REM. This study further conducts a series of subsample analyzes based on different levels of CFO generalist skills, CFO board position, CEO power, overconfident CEO, CEO–CFO team tenure, external financing needs, and information asymmetry to deepen the understanding of the relationship between CFO overconfidence and earnings management. The findings emphasize the significance of CFO cognitive biases in financial reporting decisions.

Keywords: CFO overconfidence; Earnings management; Overconfidence theory; Upper echelons theory; False consensus effect theory

2.2 Introduction

Managerial overconfidence, also known as “the root of all cognitive biases”, is considered one of the psychological traits of managers that significantly affects corporate decisions, such as investment decisions and risk management (e.g., [Bazerman and Moore, 2013](#); [Meikle et al., 2016](#); [Malmendier et al., 2022](#)). However, the majority of prior studies focus on exploring the impact of CEO overconfidence, and ignore the influence of CFO overconfidence (e.g., [Schrand and Zechman, 2012](#); [Hsieh et al., 2014](#)). In addition, a significant amount of literature has explored the motivations of earnings management practices, such as achieving managers’ compensation goals ([Jiang et al., 2010](#)), improving the appearance of firm performance to meet analyst forecasts ([Keune and Johnstone, 2012](#)), and raising external fundings ([Dechow and Skinner, 2000](#)). However, the effect of CFO overconfidence on firms’ earnings management decisions is largely unknown.

In relation to financial reporting decisions, prior studies suggest that CFOs’ roles are more vital than CEOs’ ([Mian, 2001](#); [Feng et al., 2011](#)). For instance, [Jiang et al. \(2010\)](#) find that the influence of the CFO equity incentive is stronger than that of the CEO equity incentive in explaining firms’ earnings management activities. [Black and Gallemore \(2013\)](#) show that overconfident bank managers are more likely to delay expected loss recognition. This tendency is driven by overconfident CFOs rather than overconfident CEOs, supporting the notion that CFOs have a significant role in financial reporting decisions.

In addition, according to upper echelons theory, managers’ decisions are influenced by their characteristics ([Hambrick and Mason, 1984](#)). However, CFOs’ demographics and observable traits, such as gender, age, and educational background, cannot sufficiently explain their behaviors ([Ge et al., 2011](#)). Given that a large proportion of CFOs in U.S. firms is overconfident ([Chen et al., 2022](#)), a growing number of studies shed light on the influence of CFO overconfidence on corporate decision choices; for example, overconfident CFOs have more incentives to use debt financing ([Malmendier et al., 2022](#)), engage in tax avoidance ([Hsieh et al., 2018](#)), and increase cost stickiness ([Chen et al., 2022](#)). This indicates that overconfidence significantly affects CFOs’ decisions. The foregoing motivates this study to investigate the impact of

individual characteristics of CFOs (i.e., overconfidence) on earnings management.

Furthermore, managers can influence earnings by using different earnings management methods, such as AEM and REM (Zang, 2012). Each measure has specific costs. For example, AEM is easily detected, and REM deteriorates firm operations (Zang, 2012). Given that overconfident CFOs are more likely to take risks and underestimate costs, they might have different preferences for AEM and REM compared to non-overconfident CFOs, which motivates this study to further explore the channels through which overconfident CFOs affect AEM and REM.

Empirically, using 11,321 observations of U.S. firms from 1999 to 2019, this study examines overconfident CFOs' AEM and REM decisions. Consistent with the predictions, this study finds that overconfident CFOs tend to use more AEM and REM techniques than non-overconfident CFOs. These results pass a series of robustness tests, including entropy balancing, the PSM-DID, and alternative measures of main variables. This study further finds that overconfident CFOs tend to use more AEM than non-overconfident CFOs due to their underestimation of the risk of being detected (for involving AEM) by stakeholders and low levels of career concerns. Overconfident CFOs are more likely to use REM when they underestimate the cost of deviating from optimal business strategies by using REM, and they overestimate their managerial abilities to mitigate the deteriorating effect of REM on firm performance.

This study conducts a series of additional analyzes. First, this study provides a deeper insight into the influence of the CFO's background on the positive relationship between CFO overconfidence and AEM (REM). This study finds that this positive relationship is more pronounced when overconfident CFOs are not board members. The impact of CFO overconfidence on AEM (REM) is stronger when CFOs have (do not have) generalist skills. Then, this study investigates the effect of the CEO on the positive association between CFO overconfidence and earnings management, including AEM and REM, from CEO power, CEO overconfidence, and CEO–CFO team tenure perspectives. This study finds this positive relationship is more profound when firms have powerful CEOs, overconfident CEOs, and long CEO–CFO team tenure. Next, this study examines overconfident CFOs'

choices of earnings management methods when using debt and equity financing. This study finds that the positive relationship between CFO overconfidence and AEM (REM) is stronger when firms issue equity (debt). Finally, this study tests and finds that the influence of CFO overconfidence on AEM/REM is more pronounced where there is high information asymmetry.

This study has several contributions to the literature. First, although few studies document that CFO gender affects earnings management (Barua et al., 2010; Peni and Vähämaa, 2010), Ge et al. (2011) argue that CFOs' psychological traits (e.g., overconfidence) explain their financial reporting decisions better than gender. Consistently, when this study incorporates CFO overconfidence in testing AEM and REM determinants, most coefficients on male CFO become insignificant. Besides, Ham et al. (2017) suggest that narcissistic CFOs increase earnings management as they are more likely to pursue personal objectives at the expense of others. In contrast to narcissistic CFOs, this study finds that overconfident CFOs use earnings management as they underestimate the risks and costs of earnings management. Overall, this study provides a new determinant, CFO overconfidence, to earnings management studies. Second, this study responds to the calls of Black and Gallemore (2013) and Malmendier et al. (2022) for more research into the influence of CFO overconfidence and the joint effect of CEO overconfidence and CFO overconfidence. Furthermore, this study offers empirical support to overconfidence and upper echelons theories. In addition, the findings of this study on the joint effect of CFO overconfidence and CEO overconfidence on REM decisions provide more empirical evidence, validating the false consensus effect theory. Finally, the results of this study provide implications for regulators and shareholders regarding the impact of CFO overconfidence on earnings management choices.

The remainder of this paper is arranged as follows. Section 2.3 reviews previous theories and literature and develops hypotheses. The data and research design are described in section 2.4. Section 2.5 reports the main result. Several robustness tests are conducted in section 2.6. Underpinning mechanisms are tested in section 2.7. Section 2.8 presents the results of some additional analyzes, and section 2.9 concludes the study.

2.3 Theoretical framework, literature review, and hypothesis development

From an agency perspective, many studies document managers' motivations for using earnings management. For example, managers use earnings management to pursue higher compensation (Watts and Zimmerman, 1978; Jiang et al., 2010). Managers are also more likely to use earnings management to meet their own forecasts (Kasznik, 1999; Chen, 2004). Besides, managers have the incentive to meet or beat analysts' earnings forecasts by manipulating earnings (Degeorge, Patel, and Zeckhauser, 1999; Graham, Harvey, and Rajgopal, 2005; Fang, Huang, and Karpoff, 2016). In addition, Teoh, Welch, and Wong (1998) and Dechow and Skinner (2000) suggest that managers are able to lower Initial Public Offerings (IPO) conditions if they can increase the reported earnings without being discovered. Consistently, Rangan (1998) finds that managers gain higher returns through earnings manipulation during SEO. Moreover, when a firm's political costs increase, managers are likely to postpone current earnings into future financial reports to reduce government interference (Aljifri, 2007; Habbash and Alghamdi, 2015).

Given that CFOs play a more important role in accounting decisions than other executives (Mian, 2001; Feng et al., 2011) and upper echelons theory demonstrates that top managers' traits affect their motivations and decision-making (Hambrick and Mason, 1984), a growing number of studies combining the agency and upper echelons theories to examine how CFO characteristics affect earnings management. For instance, Jiang et al. (2010) show a positive relationship between CFO equity incentives and earnings management. They suggest that CFO equity incentives are more sensitive to earnings management activities than CEO equity incentives. Ham et al. (2017) document that narcissistic CFOs are more likely to engage in earnings management to pursue their own benefits by exploiting others. As earnings management involves risks and costs (e.g., the probability of being discovered by analysts or regulators and deteriorating the firm's future performance) (Zang, 2012), prior studies suggest that CFOs' risk appetite affects earnings management. For example, Barua et al. (2010) and Peni and Vähämaa (2010) find that female CFOs are more risk-averse than male CFOs, thus reducing the use of earnings management.

Unlike risk-averse CFOs, theoretical and empirical evidence suggest that overconfident CFOs like taking risks. Specifically, overconfidence theory demonstrates that overconfident people believe that good and lucky events are more likely to occur than negative and unfortunate events (i.e., over-optimistic effect) and have unrealistic estimates about the future (i.e., miscalibration effect) (Weinstein, 1980; Skala, 2008); thus they are more likely to be risk-seeking. In the same vein, some empirical studies suggest that overconfident CFOs tend to make more risky investments (Ben-David et al., 2013), adopt aggressive tax avoidance strategies (Hsieh et al., 2018), and increase cost stickiness (Chen et al., 2022).

Thus, through the lens of upper echelons and overconfidence theories, this study expects that overconfident CFOs are more likely to use earnings management than non-overconfident CFOs. This leads to this study's generating the first hypothesis.

H1: There is a positive association between overconfident CFOs and earnings management.

There are two common earnings management methods whereby executives could manage earnings: by selecting accounting choices within Generally Accepted Accounting Principles (GAAP) (named AEM) (e.g., Dechow and Skinner, 2000) or by changing the structuring or timing of investment and operation transactions (named REM) (e.g., Roychowdhury, 2006). AEM and REM have different costs and risks (Zang, 2012).

Prior studies document a high detection risk of AEM, particularly as regulators increase their scrutiny of firms' accounting practices, reducing CFOs' incentives to use it. For instance, Cohen, Dey, and Lys (2008) suggest that the Sarbanes–Oxley Act (SOX) has increased the monitoring of earnings management activities, which has had a substantial impact on the decrease of AEM activities. Cohen and Zarowin (2010) show that firms tend to decrease AEM in the first year of a SEO as AEM activities are easily detected. In addition, AEM activities reduce financial reporting quality (Francis et al., 2008). Poor earnings quality increases CFO turnover risk (Collins et al., 2009) as CFOs are ultimately responsible for the quality of financial statements (Mian,

2001; Feng et al., 2011). Thus, Graham et al. (2005) show that CFOs reduce AEM activities when they have a long career horizon.¹

Although AEM has significant risks, overconfident CFOs might underestimate these risks as they are over-optimistic that their AEM activities will not be easily detected and will not affect their career (i.e., the notion of over-optimism from overconfidence theory). Thus, this study expects that overconfident CFOs are more likely to increase AEM than non-overconfident CFOs when firm activities are closely monitored, and CFOs have a long career horizon. This leads to this study's generating the second hypothesis.

H2: The positive relationship between overconfident CFOs and AEM is more pronounced when firm activities are closely monitored and CFOs have a long career horizon.

A significant cost of REM activities is that it deteriorates firms' future performance by deviating from optimal operational decisions (e.g., increasing sales temporarily, overproducing to reduce the report of the cost of goods sold, and reducing expenditures to boost reported profits). This cost is magnified in firms in poor financial health (Zang, 2012). CFOs care more about the firm's future performance than other executives, as the majority of CFOs would like to become CEOs in the future (Acharya, Myers, and Rajan, 2011). Thus, CFOs admit that their survival concern outweighs their reporting concerns if the firm has poor financial health (Graham et al., 2005), reducing the use of REM (Zang, 2012). However, overconfident CFOs overestimate the firm's financial health (Ben-David et al., 2013), underestimating the cost of deviating from optimal operational decisions (i.e., the notion of miscalibration from overconfidence theory). In addition, compared with non-overconfident CFOs, overconfident CFOs are more likely to overestimate their managerial abilities to mitigate this negative impact of REM on future performance (Ben-David et al., 2013; Chen et al., 2022) (i.e., the notion of the better than average effect from overconfidence theory). This evidence suggests that overconfident CFOs are more likely to underestimate the cost of deviating from optimal business

¹ CFO career horizon is the estimated length of time before a CFO is dismissed or retires (Florackis and Sainani, 2021).

strategies by using REM. Thus, this study conjectures that overconfident CFOs use more REM than their non-overconfident counterparts when firms have poor financial health, and they overestimate their managerial ability. This leads to this study's generating the third hypothesis.

H3: The positive relationship between overconfident CFOs and REM is more pronounced when firms have poor financial health and CFOs overestimate managerial ability.

2.4 Data and research design

2.4.1 Sample and data

This study's main sample is based on 11,321 observations in U.S. firms from 1999 to 2019.² This study defines the CFO position according to executive titles in ExecuComp, including chief financial officer, CFO, controller, treasurer, finance, and vice president-finance (Jiang et al., 2010). To calculate AEM, REM, external finance needs, and control variables, this study collects data from the CCM. This study gathers institutional ownership and governance data from the Thomson-Reuters 13F database and the BoardEx database, respectively. Financial firms (SIC:6000-6999) and utility firms (SIC:4900-4999) are excluded since their operational and financial structures vary from that of other businesses. The detailed sample selection construction is shown in Table 2.1. Following previous studies (e.g., Hribar and Nichols, 2007), this study winsorizes all continuous variables (except for absolute value) at the 1st and 99th percentiles and all absolute values of continuous variables at the 99th percentiles to eliminate the impact of outliers.

² This study's sample period starts in 1999 as corporate governance information (control variables) in BoardEx is available beginning in 1999.

Table 2.1. Sample construction

Steps	Details	Observations
Step 1	Initial observations from CCM database (1999-2019)	144,818
Step 2	Exclude observations without CFOs' compensation information in the ExecuComp database	(108,219)
	Observations with data available in CCM and ExecuComp databases ³	36,599
Step 3	Exclude observations in the financial industry (SIC:6000-6999)	(6,955)
Step 4	Exclude observations in the utility sector (SIC:4900-4999)	(1,713)
	Observations before deleting the missing values in various regressions	27,931
Step 5	Number of observations after deleting observations with missing values for the main sample	11,321

2.4.2 Variable measurement

2.4.2.1 The measurement of AEM

[Jones \(1991\)](#) first suggests using residuals from the regression of total accruals on non-discretionary determinants of accruals (changes in sales and property, plant and equipment) as the earnings management proxy. To avoid miscalculating non-cash revenues (i.e., account receivables) as discretionary accrual, [Dechow et al. \(1995\)](#) propose a cross-sectional Modified Jones model where changes in account receivables are deducted from changes in revenues.

The modified Jones model is widely used in AEM studies. In line with [Hsieh et al. \(2014\)](#), this study uses the modified Jones model to construct AEM. At least 15 observations are required for each industry year group ([Zang, 2012](#)). The modified Jones model is as follows:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \varepsilon_{i,t}, \quad (2.1)$$

where, $TA_{i,t}$ is the total accrual calculated from the cash flow statement (CCM variable: $IBC - (OANCF - XIDOC)$).⁴ β_0 is the unscaled intercept.⁵ $\Delta REV_{i,t}$ is the change of revenue ($REVT - L. REVT$). $\Delta REC_{i,t}$ is the change of accounts

³ Since Thomson-Reuters 13F database only discloses information that firms have institutional investors, this study retains institutional ownership information in the matched sample (i.e., data available in CRSP/Compustat merged, ExecuComp and Thomson-Reuters 13F database). This study replaces institutional ownership with zero for unmatched sample (i.e., data available in CRSP/Compustat merged and ExecuComp and unavailable in Thomson-Reuters 13F database). This step is not listed in the Table 2.1, because no observation is deleted.

⁴ In the measurements of AEM and REM, the item names in parentheses are from the CCM.

⁵ Following recommendations from [Kothari, Leone, and Wasley \(2005\)](#), [Collins, Pungaliya, and Vijh \(2017\)](#) and [Lara, Osmá, and Penalva \(2020\)](#), this study includes an unscaled intercept in the regression of the modified Jones model to include the impact of firm growth and performance. The results remain qualitatively similar when the unscaled intercept is excluded.

receivable (RECT – L. RECT). $PPE_{i,t}$ is the property, plant, and equipment (PPEGT). $A_{i,t-1}$ is the lagged total asset (L. AT). The discretionary accrual ($AEM_{i,t}$) is the estimated residual from equation (2.1).

This study uses the absolute value of $AEM_{i,t}$ ($AbsAEM_{i,t}$) since it captures accrual reversals following AEM (Cohen et al., 2008), and no specific directions for AEM are predicted by this study's hypotheses.

2.4.2.2 The measurement of REM

This study uses the third improvement in REM models of Roychowdhury (2006) proposed by Srivastava (2019) as the main REM measurement (called the revised measure (3)). Srivastava (2019) argues that the REM measurement of Roychowdhury (2006) only measures the differences in costs among industry peers. The firms that pursue unique competitive strategies might be different from the industry cost model. Consequently, for some firms, the cost differences with industry peers resulting from the competitive strategies are misclassified as REM. Therefore, Srivastava (2019) adds some additional control variables in the models of Roychowdhury (2006) to avoid mismeasurement.

According to Roychowdhury (2006) and Srivastava (2019), the equation for estimating the normal level of production cost is as follows:

$$\begin{aligned} \frac{PROD_{i,t}}{A_{i,t-1}} = & \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{SALES_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta SALES_{i,t}}{A_{i,t-1}} + \beta_4 \frac{\Delta SALES_{i,t-1}}{A_{i,t-1}} \\ & + \beta_5 \frac{SALES_{i,t+1}}{A_{i,t-1}} + \beta_6 MTB_New_{i,t} + \beta_7 ROA_{i,t-1} \\ & + \beta_8 MV_{i,t} + \beta_9 \frac{PROD_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \end{aligned} \quad (2.2)$$

where, $PROD_{i,t}$ is the cost of production (COGS + (INVT – L. INVT)). $SALES_{i,t}$ is the sales (SALE). $\Delta SALES_{i,t}$ is the change of sales (SALE – L. SALE). $\Delta SALES_{i,t-1}$ is the lagged change of sales (L. SALE – L2. SALE). $SALES_{i,t+1}$ is the future sales (F. SALE). $MTB_New_{i,t}$ is market to book ratio ((PRCC_F × CSHO + LT) / AT). $ROA_{i,t}$ is the return on asset (OIADP / L. AT). $MV_{i,t}$ is the market value of equity (PRCC_F × CSHO). The abnormal cost of production ($R_PROD_{i,t}$) is the estimated residual from equation (2.2), which is the cost of the production manipulator.

The equation for estimating the normal level of cash flow from operation is as follows:

$$\begin{aligned} \frac{CFO_{i,t}}{A_{i,t-1}} = & \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{SALES_{i,t}}{A_{i,t-1}} + \beta_3 \frac{\Delta SALES_{i,t}}{A_{i,t-1}} + \beta_4 \frac{SALES_{i,t+1}}{A_{i,t-1}} \\ & + \beta_5 MTB_New_{i,t} + \beta_6 ROA_{i,t-1} + \beta_7 MV_{i,t} + \beta_8 \frac{CFO_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \end{aligned} \quad (2.3)$$

where, $CFO_{i,t}$ is net cash flow from operating activities (OANCF). $CFO_{i,t-1}$ is lagged net cash flow from operating activities (L. OANCF). The abnormal cash flow ($R_CFO_{i,t}$) is the estimated residual from equation (2.3), which is the sales manipulator.

The equation for estimating the normal level of SG&A expenditure is as follows:

$$\begin{aligned} \frac{DISX_{i,t}}{A_{i,t-1}} = & \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{SALES_{i,t-1}}{A_{i,t-1}} + \beta_3 \frac{SALES_{i,t+1}}{A_{i,t-1}} + \beta_4 MTB_New_{i,t} \\ & + \beta_5 ROA_{i,t-1} + \beta_6 MV_{i,t} + \beta_7 \frac{DISX_{i,t-1}}{A_{i,t-1}} + \varepsilon_{i,t}, \end{aligned} \quad (2.4)$$

where, $DISX_{i,t}$ is the discretionary expenditure (XSGA + XAD + XRD).⁶ $DISX_{i,t-1}$ is the lagged discretionary expenditure (L. (XSGA + XAD + XRD)). The abnormal discretionary expense ($R_DISX_{i,t}$) is the estimated residual from equation (2.4), which is the discretionary expenditure manipulator.

According to [Cohen et al. \(2008\)](#), this study combines each REM component to compute an aggregate REM and use the absolute value to measure the magnitude of REM:

$$AbsREM_{i,t} = |R_PROD_{i,t} - R_DISX_{i,t} - R_CFO_{i,t}| \quad (2.5)$$

2.4.2.3 The measurement of overconfidence

[Malmendier and Tate \(2005\)](#) use managers' option exercise behaviors to measure overconfidence. This option-based method is the most widely used overconfidence study ([Campbell et al., 2011](#); [Huang et al., 2016](#); [Hsieh et al., 2018](#)) and is most robust to alternative interpretations ([Malmendier and Tate, 2015](#)). The logic behind this method is that managers will delay exercising

⁶ The missing values of XAD and XRD are set to zero if XSGA is available ([Roychowdhury, 2006](#)).

options if they are overconfident about the firm's future performance. Specifically, if managers put off exercising options that are more than 67% in the money, they are overconfident. Because the ExecuComp database lacks detailed data for calculating moneyness prior to 2006, this study uses the average moneyness of the CFOs' (CEOs') option portfolio to measure CFO (CEO) overconfidence following [Campbell et al. \(2011\)](#). The average moneyness is calculated as follows.

$$\frac{\text{The realizable value per option}_{i,t}}{\text{The total realizable value of the exercisable options}_{i,t}} = \text{The number of exercisable options}_{i,t} \quad (2.6)$$

$$\frac{\text{The estimate of the average exercise price of options}_{i,t}}{\text{The stock price at the fiscal year end}_{i,t} - \text{The realizable value per option}_{i,t}} = \quad (2.7)$$

$$\frac{\text{The average percent moneyness of the options}_{i,t}}{\text{The realizable value per option}_{i,t}} = \text{The estimate of the average exercise price of the options}_{i,t} \quad (2.8)$$

$Holder67CFO_{i,t}$ ($Holder67CEO_{i,t}$) is an indicator variable that equals one if CFOs (CEOs) are reluctant to exercise vested options that are no less than 67% in the money for the first time, and zero otherwise. CFOs (CEOs) would remain in their classification until the end of their tenure ([Hirshleifer et al., 2012](#); [Chen et al., 2022](#)).⁷

2.4.3 Main models

For testing the impact of CFO overconfidence and numerous control factors on AEM, this study adopts the following regressions:

$$\begin{aligned} AbsAEM_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t} + \beta_2 Holder67CEO_{i,t} + \beta_3 CFOEquityIncentive_{i,t} \\ & + \beta_4 MaleCFO_{i,t} + \beta_5 CEOEquityIncentive_{i,t} + \beta_6 MaleCEO_{i,t} + \beta_7 MTB_{i,t} \\ & + \beta_8 FirmSize_{i,t} + \beta_9 Leverage_{i,t} + \beta_{10} FirmAge_{i,t} + \beta_{11} Big4_{i,t} + \beta_{12} InsHoldings_{i,t} \\ & + \beta_{13} CEOduality_{i,t} + \beta_{14} BoardSize_{i,t} + \beta_{15} BoardIndependence_{i,t} \\ & + \beta_{16} CashFlow_{i,t} + \beta_{17} VolSale_{i,t} + \beta_{18} AbsREM_{i,t} + \text{Firm fixed effects} \\ & + \text{Year fixed effects} + \varepsilon_{i,t}, \end{aligned} \quad (2.9)$$

where, the dependent variable, the absolute values of AEM ($AbsAEM_{i,t}$), is measured by the modified Jones model ([Dechow et al., 1995](#); [Zang, 2012](#)). The

⁷ The results remain qualitatively similar when this study requires CFOs (CEOs) to hold vested options that are no less than 67% in the money at least twice ([Malmendier and Tate, 2005](#)).

variable of interest is the overconfident CFO, proxied by *Holder67CFO_{i,t}*. Following [Campbell et al. \(2011\)](#), [Hirshleifer et al. \(2012\)](#), and [Chen et al. \(2022\)](#), this study uses managers' option exercise behaviors to measure overconfidence. This study expects β_1 to be positive, confirming the positive impact of overconfident CFOs on AEM. This study controls the influence of CEO overconfidence (*Holder67CEO_{i,t}*) as overconfident CEOs are positively associated with earnings management decisions ([Hsieh et al., 2014](#)). This study also considers the impact of top managers' equity incentives and gender, as prior studies suggest that CFO equity incentives (*CFOEquityIncentive_{i,t}*), CEO equity incentives (*CEOEQuityIncentive_{i,t}*), CFO gender (*MaleCFO_{i,t}*), and CEO gender (*MaleCEO_{i,t}*) impact earnings management practice (e.g., [Bergstresser and Philippon, 2006](#); [Burns, Kedia, and Lipson, 2010](#); [Jiang et al., 2010](#)). Taking other possible factors into account, this study controls for firm growth opportunities proxied by the market-to-book ratio (*MTB_{i,t}*), as suggested by [Roychowdhury \(2006\)](#) and [Zang \(2012\)](#). This study controls for some firm characteristics that may influence earnings management practice, such as firm size (*FirmSize_{i,t}*) ([Dechow and Dichev, 2002](#); [Zang, 2012](#)), leverage (*Leverage_{i,t}*) ([DeFond and Jiambalvo, 1994](#); [Hsieh et al., 2014](#); [Nguyen and Soobaroyen, 2019](#)), and firm age (*FirmAge_{i,t}*) ([Gul, Fung, and Jaggi, 2009](#); [Capalbo et al., 2018](#)). This study also includes the effect of external monitoring on earnings management from the Big Four auditing firms (*Big4_{i,t}*) and institutional ownership (*InsHoldings_{i,t}*) perspectives ([Fraser, Hatherly, and Henry, 2004](#); [Roychowdhury, 2006](#); [Koh, 2007](#); [Boahen and Mamatzakis, 2020](#); [Egan and Xu, 2020](#)). As corporate governance affects earnings management ([Man and Wong, 2013](#); [Adegbite, 2015](#)), this study controls for CEO duality (*CEOduality_{i,t}*), board size (*BoardSize_{i,t}*) and board independence (*BoardIndependence_{i,t}*). Additionally, this study adds some special AEM controls in the test of AEM. Specifically, as prior studies (e.g., [Dechow et al., 1995](#)) argue that discretionary accruals models cannot completely separate nondiscretionary accruals that are associated with the firm performance, this study follows the study of [McNichols \(2002\)](#) and include one measurement of firm performance: cash flow (*CashFlow_{i,t}*). Following [Dechow and Dichev \(2002\)](#), this study controls for the volatility of sale (*VolSale_{i,t}*) because more volatile operating environments may offer managers more opportunities to

participate in AEM. This study controls for REM ($AbsREM_{i,t}$) because managers' strategic tradeoffs use AEM and REM (Cohen et al., 2008; Zang, 2012). Finally, this study includes firm and year dummies to control the time-invariant firm and year effects. Detailed variable measurements are outlined in Appendix A.

For testing the impact of CFO overconfidence and numerous control factors on REM, this study adopts the following regression:

$$\begin{aligned}
 AbsREM_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t} + \beta_2 Holder67CEO_{i,t} + \beta_3 CFEEquityIncentive_{i,t} \\
 & + \beta_4 MaleCFO_{i,t} + \beta_5 CEOEquityIncentive_{i,t} + \beta_6 MaleCEO_{i,t} \\
 & + \beta_7 MTB_{i,t} + \beta_8 FirmSize_{i,t} + \beta_9 Leverage_{i,t} + \beta_{10} FirmAge_{i,t} + \beta_{11} Big4_{i,t} \\
 & + \beta_{12} InsHoldings_{i,t} + \beta_{13} CEOduality_{i,t} + \beta_{14} BoardSize_{i,t} \\
 & + \beta_{15} BoardIndependence_{i,t} + \beta_{16} MarketShare_{i,t} + \text{Firm fixed effects} \\
 & + \text{Year fixed effects} + \varepsilon_{i,t},
 \end{aligned} \tag{2.10}$$

where, the dependent variable, the absolute values of REM ($AbsREM_{i,t}$), is measured by the revised measure (3) of Roychowdhury's (2006) REM measures, as proposed by Srivastava (2019). The variable of interest is overconfident CFOs, proxied by $Holder67CFO_{i,t}$. According to prior studies (e.g., Roychowdhury, 2006; Zang, 2012; Hsieh et al., 2014), this study controls top management characteristics ($CFEEquityIncentive_{i,t}$, $MaleCFO_{i,t}$, $CEOEquityIncentive_{i,t}$, and $MaleCEO_{i,t}$), firm growth opportunities ($MTB_{i,t}$), firm characteristics ($FirmSize_{i,t}$, $Leverage_{i,t}$, $FirmAge_{i,t}$), external monitoring ($Big4_{i,t}$, $InsHoldings_{i,t}$), and corporate governance ($CEOduality_{i,t}$, $BoardSize_{i,t}$, $BoardIndependence_{i,t}$). This study also controls for market share ($MarketShare_{i,t}$) in the test of REM. The market leaders tend to use more REM, and this may be because they view REM costs less (Badertscher, 2011). Finally, this study includes firm and year dummies to control the time-invariant firm and year effects. Detailed variable measurements are outlined in Appendix A.

2.5 Empirical results

2.5.1 Descriptive statistics

Table 2.2 shows the descriptive statistics. This study finds a similar mean value (0.049) of $AbsAEM_{i,t}$ as reported in prior studies (Cohen et al., 2008). The standard deviation of $AbsREM_{i,t}$ is 0.208, suggesting that REM activities vary considerably across firms. Besides, about 55.6% of CFOs are

overconfident, which implies that overconfidence is a common characteristic among CFOs.⁸ It proves the point made by [Black and Gallemlere \(2013\)](#) that only examining CEO overconfidence and ignoring CFO overconfidence might underestimate the influence of overconfidence.

The summary statistics for the control variables are in line with previous studies. For instance, $CFOEquityIncentive_{i,t}$ and $CEOEQuityIncentive_{i,t}$ are used to illustrate the portion of hypothetical managers' total compensation that would arise from a one-percentage-point increase in their firms' equity values. ([Bergstresser and Philippon, 2006](#)). The mean values of $CFOEquityIncentive_{i,t}$ and $CEOEQuityIncentive_{i,t}$ are similar to the findings of [Jiang et al. \(2010\)](#). The average value of the equity incentive ratio for CFOs is about 15%, compared to over 30% for CEOs. These figures support the claim that CEOs receive the lion's share of equity incentives offered to executives because of their various roles inside the firm ([Aggarwal and Samwick, 2003](#)). Besides, the mean values of the $MTB_{i,t}$, $InsHoldings_{i,t}$, and $Leverage_{i,t}$ are similar to the findings of [Ali and Zhang \(2015\)](#). This study uses three proxies to capture corporate governance quality, $CEOduality_{i,t}$, $BoardSize_{i,t}$, and $BoardIndependence_{i,t}$. The mean values of $CEOduality_{i,t}$ and $BoardSize_{i,t}$ are 0.543 and 2.184⁹, respectively, indicating that over half of CEOs are also the chairs and sample firms have large board sizes on average. The mean value of $BoardIndependence_{i,t}$ is about 80%, suggesting that sample firms have a large proportion of independent non-executive directors, consistent with the findings of prior studies ([Krishnan et al., 2011](#); [El Diri, Lambrinoudakis, and Alhadab, 2020](#)).

⁸ [Chen et al. \(2022\)](#) identify 51% CFOs as overconfident CFOs using the same overconfidence measurement for the period from 1992 to 2015.

⁹ The natural log of number of directors

Table 2.2. Descriptive statistics

	N	Mean	SD	Min	Median	p75	Max
<i>AbsAEM_{i,t}</i>	11,321	0.049	0.055	0	0.034	0.062	0.334
<i>AbsREM_{i,t}</i>	11,321	0.210	0.208	0	0.149	0.283	1.126
<i>Holder67CFO_{i,t}</i>	11,321	0.556	0.497	0	1	1	1
<i>Holder67CEO_{i,t}</i>	11,321	0.654	0.476	0	1	1	1
<i>CFOEquityIncentive_{i,t}</i>	11,321	0.151	0.124	0.004	0.117	0.206	0.595
<i>MaleCFO_{i,t}</i>	11,321	0.906	0.292	0	1	1	1
<i>CEOEQuityIncentive_{i,t}</i>	11,321	0.304	0.220	0.013	0.249	0.424	0.951
<i>MaleCEO_{i,t}</i>	11,321	0.969	0.173	0	1	1	1
<i>MTB_{i,t}</i>	11,321	3.192	4.017	-11.870	2.414	3.923	24.162
<i>FirmSize_{i,t}</i>	11,321	7.525	1.598	4.051	7.419	8.552	11.440
<i>Leverage_{i,t}</i>	11,321	0.218	0.182	0	0.203	0.328	0.810
<i>FirmAge_{i,t}</i>	11,321	3.157	0.666	1.609	3.178	3.761	4.220
<i>Big4_{i,t}</i>	11,321	0.908	0.289	0	1	1	1
<i>CashFlow_{i,t}</i>	11,321	0.106	0.079	-0.187	0.104	0.150	0.329
<i>VolSale_{i,t}</i>	11,321	0.140	0.121	0.016	0.103	0.176	0.704
<i>MarketShare_{i,t}</i>	11,321	0.020	0.039	0	0.004	0.018	0.225
<i>InsHoldings_{i,t}</i>	11,321	0.530	0.399	0	0.695	0.866	1.120
<i>CEOduality_{i,t}</i>	11,321	0.543	0.498	0	1	1	1
<i>BoardSize_{i,t}</i>	11,321	2.184	0.247	1.609	2.197	2.398	2.708
<i>BoardIndependence_{i,t}</i>	11,321	0.804	0.172	0.333	0.833	0.900	1.222

Notes: Table 2.2 presents summary statistics. The sample consists of 11,321 firm-year observations from 1999 to 2019 in the U.S.-listed firms with financial and executive compensation data available from CCM and ExecuComp. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.5.2 Pairwise correlations

This study conducts the Pearson correlation test. As shown in Table 2.3, the correlations of *Holder67CFO_{i,t}* with the other control variables do not exceed 0.5, and the Variance Inflation Factors (VIFs) (not tabulated for brevity) of all independent variables are less than the threshold of 10 (Gujarati, Porter, and Gunasekar, 2012), implying that multicollinearity is not an issue when interpreting the regression results. The Pearson correlation coefficient between CFO and CEO overconfidence is 0.455, which is significant at a 1% level. This means that both should be taken into account to mitigate the omitted variable bias.

2.5.3 Regression results

Table 2.4 displays the results of the estimating equations (2.9) and (2.10). The association between *Holder67CFO_{i,t}* and *AbsAEM_{i,t}* / *AbsREM_{i,t}* is shown in columns (1) and (2).

Holder67CFO_{i,t} has a positive coefficient at a 1% (5%) significance level in column (1) ((2)), indicating a statistically significant positive association between overconfident CFOs and AEM (REM). These results also

have economic significance. An overconfident CFO will lead to a 10.2% ($=0.005/0.049$) increase in $AbsAEM_{i,t}$ at the mean and a 5.2% ($=0.011/0.210$) increase in $AbsREM_{i,t}$ at the mean. This study provides statistically and economically significant evidence that overconfident CFOs increase earnings management (both in AEM and REM), supporting this study's hypothesis 1. To increase the robustness of the initial results, this study uses a more restrictive approach, i.e., entropy balancing, as it essentially recalibrates the observation weights by adjusting for systematic and random differences in the control variables.¹⁰ Specifically, to construct a sample to test AEM (REM), all observations with overconfident CFOs are reweighted to match observations with non-overconfident CFOs, based on the control variables used in equation (2.9) (equation (2.10)). Columns (3) and (4) show the results of using the entropy-balancing sample.¹¹ The coefficient of $Holder67CFO_{i,t}$ is significantly positive both statistically and economically, indicating that the findings of this study are robust.

The results of these control variables are generally consistent with prior studies. For example, $MaleCFO_{i,t}$ has a statistically significant positive coefficient in column (4). A male CFO will have a 1.9% ($=0.017/0.906$) increase in $AbsREM_{i,t}$ at the mean, suggesting that male CFOs tend to use more REM. The coefficient of $FirmSize_{i,t}$ is significantly negative in columns (1), (2) and (4), showing that large-sized firms use less earnings management (Hsieh et al., 2014). $FirmAge_{i,t}$ has a significantly negative coefficient in columns (1) and (3),

¹⁰ This study thanks the anonymous journal reviewer's suggestion.

¹¹ The samples are matched on the mean, variance, and skewness of covariate distribution.

Table 2.3. Pearson correlations

ID	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	<i>AbsAEM_{i,t}</i>	1									
(2)	<i>AbsREM_{i,t}</i>	0.193***	1								
(3)	<i>Holder67CFO_{i,t}</i>	-0.003	0.023**	1							
(4)	<i>Holder67CEO_{i,t}</i>	-0.002	0.029***	0.455***	1						
(5)	<i>CFOEquityIncentive_{i,t}</i>	-0.083***	-0.023**	0.238***	0.130***	1					
(6)	<i>MaleCFO_{i,t}</i>	0.023**	0.028***	0.003	-0.023**	0.015	1				
(7)	<i>CEOEQuityIncentive_{i,t}</i>	-0.068***	0.030***	0.154***	0.291***	0.555***	-0.024**	1			
(8)	<i>MaleCEO_{i,t}</i>	-0.011	-0.029***	0.029***	0.033***	0.038***	0.016*	0.046***	1		
(9)	<i>MTB_{i,t}</i>	0.005	0.068***	0.137***	0.112***	0.237***	-0.001	0.224***	-0.016*	1	
(10)	<i>FirmSize_{i,t}</i>	-0.180***	-0.192***	-0.057***	-0.091***	0.386***	-0.008	0.269***	0.001	0.036***	1
(11)	<i>Leverage_{i,t}</i>	-0.053***	-0.147***	-0.066***	-0.069***	-0.002	0.042***	-0.065***	0.020**	-0.063***	0.329***
(12)	<i>FirmAge_{i,t}</i>	-0.139***	-0.144***	-0.101***	-0.138***	0.082***	0.027***	-0.028***	0.019**	-0.011	0.405***
(13)	<i>Big4_{i,t}</i>	-0.085***	-0.065***	-0.023**	-0.043***	0.108***	-0.008	0.049***	-0.035***	-0.003	0.296***
(14)	<i>CashFlow_{i,t}</i>	-0.149***	0.004	0.180***	0.148***	0.222***	-0.040***	0.235***	0.002	0.219***	0.080***
(15)	<i>VolSale_{i,t}</i>	0.174***	0.197***	0.022**	0.021**	-0.118***	0.002	-0.118***	-0.009	-0.026***	-0.177***
(16)	<i>MarketShare_{i,t}</i>	-0.100***	-0.126***	-0.024***	-0.035***	0.140***	-0.025***	0.117***	-0.015	0.036***	0.501***
(17)	<i>InsHoldings_{i,t}</i>	-0.046***	-0.026***	0.075***	0.068***	0.069***	-0.020**	0.046***	0	0.054***	0.017*
(18)	<i>CEOduality_{i,t}</i>	-0.047***	-0.023**	0.015	0.127***	0.099***	0.012	0.220***	0.060***	0.020**	0.167***
(19)	<i>BoardSize_{i,t}</i>	-0.143***	-0.119***	-0.092***	-0.139***	0.173***	-0.013	0.067***	-0.006	0.039***	0.626***
(20)	<i>BoardIndependence_{i,t}</i>	-0.055***	-0.079***	-0.066***	-0.095***	0.038***	-0.040***	-0.026***	-0.047***	0.009	0.198***

Table 2.3. Pearson correlations (continued)

ID	Variables	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(11)	<i>Leverage_{i,t}</i>	1									
(12)	<i>FirmAge_{i,t}</i>	0.153***	1								
(13)	<i>Big4_{i,t}</i>	0.131***	0.053***	1							
(14)	<i>CashFlow_{i,t}</i>	-0.130***	-0.038***	0.051***	1						
(15)	<i>VolSale_{i,t}</i>	-0.041***	-0.118***	-0.062***	-0.081***	1					
(16)	<i>MarketShare_{i,t}</i>	0.133***	0.250***	0.107***	0.047***	-0.015	1				
(17)	<i>InsHoldings_{i,t}</i>	-0.01	-0.072***	0.018*	0.049***	-0.055***	-0.043***	1			
(18)	<i>CEOduality_{i,t}</i>	0.041***	0.114***	0.043***	0.018*	-0.023**	0.098***	-0.021**	1		
(19)	<i>BoardSize_{i,t}</i>	0.259***	0.418***	0.254***	0.045***	-0.113***	0.372***	-0.067***	0.106***	1	
(20)	<i>BoardIndependence_{i,t}</i>	0.098***	0.222***	0.127***	-0.036***	-0.075***	0.074***	0.123***	0.048***	0.078***	1

Notes: This table displays the Pearson correlations among regression variables for the full sample. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for detailed variable definitions. Variables of interest are marked in bold.

implying that firms with a long history use less AEM (Gul et al., 2009). The coefficient of $VolSale_{i,t}$ is positive at a 1% significant level in columns (1) and (3), indicating that more volatile operating environments lead to more AEM (Dechow and Dichev, 2002).

Table 2.4. The relationship between CFO overconfidence and AEM and REM activities.

Dependent variable	Fixed effect		Entropy balancing	
	(1) $AbsAEM_{i,t}$	(2) $AbsREM_{i,t}$	(3) $AbsAEM_{i,t}$	(4) $AbsREM_{i,t}$
$Holder67CFO_{i,t}$	0.005*** (0.002)	0.011** (0.005)	0.005** (0.002)	0.008* (0.004)
$Holder67CEO_{i,t}$	0.001 (0.002)	-0.005 (0.005)	0.002 (0.002)	-0.009* (0.005)
$CFOEquityIncentive_{i,t}$	0.009 (0.007)	0.002 (0.025)	0.007 (0.009)	0.007 (0.027)
$MaleCFO_{i,t}$	0.002 (0.003)	0.014 (0.011)	0.002 (0.003)	0.017* (0.009)
$CEOEQuityIncentive_{i,t}$	-0.002 (0.005)	0.012 (0.018)	0.001 (0.007)	0.022 (0.019)
$MaleCEO_{i,t}$	-0.002 (0.004)	0.006 (0.015)	-0.006 (0.006)	0.006 (0.015)
$MTB_{i,t}$	0.000 (0.000)	0.001** (0.001)	0.000 (0.000)	0.001* (0.001)
$FirmSize_{i,t}$	-0.004* (0.002)	-0.031*** (0.007)	-0.001 (0.003)	-0.025*** (0.007)
$Leverage_{i,t}$	0.001 (0.008)	0.015 (0.024)	0.009 (0.009)	-0.016 (0.022)
$FirmAge_{i,t}$	-0.019*** (0.005)	0.004 (0.020)	-0.026*** (0.009)	-0.015 (0.018)
$Big4_{i,t}$	-0.002 (0.004)	0.001 (0.016)	-0.003 (0.005)	-0.001 (0.012)
$InsHoldings_{i,t}$	0.001 (0.004)	-0.004 (0.011)	0.000 (0.004)	-0.005 (0.011)
$CEOduality_{i,t}$	0.002 (0.002)	-0.008* (0.005)	-0.001 (0.003)	0.003 (0.006)
$BoardSize_{i,t}$	-0.002 (0.005)	0.018 (0.017)	-0.003 (0.006)	0.008 (0.016)
$BoardIndependence_{i,t}$	0.003 (0.006)	0.021 (0.016)	-0.000 (0.007)	0.025 (0.018)
$CashFlow_{i,t}$	-0.108*** (0.018)		-0.079*** (0.020)	
$VolSale_{i,t}$	0.048*** (0.008)		0.045*** (0.010)	
$AbsREM_{i,t}$	0.061*** (0.006)		0.067*** (0.009)	

<i>MarketShare_{i,t}</i>		0.286 (0.184)	-0.006 (0.170)
Observations	11,187 ¹²	11,187	11,187
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adj. R ²	0.248	0.629	0.303
			0.656

Notes: The results of the impact of overconfident CFOs on AEM and REM are shown in this table. The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.6 Robustness tests

This study conducts numerous tests to mitigate certain potentially endogenous problems. This study also changes the measurement of main variables to further mitigate mismeasurement. Finally, this study uses the PSM-DID to mitigate problems of reverse causation.

2.6.1 Alternative measures

To eliminate the endogeneity concern from measurement errors, this study uses an alternative measurement (a spline-corrected method) provided by [Banker et al. \(2019\)](#) for the construct AEM. Some studies suggest a non-linear relationship between firm growth (or firm performance or sale growth) and accrual (e.g., [Kothari et al., 2005](#); [Collins et al., 2017](#)). The modified Jones model, however, does not address these non-linear relationships. To capture them, [Collins et al. \(2017\)](#) add quintile dummies of firm performance and growth into the modified Jones model. However, [Banker et al. \(2019\)](#) argue that the quintile dummy has discontinuous jumps at the quintile boundary, resulting in bias inference. [Banker et al. \(2019\)](#), therefore, use a spline correction to resolve the weakness of the quantile dummy method as the spline would catch variance both inside and outside of the quantile, improving the precision of the non-linear relationship being captured.

$$\frac{TA_{i,t} - New_{i,t}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{1}{A_{i,t-1}} + \beta_2 \frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}} + \beta_3 \frac{PPE_{i,t}}{A_{i,t-1}} + \gamma_1 spSGR_{1i,t} + \gamma_2 spSGR_{2i,t} + \gamma_3 spSGR_{3i,t} + \gamma_4 spSGR_{4i,t} + \gamma_5 spSGR_{5i,t} + \varepsilon_{i,t}, \quad (2.11)$$

¹² The reason why the observations in the regression are different from those in the original sample is that 134 singleton observations were deleted from the regression (Stata code: `reghdfe`).

where, $TA_New_{i,t}$ refers to the total asset calculated by the balance sheet ((ACT - CHE) - (LCT - DLC) - (DP)). $spSGR_{k,i,t}$ is the spline variable which is calculated as follows:

$$spSGR_{k,i,t} = \begin{cases} 0 & \text{if } SGR_{i,t} \text{ is below quintile } k \\ SGR_{i,t} - spSGR_k^{low} & \text{if } SGR_{i,t} \text{ is in quintile } k \\ spSGR_k^{high} - spSGR_k^{low} & \text{if } SGR_{i,t} \text{ is above quintile } k \end{cases} \quad (2.12)$$

where, $SGR_{i,t}$ is sale growth rate ((SALE - L. SALE) / L. SALE). The lower limit of sales growth rate quintile k is . The upper limit of sales growth rate quintile k is . The discretionary accrual ($Alter_AEM_{i,t}$) is residual from equation (2.11). Consistent with the prior analysis, this study also uses the absolute value of AEM ($Alter_AbsAEM_{i,t}$).

To further consider the cohort effect on the REM measure, this study adopts the cohort-adjusted measure proposed by [Srivastava \(2019\)](#) based on the method of [Roychowdhury \(2006\)](#). Specifically, matching firms have the same industry and listing year as a given firm. The firm with the closest size match is referred to as the control firm. The cohort-adjusted measure is computed by deducting the revised measure (3) of the control firm from that of the given firm. Thus, using the cohort-adjusted measure, this study generates the cost of the production manipulator ($R_PRODI_{i,t}$), sales manipulator ($R_CFOI_{i,t}$), and the discretionary expenditure manipulator ($R_DISXI_{i,t}$). Then, this study combines each REM component to compute an aggregate REM and use the absolute value to measure the magnitude of REM.

$$Alter_AbsREM_{i,t} = |R_PRODI_{i,t} - R_DISXI_{i,t} - R_CFOI_{i,t}| \quad (2.13)$$

As shown in Panel A of Table 2.5, $Holder67CFO_{i,t}$ has a positive coefficient that remains economically and statistically significant. Besides, as prior studies (e.g., [Malmendier and Tate, 2005](#); [Hirshleifer et al., 2012](#)) use different thresholds value of moneyiness to define managerial overconfidence, this study changes the threshold value of the overconfidence measure from 67% to 100% to rule out the concern that the results of this study may depend on the thresholds this study chose. The coefficient of $Holder100CFO_{i,t}$ is significantly positive both statistically and economically, indicating that the findings of this study remain hold.

Table 2.5. Robustness tests – Alternative measures**Panel A:** Alternative AEM and REM measurement

Dependent variable	Fixed effect		Entropy balancing	
	(1) <i>Alter_AbsAE</i> <i>M_{i,t}</i>	(2) <i>Alter_AbsRE</i> <i>M_{i,t}</i>	(3) <i>Alter_AbsAE</i> <i>M_{i,t}</i>	(4) <i>Alter_AbsRE</i> <i>M_{i,t}</i>
<i>Holder67CFO_{i,t}</i>	0.002*	0.032**	0.002*	0.041**
	(0.001)	(0.015)	(0.001)	(0.017)
Controls	Yes	Yes	Yes	Yes
Observations	10,840	3,419	10,840	3,419
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.221	0.404	0.265	0.455

Panel B: Alternative overconfidence measurement

Dependent variable	Fixed effect		Entropy balancing	
	(1) <i>AbsAEM_{i,t}</i>	(2) <i>AbsREM_{i,t}</i>	(3) <i>AbsAEM_{i,t}</i>	(4) <i>AbsREM_{i,t}</i>
<i>Holder100CFO_{i,t}</i>	0.006***	0.010*	0.007***	0.013*
	(0.002)	(0.005)	(0.002)	(0.007)
Controls	Yes	Yes	Yes	Yes
Observations	11,059	11,059	11,059	11,059
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.249	0.631	0.313	0.648

Notes: The results of the alternative measures of the main variables are shown in this table. When the dependent variable is *AbsAEM_{i,t}* (*Alter_AbsAEM_{i,t}*), controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}* (*Alter_AbsREM_{i,t}*), controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.6.2 PSM-DID

One may argue that this study's empirical findings have problems of reverse causation. That is, firms engaged in more earnings management activities tend to hire overconfident CFOs. To address this concern, this study performs PSM-DID. Specifically, according to prior research (e.g., [Ahmed and Duellman, 2013](#); [Lin et al., 2020](#)), this study uses CFO turnover as the exogenous shock. In line with [Huang and Kisgen \(2013\)](#) and [Fu and Zhang](#)

(2019), this study first restricts the sample to the three years preceding and following a CFO turnover, excluding the transition year. Second, this study requires the firm to have at least two years of available data prior to the CFO turnover. Third, this study requires a new CFO to be in charge for at least two years after the turnover year to ensure that they have enough time to influence firm choices. This study defines $Treat_i$, an indicator variable, as equal to one if a firm changes CFO from a non-overconfident one to an overconfident one, and it equals zero if the firm replaces a non-overconfident CFO with another non-overconfident one. $Post_{i,t}$, an indicator variable, equals one in the first three years after CFO turnover and equals zero in the last three years before CFO turnover. Consistent with Ge et al. (2020), the turnover year is excluded from the regression analysis in this study because both departing and replacement CFOs may impact earnings management in the turnover year. To select a control group, this study uses kernel matching. This study matches the treatment and control groups for testing AEM (REM) using the control variables in equation (2.9) (equation (2.10)). This procedure leaves 1080 (1080) observations. The empirical model for DID estimation is as follows:

$$AbsAEM_{i,t}(AbsREM_{i,t}) = \beta_0 + \beta_1 Treat_i \times Post_{i,t} + AEMControls(REMControls) + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t}, \quad (2.14)$$

Where, the interaction term ($Treat_i \times Post_{i,t}$) is this study's variable of interest. Given that this study includes firm and year dummies, thus this study excludes $Treat_i$ and $Post_{i,t}$ to avoid collinearity. This study predicts β_1 to be positive, indicating that the new overconfident CFOs tend to do more earnings management than the new CFOs who are non-overconfident. This study includes the same control variables ($AEMControls$) as in equation (2.9) when the dependent variable is $AbsAEM_{i,t}$. This study includes the same controls variables ($REMControls$) as in equation (2.10) when the dependent variable is $AbsREM_{i,t}$. Detailed variable measurements are summarized in Appendix A.

Panel A of Table 2.6 displays the results of PSM in the AEM sample. Panel B of Table 2.6 presents the results of PSM in the REM sample. As shown in Panel A and B, p-values of all control variables are greater than 0.1 in the matched sample, indicating that these controls are not significantly different in the matched sample between the treat and control groups. The results of DID

are presented in Table 2.6. The interaction term ($Treat_i \times Post_{i,t}$) in column (1) has a significantly positive coefficient, implying that firms with overconfident CFOs have more AEM. However, the interaction term ($Treat_i \times Post_{i,t}$) in column (2) has an insignificant coefficient, suggesting that the relationship between overconfident CFOs and REM is unclear under PSM-DID estimation.¹³

¹³ The reason for the insignificant coefficient might be the loss of many valid observations in the PSM process.

Table 2.6. Robustness tests – PSM-DID**Panel A: PSM-AEM**

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Holder67CEO_{i,t}</i>	Unmatched	0.663	0.335	69.400		10.800	0.000
	Matched	0.642	0.622	4.300	93.800	0.540	0.592
<i>CFOEquityIncentive_{i,t}</i>	Unmatched	0.150	0.122	22.900		3.740	0.000
	Matched	0.145	0.141	2.600	88.800	0.310	0.753
<i>MaleCFO_{i,t}</i>	Unmatched	0.901	0.929	-9.900		-1.580	0.114
	Matched	0.901	0.906	-1.800	81.700	-0.220	0.829
<i>CEOEquityIncentive_{i,t}</i>	Unmatched	0.336	0.254	37.700		6.190	0.000
	Matched	0.323	0.319	1.700	95.400	0.210	0.835
<i>MaleCEO_{i,t}</i>	Unmatched	0.907	0.966	-24.100		-4.130	0.000
	Matched	0.944	0.929	6.400	73.300	0.820	0.415
<i>MTB_{i,t}</i>	Unmatched	3.284	2.486	18.000		2.760	0.006
	Matched	3.069	3.256	-4.200	76.500	-0.530	0.597
<i>FirmSize_{i,t}</i>	Unmatched	7.633	7.991	-21.400		-3.240	0.001
	Matched	7.703	7.695	0.500	97.700	0.060	0.949

(This table is continued on the next page.)

Panel A: PSM-AEM (continued)

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Leverage_{i,t}</i>	Unmatched	0.215	0.259	-23.000		-3.600	0.000
	Matched	0.220	0.216	2.200	90.600	0.280	0.779
<i>FirmAge_{i,t}</i>	Unmatched	3.267	3.409	-22.100		-3.450	0.001
	Matched	3.303	3.296	1.100	95.200	0.130	0.894
<i>Big4_{i,t}</i>	Unmatched	0.904	0.911	-2.500		-0.400	0.690
	Matched	0.898	0.888	3.700	-43.800	0.440	0.663
<i>InsHoldings_{i,t}</i>	Unmatched	0.573	0.521	13.400		2.090	0.037
	Matched	0.551	0.552	-0.100	99.200	-0.010	0.989
<i>CEOduality_{i,t}</i>	Unmatched	0.517	0.492	5.100		0.790	0.429
	Matched	0.528	0.508	3.900	23.800	0.490	0.622
<i>BoardSize_{i,t}</i>	Unmatched	2.201	2.241	-16.200		-2.590	0.010
	Matched	2.208	2.220	-5.000	68.900	-0.640	0.523
<i>BoardIndependence_{i,t}</i>	Unmatched	0.843	0.859	-10.700		-1.670	0.095
	Matched	0.842	0.847	-3.000	72.100	-0.380	0.703

(This table is continued on the next page.)

Panel A: PSM-AEM (continued)

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>CashFlow_{i,t}</i>	Unmatched	0.101	0.087	20.000		3.100	0.002
	Matched	0.099	0.096	4.300	78.600	0.520	0.602
<i>VolSale_{i,t}</i>	Unmatched	0.116	0.126	-10.000		-1.500	0.133
	Matched	0.119	0.119	-0.600	94.200	-0.080	0.938
<i>AbsREM_{i,t}</i>	Unmatched	0.178	0.180	-0.900		-0.130	0.893
	Matched	0.169	0.182	-7.400	-766.700	-1.000	0.317

Panel B: PSM-REM

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Holder67CEO_{i,t}</i>	Unmatched	0.663	0.335	69.400		10.800	0.000
	Matched	0.646	0.639	1.600	97.800	0.200	0.845
<i>CFOEquityIncentive_{i,t}</i>	Unmatched	0.150	0.122	22.900		3.740	0.000
	Matched	0.146	0.137	7.500	67.200	0.940	0.350

(This table is continued on the next page.)

Panel B: PSM-REM (continued)

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>MaleCFO_{i,t}</i>	Unmatched	0.901	0.929	-9.900		-1.580	0.114
	Matched	0.896	0.922	-9.000	8.300	-1.120	0.262
<i>CEOEquityIncentive_{i,t}</i>	Unmatched	0.336	0.254	37.700		6.190	0.000
	Matched	0.326	0.318	3.700	90.200	0.450	0.655
<i>MaleCEO_{i,t}</i>	Unmatched	0.907	0.966	-24.100		-4.130	0.000
	Matched	0.942	0.937	2.100	91.300	0.270	0.785
<i>MTB_{i,t}</i>	Unmatched	3.284	2.486	18.000		2.760	0.006
	Matched	3.071	3.306	-5.300	70.500	-0.670	0.506
<i>FirmSize_{i,t}</i>	Unmatched	7.633	7.991	-21.400		-3.240	0.001
	Matched	7.703	7.661	2.500	88.300	0.320	0.745
<i>Leverage_{i,t}</i>	Unmatched	0.215	0.259	-23.000		-3.600	0.000
	Matched	0.221	0.217	2.600	88.800	0.340	0.736
<i>FirmAge_{i,t}</i>	Unmatched	3.267	3.409	-22.100		-3.450	0.001
	Matched	3.296	3.271	3.900	82.200	0.490	0.621

(This table is continued on the next page.)

Panel B: PSM-REM (continued)

Variables	Sample Type	Mean		%Reduct		t-test	
		Treated	Control	%Bias	Bias	t	p>t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Big4_{i,t}</i>	Unmatched	0.904	0.911	-2.500		-0.400	0.690
	Matched	0.899	0.884	5.200	-104.900	0.620	0.534
<i>InsHoldings_{i,t}</i>	Unmatched	0.573	0.521	13.400		2.090	0.037
	Matched	0.555	0.564	-2.400	81.900	-0.310	0.755
<i>CEOduality_{i,t}</i>	Unmatched	0.517	0.492	5.100		0.790	0.429
	Matched	0.518	0.503	3.000	40.600	0.390	0.699
<i>BoardSize_{i,t}</i>	Unmatched	2.201	2.241	-16.200		-2.590	0.010
	Matched	2.207	2.212	-1.700	89.200	-0.220	0.823
<i>BoardIndependence_{i,t}</i>	Unmatched	0.843	0.859	-10.700		-1.670	0.095
	Matched	0.843	0.840	1.900	81.900	0.250	0.804
<i>MarketShare_{i,t}</i>	Unmatched	0.017	0.027	-22.100		-3.230	0.001
	Matched	0.018	0.017	2.200	90.100	0.340	0.735

(This table is continued on the next page.)

Panel C: DID

Dependent variable	(1) <i>AbsAEM_{i,t}</i>	(2) <i>AbsREM_{i,t}</i>
<i>Treat_i × Post_{i,t}</i>	0.013** (0.006)	-0.017 (0.013)
Controls	Yes	Yes
Observations	1,080	1,080
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R ²	0.218	0.669

Notes: Panel A and B present the results for PSM. Panel C presents the results of DID regression based on the PSM-matched sample. When the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}*, controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.7 Underpinning mechanisms

2.7.1 Why do overconfident CFOs use AEM?

This study conjectures that overconfident CFOs are more likely than non-overconfident CFOs to increase AEM, as they are more inclined to want to take the risks of engaging in AEM practices. This section conducts two subsample analyzes to explore this further. First, risk-averse managers reduce AEM when firms have a high risk of securities class action litigation (i.e., high litigation risks) (Hopkins, 2018; Zalata et al., 2019). However, overconfident CFOs might take risks when they underestimate the possibility that using AEM will be detected.

Empirically, this study separates the sample into two subsamples, high and low litigation risk, and test whether overconfident CFOs are more likely than non-overconfident CFOs to use AEM when there is high litigation risk.¹⁴ As shown in Panel A of Table 2.7, this study finds that the coefficients on $Holder67CFO_{i,t}$ are significant, with higher economic magnitude, only in firms with high litigation risk ($HighLIT_{i,t}=1$). This is consistent with this study's expectation that the positive relationship between overconfident CFOs and AEM is more pronounced in firms with high litigation risk.

Second, CFOs with long career horizons are often younger and have more years of employment left. As such, if aggressive earnings management is detected, the loss for CFOs with long career horizons (e.g., failing to find comparable work) in the future is significant (Cheng, Lee, and Shevlin, 2016). Although AEM, if detected, will affect CFOs' reputations and careers (Feng et al., 2011), overconfident CFOs might have fewer career concerns even if they have long career horizons. As such, this study expects that the positive relationship between overconfident CFOs and AEM is more pronounced in CFOs with long career horizons. Empirically, this study separates the sample into two subsamples: long and short career horizons.¹⁵ Consistent with the prediction, this study finds that the positive effect of overconfident CFOs on AEM is more pronounced when CFOs have long career horizons ($CFO_LongCareerHorizons_{i,t}=1$), as shown in Panel B of Table 2.7.

¹⁴ Please see the measurement of litigation risk in Appendix A.

¹⁵ Please see the measurement of career concern in Appendix A.

Table 2.7. Channel tests - AEM**Panel A: Subsample - High litigation risk**

Dependent variable	Fixed effect		Entropy balancing	
	(1)	(2)	(3)	(4)
	<i>AbsAEM_{i,t}</i>		<i>AbsAEM_{i,t}</i>	
<i>HighLIT_{i,t}</i>	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.009***	0.002	0.007*	0.003
	(0.003)	(0.002)	(0.004)	(0.002)
Controls	Yes	Yes	Yes	Yes
Observations	3,797	7,388	3,797	7,389
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.244	0.243	0.328	0.282

Panel B: Subsample - CFO_LongCareerHorizons

Dependent variable	Fixed effect		Entropy balancing	
	(1)	(2)	(3)	(4)
	<i>AbsAEM_{i,t}</i>		<i>AbsAEM_{i,t}</i>	
<i>CFO_LongCareerHorizons_{i,t}</i>	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.007**	0.002	0.009***	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Controls	Yes	Yes	Yes	Yes
Observations	4,065	4,018	4,065	4,019
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.243	0.283	0.293	0.264

Notes: The results of the subsample analysis based on litigation risk and CFO career horizons are shown in this table. As the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.7.2 Why do overconfident CFOs use REM?

This section examines whether the influence of overconfident CFOs on REM is subject to overestimating financial health and managerial ability. Following previous studies (Zang, 2012; Chen and Wang, 2012), this study uses Z-score proposed by Altman (1968) to measure the financial health at the beginning of the year.¹⁶ This study expects that the positive relationship between CFO overconfidence and REM is more pronounced in firms with a less-healthy financial condition (i.e., a low Z-score). As shown in Panel A of

¹⁶ Please see the measurement of financial health in Appendix A.

Table 2.8, this study finds that the positive effect of overconfident CFOs and REM is stronger when a firm has poor financial health ($PoorFinancialHealth_{i,t-1}=1$), consistent with this study's expectations.¹⁷

In addition, [Kruger and Dunning \(1999\)](#) suggest that people with less ability are more likely to overestimate their ability than those with better skills. As such, it is more likely that overconfident CFOs overestimate managerial abilities to mitigate the negative effect of REM on future performance when the managers have low abilities. Thus, this study expects that the positive relationship between CFO overconfidence and REM is more pronounced in firms with low managerial abilities. Empirically, this study separates the sample into two subsamples, high and low managerial abilities.¹⁸ As shown in Panel B of Table 2.8, this study finds that the positive effect of overconfident CFOs and REM is stronger when managers have low ability ($LowAbility_{i,t}=1$), which is consistent with this study's expectations.

Table 2.8. Channel tests - REM

Panel A: Subsample- PoorFinancialHealth

Dependent variable	Fixed effect		Entropy balancing	
	(1)	(2)	(3)	(4)
	$AbsREM_{i,t}$		$AbsREM_{i,t}$	
<i>PoorFinancialHealth_{i,t-1}</i>	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.018*** (0.006)	-0.003 (0.007)	0.017** (0.007)	-0.008 (0.008)
Controls	Yes	Yes	Yes	Yes
Observations	5,383	5,552	5,383	5,552
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.647	0.649	0.644	0.661

Panel B: Subsample- LowAbility

Dependent variable	Fixed effect		Entropy balancing	
	(1)	(2)	(3)	(4)
	$AbsREM_{i,t}$		$AbsREM_{i,t}$	
<i>LowAbility_{i,t}</i>	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.014*** (0.005)	-0.000 (0.007)	0.009* (0.005)	0.000 (0.009)
Controls	Yes	Yes	Yes	Yes

¹⁷ This study also uses O-score to capture the financial health ([Ohlson, 1980](#)). The results are similar.

¹⁸ Please see the measurement of managerial abilities in Appendix A.

Observations	5,184	5,183	5,184	5,183
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.673	0.621	0.705	0.656

Notes: The results of the subsample analysis based on financial health and managerial ability are shown in this table. As the dependent variable is $AbsREM_{i,t}$, controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.8 Additional tests

2.8.1 The effect of CFO background

This section investigates whether the positive relationship between CFO overconfidence and earnings management is affected by the CFO's background. First, in addition to accounting decisions, CFOs are increasingly involved in strategic decisions such as cash holding and acquisition deals (Uhde, Klarner, and Tuschke, 2017; Florackis and Sainani, 2018; Chen et al., 2022). All of these jobs require the CFO to be a key strategic player on the TMT (Datta and Iskandar - Datta, 2014). Thus, CFOs are more likely to have generalist knowledge (Ferreira and Sah, 2012). As generalist CFOs care more about strategic decisions and REM undermines strategic choices, this study anticipates that non-generalist CFOs will do REM more frequently than generalist CFOs. However, generalist CFOs are more likely to utilize AEM as a substitute earnings management method.

Empirically, this study separates the sample into two subsamples: generalist and non-generalist CFOs.¹⁹ As shown in Panel A of Table 2.9, this study finds that the positive effect of overconfident CFOs on AEM (REM) is stronger when firms have generalist CFOs (non-generalist CFOs). These findings are consistent with this study's expectations.

Second, board membership is a crucial CFO feature that influences firms' accounting and financial decision-making (Mobbs, 2018). For example, CFOs sit on the board to increase the firm's earnings quality (Bedard, Hoitash, and Hoitash, 2014). Thus, this study expects that overconfident CFOs are more likely to use earnings management when they do not have a board position.

¹⁹ Please see the measurement of generalist skills in Appendix A.

Empirically, this study separates the sample into two subsamples: CFOs who are a member of the board and CFOs who are not.²⁰ As shown in Panel B of Table 2.9, this study finds that the positive effects of overconfident CFOs and earnings management (i.e., AEM and REM) are stronger when firms have CFOs not seated on the board ($CFOBoardposition_{i,t} = 0$), which is consistent with this study's expectations.

²⁰ Please see the measurement of the CFO boardposition in Appendix A.

Table 2.9. The effect of CFO background**Panel A: GeneralistCFO**

Dependent variable	Fixed effect				Entropy balancing			
	(1) <i>AbsAEM_{i,t}</i>	(2) <i>AbsAEM_{i,t}</i>	(3) <i>AbsREM_{i,t}</i>	(4) <i>AbsREM_{i,t}</i>	(5) <i>AbsAEM_{i,t}</i>	(6) <i>AbsAEM_{i,t}</i>	(7) <i>AbsREM_{i,t}</i>	(8) <i>AbsREM_{i,t}</i>
<i>GeneralistCFO_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.009** (0.004)	0.003 (0.002)	-0.009 (0.011)	0.017*** (0.006)	0.012*** (0.004)	0.002 (0.003)	0.002 (0.012)	0.015** (0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,868	7,289	1,868	7,289	1,868	7,289	1,868	7,289
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.231	0.269	0.666	0.629	0.350	0.339	0.690	0.665

(This table is continued on the next page.)

Table 2.9. The effect of CFO background (continued)**Panel B: CFOBoardposition**

Dependent variable	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>CFOBoardposition_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.007 (0.007)	0.005*** (0.002)	0.001 (0.020)	0.011** (0.005)	0.009 (0.009)	0.005** (0.002)	0.003 (0.018)	0.010** (0.005)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,146	9,917	1,146	9,917	1,146	9,917	1,146	9,917
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.207	0.249	0.579	0.640	0.320	0.311	0.650	0.664

Notes: The results of the subsample analysis based on the CFO background are shown in this table. When the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}*, controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.8.2 The effect of CEOs

Although CFOs have a vital impact on accounting decisions, CEOs set the tone at the top (Feng et al., 2011; Friedman, 2014). Thus, this section explores the effect of CEOs. First, this study examines whether the positive relationship between CFO overconfidence and earnings management is affected by CEO power. Friedman (2014) provides an agency model and demonstrates that CEOs can pressure CFOs to manage earnings. Consistently, Feng et al. (2011) find that CFOs are engaged in material earnings manipulations because they succumb to CEO pressure. Given these notions, this study anticipates that overconfident CFOs are more likely to engage in earnings management when pressured by the CEO. Thus, this study separates the sample into two subsamples: powerful and non-powerful CEOs.²¹ The results are shown in Panel A of Table 2.10. The positive relationship between CFO overconfidence and earnings management is stronger when firms have powerful CEOs ($PowerfulCEO_{i,t}=1$).²²

Second, overconfident CEOs are more likely to engage in earnings management (Hsieh et al., 2014). Based on the false consensus effect theory that people work closely with those who have similar personalities to achieve consensus agreements (Bahns et al., 2017), this study predicts that the positive relationship between CFO overconfidence and earnings management is more pronounced in firms with overconfident CEOs. Empirically, this study separates the sample into overconfident and non-overconfident CEOs. These results are shown in Panel B of Table 2.10. Consistent with the prediction, this study finds that the positive effect of overconfident CFOs on earnings management is stronger when CEOs are overconfident ($Holder67CEO_{i,t}=1$).

Third, this study explores whether the positive relationship between CFO overconfidence and earnings management is affected by CEO–CFO team tenure. As the CEO and CFO spend more time working together, it is easier for them to communicate and make consistent decisions (Zenger and Lawrence, 1989; Ancona and Caldwell, 1992). This study predicts that overconfident CFOs are more likely to engage in earnings management when the CEO–CFO team has a longer tenure. Thus, this study divides the sample into two

²¹ Please see the measurement of CEO power in Appendix A.

²² However, this study does not find similar results when using the entropy-balancing matched sample.

subsamples: long and short CEO–CFO team tenure.²³ The results are shown in Panel C of Table 2.10. The positive relationship between CFO overconfidence and earnings management is stronger when firms have long CEO–CFO team tenure ($LongCEOCFOtenure_{i,t}=1$).

²³ Please see the measurement of CEO–CFO team tenure in Appendix A.

Table 2.10. The effect of CEOs**Panel A: CEO power**

Dependent variable	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>PowerfulCEO_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.004* (0.002)	-0.001 (0.006)	0.010* (0.006)	0.024 (0.019)	0.002 (0.002)	0.001 (0.006)	0.005 (0.007)	0.014 (0.018)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,689	1,111	4,689	1,111	4,690	1,111	4,689	1,111
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.245	0.220	0.654	0.625	0.303	0.356	0.678	0.644

(This table is continued on the next page.)

Table 2.10. The effect of CEOs (continued)**Panel B: Holder67CEO**

Dependent variable	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>Holder67CEO_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.006*** (0.002)	0.003 (0.004)	0.018*** (0.006)	0.008 (0.009)	0.006** (0.002)	0.000 (0.004)	0.012** (0.006)	0.006 (0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,243	3,691	7,243	3,691	7,243	3,691	7,243	3,691
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.259	0.247	0.635	0.705	0.288	0.314	0.667	0.688

(This table is continued on the next page.)

Table 2.10. The effect of CEOs (continued)**Panel C: LongCEOCFOtenure**

	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>LongCEOCFOtenure_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.004* (0.002)	0.005 (0.003)	0.011* (0.006)	0.004 (0.009)	0.006*** (0.002)	0.003 (0.003)	0.011** (0.005)	0.001 (0.011)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	7,898	2,671	7,898	2,671	7,898	2,671	7,898	2,671
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.240	0.232	0.660	0.551	0.264	0.491	0.689	0.643

Notes: The results of the subsample analysis based on the effect of CEOs are shown in this table. When the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}*, controls are consistent with equation (2.10). When the subsample variable is *PowerfulCEO_{i,t}*, *CEOduality_{i,t}* is removed from the control variable. When the subsample variable is *Holder67CEO_{i,t}*, *Holder67CFO_{i,t}* is removed from the control variable. The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.8.3 The effect of external financing

Previous studies suggest that investors typically price securities according to the issuers' financial report information, which motivates executives to influence investors' valuation decisions by managing earnings (e.g., DuCharme, Malatesta, and Sefcik, 2004; Francis et al., 2005; Liu, Ning, and Davidson III, 2010; Kim and Sohn, 2013).

As shareholders have residual rights on firms' cash flow, whereas debtholders have fixed claims, shareholders are more sensitive to firms' financial information than debtholders (Myers and Majluf, 1984; Holderness, 2018). Moreover, as well-informed investors, debtholders have low costs for monitoring firms' financial information closely than shareholders (Rauh and Sufi, 2010; Huang, Jiang, and Wu, 2018). Thus, this study predicts that overconfident CFOs are more likely to manipulate earnings when raising equity. Compared to firms that use REM, firms that use AEM are more likely to have a lower cost of equity (Kim and Sohn, 2011). Thus, this study further predicts that overconfident CFOs have more incentives to use AEM when raising equity.

Empirically, this study first separates the sample into two subsamples, equity and non-equity issuers.²⁴ As shown in Panel A of Table 2.11, this study finds that the positive relationship between CFO overconfidence and AEM is more pronounced when firms issue equity ($EquityIssuer_{i,t}=1$). Then, this study separates the samples into two subsamples, debt and non-debt issuers.²⁵ As shown in Panel B of Table 2.11, this study finds that the positive relationship between CFO overconfidence and AEM is stronger when firms do not issue debt ($DebtIssuer_{i,t}=0$). However, when firms issue debt, the positive relationship between CFO overconfidence and REM is stronger ($DebtIssuer_{i,t}=1$) in column (3). These findings are in line with the view that managers tend to use REM rather than AEM to raise debt as debtholders easily detect AEM activities.

²⁴ Please see the measurement of the equity issuer in Appendix A.

²⁵ Please see the measurement of the debt issuer in Appendix A.

Table 2.11. The effect of external financing**Panel A: EquityIssuer**

Dependent variable	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>EquityIssuer_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.014*** (0.004)	0.002 (0.002)	0.015 (0.010)	0.006 (0.005)	0.013*** (0.005)	0.003 (0.002)	0.019 (0.012)	0.001 (0.007)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,204	7,203	3,203	7,203	3,204	7,203	3,204	7,203
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.238	0.232	0.557	0.680	0.308	0.273	0.614	0.695

(This table is continued on the next page.)

Table 2.11. The effect of external financing (continued)**Panel B: DebtIssuer**

	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>DebtIssuer_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.001 (0.002)	0.006*** (0.002)	0.010* (0.006)	0.009 (0.006)	0.002 (0.003)	0.005** (0.002)	0.008 (0.007)	0.005 (0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,003	6,301	4,004	6,301	4,003	6,301	4,004	6,301
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.292	0.236	0.662	0.624	0.369	0.311	0.711	0.659

Notes: The results of the subsample analysis based on the different financing methods are shown in this table. When the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}*, controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.8.4 The effect of information asymmetry

This study examines whether the extent of a firm's asymmetric information affects the positive association between CFO overconfidence and earnings management. First, overconfident CFOs believe that their firm values are underestimated ([Malmendier et al., 2022](#)), especially in firms that have high information asymmetry. Thus, they might have more incentives to convey private information by managing earnings ([Jiraporn et al., 2008](#)). Second, when information asymmetry is high, investors lack the resources and motivation to supervise managers' behavior, which leads to earnings management ([Schipper, 1989](#)). Given these notions, this study predicts that the positive relationship between CFO overconfidence and earnings management is stronger in firms with high information asymmetry.

Empirically, this study uses two proxies, low analyst follow and high analyst forecast error, to measure high information asymmetry.²⁶ Then, this study separates the sample into two subsamples: high and low information asymmetry. The results are shown in Table 2.12. The positive relationship between CFO overconfidence and earnings management is more pronounced in the low analyst follows ($LowAnalystFollow_{i,t}=1$) and high analyst forecast error ($HighAnalystError_{i,t}=1$), which is consistent with this study's expectations.

²⁶ Please see the measurement of information asymmetry in Appendix A.

Table 2.12. The effect of information asymmetry**Panel A: LowAnalystFollow**

Dependent variable	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>LowAnalystFollow_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.008*** (0.003)	0.002 (0.002)	0.021*** (0.007)	-0.001 (0.007)	0.007** (0.003)	0.003 (0.003)	0.024*** (0.009)	-0.005 (0.009)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,637	5,041	5,637	5,041	5,637	5,041	5,637	5,041
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.231	0.292	0.640	0.606	0.285	0.387	0.669	0.650

(This table is continued on the next page.)

Table 2.12. The effect of information asymmetry (continued)**Panel B: HighAnalystError**

	Fixed effect				Entropy balancing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable	<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>		<i>AbsAEM_{i,t}</i>		<i>AbsREM_{i,t}</i>	
<i>HighAnalystError_{i,t}</i>	1	0	1	0	1	0	1	0
<i>Holder67CFO_{i,t}</i>	0.009*** (0.003)	0.002 (0.002)	0.016** (0.007)	0.007 (0.006)	0.009*** (0.003)	0.002 (0.002)	0.020** (0.009)	-0.001 (0.008)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,213	5,236	5,213	5,236	5,213	5,236	5,213	5,236
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.198	0.302	0.619	0.632	0.270	0.355	0.671	0.658

Notes: The results of the subsample analysis based on the level of information asymmetry are shown in this table. When the dependent variable is *AbsAEM_{i,t}*, controls are consistent with equation (2.9). When the dependent variable is *AbsREM_{i,t}*, controls are consistent with equation (2.10). The standard errors clustering at the firm level are displayed in parentheses. The constant term is included. The significance levels of 10%, 5%, and 1% are indicated by *, **, and ***, respectively. See Appendix A for variable definitions. Variables of interest are marked in bold.

2.9 Conclusion

This study focuses on the link between CFO overconfidence and earnings management. In the main, this study finds that overconfident CFOs engage in more AEM and REM than non-overconfident CFOs. These findings remain after a series of robustness tests, including using entropy balancing, PSM-DID estimation, and changing the measurements of main variables. This study further tests the channels through which overconfident CFOs affect AEM and REM. This study finds that overconfident CFOs use AEM as they tend to underestimate the detection risks of their AEM activities and have low career concerns. Overconfident CFOs conduct REM because they underestimate the cost of deviating from optimal operational decisions and overestimate their managerial ability to mitigate the deteriorating effect of REM on firm performance. Further evidence shows that the impacts of CFO overconfidence on AEM and REM are more pronounced for firms with CFOs who are not sitting on the board of directors, as well as firms that have powerful CEOs, overconfident CEOs, long CEO–CFO team tenure, and high information asymmetry. The positive relationship between CFO overconfidence and AEM (REM) is stronger when the CFOs have (do not have) generalist skills, and firms have equity (debt) financing needs.

This study extends and contributes to the increasing studies on the determinants of earnings management by adding empirical evidence that CFO overconfidence has a dominant effect on earnings management activities. Furthermore, this study finds that overconfident CFOs use more earnings management with the support of overconfident CEOs, which provides a deeper insight into the joint effect of CFO overconfidence and CEO overconfidence. Empirical findings of this study support the upper echelons, overconfidence, and false consensus theories. In addition, this study can help stakeholders understand the importance of CFO overconfidence in financial reporting decisions. Given the increasing importance of the CFO in corporate decision-making, future research should shed more light on the influence of CFO overconfidence and the joint effect of CEO and CFO overconfidence on other corporate decisions, to deepen the understanding of the impact of managerial overconfidence.

Chapter 3: Paper 2 CFO Overconfidence and Conditional Accounting Conservatism

3.1 Abstract

Two distinct perspectives on financial reporting objectives, “contracting efficiency view” and “value relevance view”, have triggered a heated discussion on whether accounting information needs to be conservative or not. Since preparing and overseeing accounting information are CFOs’ primary responsibilities, CFOs’ views on the aims of accounting information directly impact the adoption of conditional accounting conservatism. Previous studies have shown that CFO observable characteristics have weak explanatory power for their decision-making. Thus, this paper sheds light on CFO overconfidence, a common psychological trait among CFOs. Relying on upper echelons and overconfidence theories, and based on a large sample size of U.S.-listed firms’ data from 1992 to 2019 (21,626 firm-year observations), this study finds that overconfident CFOs, especially those with high power, tend to diminish conditional accounting conservatism. These findings remain in a series of robustness tests. This study also finds that overconfident CFOs who adopt a lower level of conditional accounting conservatism increase earnings informativeness and financial flexibility, suggesting that overconfident CFOs aim to convey information, thereby supporting the “value relevance view” of financial reporting. This study further finds that overconfident CFOs reduce unconditional accounting conservatism. The findings of this study complement and expand the current theoretical and empirical literature on CFO and accounting conservatism.

Keywords: CFO overconfidence; Conditional accounting conservatism; Accounting information; Upper echelons theory; Overconfidence theory

3.2 Introduction

Given that information asymmetry exists between managers and external stakeholders, financial reporting is an essential tool for managers to inform outside investors and stakeholders about organizational performance (Jensen and Meckling, 1976; Healy and Palepu, 2001). However, previous studies demonstrate two opposing opinions on financial reporting objectives (Barker, 2015). The supporters of the “contracting efficiency view” suggest that the primary purpose of financial reporting is to improve contract efficiency and monitoring (Holthausen and Watts, 2001). On the other hand, adherents of the “value relevance view” argue that monitoring is a secondary consideration for financial reporting and that financial reporting should be mainly concerned with the utility of forecasting future cash flows (Barth, Beaver, and Landsman, 2001; Schipper, 2005). These different views on financial reporting objectives have led to conditional accounting conservatism becoming a controversial earnings quality characteristic and a critical topic for several accounting standard setters and researchers.^{27 28}

Some studies examine whether managers’ cognitive biases affect conditional accounting conservatism, given that upper echelons theory suggests that corporate decision-making is substantially affected by top management cognitive biases (Hambrick and Mason, 1984). Unlike the majority of studies focusing on managerial demographic traits, Ahmed and Duellman (2013) claim that CEO overconfidence has a considerable negative impact on accounting conservatism. Pierk (2021) explores a potential channel that overconfident CEOs are less likely to take a big bath after being hired to explain the results of Ahmed and Duellman (2013). However, these findings may not apply to CFO overconfidence because CEOs and CFOs have different duties. CEOs are primarily accountable for strategic decisions, while CFOs are ultimately

²⁷ Conditional accounting conservatism refers to accountants’ demand for a greater degree of verification to recognize good news from bad news; this is reflected in the accounting recognition of bad news being more timely than good news, where bad news (good news) represents negative (positive) expected cash flows (e.g., Basu, 1997; Beaver and Ryan, 2005).

²⁸ Conditional conservatism is based on economic news, while unconditional conservatism is not. Unconditional conservatism refers to the constant under recognition of net assets (Beaver and Ryan, 2005). Unconditional accounting conservatism includes expensing R&D and advertising expenditures, using accelerated depreciation methods, accumulated reserves above expected future costs, etc. (Beaver and Ryan, 2005; Ruch and Taylor, 2015). This paper mainly focuses on conditional accounting conservatism and discusses the impact of CFO overconfidence on unconditional accounting conservatism in section 3.7.2.

responsible for accounting issues ([Bertrand and Schoar, 2003](#)). Thus, overconfident CFOs have a dominant role in relation to accounting-related choices and decisions, such as financing ([Malmendier et al., 2022](#)) and cost stickiness ([Chen et al., 2022](#)). Besides, CFOs bear more penalties than CEOs for accounting failures ([Hennes, Leone, and Miller, 2008](#)). These reasons motivate this study to investigate the association between CFO overconfidence and conditional accounting conservatism. Furthermore, the incentives for overconfident CFOs and overconfident CEOs influencing conditional accounting conservatism may differ. Thus, this study further explores the potential channel to explain overconfident CFOs' conditional accounting conservatism decisions.

This study tests the relationship between CFO overconfidence and conditional accounting using U.S.-listed firms between 1992 to 2019. To measure conditional accounting conservatism, this study uses two methods proposed by [Khan and Watts \(2009\)](#) and [Banker et al. \(2016\)](#) regarding specific estimation of the timeliness of bad news. Also, following [Malmendier and Tate \(2005\)](#), [Campbell et al. \(2011\)](#), and [Chen et al. \(2022\)](#), this study uses managers' option-exercising behaviors to measure CFO overconfidence. This study finds statistically and economically significant evidence that overconfident CFOs, compared with non-overconfident CFOs, are less likely to adopt conditional accounting conservatism. In addition, the influence of CFO overconfidence on conditional accounting conservatism is more pronounced when CFOs are powerful.

Besides that, this study considers the influence of the endogeneity issue by addressing the reverse causality concern since firms with a low level of conditional accounting conservatism might tend to hire overconfident CFOs. To conduct this analysis, this study uses PSM-DID method, wherein this study defines non-overconfident to overconfident CFO transition as the treatment group and non-overconfident to non-overconfident CFO transition as the control group. This study finds that conditional accounting conservatism decreases after firms change their CFOs from non-overconfident to overconfident, which is in line with documented results. The findings of this study are robust when using an alternative overconfidence measurement and controlling for the effect of CFOs' and CEOs' risk tolerance and governance

mechanisms. The negative association between CFO overconfidence and conditional accounting conservatism is not driven by CEO overconfidence, suggesting that overconfident CFOs have an independent role in conditional accounting conservatism decisions. The additional analyzes suggest that overconfident CFOs increase earnings informativeness and financial flexibility by reducing conditional accounting conservatism, supporting the “value relevance” view. Besides, overconfident CFOs also tend to reduce unconditional accounting conservatism.

Accordingly, this paper has several contributions. Empirically, since most studies (e.g., [Francis et al., 2015](#)) focus on the relationship between CFOs’ demographic characteristics and their conservative accounting choices, this study supplements these studies with the CFOs’ psychological traits perspective. Given that [Ahmed and Duellman \(2013\)](#) and [Pierk \(2021\)](#) only focus on the link between CEO overconfidence and conditional accounting conservatism, this paper extends their study to include CFO overconfidence. Besides, [Ahmed and Duellman \(2013\)](#) do not examine the influence of unconditional accounting conservatism on conditional accounting conservatism, which might lead to some biases, as conditional accounting conservatism can be preempted by unconditional accounting conservatism ([Beaver and Ryan, 2005](#)). To increase the robustness of the results, this study considers the impact of unconditional accounting conservatism in testing conditional accounting conservatism. Furthermore, the findings that overconfident CFOs would increase earnings informativeness and financial flexibility suggest that overconfident CFOs convey private information through reducing conditional accounting conservatism, which is different from the overconfident CEOs’ motivations ([Ahmed and Duellman, 2013](#); [Pierk, 2021](#)).

Theoretically, combining upper echelons and overconfidence theories, this study finds that CFO overconfidence, a psychological trait, significantly impacts conditional accounting conservatism decisions. Therefore, the findings provide more evidence in support of the upper echelons and overconfidence theories. The findings also have significant implications for practice and policy. The FASB and IASB opposed conservative accounting and removed the requirement for accounting conservatism from the joint conceptual framework in 2010 as they believed that neutrality is a better financial quality objective

(FASB, 2010; IASB, 2010). Their choices, however, have generated considerable dispute. The study's findings support their decision from the "value relevance" view.

The remainder of this study is organized as follows. Section 3.3 presents the theoretical framework, literature review, and hypothesis development. Section 3.4 shows the research design. Section 3.5 presents the baseline analysis and some robustness tests. This study discusses the moderating effect of CFO power in Section 3.6. Section 3.7 conducts two additional tests, and Section 3.8 concludes the paper.

3.3 Theoretical framework, literature review, and hypothesis development

From the 'contracting efficiency' perspective, conditional accounting conservatism assists the directors' and investors' monitoring and governance. Some empirical studies suggest that lenders are more interested in information about borrower losses than borrower profits in setting debt agreements because the lenders' upside is limited to contractual interest payments (Watts, 2003; Ruch and Taylor, 2015). According to this idea, conditional accounting conservatism provides lenders with more relevant information by timely loss recognition, improving the detection of default risk (e.g., Ahmed et al., 2002; Watts, 2003; Wittenberg-Moerman, 2008; Zhang, 2008).

On the contrary, Penalva and Wagenhofer (2019) argue that the impact of conditional accounting conservatism on efficient debt arrangements is uncertain in the theoretical literature. For example, Gigler et al. (2009) define efficient debt contracts as lowering the cost of erroneous actions caused by false alarms and excessive optimism. False alarms refer to situations when lenders abandon or deny debt arrangements that would have been beneficial to fulfill. Excessive optimism occurs when a lender terminates or commences a loan deal that would have been lucrative to cancel or abandon. According to Gigler et al. (2009), conditional accounting conservatism minimizes the risk of excessive optimism while increasing the likelihood of false alarms. However, Mora and Walker (2015) remind researchers to take the conclusions of Gigler et al. (2009) carefully as Gigler et al. (2009) implicitly assume no adverse selection or moral hazard problem in their model.

In addition to debt contracts, some studies suggest that conditional accounting conservatism plays a vital role in monitoring managers. For example, [Watts \(2003\)](#) suggests that accounting conservatism improves the veracity of reported earnings. Besides, conditional accounting conservatism urges managers to timely abandon negative net present value (NPV) projects ([Francis and Martin, 2010](#); [Louis, Sun, and Urcan, 2012](#)). However, conditional accounting conservatism might also reduce managers' incentive to take risky but positive NPV projects ([Kravet, 2014](#)).

A growing number of scholars and accounting standard setters have criticized conditional accounting conservatism from the "value relevance" view of financial reporting. Some studies suggest that conditional accounting conservatism might increase analyst forecast error and dispersion ([Mensah, Song, and Ho, 2004](#); [Pae and Thornton, 2010](#); [Heflin, Hsu, and Jin, 2015](#)). [Lee \(2010\)](#) finds that firms with a higher conditional accounting conservatism have less flexibility in liquidity management, external financing decisions, investment sensitivity to financing constraints, and payout policies. Furthermore, [Barth et al. \(2014\)](#) indicate that conditional accounting conservatism diminishes earnings informativeness, making it more difficult for equity investors to estimate the value of earnings information. Similarly, [Heflin et al. \(2015\)](#) suggest that conditional accounting conservatism reduces the persistence and informativeness of GAAP earnings and income smoothing.

These flaws in conditional accounting conservatism prompt accounting standard setters to reconsider whether conservatism should be included in conceptual frameworks. FASB and IASB removed the concept of conservatism from the joint conceptual framework in 2010, believing that neutrality is a better financial quality objective than conservatism ([FASB, 2010](#); [IASB, 2010](#)).

Overall, it needs to critically consider whether conditional accounting conservatism is beneficial or detrimental because the net effect of conditional accounting conservatism is contingent upon how accounting information is used ([Mora and Walker, 2015](#)). Since preparing and overseeing accounting information are CFOs' primary responsibilities ([Bertrand and Schoar, 2003](#); [Jiang et al., 2010](#); [Kuang et al., 2022](#)), plenty of studies shed light on the association between CFO and conditional accounting conservatism. These studies focus on CFOs' traits as the upper echelons theory suggests that

corporate decision-making is substantially affected by top management cognitive biases (Hambrick and Mason, 1984). Given the difficulty of measuring cognitive bias, earlier studies use CFOs' demographic characteristics as proxies for CFOs' cognitive biases.

Francis et al. (2015) find a positive relationship between female CFOs and conservative accounting; this relationship is more pronounced when firms face high litigation, default, systemic, and turnover risks. They explain that female CFOs are more sensitive to risks than male CFOs, increasing accounting conservatism. Using a difference-in-difference approach to address the endogeneity problem caused by reverse causality, Francis et al. (2015) prove that changing from a male to a female CFO leads to more conservative accounting decisions than changing from a male to a female or another male CFO. Excluding the simultaneous changes of CFOs and CEOs, this finding still holds, indicating that CFOs have an important and independent influence on conservative accounting decisions. Besides, the agency problem worsens as top managers' ownership declines, increasing the necessity for accounting conservatism (LaFond and Watts, 2008).

Ge et al. (2011), on the other hand, argue that CFO apparent and demographic features have limited explanatory power for their styles. A growing number of studies shed light on the impact of CFO overconfidence on firm decisions. Overconfident CFOs overestimate their firm's future performance, which is reflected in making more optimistic forecasts and investments and increasing the stickiness of costs (Ben-David et al., 2013; Chen et al., 2022). Thus, overconfident CFOs deem that investors undervalue their current firms, making them more willing to use internal funds, followed by debt financing (Malmendier et al., 2022). However, it is unclear whether CFO overconfidence affects conditional accounting conservatism. Although Ahmed and Duellman (2013) document a negative association between CEO overconfidence and the application of accounting conservatism, this conclusion may not be generalizable to CFO overconfidence research because of the difference in their roles.

CFOs are ultimately accountable for the quality of financial reporting, whereas CEOs are responsible for the firms' strategic operations (Geiger and North, 2006; Feng et al., 2011). Distinct roles in firms result in CEOs and CFOs

making decisions from different perspectives. In other words, CEOs are more likely to make decisions from the investment and operation perspectives, whereas CFOs tend to make decisions from the earnings quality and financing perspectives. Besides, distinct roles come with different responsibilities. Although CEOs and CFOs both have the incentive to manipulate earnings (e.g., [Masters-Stout, Costigan, and Lovata, 2008](#)), CFOs suffer higher costs (e.g., reductions in compensation levels, turnovers, and severe legal penalties) than CEOs when opportunistic earnings management actions are detected ([Hennes et al., 2008](#); [Hoitash, Hoitash, and Johnstone, 2012](#); [Kroos, Schabus, and Verbeeten, 2018](#)). That is because CFOs cannot claim their lack of accounting knowledge as convincingly as CEOs can. Therefore, this study will analyze the relationship between CFO overconfidence and accounting conservatism in combination with CFO responsibility and financial statement objectives.

This study predicts that directors and investors demand more conditional accounting conservatism when firms have overconfident CFOs from the ‘contracting efficiency’ perspective. Overconfidence theory, from the concept of over-optimism concept, suggests that people believe that the probability of positive and lucky events outweighs the probability of negative and unfortunate events ([Weinstein, 1980](#)). This cognitive bias significantly affects managers’ decisions, according to the upper echelons theory ([Hambrick and Mason, 1984](#)). Theoretically, overconfident CFOs are less likely to recognize and report bad news timely, but are willing to confirm good news promptly. Previous empirical studies support this point and show that overconfident CFOs are more likely to make overly optimistic forecasts, overinvest, and increase cost stickiness ([Ben-David et al., 2013](#); [Chen et al., 2022](#)). These aggressive behaviors might increase the information asymmetry between overconfident CFOs and managers. Thus, the directors and investors might demand conditional accounting conservatism to monitor overconfident CFOs’ aggressive behaviors and enhance contracting efficiency. The foregoing discussion leads to the following hypothesis:

H1a: (“contracting efficiency view”) There is a positive association between CFO overconfidence and conditional accounting conservatism.

However, this study predicts a negative association between CFO overconfidence and conditional accounting conservatism from the “value relevance” view. The requirements of conditional accounting conservatism, accelerating bad news while delaying good news disclosure, reduce the value-relevant information provided by the managers (Barth et al., 2014; Heflin et al., 2015). These requirements contradict overconfident CFOs’ willingness to convey value-adding private information to reduce financing costs. Specifically, from the notion of miscalibration, the overconfidence theory suggests that people overestimate their ability to reduce future uncertainty and make accurate predictions (Alicke, 1985). Relying on the upper echelons and overconfidence theories, prior studies suggest that overconfident CFOs deem that the market underestimates their firm values, overestimating the cost of external capital (Ben-David et al., 2013; Malmendier et al., 2022). As a result, overconfident CFOs excessively rely on internal funds and consider debt financing when internal funds are insufficient (Malmendier et al., 2022). As the primary person in charge of financing, overconfident CFOs have the incentive to convey their private information by accelerating good news recognition and delaying bad news recognition, thereby reducing the cost of capital (Mangena, Li, and Taurigana, 2016). The foregoing discussion leads to the following hypothesis:

H1b: (“value relevance view”) There is a negative association between CFO overconfidence and conditional accounting conservatism.

According to updated upper echelons theory, strong management discretion (i.e., high power) moderates the effect of managerial traits on firm decisions (Hambrick, 2007). Consistently, some empirical studies argue that CFOs play a vital role in some accounting-related decisions, especially if they are powerful. For example, CFOs have more power than auditor committees in negotiating audit fees (Beck and Mauldin, 2014). CFO equity incentives have a more vital role in earnings management decisions than CEO equity incentives (Jiang et al., 2010). After controlling the effect of governance, Florackis and Sainani (2021) find that CFOs resist excessive pressure from CEOs to manipulate earnings. The effect of CFO overconfidence exceeds CEO overconfidence in making external financing choices (Malmendier et al., 2022).

The positive association between CFO overconfidence and cost stickiness is enhanced when firms have powerful CFOs (Chen et al., 2022). Given that this study has predicted that overconfident CFOs have an incentive to reduce conditional accounting conservatism from the “value relevance” view, this study further expects that overconfident CFOs with more power will have a more pronounced influence on conditional accounting conservatism. The foregoing discussion leads to the following hypothesis:

H2: Overconfident CFOs with more power are more likely to reduce conditional accounting conservatism.

3.4 Research design

3.4.1 Sample selection and data sources

This study uses U.S.-listed firms’ data collected from multiple databases. The accounting data is mainly collected from the CCM and CRSP databases. The CFOs’ and CEOs’ compensation information comes from the ExecuComp database. For the robustness test, this study uses institutional investors and corporate governance information, which are collected from Thomson-Reuters 13F and BoardEx databases, respectively. The analysts’ information is collected from the I/B/E/S database. This study’s sample period is from 1992 to 2019 because CFO and CEO compensation information has been available in the ExecuComp database since 1992. This study excludes financial firms (SIC:6000-6999) and utility firms (SIC:4900-4999). To reduce the potential impact of outliers, this study winsorizes all continuous variables at the 1st and 99th percentiles. The main sample of this study has 21,626 firm-year observations. The firm-year observations change when testing the hypothesis related to CFO power, which depends on the available data for each proxy of CFO power. The detailed data sample construction is shown in Table 3.1.

Table 3.1. Sample selection

Steps	Details	Observations
Step 1	Initial data of U.S.-listed firms from CCM database	178,295
Step 2	Exclude: observations that do not include CFOs' compensation information in the ExecuComp database	(137,142)
	Total number of observations for U.S.-listed firms with CCM and ExecuComp data	41,153
Step3	Exclude: Financial firms (sic: 6000-6999)	(7,154)
Step4	Exclude: Utility firms (sic: 4900-4999)	(2,151)
Step5	Exclude: Missing value of the variable used to test the H1a and H1b	(10,222)
	Total number of observations to test the H1a and H1b	21,626
	Total number of observations to test the third hypothesis	The different sample sizes depend on the number of observations of the independent variable.

3.4.2 Variable measurement

3.4.2.1 *The measurement of conditional accounting conservatism*

Basu (1997) proposes the measures of conditional accounting conservatism. The industry-year measurement of Basu (1997) assumes that all firms in the same industry are homogeneous. The individual firm measurement of Basu (1997) assumes that the operating traits of the firm are stable. However, Khan and Watts (2009) argue that both measures of Basu (1997) have limitations because firms' conditional accounting conservatism is affected by time-specific and firm-specific factors.²⁹ Thus, Khan and Watts (2009) modify the measurement of Basu (1997), which can be used to measure firm-year level conservatism. Specifically, Khan and Watts (2009) develop a firm-specific

²⁹ Since the method of Basu (1997) has a few limitations which are pointed out by many studies, such as Dietrich, Muller, and Riedl (2007) and Khan and Watts (2009), this study does not use this method in this study's main analysis. However, untabulated results show that there is a significant negative relationship between CFO overconfidence and conditional accounting conservatism when this study uses the method of Basu (1997).

estimation of the timeliness of bad news (C-Score) and good news (G-Score) and suggest that the C-score refers to conditional accounting conservatism.

The G-Score and C-Score are estimated as follows.

$$NI_{i,t} = \beta_1 + \beta_2 D_{i,t} + \beta_3 RET_{i,t} + \beta_4 D_{i,t} \times RET_{i,t} + \varepsilon_{i,t}, \quad (3.1)$$

$$G_score I_{i,t} = \beta_3 = \mu_1 + \mu_2 MV_{i,t} + \mu_3 MTB_{i,t} + \mu_4 LEV_{i,t} + \varepsilon_{i,t}, \quad (3.2)$$

$$C_score I_{i,t} = \beta_4 = \lambda_1 + \lambda_2 MV_{i,t} + \lambda_3 MTB_{i,t} + \lambda_4 LEV_{i,t} + \varepsilon_{i,t}, \quad (3.3)$$

where, $NI_{i,t}$ refers to net income before extraordinary items deflated by the market value of equity at the beginning of fiscal year t ; $RET_{i,t}$ refers to the annual buy and hold return starting from the fourth month after the previous fiscal year-end; $D_{i,t}$ refers to an indicator variable that equals one if $RET_{i,t}$ is negative, and zero otherwise; $MV_{i,t}$ refers to the log of the market value of equity; $MTB_{i,t}$ refers to the market value of equity divided by the book value of equity; $LEV_{i,t}$ refers to total debt divided by total assets.

Next, replacing β_3 and β_4 from equations (3.2) and (3.3) into regression equation (3.1) yields equation (3.4).

$$\begin{aligned} NI_{i,t} = & \beta_1 + \beta_2 D_{i,t} + RET_{i,t} \times (\mu_1 + \mu_2 MV_{i,t} + \mu_3 MTB_{i,t} + \mu_4 LEV_{i,t}) \\ & + D_{i,t} \times RET_{i,t} \times (\lambda_1 + \lambda_2 MV_{i,t} + \lambda_3 MTB_{i,t} + \lambda_4 LEV_{i,t}) \\ & + \delta_1 MV_{i,t} + \delta_2 MTB_{i,t} + \delta_3 LEV_{i,t} + \delta_4 D_{i,t} \times MV_{i,t} \\ & + \delta_5 D_{i,t} \times MTB_{i,t} + \delta_6 D_{i,t} \times LEV_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (3.4)$$

The firm-specific conditional accounting conservatism ($C_score I_{i,t}$) is calculated by applying the estimates from equation (3.4) to equation (3.3).

Banker et al. (2016) argue that reductions in sales affect earnings more than sales increases because the confounding variation in cost stickiness significantly affects the measurement of Khan and Watts (2009). Thus, Banker et al. (2016) modify the measurement of Khan and Watts (2009) as follows.

$$\begin{aligned} NI_{i,t} = & \beta_1 + \beta_2 D_{i,t} + \beta_3 RET_{i,t} + \beta_4 D_{i,t} \times RET_{i,t} + \beta_5 S_{i,t} / MKT_{i,t-1} + \beta_6 DS_{i,t} \\ & + \beta_7 S_{i,t} / MTK_{i,t-1} \times DS_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (3.5)$$

$$G_score 2_{i,t} = \beta_3 = \mu_1 + \mu_2 MV_{i,t-1} + \mu_3 BM_{i,t-1} + \mu_4 LEV_{i,t-1} + \varepsilon_{i,t}, \quad (3.6)$$

$$C_score 2_{i,t} = \beta_4 = \lambda_1 + \lambda_2 MV_{i,t-1} + \lambda_3 BM_{i,t-1} + \lambda_4 LEV_{i,t-1} + \varepsilon_{i,t}, \quad (3.7)$$

where, $MV_{i,t-1}$ refers to the log of the market value of equity in the fiscal year $t-1$; $BM_{i,t-1}$ refers to the book value of equity divided by the market value of equity in the fiscal year $t-1$; $LEV_{i,t-1}$ refers to total debt divided by total assets in the fiscal year $t-1$; $S_{i,t}/MKT_{i,t-1}$ is the changes in sales divided by market value

of equity in the fiscal year $t-1$; $DS_{i,t}$ equals one if $S_{i,t}$ is negative, and zero otherwise.

Next, replacing β_3 and β_4 from equations (3.6) and (3.7) into regression equation (3.5) yields equation (3.8).

$$\begin{aligned}
 NI_{i,t} = & \beta_1 + \beta_2 D_{i,t} + RET_{i,t} \times (\mu_1 + \mu_2 MV_{i,t-1} + \mu_3 BM_{i,t-1} + \mu_4 LEV_{i,t-1}) \\
 & + D_{i,t} \times RET_{i,t} \times (\lambda_1 + \lambda_2 MV_{i,t-1} + \lambda_3 BM_{i,t-1} + \lambda_4 LEV_{i,t-1}) \\
 & + \beta_5 S_{i,t} / MKT_{i,t-1} + \beta_6 DS_{i,t} + \beta_7 S_{i,t} / MKT_{i,t-1} \times DS_{i,t} + \delta_1 MV_{i,t-1} \\
 & + \delta_2 BM_{i,t-1} + \delta_3 LEV_{i,t-1} + \delta_4 D_{i,t} \times MV_{i,t-1} + \delta_5 D_{i,t} \times BM_{i,t-1} \\
 & + \delta_6 D_{i,t} \times LEV_{i,t-1} + \delta_7 S_{i,t} / MKT_{i,t-1} \times MV_{i,t-1} + \delta_8 S_{i,t} / MKT_{i,t-1} \times BM_{i,t-1} \\
 & + \delta_9 S_{i,t} / MKT_{i,t-1} \times LEV_{i,t-1} + \delta_{10} DS_{i,t} \times MV_{i,t-1} + \delta_{11} DS_{i,t} \times BM_{i,t-1} \\
 & + \delta_{12} DS_{i,t} \times LEV_{i,t-1} + \delta_{13} S_{i,t} / MKT_{i,t-1} \times DS_{i,t} \times MV_{i,t-1} \\
 & + \delta_{14} S_{i,t} / MKT_{i,t-1} \times DS_{i,t} \times BM_{i,t-1} + \delta_{15} S_{i,t} / MKT_{i,t-1} \times DS_{i,t} \times LEV_{i,t-1} + \varepsilon_{i,t}.
 \end{aligned} \tag{3.8}$$

The firm-specific conditional accounting conservatism ($C_score2_{i,t}$) is measured by applying the estimates from equation (3.8) to equation (3.7).

3.4.2.2 The measurement of overconfidence

The mainstream method of measuring managers' overconfidence in the current literature is the option-based method proposed by [Malmendier and Tate \(2005\)](#). The logic behind this measure is that managers who are overconfident about the future performance of the firm will put off exercising their options. This study, following the method of [Malmendier and Tate \(2005\)](#), regards CFOs or CEOs as overconfident managers when they are reluctant to exercise options that exceed 67% in the money. [Malmendier and Tate \(2005\)](#) use detailed information on each option package. As ExecuComp does not have detailed data on managers' options holdings and exercise prices for each option grant before 2006, this study follows the method of [Campbell et al. \(2011\)](#) using the average moneyness of managers' option portfolios as proxies of overconfidence. The average moneyness is calculated as follows.

$$\begin{aligned}
 & \text{The realizable value per option}_{i,t} = \\
 & \frac{\text{The total realizable value of the exercisable options}_{i,t}}{\text{The number of exercisable options}_{i,t}}
 \end{aligned} \tag{3.9}$$

$$\begin{aligned}
 & \text{The estimate of the average exercise price of options}_{i,t} = \\
 & \text{The stock price at the fiscal year end}_{i,t} - \text{The realizable value per option}_{i,t}
 \end{aligned} \tag{3.10}$$

$$\frac{\text{The average percent moneyness of the options}_{i,t}}{\frac{\text{The realizable value per option}_{i,t}}{\text{The estimate of the average exercise price of the options}_{i,t}}} = \quad (3.11)$$

Therefore, $Holder67CFO_{i,t}$ ($Holder67CEO_{i,t}$) equals one from the first time that CFOs (CEOs) hold vested options that are at least 67% in the money to the end of their tenure, and zero otherwise (Hirshleifer et al., 2012; Chen et al., 2022).³⁰

3.4.3 Baseline regression model design

This study examines the relationship between CFO overconfidence on conditional accounting conservatism using the following model.

$$\begin{aligned} C_score_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t} + \beta_2 Holder67CEO_{i,t} + \beta_3 CFO_male_{i,t} \\ & + \beta_4 CFO_ownership_{i,t} + \beta_5 MTB_{i,t} + \beta_6 SaleGrowth_{i,t} \\ & + \beta_7 Volsale_{i,t} + \beta_8 CashFlow_{i,t} + \beta_9 FirmSize_{i,t} \\ & + \beta_{10} Leverage_{i,t} + \beta_{11} RDAD_{i,t} + \beta_{12} Big_four_{i,t} \\ & + \beta_{13} High_LIT_{i,t} + \beta_{14} UnAC_{i,t} + Firm\ fixed\ effects \\ & + Year\ fixed\ effects + \varepsilon_{i,t}, \end{aligned} \quad (3.12)$$

where, $C_score_{i,t}$ is one of two conditional accounting conservatism proxies ($C_score1_{i,t}$ and $C_score2_{i,t}$); $Holder67CFO_{i,t}$, the proxy of overconfident CFOs, is the variable of interest; β_1 captures the relationship between CFO overconfidence and conditional accounting conservatism. If the β_1 is significantly positive, it indicates a positive association between CFO overconfidence and conditional accounting conservatism (hypothesis H1a). However, this study will confirm hypothesis H1b that overconfident CFOs tend to reduce conditional accounting conservatism if β_1 is significantly negative.

In the regression, this study also includes control variables based on previous conditional accounting conservatism studies. Ahmed and Duellman (2013) find a negative relationship between CEO overconfidence and conditional accounting conservatism decisions. Thus, this study includes the effect of CEO overconfidence ($Holder67CEO_{i,t}$). Since Francis et al. (2015) demonstrate that male CFOs tend to use fewer conservative accounting

³⁰ Results remain robust if this study requires that CFOs (CEOs) hold vested options that are at least 67% in the money at least twice.

principles, this study also controls for CFO gender ($CFO_male_{i,t}$). In addition to CFO gender, a prior study shows that the ownership of top managers has a significant effect on conditional accounting conservatism (LaFond and Watts, 2008); therefore, this study also controls for the influence of CFO ownership ($CFO_ownership_{i,t}$). Since firms are not static across time, this study also controls for firm performance and characteristics. Specifically, as prior studies suggest that firms' growth opportunities, sale growth rates, operating uncertainty, and profitability affect conditional accounting conservatism (e.g., Smith and Watts, 1992; Ahmed et al., 2002; Ahmed and Duellman, 2007; Ahmed and Duellman, 2013), this study uses the market-to-book ratio ($MTB_{i,t}$), sales growth ($SaleGrowth_{i,t}$), sales volatility ($VolSale_{i,t}$), and cash flows from operations ($CashFlow_{i,t}$) to capture them, respectively. This study also controls for firm characteristics, including firm size ($FirmSize_{i,t}$), leverage ($Leverage_{i,t}$), R&D and advertising expenses ($RDAD_{i,t}$), following Ahmed et al. (2002), Givoly, Hayn, and Natarajan (2007), and Ahmed and Duellman (2013). From a monitoring perspective, this study includes auditor and litigation risk because a high-quality auditor ($Big_four_{i,t}$) and high litigation risk ($High_LIT_{i,t}$) affect firms' conditional accounting conservatism decisions (Basu, Hwang, and Jan, 2001; Watts, 2003; Cano-Rodríguez, 2010). In addition, Beaver and Ryan (2005) suggest that unconditional accounting conservatism should be controlled for in the study of conditional accounting conservatism as conditional accounting conservatism can be preempted by unconditional accounting conservatism. In response to their call, this study also controls for unconditional accounting conservatism ($UnAC_{i,t}$). Finally, this study uses firm-fixed effect models and include year dummies to control for the potential omitted time-invariant effects of firms and years. Detailed variable measurements are provided in the Appendix B.

3.5 Empirical results

3.5.1 Descriptive statistics

Table 3.2 displays descriptive statistics of all variables in the baseline regression. Panel A of Table 3.2 shows the descriptive statistics of the full sample. Following Ahmed and Duellman (2013), this study uses the conditional accounting conservatism measurement proposed by Khan and Watts (2009) as

the first conditional accounting conservatism measurement. [Khan and Watts \(2009\)](#) propose using a firm-level estimate of the incremental timeliness of earnings to bad news ($C_score1_{i,t}$) to capture conditional accounting conservatism. The mean (median) value of $C_score1_{i,t}$ is 0.062 (0.068), indicating that conservatism is a widespread characteristic of financial reporting in the sample firms. Following [Khalilov and Osma \(2020\)](#), the second conditional accounting conservatism measurement ($C_score2_{i,t}$) uses the approach of [Banker et al. \(2016\)](#). The mean value of the $C_score2_{i,t}$ is 0.182, which is consistent with the findings of [Khalilov and Osma \(2020\)](#). This study's overconfidence measure is consistent with [Chen et al. \(2022\)](#). Although this study's sample period differs from that used by [Chen et al. \(2022\)](#), this study has comparable results: the mean values of overconfident CFOs and overconfident CEOs in their sample are 0.510 and 0.593, respectively, and the mean values of $Holder67CFO_{i,t}$ and $Holder67CEO_{i,t}$ are 0.548 and 0.650 in this study's sample. Over half of CFOs and CEOs are overconfident, which is in line with previous findings that overconfidence is a common trait among top managers ([Malmendier et al., 2022](#)), indicating that overconfident CFOs' behaviors are worth studying.

The summary statistics for the control variable are consistent with previous research. For example, the mean ownership by the CFO ($CFO_ownership_{i,t}$ (%)) is 0.087%, showing that the low percentage of shares outstanding excluded options held by the CFO in the sample firms ([Jiang et al., 2010](#)). Following [Ahmed and Duellman \(2013\)](#), this study uses the persistent use of negative accruals to capture unconditional accounting conservatism. For ease of interpretation, $UnAC_{i,t}$ is the persistent use of negative accruals multiplied by -1 .³¹ The mean and median values of $UnAC_{i,t}$ are 0.014 and 0.009, showing that unconditional accounting conservatism is widely adopted in sample firms.

Panel B of Table 3.2 shows the descriptive statistics of the subsample sample. T-tests are conducted to test for differences in independent and control variables between the overconfident CFO sample and the non-overconfident CFO sample. Univariate comparisons show that the mean values of $C_score1_{i,t}$

³¹ A higher $UnAC_{i,t}$ indicates greater unconditional accounting conservatism.

and $C_score2_{i,t}$ in the overconfident CFOs sample are significantly lower than the corresponding values for their non-overconfident CFOs sample, which is consistent with the hypothesis H1b.

Table 3.2. Descriptive statistics

Panel A: Full sample

	N	Mean	SD	25P	Median	75P	Max
$C_score1_{i,t}$	21,626	0.062	0.151	-0.026	0.068	0.154	0.476
$C_score2_{i,t}$	21,626	0.182	0.187	0.072	0.178	0.293	0.715
$Holder67CFO_{i,t}$	21,626	0.548	0.498	0	1	1	1
$EO_{i,t}$	21,626	0.650	0.477	0	1	1	1
$CFO_male_{i,t}$	21,626	0.921	0.269	1	1	1	1
$CFO_ownership_{i,t}(\%)$	21,626	0.087	0.234	0.000	0.000	0.059	1.600
$MTB_{i,t}$	21,626	3.447	3.709	1.559	2.394	3.840	26.455
$SaleGrowth_{i,t}$	21,626	0.106	0.239	-0.004	0.075	0.177	1.193
$h_{i,t}$	21,626	0.144	0.124	0.063	0.106	0.182	0.695
$CashFlow_{i,t}$	21,626	0.100	0.085	0.059	0.101	0.147	0.322
$FirmSize_{i,t}$	21,626	7.318	1.582	6.172	7.200	8.348	11.430
$Leverage_{i,t}$	21,626	0.213	0.169	0.056	0.205	0.328	0.659
$RDAD_{i,t}$	21,626	0.067	0.126	0.000	0.022	0.080	0.913
$Big_four_{i,t}$	21,626	0.864	0.343	1	1	1	1
$High_LIT_{i,t}$	21,626	0.100	0.300	0	0	0	1
$UnAC_{i,t}$	21,626	0.014	0.051	-0.010	0.009	0.031	0.237

Panel B: Subsample

Variable	$Holder67CFO_{i,t}=0$ (N=9,775)	$Holder67CFO_{i,t}=1$ (N=11,851)	T-statistics for tests of difference in means (Non- overconfident CFOs- Overconfident CFOs)
	Mean	Mean	
$C_score1_{i,t}$	0.079	0.047	0.032***
$C_score2_{i,t}$	0.210	0.159	0.051***
$Holder67CEO_{i,t}$	0.398	0.858	-0.459***
$CFO_male_{i,t}$	0.922	0.920	0.002
$CFO_ownership_{i,t}$	0.062	0.107	-0.045***
$MTB_{i,t}$	2.829	3.957	-1.129***
$SaleGrowth_{i,t}$	0.062	0.143	-0.081***
$VolSale_{i,t}$	0.143	0.145	-0.002
$CashFlow_{i,t}$	0.087	0.111	-0.025***
$FirmSize_{i,t}$	7.351	7.290	0.061**
$Leverage_{i,t}$	0.225	0.203	0.021***
$RDAD_{i,t}$	0.069	0.066	0.004
$Big_four_{i,t}$	0.860	0.867	-0.007
$High_LIT_{i,t}$	0.109	0.092	0.017***
$UnAC_{i,t}$	0.018	0.011	0.007***

Notes: Panel A of Table 3.2 shows the descriptive statistics of the full sample. Panel B of Table 3.2 shows the descriptive statistics of the subsample sample. T-tests are conducted to test for differences in the means between the overconfident CFOs sample and the non-overconfident CFOs sample. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.5.2 Pairwise correlations

Table 3.3 shows the Pearson correlation coefficients. The correlations among the independent and control variables do not exceed 0.6, and the untabulated values of VIFs are lower than the cutoff of 10 (Gujarati et al., 2012), indicating that multicollinearity is not a problem when analyzing the regression results. Besides, *Holder67CFO_{i,t}* and *Holder67CEO_{i,t}* have a significant association (a correlation coefficient of 0.479), indicating that both should be included in one regression to avoid the omitted variables problem. *Holder67CFO_{i,t}* has significant negative correlations with *C_score1_{i,t}* and *C_score2_{i,t}* without controlling other variables, which is in line with the hypothesis H1b that overconfident CFOs tend to reduce conditional accounting conservatism compared with non-overconfident CFOs.

Table 3.3. Correlations

	Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1)	$C_score1_{i,t}$	1							
(2)	$C_score2_{i,t}$	0.748***	1						
(3)	Holder67CFO_{i,t}	-0.107***	-0.136***	1					
(4)	$Holder67CEO_{i,t}$	-0.078***	-0.117***	0.479***	1				
(5)	$CFO_male_{i,t}$	0.021***	0.033***	-0.004	-0.030***	1			
(6)	$CFO_ownership_{i,t}$	0.184***	0.131***	0.095***	0.053***	0.031***	1		
(7)	$MTB_{i,t}$	-0.325***	-0.356***	0.151***	0.136***	-0.014**	-0.034***	1	
(8)	$SaleGrowth_{i,t}$	-0.074***	-0.144***	0.168***	0.159***	0.008	-0.018***	0.125***	1
(9)	$VolSale_{i,t}$	0.147***	0.122***	0.009	0.021***	0.003	0.035***	0.007	0.065***
(10)	$CashFlow_{i,t}$	-0.273***	-0.222***	0.145***	0.109***	-0.041***	-0.013*	0.201***	0.056***
(11)	$FirmSize_{i,t}$	-0.587***	-0.469***	-0.019***	-0.041***	-0.022***	-0.186***	0.051***	-0.061***
(12)	$Leverage_{i,t}$	-0.011	-0.080***	-0.063***	-0.064***	0.050***	-0.040***	0.107***	-0.035***
(13)	$RDAD_{i,t}$	0.025***	-0.013*	-0.015**	0.025***	-0.006	-0.029***	0.163***	0.049***
(14)	$Big_four_{i,t}$	-0.096***	-0.082***	0.009	0.001	-0.032***	-0.066***	0.022***	-0.049***
(15)	$High_LIT_{i,t}$	-0.015**	0.047***	-0.027***	-0.015**	-0.004	-0.048***	-0.054***	-0.061***
(16)	$UnAC_{i,t}$	0.074***	0.057***	-0.067***	-0.049***	-0.017**	0.008	0.089***	-0.005

(This table is continued on the next page.)

Table 3.3. Correlations (continued)

	Variable	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(9)	<i>VolSale_{i,t}</i>	1							
(10)	<i>CashFlow_{i,t}</i>	-0.088***	1						
(11)	<i>FirmSize_{i,t}</i>	-0.175***	0.123***	1					
(12)	<i>Leverage_{i,t}</i>	-0.041***	-0.153***	0.355***	1				
(13)	<i>RDAD_{i,t}</i>	-0.037***	-0.318***	-0.214***	-0.196***	1			
(14)	<i>Big_four_{i,t}</i>	-0.036***	0.040***	0.240***	0.070***	-0.014**	1		
(15)	<i>High_LIT_{i,t}</i>	0.086***	-0.091***	0.184***	0.099***	0.036***	0.052***	1	
(16)	<i>UnAC_{i,t}</i>	0.048***	0.003	-0.064***	-0.055***	0.186***	0.053***	0.042***	1

Notes: Table 3.3 shows the Pearson correlation coefficients. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.5.3 Baseline regression results

In this section, this study uses fixed-effect models to test the relationship between CFO overconfidence and conditional accounting conservatism.³² Table 3.4 shows the regression results of the estimation of equation (3.12). The dependent variables are $C_score1_{i,t}$ measured using the method of [Khan and Watts \(2009\)](#) (columns (1) and (3)) and $C_score2_{i,t}$ measured using the approach of [Banker et al. \(2016\)](#) (columns (2) and (4)). The variable of interest is CFO overconfidence ($Holder67CFO_{i,t}$) calculated following [Chen et al. \(2022\)](#).

Table 3.4. The impact of CFO overconfidence on conditional accounting conservatism.

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$	(3) $C_score1_{i,t}$	(4) $C_score2_{i,t}$
$Holder67CFO_{i,t}$	-0.016*** (0.002)	-0.025*** (0.002)	-0.012*** (0.002)	-0.018*** (0.003)
$Holder67CEO_{i,t}$			-0.011*** (0.002)	-0.019*** (0.003)
$CFO_male_{i,t}$	0.006 (0.004)	0.008 (0.006)	0.006 (0.004)	0.008 (0.006)
$CFO_ownershi$ $p_{i,t}$	0.016*** (0.005)	0.031*** (0.008)	0.016*** (0.005)	0.032*** (0.008)
$MTB_{i,t}$	-0.010*** (0.001)	-0.008*** (0.000)	-0.009*** (0.001)	-0.008*** (0.000)
$SaleGrowth_{i,t}$	-0.014*** (0.003)	-0.024*** (0.004)	-0.013*** (0.003)	-0.023*** (0.004)
$VolSale_{i,t}$	-0.014* (0.008)	-0.048*** (0.012)	-0.013* (0.008)	-0.045*** (0.012)
$CashFlow_{i,t}$	-0.099*** (0.012)	-0.119*** (0.017)	-0.097*** (0.012)	-0.115*** (0.017)
$FirmSize_{i,t}$	-0.070*** (0.002)	-0.060*** (0.003)	-0.069*** (0.002)	-0.058*** (0.003)

(This table is continued on the next page.)

³² This study uses two-way fixed-effect models, firm-fixed effect and year-fixed effect, to control for the influence of time-invariant firm characteristics and factors that are common to all firms for a given fiscal year, respectively. Besides, the untabulated F, LM, and Hausman tests indicate that fixed-effect models are the best choice for this study compared with random effect and pooled OLS models. The following regressions used the fixed-effect models for the same reasons, which this study will not repeat for brevity.

Table 3.4. The impact of CFO overconfidence on conditional accounting conservatism (continued).

Variable	(1) <i>C_score1_{i,t}</i>	(2) <i>C_score2_{i,t}</i>	(3) <i>C_score1_{i,t}</i>	(4) <i>C_score2_{i,t}</i>
<i>Leverage_{i,t}</i>	0.202*** (0.009)	0.090*** (0.012)	0.200*** (0.009)	0.086*** (0.012)
<i>RDAD_{i,t}</i>	-0.048*** (0.018)	-0.088*** (0.030)	-0.047*** (0.018)	-0.086*** (0.030)
<i>Big_four_{i,t}</i>	-0.014*** (0.003)	-0.018*** (0.005)	-0.014*** (0.003)	-0.018*** (0.005)
<i>High_LIT_{i,t}</i>	0.020*** (0.003)	0.014*** (0.004)	0.020*** (0.003)	0.014*** (0.004)
<i>UnAC_{i,t}</i>	0.074*** (0.016)	0.110*** (0.022)	0.071*** (0.016)	0.104*** (0.022)
Constant	0.424*** (0.015)	0.517*** (0.028)	0.422*** (0.015)	0.514*** (0.028)
Observations	21,626	21,626	21,626	21,626
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.797	0.751	0.798	0.752

Notes: The results of the impact of CFO overconfidence on conditional accounting conservatism are shown in Table 3.4. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

The coefficient of CFO overconfidence (*Holder67CFO_{i,t}*) is significant and negative in column (1), suggesting that firms with overconfident CFOs adopt less conditional accounting conservatism than firms with non-overconfident CFOs. Given that the mean value of conditional accounting conservatism (*C_score1_{i,t}*) is 0.062, this appears to be a sizeable difference (25.806%).³³ A similar result related to the significantly negative coefficient on *Holder67CFO_{i,t}* is shown in column (2), indicating that alternative conditional accounting conservatism measurements cannot change the inference regarding the negative relationship between CFO overconfidence and conditional accounting conservatism.

As CFO overconfidence (*Holder67CFO_{i,t}*) and CEO overconfidence (*Holder67CEO_{i,t}*) have a high correlation, and in response to the call made by

³³ 25.806% equals to the absolute value of coefficient on *Holder67CFO_{i,t}* (0.016) in column (1) of Table 3.4 divided by the mean value of *C_score1_{i,t}* (0.062) in Table 3.2, then multiplied by 100%.

Black and Gallemore (2013) and Malmendier et al. (2022) that CFO overconfidence and CEO overconfidence should be jointly considered in corporate decision-making, this study also controls for the effect of $Holder67CEO_{i,t}$ in columns (3) and (4). $Holder67CEO_{i,t}$ has a significant negative coefficient in columns (3) and (4), which is consistent with the finding of Ahmed and Duellman (2013). The coefficient on $Holder67CFO_{i,t}$ remains negative and statistically significant in columns (3) and (4). Besides, the coefficients on $Holder67CFO_{i,t}$ suggest that firms with overconfident CFOs cause a decrease in $C_score1_{i,t}$ by 19.355% (in comparison to the mean $C_score1_{i,t}$) in column (3) and a decrease in $C_score2_{i,t}$ by 9.890% (in comparison to the mean $C_score2_{i,t}$) in column (4), showing that these findings are also economically significant.

In terms of the control variables, the market to book ratio ($MTB_{i,t}$) has a negative and significant coefficient in columns (1) to (4), which is consistent with the finding of Roychowdhury and Watts (2007) that firms with high growth opportunities adopt low conditional accounting conservatism. $CashFlow_{i,t}$ has negative and significant in each column, showing that high-profit firms reduce the application of conditional accounting conservatism (Ahmed and Duellman, 2013). The coefficient on firm size ($FirmSize_{i,t}$) is negative and significant in columns (1) to (4), suggesting that larger firms are less likely to recognize losses timely (Givoly et al., 2007). The coefficient of high litigation risk ($High_LIT_{i,t}$) is significantly positive in columns (1) to (4), indicating that firms under high litigation risk adopt more conditional accounting conservatism (Watts, 2003).

Overall, this study finds that overconfident CFOs negatively affect conditional accounting conservatism, supporting the value relevance view (hypothesis H1b). However, currently, this study might not be able to rule out hypothesis H1a that directors and investors use conditional accounting conservatism to monitor overconfident CFOs' behaviors as there is another possibility to explain this negative relationship. Since the overconfident CFO has more influence on the conditional accounting conservatism than the directors and investors, the negative effects (H1b) outweigh the positive effects (H1a), resulting in a negative coefficient. This study will further discuss this possibility in the following sections.

3.5.4 Robustness tests

So far, the baseline regression results show that there is a negative association between CFO overconfidence and conditional accounting conservatism. In this section, this study will conduct a series of tests to mitigate the endogeneity issues in the findings.

3.5.4.1 Reverse causality concern

Someone might be concerned that overconfident CFOs might self-select into firms with less conservative accounting rather than have an incentive to reduce conditional accounting conservatism. To address this concern, this study lags all the independent variables and control variables in equation (3.12) by one year relative to the conditional accounting conservatism measures. The results are shown in Table 3.5. *Holder67CFO_{i,t}* has a significantly negative coefficient in columns (1) and (2), proving that overconfident CFOs are able to reduce future conditional accounting conservatism.

Table 3.5. The impact of CFO overconfidence on future conditional accounting conservatism.

Variable	(1) <i>C_score1_{i,t+1}</i>	(2) <i>C_score2_{i,t+1}</i>
<i>Holder67CFO_{i,t}</i>	-0.010*** (0.002)	-0.021*** (0.003)
<i>Holder67CEO_{i,t}</i>	-0.012*** (0.002)	-0.023*** (0.003)
<i>CFO_male_{i,t}</i>	0.005 (0.005)	0.011 (0.007)
<i>CFO_ownership_{i,t}</i>	0.011** (0.005)	0.031*** (0.008)
<i>MTB_{i,t}</i>	-0.007*** (0.001)	-0.013*** (0.001)
<i>SaleGrowth_{i,t}</i>	-0.009** (0.003)	-0.030*** (0.005)
<i>VolSale_{i,t}</i>	-0.019** (0.009)	-0.036*** (0.012)
<i>CashFlow_{i,t}</i>	-0.100*** (0.014)	-0.141*** (0.020)

(This table is continued on the next page.)

Table 3.5. The impact of CFO overconfidence on future conditional accounting conservatism (continued).

Variable	(1) <i>C_score1_{i,t+1}</i>	(2) <i>C_score2_{i,t+1}</i>
<i>FirmSize_{i,t}</i>	-0.050*** (0.003)	-0.048*** (0.003)
<i>Leverage_{i,t}</i>	0.135*** (0.010)	0.088*** (0.014)
<i>RDAD_{i,t}</i>	-0.046* (0.025)	-0.038 (0.032)
<i>Big_four_{i,t}</i>	-0.019*** (0.004)	-0.020*** (0.006)
<i>High_LIT_{i,t}</i>	0.021*** (0.003)	0.041*** (0.004)
<i>UnAC_{i,t}</i>	0.046** (0.020)	-0.008 (0.025)
Constant	0.359*** (0.020)	0.565*** (0.028)
Observations	17,074	17,074
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R ²	0.779	0.785

Notes: The results of the impact of CFO overconfidence on future conditional accounting conservatism are shown in Table 3.5. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

To further mitigate the reverse causality concern, this study uses the PSM-DID method. Following [Ahmed and Duellman \(2013\)](#), this study uses CFO turnover as an exogenous shock and require that the outgoing CFO was in office for no less than four years, and that the incoming CFO remains in office for no less than three years to satisfy that CFOs have sufficient time to influence firms' decisions. To eliminate the potential influence of CEOs, this study removes the simultaneous CEO and CFO turnovers. This study matches treatment and control groups based on the control variable included in equation (3.12) and uses the one-to-one nearest-neighbor method for which the calliper does not exceed 5% to find the matched sample. The *Treat_i* equals one if both outgoing CFO is non-overconfident and the incoming CFO is overconfident, and zero if both outgoing CFO and incoming CFO are non-overconfident. The *Post_{i,t}* equals one when observations occur in the first year after CFO turnover,

and zero when observations occur in the last year before CFO turnover. The DID estimation model is as follows:

$$C_score_{i,t} = \beta_0 + \beta_1 Treat_i \times Post_{i,t} + Controls + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t}, \quad (3.13)$$

where, the interaction term, $Treat_i \times Post_{i,t}$, is this study's variable of interest. This study includes firm fixed effect and year fixed effect, so this study excludes $Treat_i$ and $Post_{i,t}$ to avoid multiple collinearities. Control variables are consistent with equation (3.12). Detailed variable information is shown in Appendix B.

Panel A of Table 3.6 shows the results of one-to-one nearest-neighbor PSM. Panel B of Table 3.6 describes the result of the DID estimation. In the DID test, this study uses a fixed-effect model to compare the impacts of firms' changing their CFOs from non-overconfident to overconfident and firms' changing their CFOs from non-overconfident to non-overconfident on conditional accounting conservatism decisions. As shown in Panel A of Table 3.6, the P values of control variables in the matched sample are larger than 0.1, indicating that these control variables are not significantly different between the treat and control groups in the matched samples. The coefficient on $Treat_i \times Post_{i,t}$ is significantly negative in Panel B of Table 3.6, suggesting that the negative relationship between CFO overconfidence and conditional accounting conservatism remains under PSM-DID estimation.

Table 3.6. PSM-DID**Panel A: PSM**

Variable	Unmatched		Mean		Bias		T-test	
	Matched		Treated	Control	%bias	%reduct bias	t	p> t
			(2)	(3)	(4)	(5)	(6)	(7)
<i>Holder67CEO_{i,t}</i>	U		0.610	0.326	59.100		4.820	0.000
	M		0.610	0.598	2.500	95.700	0.160	0.874
<i>CFO_{male}_{i,t}</i>	U		0.890	0.909	-6.100		-0.510	0.612
	M		0.890	0.890	0.000	100.000	0.000	1.000
<i>CFO_{ownership}_{i,t}</i>	U		0.056	0.032	22.600		2.110	0.036
	M		0.056	0.042	13.300	41.100	0.930	0.354
<i>MTB_{i,t}</i>	U		2.717	2.449	16.800		1.250	0.213
	M		2.717	2.789	-4.500	73.300	-0.220	0.824
<i>SaleGrowth_{i,t}</i>	U		0.107	0.035	31.300		2.210	0.028
	M		0.107	0.108	-0.400	98.800	-0.020	0.984
<i>VolSale_{i,t}</i>	U		0.134	0.136	-2.000		-0.180	0.860
	M		0.134	0.149	-11.300	-477.200	-0.740	0.461

(This table is continued on the next page.)

Panel A: PSM (continued)

Variable	Unmatched	Mean		Bias		T-test	
	Matched	Treated	Control	%bias	%reduct bias	t	p> t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>CashFlow_{i,t}</i>	U	0.099	0.083	22.300		1.580	0.114
	M	0.099	0.102	-3.100	85.900	-0.250	0.803
<i>FirmSize_{i,t}</i>	U	7.679	7.795	-7.700		-0.620	0.538
	M	7.679	7.689	-0.700	91.100	-0.050	0.962
<i>Leverage_{i,t}</i>	U	0.208	0.231	-15.500		-1.260	0.209
	M	0.208	0.202	3.600	76.800	0.240	0.814
<i>RDAD_{i,t}</i>	U	0.060	0.089	-11.900		-0.780	0.437
	M	0.060	0.049	4.200	64.800	0.760	0.449
<i>Big_four_{i,t}</i>	U	0.927	0.919	3.100		0.240	0.807
	M	0.927	0.963	-13.600	-342.800	-1.030	0.307
<i>High_LIT_{i,t}</i>	U	0.037	0.085	-20.200		-1.470	0.141
	M	0.037	0.049	-5.100	74.600	-0.380	0.701
<i>UnAC_{i,t}</i>	U	0.011	0.016	-12.500		-0.960	0.338
	M	0.011	0.005	12.300	2.000	0.950	0.342

(This table is continued on the next page.)

Table 3.6. PSM-DID (continued)**Panel B: DID**

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$
$Treat_i \times Post_{i,t}$	-0.022* (0.012)	-0.025** (0.010)
Constant	0.919*** (0.174)	0.826*** (0.139)
Observations	120	120
Controls in equation (3.13)	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R ²	0.922	0.949

Notes: Panel A of Table 3.6 reports the results of PSM. Panel B of Table 3.6 shows the results of DID. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.5.4.2 Measurement error

This study's first overconfidence measure uses 67% as the threshold value. However, some studies adopt other threshold values to measure overconfidence. Thus, this study repeats the analysis using an alternative overconfidence proxy. Following [Campbell et al. \(2011\)](#) and [Hirshleifer et al. \(2012\)](#), this study changes the threshold value of option moneyiness such that $Holder100CFO_{i,t}$ ($Holder100CEO_{i,t}$) equals one from the first time that CFOs (CEOs) hold vested options that are at least 100% in the money to the end of their tenure, and zero otherwise. Besides, to rule out the concern that CFOs and CEOs exercise their options late because they are risk-tolerant rather than overconfident, this study, following [Huang et al. \(2016\)](#), controls for CFO and CEO risk tolerance ($CFO_vega_{i,t}$ and $CEO_vega_{i,t}$). As shown in Table 3.7, using the new proxy of overconfidence and controlling for CFOs' and CEOs' risk tolerance has a negligible effect on the negative relationship between CFO overconfidence and conditional accounting conservatism. In addition, although this study uses two methods to capture firm-specific conditional accounting conservatism, this study uses the method proposed by [Basu \(1997\)](#) to measure conditional accounting conservatism. Untabulated results show that overconfident CFOs tend to recognize good news more promptly than bad news.

Table 3.7. The impact of CFO overconfidence on conditional accounting conservatism-alternative measurement of overconfidence.

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$	(3) $C_score1_{i,t}$	(4) $C_score2_{i,t}$
$Holder100CF$ $O_{i,t}$	-0.010*** (0.002)	-0.019*** (0.003)	-0.011*** (0.002)	-0.021*** (0.003)
$Holder100CE$ $O_{i,t}$	-0.011*** (0.002)	-0.017*** (0.003)	-0.010*** (0.002)	-0.018*** (0.003)
$CFO_male_{i,t}$	0.006* (0.004)	0.008 (0.006)	0.004 (0.004)	0.005 (0.006)
$CFO_ownershi$ $pl_{i,t}$	0.016*** (0.005)	0.032*** (0.008)	0.017*** (0.005)	0.038*** (0.008)
$MTB_{i,t}$	-0.009*** (0.001)	-0.008*** (0.000)	-0.010*** (0.001)	-0.008*** (0.000)

(This table is continued on the next page.)

Table 3.7. The impact of CFO overconfidence on conditional accounting conservatism-alternative measurement of overconfidence (continued)

Variable	(1) <i>C_score1_{i,t}</i>	(2) <i>C_score2_{i,t}</i>	(3) <i>C_score1_{i,t}</i>	(4) <i>C_score2_{i,t}</i>
<i>SaleGrowth_{i,t}</i>	-0.014*** (0.003)	-0.023*** (0.004)	-0.013*** (0.003)	-0.023*** (0.004)
<i>VolSale_{i,t}</i>	-0.012 (0.008)	-0.044*** (0.012)	-0.016* (0.008)	-0.050*** (0.013)
<i>CashFlow_{i,t}</i>	-0.099*** (0.012)	-0.116*** (0.017)	-0.097*** (0.014)	-0.108*** (0.019)
<i>FirmSize_{i,t}</i>	-0.069*** (0.002)	-0.058*** (0.003)	-0.070*** (0.002)	-0.055*** (0.004)
<i>Leverage_{i,t}</i>	0.199*** (0.009)	0.085*** (0.013)	0.201*** (0.010)	0.082*** (0.014)
<i>RDAD_{i,t}</i>	-0.049*** (0.018)	-0.088*** (0.030)	-0.057*** (0.020)	-0.111*** (0.030)
<i>Big_four_{i,t}</i>	-0.014*** (0.003)	-0.018*** (0.005)	-0.016*** (0.004)	-0.019*** (0.006)
<i>High_LIT_{i,t}</i>	0.020*** (0.003)	0.014*** (0.004)	0.020*** (0.003)	0.016*** (0.004)
<i>UnAC_{i,t}</i>	0.072*** (0.016)	0.104*** (0.023)	0.073*** (0.018)	0.096*** (0.025)
<i>CFO_vega_{i,t}</i>			0.001 (0.001)	-0.003** (0.001)
<i>CEO_vega_{i,t}</i>			-0.001 (0.001)	-0.003** (0.001)
Constant	0.416*** (0.015)	0.510*** (0.028)	0.490*** (0.019)	0.595*** (0.033)
Observations	21,388	21,388	18,601	18,601
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.797	0.752	0.799	0.760

Notes: The results of using an alternative overconfidence measure are shown in Table 3.7. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.5.4.3 The effect of CEO

Although this study finds a negative association between CFO overconfidence and conditional accounting conservatism, someone might argue that this result is due to the co-existence of CEO overconfidence and CFO overconfidence. [Hsieh et al. \(2018\)](#) and [Chyz et al. \(2019\)](#) find the interactive impact of CEO overconfidence and CFO overconfidence on tax-avoidance

decisions, but overconfident CFOs do not have an independent effect on tax avoidance. To rule out this concern, this study adds the interaction term, $Holder67CFO_{i,t} \times Holder67CEO_{i,t}$, into equation (3.12). As shown in Table 3.8, the coefficient on $Holder67CFO_{i,t} \times Holder67CEO_{i,t}$ is insignificant, suggesting that this study does not find a significant joint effect of CFO and CEO overconfidence on conditional accounting conservatism. The coefficient on $Holder67CFO_{i,t}$ and $Holder67CFO_{i,t} + Holder67CFO_{i,t} \times Holder67CEO_{i,t}$ are significantly negative, indicating that overconfident CFOs have an independent effect on conditional accounting conservatism no matter whether CEOs are overconfident or not. These findings are held after controlling for CEO gender ($CEO_male_{i,t}$) and CEO ownership ($CEO_ownership_{i,t}$), which are shown in columns (3) and (4).

Table 3.8. The impact of CEO overconfidence on the relationship between CFO overconfidence and conditional accounting conservatism.

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$	(3) $C_score1_{i,t}$	(4) $C_score2_{i,t}$
$Holder67CFO_{i,t}$	-0.015*** (0.003)	-0.024*** (0.005)	-0.015*** (0.003)	-0.024*** (0.005)
$Holder67CEO_{i,t}$	-0.011*** (0.003)	-0.021*** (0.004)	-0.012*** (0.003)	-0.021*** (0.004)
$Holder67CFO_{i,t} \times Holder67CEO_{i,t}$	0.002 (0.004)	0.005 (0.006)	0.002 (0.004)	0.005 (0.006)
$CFO_male_{i,t}$	0.003 (0.004)	0.005 (0.006)	0.003 (0.004)	0.005 (0.006)
$CFO_ownership_{i,t}$	0.017*** (0.005)	0.038*** (0.008)	0.016*** (0.005)	0.037*** (0.008)
$CEO_male_{i,t}$			0.013 (0.008)	0.004 (0.011)
$CEO_ownership_{i,t}$			0.000 (0.000)	0.000 (0.000)
$MTB_{i,t}$	-0.010*** (0.001)	-0.008*** (0.000)	-0.010*** (0.001)	-0.008*** (0.001)

(This table is continued on the next page.)

Table 3.8. The impact of CEO overconfidence on the relationship between CFO overconfidence and conditional accounting conservatism (continued).

Variable	(1) <i>C_score1_{i,t}</i>	(2) <i>C_score2_{i,t}</i>	(3) <i>C_score1_{i,t}</i>	(4) <i>C_score2_{i,t}</i>
<i>SaleGrowth_{i,t}</i>	-0.012*** (0.003)	-0.023*** (0.004)	-0.012*** (0.003)	-0.023*** (0.004)
<i>VolSale_{i,t}</i>	-0.017** (0.008)	-0.052*** (0.013)	-0.017** (0.008)	-0.052*** (0.013)
<i>CashFlow_{i,t}</i>	-0.094*** (0.014)	-0.106*** (0.019)	-0.094*** (0.014)	-0.105*** (0.019)
<i>FirmSize_{i,t}</i>	-0.070*** (0.002)	-0.055*** (0.004)	-0.070*** (0.002)	-0.055*** (0.003)
<i>Leverage_{i,t}</i>	0.202*** (0.010)	0.084*** (0.013)	0.202*** (0.010)	0.084*** (0.013)
<i>RDAD_{i,t}</i>	-0.053*** (0.020)	-0.107*** (0.030)	-0.053*** (0.020)	-0.107*** (0.030)
<i>Big_four_{i,t}</i>	-0.016*** (0.004)	-0.019*** (0.006)	-0.016*** (0.004)	-0.019*** (0.006)
<i>High_LIT_{i,t}</i>	0.020*** (0.003)	0.015*** (0.004)	0.020*** (0.003)	0.015*** (0.004)
<i>UnAC_{i,t}</i>	0.072*** (0.018)	0.096*** (0.025)	0.073*** (0.018)	0.097*** (0.025)
<i>CFO_vega_{i,t}</i>	0.001 (0.001)	-0.003** (0.001)	0.001 (0.001)	-0.003** (0.001)
<i>CEO_vega_{i,t}</i>	-0.001 (0.001)	-0.003** (0.001)	-0.001 (0.001)	-0.003** (0.001)
Constant	0.496*** (0.019)	0.599*** (0.033)	0.482*** (0.021)	0.594*** (0.034)
<i>Holder67CFO_{i,t}</i>	-0.013***	-0.019***	-0.012***	-0.019***
<i>Holder67CFO_{i,t}</i>				
<i>Holder67CEO_{i,t}</i>				
	(0.002)	(0.004)	(0.002)	(0.004)
Observations	18,824	18,824	18,824	18,824
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.800	0.761	0.800	0.761

Notes: The results of the impact of CEO overconfidence on the relationship between CFO overconfidence and conditional accounting conservatism are shown in Table 3.8. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.5.4.4 The effect of governance

As mentioned earlier, someone may argue that there are two explanations for the negative association between CFO overconfidence and conditional accounting conservatism. The first is that directors and investors do not use conditional accounting conservatism to monitor overconfident CFOs' behaviors. The second one is that the negative effect of CFO overconfidence dominates the positive influence of governance on conditional accounting conservatism. To test these two explanations, this study examines the impact of strong corporate governance on the relationship between CFO overconfidence and conditional accounting conservatism. If this study does not find a significant effect of strong governance, it will confirm the first explanation.³⁴

This study follows [Ahmed and Duellman \(2013\)](#) to measure strong governance. Firms have strong governance ($StrongCG_{i,t}$) if they meet three of the four criteria listed below: First, the CEO is not simultaneously the Chairman. Second, the percentage of outside directors is greater than the sample's median figure. Third, the institutional ownership percentage is more than the sample's median figure. Fourth, the percentage of inside directors is lower than the median value of the sample. As shown in columns (1) and (2) of Table 3.9, this study additionally controls for the $StrongCG_{i,t}$ in equation (3.12). $Holder67CFO_{i,t}$ remain has a significantly negative coefficient. Besides, this study adds the interaction term, $Holder67CFO_{i,t} \times StrongCG_{i,t}$, into equation (3.12). As shown in columns (3) and (4), the coefficient on the interaction term is insignificant. However, the coefficients on $Holder67CFO_{i,t}$ and $Holder67CFO_{i,t} + Holder67CFO_{i,t} \times StrongCG_{i,t}$ are significantly negative, suggesting that strong governance cannot moderate the association between CFO overconfidence and conditional accounting conservatism. These findings rule out H1a.

³⁴ Someone might argue that the insignificant effect of strong governance is because directors and investors are less likely to demand conditional accounting conservatism for firms with strong governance. However, [Lara, Osmá, and Penalva \(2009\)](#) suggest that governance and conservatism are not substitutes. Firms with stronger governance might have a higher level of accounting conservatism.

Table 3.9. The impact of strong governance on the relationship between CFO overconfidence and conditional accounting conservatism.

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$	(3) $C_score1_{i,t}$	(4) $C_score2_{i,t}$
$Holder67CFO_{i,t}$	-0.016***	-0.025***	-0.016***	-0.025***
	(0.003)	(0.004)	(0.003)	(0.004)
$StrongCG_{i,t}$	0.002	0.007	0.002	0.008
	(0.003)	(0.004)	(0.004)	(0.006)
$Holder67CFO_{i,t} \times StrongCG_{i,t}$			0.000	-0.003
			(0.004)	(0.007)
$Holder67CEO_{i,t}$	-0.009***	-0.016***	-0.009***	-0.016***
	(0.003)	(0.004)	(0.003)	(0.004)
$CFO_male_{i,t}$	0.004	0.011	0.004	0.011
	(0.005)	(0.008)	(0.005)	(0.008)
$CFO_ownershi$ $p_{i,t}$	0.028***	0.050***	0.028***	0.050***
	(0.007)	(0.012)	(0.007)	(0.012)
$CEO_male_{i,t}$	0.009	0.012	0.009	0.012
	(0.011)	(0.017)	(0.011)	(0.017)
$CEO_ownershi$ $p_{i,t}$	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
$MTB_{i,t}$	-0.010***	-0.008***	-0.010***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)
$SaleGrowth_{i,t}$	-0.007	-0.024***	-0.007	-0.024***
	(0.004)	(0.006)	(0.004)	(0.006)
$VolSale_{i,t}$	-0.032**	-0.068***	-0.032**	-0.068***
	(0.013)	(0.018)	(0.013)	(0.018)
$CashFlow_{i,t}$	-0.103***	-0.086***	-0.103***	-0.086***
	(0.020)	(0.024)	(0.020)	(0.024)
$FirmSize_{i,t}$	-0.071***	-0.055***	-0.071***	-0.055***
	(0.004)	(0.005)	(0.004)	(0.005)
$Leverage_{i,t}$	0.197***	0.082***	0.197***	0.082***
	(0.013)	(0.019)	(0.013)	(0.019)
$RDAD_{i,t}$	-0.072**	-0.118***	-0.072**	-0.118***
	(0.028)	(0.040)	(0.028)	(0.040)
$Big_four_{i,t}$	-0.038***	-0.045***	-0.038***	-0.045***
	(0.007)	(0.009)	(0.007)	(0.009)
$High_LIT_{i,t}$	0.014***	0.016***	0.014***	0.016***
	(0.004)	(0.005)	(0.004)	(0.005)
$UnAC_{i,t}$	0.064**	0.093***	0.064**	0.093***
	(0.027)	(0.035)	(0.027)	(0.035)
$CFO_vega_{i,t}$	0.001	-0.002	0.001	-0.002
	(0.001)	(0.002)	(0.001)	(0.002)

(This table is continued on the next page.)

Table 3.9. The impact of strong governance on the relationship between CFO overconfidence and conditional accounting conservatism (continued).

Variable	(1) $C_score1_{i,t}$	(2) $C_score2_{i,t}$	(3) $C_score1_{i,t}$	(4) $C_score2_{i,t}$
$CEO_vega_{i,t}$	-0.000 (0.001)	-0.001 (0.001)	-0.000 (0.001)	-0.001 (0.001)
Constant	0.577*** (0.028)	0.509*** (0.053)	0.577*** (0.028)	0.508*** (0.053)
$Holder67CFO_{i,t} +$ $Holder67CFO_{i,t} \times StrongCG_{i,t}$			-0.016***	-0.028***
Observations	11,361	11,361	(0.005) 11,361	(0.007) 11,361
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.807	0.769	0.807	0.769

Notes: The results of the impact of strong governance on the relationship between CFO overconfidence and conditional accounting conservatism are shown in Table 3.9. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.6 CFO power, CFO overconfidence, and conditional accounting conservatism

This section will examine the moderating effect of CFO power on CFO overconfidence and conditional accounting conservatism. Following prior studies, this study uses three methods to measure CFO power. The first measure, $CFO_rank_{i,t}$, is an indicator variable that equals one if the CFO is among the three highest-paid managers, and zero otherwise (Florackis and Sainani, 2021). The second measure, $CFO_topquartile_{i,t}$, is an indicator variable that equals one if the total CFO compensation is divided by the total compensation of the top three executives, excluding the CEO and CFO, in the top quartile of the sample, and zero otherwise (Baker et al., 2019). The third measure, $CFO_payslice_{i,t}$ equals CFO total compensation to the top five executives' total compensation. If fewer than five executives' compensations are reported, this study assumes that the remaining top five unreported executives get the same level of salary as the lowest-paid executive among those disclosed (Feng et al., 2011). This study

then modifies equation (3.12) as follows to examine the moderating effect of CFO power.

$$\begin{aligned}
 C_score_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t} + \beta_2 CFO_power_{i,t} + \beta_3 Holder67CFO_{i,t} \times CFO_power_{i,t} \\
 & + \beta_4 Holder67CEO_{i,t} + \beta_5 CFO_male_{i,t} + \beta_6 CFO_ownership_{i,t} \\
 & + \beta_7 CEO_male_{i,t} + \beta_8 CEO_ownership_{i,t} + \beta_9 MTB_{i,t} + \beta_{10} SaleGrowth_{i,t} \\
 & + \beta_{11} Volsale_{i,t} + \beta_{12} CashFlow_{i,t} + \beta_{13} FirmSize_{i,t} + \beta_{14} Leverage_{i,t} \\
 & + \beta_{15} RDAD_{i,t} + \beta_{16} Big_four_{i,t} + \beta_{17} High_LIT_{i,t} + \beta_{18} UnAC_{i,t} \\
 & + \beta_{19} CFO_vega_{i,t} + \beta_{20} CEO_vega_{i,t} + \beta_{21} StrongCG_{i,t} \\
 & + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t},
 \end{aligned}
 \tag{3.14}$$

where, $CFO_power_{i,t}$ is one of three CFO power proxies ($CFO_rank_{i,t}$, $CFO_topquartile_{i,t}$ and $CFO_payslice_{i,t}$); $Holder67CFO_{i,t} \times CFO_power_{i,t}$ is the variable of interest; β_3 captures the moderating effect of CFO power on the relationship between CFO overconfidence and conditional accounting conservatism. If the β_3 is significantly negative, overconfident CFOs with more power are more likely to reduce conditional accounting conservatism. Detailed variable measurements are provided in Appendix B.

Table 3.10. The impact of CFO power on the relationship between CFO overconfidence and conditional accounting conservatism.

Variable	(1) <i>C_score1_{i,t}</i>	(2) <i>C_score2_{i,t}</i>	(3) <i>C_score1_{i,t}</i>	(4) <i>C_score2_{i,t}</i>	(5) <i>C_score1_{i,t}</i>	(6) <i>C_score2_{i,t}</i>
<i>Holder67CFO_{i,t}</i>	-0.013*** (0.004)	-0.018*** (0.005)	-0.015*** (0.003)	-0.022*** (0.004)	-0.012** (0.006)	-0.010 (0.008)
<i>CFO_rank_{i,t}</i>	0.006** (0.003)	0.014*** (0.004)				
<i>Holder67CFO_{i,t} × CFO_rank_{i,t}</i>	-0.007* (0.004)	-0.015*** (0.005)				
<i>CFO_topquartile_{i,t}</i>			0.006** (0.003)	0.010** (0.004)		
<i>Holder67CFO_{i,t} × CFO_topquartile_{i,t}</i>			-0.005 (0.004)	-0.010* (0.005)		
<i>CFO_payslice_{i,t}</i>					0.055** (0.026)	0.060 (0.039)
<i>Holder67CFO_{i,t} × CFO_payslice_{i,t}</i>					-0.028 (0.035)	-0.099** (0.049)

(This table is continued on the next page.)

Table 3.10. The impact of CFO power on the relationship between CFO overconfidence and conditional accounting conservatism (continued).

Variable	(1) <i>C_score1_{i,t}</i>	(2) <i>C_score2_{i,t}</i>	(3) <i>C_score1_{i,t}</i>	(4) <i>C_score2_{i,t}</i>	(5) <i>C_score1_{i,t}</i>	(6) <i>C_score2_{i,t}</i>
Constant	0.566*** (0.030)	0.484*** (0.053)	0.565*** (0.026)	0.484*** (0.050)	0.558*** (0.026)	0.478*** (0.051)
Observations	10,679	10,679	11,781	11,781	11,845	11,845
Controls in equation (3.14)	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.804	0.764	0.800	0.766	0.799	0.764

Notes: The results of the impact of CFO power on the relationship between CFO overconfidence and conditional accounting conservatism are shown in Table 3.10. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

In columns (1) and (2) of Table 3.10, the coefficient on $Holder67CFO_{i,t} \times CFO_rank_{i,t}$ is significantly negative, suggesting that overconfident CFOs tend to reduce accounting conservatism when they are more powerful, which is in line with the second hypothesis (H2). The results are broadly similar when this study changes the measurement of CFO power. However, the $Holder67CFO_{i,t} \times CFO_topquartile_{i,t}$ and $Holder67CFO_{i,t} \times CFO_payslice_{i,t}$ have negative but insignificant coefficients in columns (3) and (5), respectively.

3.7 Additional analyzes

3.7.1 The consequence of overconfident CFOs' conditional accounting conservatism decision

From the “value relevance” perspective, this study hypothesizes that overconfident CFOs tend to convey private information by reducing conditional accounting conservatism due to overestimating their firm performance. Then, the baseline results confirm the negative relationship between overconfident CFOs and conditional accounting conservatism. In this section, this study further tests whether overconfident CFOs are able to convey information by reducing conditional accounting conservatism.

First, following the prior studies (e.g., [Lundholm and Myers, 2002](#)), this study defines overconfident CFOs' convey their private information to investors by reducing conditional accounting conservatism if the current stock prices are high related to future earnings. This study uses the future earnings response coefficient (FERC) to measure the informativeness of stock prices in relation to future earnings ([Shu, 2021](#)). To test the impact of accounting conservatism on FERC, this study extends the basic FERC measurement as follows:

$$\begin{aligned}
R_{i,t} = & \beta_0 + \beta_1 Earn_{i,t-1} + \beta_2 Earn_{i,t} + \beta_3 Earn_{i,t+3} + \beta_4 R_{i,t+3} + \beta_5 Holder67CFO_{i,t} \\
& + \beta_6 Holder67CFO_{i,t} \times Earn_{i,t-1} + \beta_7 Holder67CFO_{i,t} \times Earn_{i,t} \\
& + \beta_8 Holder67CFO_{i,t} \times Earn_{i,t+3} + \beta_9 Holder67CFO_{i,t} \times R_{i,t+3} \\
& + \beta_{10} RevC_score_{i,t} + \beta_{11} RevC_score_{i,t} \times Earn_{i,t-1} \\
& + \beta_{12} RevC_score_{i,t} \times Earn_{i,t} + \beta_{13} RevC_score_{i,t} \times Earn_{i,t+3} \\
& + \beta_{14} RevC_score_{i,t} \times R_{i,t+3} + \beta_{15} Holder67CFO_{i,t} \times RevC_score_{i,t} \\
& + \beta_{16} Holder67CFO_{i,t} \times RevC_score_{i,t} \times Earn_{i,t-1} \\
& + \beta_{17} Holder67CFO_{i,t} \times RevC_score_{i,t} \times Earn_{i,t} \\
& + \beta_{18} Holder67CFO_{i,t} \times RevC_score_{i,t} \times Earn_{i,t+3} \\
& + \beta_{19} Holder67CFO_{i,t} \times RevC_score_{i,t} \times R_{i,t+3} + \beta_{20} Holder67CEO_{i,t} \\
& + \beta_{21} CFO_male_{i,t} + \beta_{22} CFO_ownership_{i,t} + \beta_{23} CEO_male_{i,t} \\
& + \beta_{24} CEO_ownership_{i,t} + \beta_{25} MTB_{i,t} + \beta_{26} SaleGrowth_{i,t} + \beta_{27} Volsale_{i,t} \\
& + \beta_{28} FirmSize_{i,t} + \beta_{29} FirmAge_{i,t} + \beta_{30} Leverage_{i,t} + \beta_{31} Invest_{i,t} + \beta_{32} PPE_{i,t} \\
& + \beta_{33} Loss_{i,t} + \beta_{34} AnalystNumber_{i,t} + \beta_{35} CFO_vega_{i,t} + \beta_{36} CEO_vega_{i,t} \\
& + \beta_{37} StrongCG_{i,t} + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t}, \quad (3.15)
\end{aligned}$$

where, the dependent variable is the stock return ($R_{i,t}$). This study includes last year earnings per share ($Earn_{i,t-1}$), earnings per share ($Earn_{i,t}$), the sum of earnings per share for fiscal year t+1 to t+3 ($Earn_{i,t+3}$), the sum of stock return for fiscal year t+1 to t+3 ($R_{i,t+3}$) and CFO overconfidence ($Hold67CFO_{i,t}$) in the regressions. To easily interpret the results, this study multiply $C_score_{i,t}$ (including $C_score1_{i,t}$ and $C_score2_{i,t}$) by -1 to generate $RevC_score_{i,t}$ (including $RevC_score1_{i,t}$ and $RevC_score2_{i,t}$). The greater the value of $RevC_score_{i,t}$ indicates the lower conditional accounting conservatism. This study also includes interaction terms among them. The variable of interest is the triple interaction term, $Hold67CFO_{i,t} \times RevC_score_{i,t} \times Earn_{i,t+3}$. In addition, this study following prior studies (e.g., [Shu, 2021](#)) controls for CEO overconfidence ($Hold67CEO_{i,t}$), CFO gender ($CFO_male_{i,t}$), CFO ownership ($CFO_ownership_{i,t}$), CEO gender ($CEO_male_{i,t}$), CEO ownership ($CEO_ownership_{i,t}$), Market to book ratio ($MTB_{i,t}$), Sales growth ($SaleGrowth_{i,t}$), Sales volatility ($VolSale_{i,t}$), Firm Size ($FirmSize_{i,t}$), Firm age ($FirmAge_{i,t}$), Leverage ($Leverage_{i,t}$), Investment ($Invest_{i,t}$), Property, Plant & Equipment ($PPE_{i,t}$), Negative earnings per share ($Loss_{i,t}$), Number of the analyst ($Analyst_number_{i,t}$), CFO risk tolerance ($CFO_vega_{i,t}$), CEO risk tolerance ($CEO_vega_{i,t}$) and Strong governance ($StrongCG_{i,t}$). Detailed variable measurements are provided in Appendix B.

Table 3.11. The impact of overconfident CFOs' conditional accounting conservatism decision on earnings informativeness.

Variable	(1) $R_{i,t}$	(2) $R_{i,t}$
$Earn_{i,t-1}$	-0.170 (0.223)	-0.074 (0.335)
$Earn_{i,t}$	-0.319 (0.222)	0.535** (0.233)
$Earn_{i,t+3}$	0.551*** (0.094)	0.674*** (0.115)
$R_{i,t+3}$	-0.154*** (0.020)	-0.150*** (0.028)
$Holder67CFO_{i,t}$	-0.060** (0.030)	-0.025 (0.043)
$Holder67CFO_{i,t} \times Earn_{i,t-1}$	-0.023 (0.390)	-0.502 (0.488)
$Holder67CFO_{i,t} \times Earn_{i,t}$	0.650** (0.299)	0.598 (0.456)
$Holder67CFO_{i,t} \times Earn_{i,t+3}$	0.169 (0.118)	0.238* (0.142)
$Holder67CFO_{i,t} \times R_{i,t+3}$	0.031 (0.023)	0.005 (0.031)
$RevC_score1_{i,t}$	0.727*** (0.144)	
$RevC_score1_{i,t} \times Earn_{i,t-1}$	1.625* (0.886)	
$RevC_score1_{i,t} \times Earn_{i,t}$	-1.226 (0.754)	
$RevC_score1_{i,t} \times Earn_{i,t+3}$	0.116 (0.406)	
$RevC_score1_{i,t} \times R_{i,t+3}$	-0.028 (0.100)	
$Holder67CFO_{i,t} \times RevC_score1_{i,t}$	-0.360*** (0.135)	
$Holder67CFO_{i,t} \times RevC_score1_{i,t} \times Earn_{i,t-1}$	-0.499 (1.880)	
$Holder67CFO_{i,t} \times RevC_score1_{i,t} \times Earn_{i,t}$	-1.096 (1.645)	
$Holder67CFO_{i,t} \times RevC_score1_{i,t} \times Earn_{i,t+3}$	1.106* (0.623)	
$Holder67CFO_{i,t} \times RevC_score1_{i,t} \times F_{i,t+3}$	0.107 (0.139)	
$RevC_score2_{i,t}$		-1.114*** (0.123)

(The table is continued on the next page.)

Table 3.11. The impact of overconfident CFOs' conditional accounting conservatism decision on earnings informativeness (continued).

Variable	(1) $R_{i,t}$	(2) $R_{i,t}$
$RevC_score2_{i,t} \times Earn_{i,t-1}$		0.448 (0.929)
$RevC_score2_{i,t} \times Earn_{i,t}$		1.529* (0.780)
$RevC_score2_{i,t} \times Earn_{i,t+3}$		0.348 (0.379)
$RevC_score2_{i,t} \times R_{i,t+3}$		0.037 (0.128)
$Holder67CFO_{i,t} \times RevC_score2_{i,t}$		-0.248* (0.135)
$Holder67CFO_{i,t} \times RevC_score2_{i,t} \times Earn_{i,t-1}$		-1.039 (1.313)
$Holder67CFO_{i,t} \times RevC_score2_{i,t} \times Earn_{i,t}$		-0.498 (1.397)
$Holder67CFO_{i,t} \times RevC_score2_{i,t} \times Earn_{i,t+3}$		0.854* (0.496)
$Holder67CFO_{i,t} \times RevC_score2_{i,t} \times R_{i,t+3}$		0.013 (0.146)
Constant	1.551*** (0.272)	1.181*** (0.274)
Observations	5,264	5,264
Controls in equation (3.15)	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R^2	0.340	0.378

Notes: The results of the impact of overconfident CFOs' conditional accounting conservatism decision on earnings informativeness are shown in Table 3.11. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

As shown in Table 3.11, the coefficients on the $Holder67CFO_{i,t} \times RevC_score1_{i,t} \times Earn_{i,t+3}$ and $Holder67CFO_{i,t} \times RevC_score2_{i,t} \times Earn_{i,t+3}$ are significantly positive in the columns (1) and (2), respectively. These findings show that overconfident CFOs who reduce conditional accounting conservatism decisions increase earnings informativeness, which is consistent with this study's prediction that overconfident CFOs tend to convey information by reducing conditional accounting conservatism.

In addition, as the main person in charge of financing, this study predicts that the ultimate purpose of overconfident CFOs conveying information is to improve financial flexibility. Then, this study will further test whether overconfident CFOs increase financial flexibility by reducing conditional accounting conservatism. When capital markets are frictionless, firms have little incentive to hold cash if they are able to obtain financing for their positive NPV projects (Miller and Orr, 1966). However, firms' precautionary motives increase when firms face uncertainty about future access to external funds, thereby holding more cash (Opler et al., 1999; Denis and Sibilkov, 2010). Overconfident CFOs deem that the market undervalues their firm values, overestimating the cost of external capitals (Malmendier et al., 2022). Thus, overconfident managers hold more cash for future investment (Chen et al., 2020). From the value relevance view, Lee (2010) suggests that firms that adopt low accounting conservatism reduce financial frictions, increasing financial flexibility. In this case, this study expects overconfident CFOs to reduce precautionary motives to save cash. This study tests this prediction using this model:

$$\begin{aligned}
Cash_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t} + \beta_2 RevC_score_{i,t} \\
& + \beta_3 Holder67CFO_{i,t} \times RevC_score_{i,t} + \beta_4 Holder67CEO_{i,t} \\
& + \beta_5 CFO_male_{i,t} + \beta_6 CFO_ownership_{i,t} + \beta_7 CEO_male_{i,t} \\
& + \beta_8 CEO_ownership_{i,t} + \beta_9 MTB_{i,t} + \beta_{10} VolCashFlow_{i,t} \\
& + \beta_{11} Vwretd_{i,t} + \beta_{12} SdVwretd_{i,t} + \beta_{13} NWC_{i,t} + \beta_{14} CAPEX_{i,t} \\
& + \beta_{15} ACQ_{i,t} + \beta_{16} R \& D_{i,t} + \beta_{17} FirmSize_{i,t} + \beta_{18} Leverage_{i,t} \\
& + \beta_{19} Dividend_{i,t} + \beta_{20} CFO_vega_{i,t} + \beta_{21} CEO_vega_{i,t} \\
& + \beta_{22} StrongCG_{i,t} + Firm\ fixed\ effects + Year\ fixed\ effects + \varepsilon_{i,t}, \quad (3.16)
\end{aligned}$$

where, the dependent variable is Cash ($Cash_{i,t}$). The variable of interest is the interaction term, $Hold67CFO_{i,t} \times RevC_score_{i,t}$. This study follows prior studies (e.g., Lee, 2010) control CEO overconfidence ($Hold67CEO_{i,t}$), CFO gender ($CFO_male_{i,t}$), CFO ownership ($CFO_ownership_{i,t}$), CEO gender ($CEO_male_{i,t}$), CEO ownership ($CEO_ownership_{i,t}$), Market to book ratio ($MTB_{i,t}$), Volatility of cash flow ($VolCashFlow_{i,t}$), Value-weighted 12-month market-adjusted returns ($Vwretd_{i,t}$), Returns volatility ($SdVwretd_{i,t}$), Net

working capital ($NWC_{i,t}$), Capital expenditure ($CAPEX_{i,t}$), Acquisition expenditure ($ACQ_{i,t}$), Research and development expenditure ($R\&D_{i,t}$), Firm Size ($FirmSize_{i,t}$), Leverage ($Leverage_{i,t}$), Dividend payer ($Dividend_{i,t}$), CFO risk tolerance ($CFO_vega_{i,t}$), CEO risk tolerance ($CEO_vega_{i,t}$) and Strong governance ($StrongCG_{i,t}$). Detailed variable measurements are provided in the Appendix B.

Table 3.12. The impact of overconfident CFOs' conditional accounting conservatism decision on cash holding.

Variable	(1) $Cash_{i,t}$	(2) $Cash_{i,t}$	(3) $Cash_{i,t}$	(4) $Cash_{i,t}$
$Holder67CFO_{i,t}$		0.011*** (0.003)	0.007** (0.003)	0.005 (0.003)
$RevC_score1_{i,t}$			0.106*** (0.015)	
$Holder67CF$ $O_{i,t} \times$ $RevC_score1_{i,t}$			-0.036*** (0.013)	
$RevC_score2_{i,t}$				0.080*** (0.011)
$Holder67CF$ $O_{i,t} \times$ $RevC_score2_{i,t}$				-0.022** (0.010)
$Holder67CEO_{i,t}$	0.005* (0.003)	0.001 (0.003)	0.000 (0.003)	0.000 (0.003)
Constant	0.466*** (0.058)	0.463*** (0.058)	0.516*** (0.059)	0.505*** (0.060)
Observations	11,568	11,568	11,568	11,568
Controls in equation (3.16)	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Adj. R ²	0.817	0.817	0.819	0.819

Notes: The results of the impact of overconfident CFOs' conditional accounting conservatism decision on cash holding are shown in Table 3.12. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

In columns (1) and (2) of Table 3.12, this study finds that *Holder67CEO_{i,t}* and *Holder67CFO_{i,t}* have a significantly positive coefficient, respectively. These findings suggest that overconfident managers have more incentives to hold cash, which is consistent with the finding of [Chen et al. \(2020\)](#). The coefficient of *Holder67CFO_{i,t} × RevC_score_{i,t}* is significantly negative in column (3), suggesting that overconfident CFOs reduce the incentive to hold cash by reducing conditional accounting conservatism. A similar result is shown in column (4). Overall, this evidence indicates that overconfident CFOs who reduce conditional accounting conservatism increase firms' financial flexibility.

3.7.2 Overconfident CFOs and unconditional accounting conservatism

In addition to conditional accounting conservatism, there is another type of accounting conservatism called unconditional accounting conservatism or balance sheet conservatism. The idea of unconditional accounting conservatism is that the value of assets on the balance sheet is less than their neutral value (e.g., [Mora and Walker, 2015](#)). Overconfident CFOs overestimate their firms' future performance, so they are more likely to recognize spending on expected future earnings as an investment and choose lower depreciation rates. This study expects that overconfident CFOs also tend to reduce unconditional accounting conservatism. This study adopts the following model to test this prediction:

$$\begin{aligned}
 \text{UnconditionalAC}_{i,t} = & \beta_0 + \beta_1 \text{Holder67CFO}_{i,t} + \beta_2 \text{Holder67CEO}_{i,t} + \beta_3 \text{CFO_male}_{i,t} \\
 & + \beta_4 \text{CFO_ownership}_{i,t} + \beta_5 \text{CEO_male}_{i,t} \\
 & + \beta_6 \text{CEO_ownership}_{i,t} + \beta_7 \text{MTB}_{i,t} + \beta_8 \text{SaleGrowth}_{i,t} \\
 & + \beta_9 \text{Volsale}_{i,t} + \beta_{10} \text{CashFlow}_{i,t} + \beta_{11} \text{FirmSize}_{i,t} \\
 & + \beta_{12} \text{Leverage}_{i,t} + \beta_{13} \text{RDAD}_{i,t} + \beta_{14} \text{Big_four}_{i,t} \\
 & + \beta_{15} \text{High_LIT}_{i,t} + \beta_{16} \text{CFO_vega}_{i,t} + \beta_{17} \text{CEO_vega}_{i,t} \\
 & + \beta_{18} \text{StrongCG}_{i,t} + \text{Firm fixed effects} \\
 & + \text{Year fixed effects} + \varepsilon_{i,t},
 \end{aligned}$$

(3.17)

where, $UnconditionalAC_{i,t}$ is one of two unconditional accounting conservatism proxies ($UnAC_{i,t}$ and $UnAC1_{i,t}$). The variable of interest is CFO overconfidence ($Hold67CFO_{i,t}$). This study following prior studies (e.g., [Ahmed and Duellman, 2013](#)) control CEO overconfidence ($Hold67CEO_{i,t}$), CFO gender ($CFO_male_{i,t}$), CFO ownership ($CFO_ownership_{i,t}$), CEO gender ($CEO_male_{i,t}$), CEO ownership ($CEO_ownership_{i,t}$), Market to book ratio ($MTB_{i,t}$), Sales growth ($SaleGrowth_{i,t}$), Sales volatility ($VolSale_{i,t}$), Cash Flow ($CashFlow_{i,t}$), Firm Size ($FirmSize_{i,t}$), Leverage ($Leverage_{i,t}$), Research and development expense and advertising expense ($RDAD_{i,t}$), Audit firm ($Big_four_{i,t}$), High litigation risk ($High_LIT_{i,t}$), CFO risk tolerance ($CFO_vega_{i,t}$), CEO risk tolerance ($CEO_vega_{i,t}$) and Strong governance ($StrongCG_{i,t}$). Detailed variable measurements are provided in the Appendix B.

As shown in Table 3.13, the coefficient on $Hold67CFO_{i,t}$ is significantly negative, suggesting that overconfident CFOs are more likely to reduce unconditional accounting conservatism. Overall, these results are in line with this study's expectations.

Table 3.13. The impact of CFO overconfidence on unconditional accounting conservatism.

Variable	(1) $UnAC_{i,t}$	(2) $UnAC1_{i,t}$
$Holder67CFO_{i,t}$	-0.007*** (0.002)	-0.152** (0.059)
Constant	0.121*** (0.026)	4.574** (1.823)
Observations	11,890	11,890
Controls in equation (3.17)	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Adj. R ²	0.375	0.033

Notes: The results of the impact of CFO overconfidence on unconditional accounting conservatism are shown in Table 3.13. The standard errors clustering at the firm level are displayed in parentheses. Detailed variable information is shown in Appendix B. *, **, and *** represent significance levels of 0.10, 0.05, and 0.01, respectively. Variables of interest are marked in bold.

3.8 Conclusion

This study provides statistically and economically significant evidence that overconfident CFOs tend to use less conditional accounting conservatism than non-overconfident CFOs, especially when they have great power. To address the potential endogeneity problems, this study uses the PSM-DID test to rule out the concern that overconfident CFOs self-select into firms with a low level of conditional accounting conservatism. Besides, this study uses an alternative overconfidence measurement and consider the effect of risk tolerance, CEO overconfidence, and governance. These robustness tests have a negligible effect on this study's previously documented findings. In the additional tests, this study finds that overconfident CFOs would increase earnings informativeness and financial flexibility by reducing conditional accounting conservatism. Besides, overconfident CFOs also have an incentive to reduce unconditional accounting conservatism.

These findings extend the growing literature on the influence of CFO overconfidence in corporate decisions and provide a new understanding of the determinants of conditional accounting conservatism. Besides, to answer the calls of [Black and Gallemore \(2013\)](#) and [Malmendier et al. \(2022\)](#), this study examines the joint effect of CFO and CEO overconfidence, thereby complementing and extending the findings of [Ahmed and Duellman \(2013\)](#) about the negative relationship between CEO overconfidence and conditional accounting conservatism. In contrast to [Ahmed and Duellman \(2013\)](#), this study also controls for the impact of unconditional accounting conservatism in the analysis of conditional accounting conservatism, as [Beaver and Ryan \(2005\)](#) suggest that conditional accounting conservatism can be preempted by unconditional accounting conservatism. As such, this study provides more robust results about the link between managerial overconfidence and conditional accounting conservatism.

Theoretically, most empirical conditional accounting conservatism studies rely on the upper echelons theory to examine the effects of CFOs' cognitive biases proxied by demographic characteristics (e.g., [Francis et al., 2015](#)). However, as argued by prior studies (e.g., [Ge et al., 2011](#)), overconfidence has more substantial power in explaining CFOs' cognitive biases. Indeed, this study finds that CFO overconfidence plays an important role

in conditional accounting conservatism decisions, thereby providing more empirical support for the combination of upper echelons and overconfidence theories. For policymakers, these findings provide more evidence for the current discussion over FASB and IASB's decisions which removed conservatism from the joint conceptual framework. This study finds that overconfident CFOs with low conditional accounting conservatism would increase earnings informativeness and financial flexibility, supporting FASB and IASB's decisions.

Given that the effect of CFO overconfidence has received little attention within the current literature and CFOs have a growing role in firms' strategic decision-making (e.g., [Malmendier et al., 2022](#)), this study suggests that future studies pay more attention to the effect of CFO overconfidence as well as the joint effect of CEO overconfidence and CFO overconfidence on corporate decision-making.

Chapter 4: Paper 3 CFO Overconfidence and Stock Price Crash Risk

4.1 Abstract

Numerous studies have shown the prevalence of overconfidence among CFOs. Surprisingly, the real effect of CFO overconfidence is under-researched. Using data from a large sample of U.S.-listed firms over the period 1993-2019 and adopting an eclectic theoretical approach, this study finds that overconfident CFOs are more likely to increase stock price crash risk than non-overconfident CFOs through risk-taking and bad news hoarding. These findings pass a series of robustness tests. Furthermore, departing from most overconfident studies that merely examine one type of top managers (i.e., CEO), this study considers the influence of CEO and CFO overconfidence jointly. Interestingly, this study finds that CFO overconfidence outweighs CEO overconfidence in influencing stock price crash risk. Moreover, the overconfidence effect is intensified when overconfident CFOs collaborate with overconfident CEOs, thus raising stock price crash risk. However, stronger governance and a transparent information environment constrain overconfident CFOs' effect on stock price crash risk. Overall, this study's findings highlight the importance of CFO overconfidence in determining stock return tail risks.

Keywords: CFO overconfidence; Stock price crash risk; Overconfidence theory; Upper echelons theory; Power circulation theory; False consensus effect theory

4.2 Introduction

Stock price crash risk refers to when firms' bad news reaches a specific threshold and is revealed to the market all at once, causing a significant drop in stock price (e.g., [Kim et al., 2011a](#); [Kim, Li, and Zhang, 2011b](#); [Kim, Li, et al., 2016](#)). As CFOs are primarily responsible for the quality and timely disclosure of financial information ([Mian, 2001](#)), the increasing number of studies on stock price crash risks examine the influence of CFOs. For instance, adopting the agency theory framework, [Kim et al. \(2011a\)](#) find that CFOs with high equity incentives are more likely to conceal bad news, raising future stock price crash risk. Relying on upper echelons theory that managers' cognitive biases significantly affect their decisions ([Hambrick and Mason, 1984](#)), [Li and Zeng \(2019\)](#) find that female CFOs have a low-risk tolerance and promptly abandon money-losing projects, reducing numbers of negative news and the possibility of stock price crashes.

In contrast to most studies from an agency perspective, [Kim, Wang, et al. \(2016\)](#), relied on the overconfidence theory to shed light on the relationship between managers' psychological characteristics (i.e., overconfidence) and stock price crash risks. They show that overconfidence amplifies CEOs' cognitive biases on their own ability and their firms' prospects, thereby increasing their willingness to continue negative NPV projects and consequently the risk of their firms' future stock price crash.

However, the impact of CFO overconfidence and stock price crash risks remains unknown, motivating this study to explore it for two reasons. First, CFOs' cognitive biases are superior to other traits in explaining their decisions. Specifically, [Ge et al. \(2011\)](#) argue that CFOs' observable and demographic characteristics (e.g., age, gender, and educational background) cannot explain their styles sufficiently. However, a series of studies document the significant effects of CFO overconfidence on corporate decisions (e.g., investment, financing choice, and cost management) ([Ben-David et al., 2013](#); [Chen et al., 2022](#); [Malmendier et al., 2022](#)). Second, the nascent literature on CFO overconfidence demonstrates that overconfident CFOs have incentives to take risks and conceal negative news from investors, which are the most common causes of sharp stock price drops (e.g., [Kim and Zhang, 2016](#); [Li and Zeng, 2019](#); [Long et al., 2020](#)), making it reasonable to link CFO overconfidence and

stock price crash risk. This study, therefore, predicts that CFO overconfidence leads to a higher stock price crash risk.

Empirically, this study employs three widely used methods to capture stock price crash risk, the chance of a crash, negative conditional return skewness, and down-to-up volatility (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b), reducing the possibility of mismeasurement and increasing the robustness of results. Following a majority of overconfidence studies (e.g., Chen et al., 2022), this study uses options exercise behavior to measure CFO overconfidence. By analyzing U.S.-listed firms' information from 1993 to 2019, this study discovers a significant and positive relationship between overconfident CFOs and stock price crash risk. This finding is solid in the PSM-DID test, under an alternative measure of overconfidence, and rule out another explanation of this study's overconfidence measure (i.e., inside trading).

Following that, this study examines a series of moderating effects on the association between CFO overconfidence and stock price crash risk. Firstly, this study conducts two tests to examine the channels through which overconfident CFOs affect stock price crashes. This study observes that overconfident CFOs increase stock price crash risk due to their risk-taking and bad news hoarding incentives.

Secondly, merely investigating one type of managerial overconfidence would underestimate the impact of the TMT's overconfidence on corporate decisions (Black and Gallemore, 2013; Malmendier et al., 2022). Thus, this study further analyzes the influence of CEO overconfidence on the link between CFO overconfidence and the likelihood of stock price crashes. Interestingly, this study finds that CFO overconfidence dominates CEO overconfidence in determining stock price crash risks, which is consistent with the notion that CFOs play a more vital role in information reporting than other executives (Mian, 2001; Jiang et al., 2010; Kim et al., 2011a). Besides, this study finds that the overconfidence effect on stock price crashes is magnified when firms simultaneously have overconfident CFOs and CEOs. In the last two cross-sectional tests, this study provides evidence that strong governance and a transparent information environment curb overconfident CFOs' biased decision, lowering firms' stock price crash risk.

This study contributes to prior literature in several aspects. Early studies on stock price crash risk demonstrate the influence of firm characteristics (e.g., [Hutton et al., 2009](#); [Kim et al., 2011b](#); [Kim and Zhang, 2014](#); [Kim, Li, et al., 2016](#); [Kim and Zhang, 2016](#)). In particular, a growing body of current studies sheds light on the effect of managerial traits on stock price crash risk. However, most of these studies mainly focus on CEOs (e.g., [Kim, Wang, et al., 2016](#); [Long et al., 2020](#); [Chen et al., 2021](#)). For example, [Kim, Wang, et al. \(2016\)](#) only studied the effect of one type of managerial styles (i.e., CEO overconfidence), which might underestimate the influence of top management overconfidence. This study extends their study by testing the effect of CEO overconfidence on the relationship between CFO overconfidence and stock price crash risk, which also responds to the call made by [Black and Gallemore \(2013\)](#) and [Malmendier et al. \(2022\)](#) that additional research is critical for understanding joint effects of CEO and CFO overconfidence.

While this study makes a contribution to studies on managerial overconfidence and stock price crash risk, this study also contributes to overconfidence, upper echelons, power circulation, and false consensus effect theories. Specifically, this study finds that CFOs affect stock price crashes due to biased estimations about themselves and firms, supporting the upper echelons and overconfidence theories. Besides, this study's findings that CFO overconfidence exceeds CEO overconfidence in determining stock price crashes, validating the power circulation theory. This study's discovery of the interaction impact of CEO and CFO overconfidence aligns with the false consensus effect theory.

In addition, this study argues that overconfident CFOs' risk-taking and bad news hoarding behaviors result from cognitive biases rather than the seeking of private gains. However, this study finally finds the undesirable consequences of CFOs' cognitive bias (i.e., increasing stock price crash risk) (see also: [McCann \(2014\)](#)) and provides implications for board members, investors, and other users of financial reports to monitor the information disclosure of overconfident CFOs in a timely way.

The rest of the paper is structured as follows. Section 4.3 discusses the related theories, literature, and hypotheses development. Sections 4.4 and 4.5

describe the empirical design and findings, respectively. Section 4.6 presents a series of cross-sectional tests, while section 4.7 concludes the paper.

4.3 Theoretical framework, literature review, and hypothesis development

4.3.1 Managerial traits and stock price crash risk

From an agency theory perspective, a large number of studies document that managerial bad news hoarding activities increase firms' future stock price crash risk.³⁵ These studies assume that managers can make rational and accurate judgments about their firm value and future performance. To pursue their own benefits (e.g., high compensation and stable jobs) at the expense of shareholders, managers have an incentive to hide bad news from outside investors for an extended period (e.g., [Benmelech, Kandel, and Veronesi, 2010](#); [Kim et al., 2011a](#); [He, 2015](#); [Andreou, Louca, and Petrou, 2017](#); [Al Mamun et al., 2020](#); [Shahab et al., 2020](#)). When bad news accumulates at a certain level, it is exposed to the market all at once, resulting in a sharp decrease in stock price (e.g., [Bleck and Liu, 2007](#); [Hutton et al., 2009](#); [Kim et al., 2011b](#)).

Unlike studying the managerial bad news hoarding behaviors within the traditional agency theory scope, [Kim, Wang, et al. \(2016\)](#) test the link between irrational CEOs (i.e., overconfident CEOs) and stock price crash risk based on the upper echelons and overconfidence theories. Upper echelons theory demonstrates the impact of managerial cognitive bias on firms' decisions ([Hambrick and Mason, 1984](#)). Overconfidence is the root of all cognitive biases ([Bazerman and Moore, 2013](#); [Meikle et al., 2016](#); [Malmendier et al., 2022](#)). Overconfidence theory has four manifestations, including over-optimism, the above-average effect, miscalibration, and the illusion of control. [Weinstein \(1980\)](#) suggests that over-optimistic people believe that the likelihood of fortunate events exceeds the likelihood of unfortunate events. The above-average effect refers to people who feel they are superior to their reference group regarding a certain trait ([Alicke, 1985](#)). The miscalibration and illusion of control mean people overestimate the precision of their own forecasts and overestimate their ability to control events, respectively ([Langer, 1975](#); [Ronis and Yates, 1987](#)).

³⁵ Agency theory states that asymmetric information between shareholders and managers leads to managers not acting in the best interests of shareholders ([Jensen and Meckling, 1976](#)).

Overconfident CEOs, in the study of [Kim, Wang, et al. \(2016\)](#), are defined as CEOs' tendency to overestimate their own intelligence, mastery, and possibilities for favorable future outcomes. Thus, [Kim, Wang, et al. \(2016\)](#) state that overconfident CEOs are less likely to terminate negative NPV projects because they misperceive these projects as value-creating and believe that they are in the best interests of shareholders to continue these projects, rather than because they tend to pursue private benefits. Accordingly, negative NPV projects are held for a long period of time, and bad news accumulates, potentially leading to stock price crashes. [Kim, Wang, et al. \(2016\)](#) provide a novel explanation of stock price crash risks from managerial cognitive bias (i.e., CEO overconfidence), which distinguishes and extends the traditional agency theory. However, the relationship between CFO overconfidence and stock price crash risk remains unknown.

4.3.2 CFO overconfidence and stock price crash risk

Through the lens of upper echelons and overconfidence theories, this study predicts that overconfident CFOs might increase stock price crash risk as they are risk-takers. Specifically, it is well documented in the literature and theory that overconfident CFOs are more likely to pursue risks than their less confident counterparts. To be specific, according to the overconfidence theory, the miscalibration and illusion of control cause overconfident people to overestimate their own decisions' precision and their ability to control events, respectively ([Langer, 1975](#); [Ronis and Yates, 1987](#)). These biases might lead overconfident CFOs to overestimate their capacity to forecast and control risks in their decisions, causing them to make risky decisions. Besides, overconfident people feel that the possibility of lucky events outweighs the likelihood of terrible happenings ([Weinstein, 1980](#)). Thus, overconfident CFOs might underestimate the consequences of taking risks. Empirical studies confirm these theoretical predictions that overconfident CFOs have a high-risk tolerance. For example, [Ben-David et al. \(2013\)](#) suggest that overconfident CFOs are more likely to overestimate their prediction ability and firms' prospects, thus adopting more risky investment strategies. Besides, overconfident CFOs positively correlate with firms' risky strategies, such as, tax avoidance and cost management ([Hsieh et al., 2018](#); [Chen et al., 2022](#)).

Managerial risk-taking behavior is the main determinant of stock price crash risk (Fu and Zhang, 2019; Li and Zeng, 2019; Long et al., 2020). Many empirical studies (e.g., Kim, Wang, et al., 2016) relying on upper echelons theory suggest that firms with more risk-tolerant managers are more likely to invest in risky projects initially and are not willing to terminate negative NPV projects early, which may lead to poor operating performance (i.e., bad news) in the first place. When bad news accumulates to a tipping point, terrible news is disclosed all at once in the market, resulting in a stock price crash. Specifically, Long et al. (2020) find that CEOs with early-life experience of the Great Chinese Famine become risk aversion, lowering stock price crash risk. Li and Zeng (2019) suggest that female CFOs decrease the probability of stock price crash risk due to their low-risk tolerance. Fu and Zhang (2019) find that CFOs with cultural backgrounds emphasizing uncertainty avoidance reduce firms' future stock price crash risk.

Thus, this study predicts that overconfident CFOs, due to high risk-taking incentives, might raise the likelihood of bad news in the first place, thus increasing the probability of a future stock price crash. The foregoing discussion leads to the following hypotheses:

H1: There is a positive relationship between CFO overconfidence and stock price crash risk.

H2: The positive relationship between CFO overconfidence and stock price crash risk is more profound for overconfident CFOs with a high-risk tolerance.

In addition, this study predicts that overconfidence affects CFOs' bad news' disclosure to the market. According to upper echelons and overconfidence theories, overconfident CFOs believe in their abilities and the firm's prospects (Ben-David et al., 2013). To persuade investors that their beliefs are reliable, overconfident CFOs might conceal bad news to optimistically adjust their reported information. Empirical findings are consistent with this prediction. For example, Malmendier et al. (2022) find that overconfident CFOs overestimate firms' intrinsic value and deem their firms undervalued by the market; thus, overconfident CFOs perceive the cost of capital as costly. To increase cash inflows and meet firm high investment

demands, overconfident CFOs might have incentives to lower the cost of capital (Ben-David et al., 2013), particularly if internal financing is insufficient.

Prior studies document that managers tend to lower the cost of capital by hoarding bad news. For instance, to reduce the cost of equity, managers have incentives to withhold bad news by using income-increasing earnings management (Rangan, 1998; Teoh et al., 1998; Dechow and Skinner, 2000). Moreover, managers can smoothen earnings via earnings management to hide bad news and improve firms' credit ratings, thus lowering the cost of borrowing (Jung, Soderstrom, and Yang, 2013). Thus, this study predicts that overconfident CFOs have incentives to reduce the cost of capital by hoarding bad news. Bad news piled up reaches a tipping point and is exposed all at once in the market, leading to a stock price crash. The foregoing discussion leads to the next hypothesis:

H3: The positive relationship between CFO overconfidence and stock price crash risk is more profound for overconfident CFOs with bad news hoarding behaviors.

4.3.3 CEO overconfidence, CFO overconfidence, and stock price crash risk

Many studies suggest that only studying one type of managerial overconfidence would underestimate the influence of the TMT's overconfidence in firm decisions (Black and Gallemler, 2013; Malmendier et al., 2022). Thus, this study further explores the effect of CEO overconfidence on the relationship between CFO overconfidence and stock price crash risk.

Although CEOs set the tone at the top, power circulation theory states that CEO influence may be diffused, partly due to competition from other executives who are perceived as competitors for the CEO position (Ocasio, 1994; Shen and Cannella Jr, 2002a; Baker et al., 2019). As CFOs are competitive candidates for future CEOs, a growing number of studies find that CFOs dominate CEOs in reporting and financing decisions for which CFOs are responsible. For example, CFO equity incentives dominate CEO equity incentives in determining earnings management (Jiang et al., 2010). CFO overconfidence plays a more vital role than CEO overconfidence in making the external financing choice (Malmendier et al., 2022). Given that stock price crash

risk is related to bad news disclosures, some studies document that CFO gender and equity incentives have more explanatory power than those characteristics of CEOs in explaining stock price crash risk (Kim et al., 2011a; Li and Zeng, 2019). Adopting the power circulation theory framework, this study predicts that CFO overconfidence outweighs CEO overconfidence in influencing stock price crash risk. The foregoing discussion leads to the hypothesis:

H4: CFO overconfidence outweighs CEO overconfidence in influencing stock price crash risk.

In addition, this study explores the joint effects of CEO and CFO overconfidence on stock price crash risk. The false consensus effect theory posits that people are more likely to connect with those who have similar personalities and who share similar opinions and values (Bahns et al., 2017). Applying this theory to management research, some studies find that managers with common characteristics are able to reach consensus. For instance, Hsieh et al. (2018) find that firms with both overconfident CEOs and CFOs are more likely to engage in tax-avoidance activities. In the same vein, Black and Gallemler (2013) document the joint influence of overconfident CEOs and CFOs on delayed expected loan loss recognition. However, the interactive effect of overconfident CFOs and CEOs on stock price crash risks remains unclear. Based on the false consensus effect theory and the finding of Kim, Wang, et al. (2016) that overconfident CEOs have incentives to hoard bad news, this study predicts that firms with overconfident CEOs and CFOs are more likely to withhold bad news from the investors for an extended period, thus increasing future stock price crash risk. The foregoing discussion leads to the hypothesis:

H5: The positive relationship between CFO overconfidence and stock price crash risk is more profound for firms with overconfident CFOs and CEOs working together.

4.4 Empirical design

4.4.1 Variable measurement

4.4.1.1 The measurement of stock price crash risk

This study uses three measures of firm-specific crash risk following previous studies (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b; Kim, Li, and Li, 2014). All measurements are based on firm-specific weekly returns calculated based on the residuals from the following market model.

$$r_{i,\tau} = \alpha_i + \beta_{1,i}r_{m,\tau-2} + \beta_{2,i}r_{m,\tau-1} + \beta_{3,i}r_{m,\tau} + \beta_{4,i}r_{m,\tau+1} + \beta_{5,i}r_{m,\tau+2} + \varepsilon_{i,\tau}, \quad (4.1)$$

where, $r_{i,\tau}$ and $r_{m,\tau}$ denote the return of stock i and the return on the CRSP value-weighted market index in week τ , respectively. To enable nonsynchronous trading, this study includes lead and lag terms for the market index return (Dimson, 1979).

To compute firm-specific weekly returns ($w_{i,\tau}$), this study uses the natural log of one plus the residual from equation (4.1) (i.e., $w_{i,\tau} = \ln(1 + \varepsilon_{i,\tau})$) (Kim et al., 2011a, 2011b; Kim et al., 2014).

The first measure is the chance of a crash for each firm in each year. For any given fiscal year, a firm's crash week is defined as a week where the firm's weekly returns are 3.2 standard deviations below the mean firm-specific weekly returns during the year, with 3.2 chosen to give a frequency of 0.1% in the normal distribution (Kim et al., 2011b).

The first measure, $SCR_Crash_{i,t}$, is an indicator variable that equals one if a firm has one or more crash weeks (as indicated above) in a year, and zero otherwise (Hutton et al., 2009; Kim et al., 2011a, 2011b).

This study's second measure is negative conditional return skewness ($SCR_Ncskew_{i,t}$), which is defined as the negative of the third moments of the firm-specific weekly returns divided by the standard deviation of firm-specific weekly returns raised to the third power (Chen et al., 2001; Kim et al., 2014). Specifically, for each firm i in year t , this study calculates $SCR_Ncskew_{i,t}$ as follows:

$$SCR_Ncskew_{i,t} = -\frac{N(N-1)^2 \sum W_{i,\tau}^3}{(N-1)(N-2)(\sum W_{i,\tau}^2)^{\frac{3}{2}}}, \quad (4.2)$$

where, N is the number of firm-specific weekly returns generated by firm i in a fiscal year. Higher $SCR_Ncskew_{i,t}$ values indicate a greater crash risk.

The third measurement is down-to-up volatility ($SCR_Duvol_{i,t}$) following prior studies (Chen et al., 2001; Kim et al., 2014). Specifically, weekly results are divided into up and down weeks. Down (up) weeks are defined as those in which firm-specific weekly returns are less than (greater than) the yearly average weekly return. $SCR_Duvol_{i,t}$ is the natural logarithm of the ratio of the standard deviation in the down weeks to the standard deviation in the up weeks (Kim et al., 2014). Specifically, for each firm i in year t , this study calculates $SCR_Duvol_{i,t}$ as follows:

$$SCR_Duvol_{i,t} = \ln\left(\frac{(N_U - 1) \sum W_{iU,\tau}^2}{(N_D - 1) \sum W_{iD,\tau}^2}\right), \quad (4.3)$$

where, $W_{iD,\tau}$ ($W_{iU,\tau}$) denotes firm i 's firm-specific weekly return in a down-(up-) week, and N_D (N_U) is the number of down-(up-) weeks in a fiscal year. Higher $SCR_Duvol_{i,t}$ values indicate a greater crash risk.

4.4.1.2 The measurement of overconfidence

The option-based technique suggested by Malmendier and Tate (2005) is the most widely used managerial overconfidence measure in the existing literature (Campbell et al., 2011; Huang et al., 2016; Hsieh et al., 2018) and is most robust to alternative interpretations (Malmendier and Tate, 2015). According to Malmendier and Tate (2005), when managers are unwilling to exercise options that are more than 67% in the money, they are considered overconfident managers. Because ExecuComp does not have specific data on CFOs' option holdings and exercise prices prior to 2006, this study uses the average moneyness of CFOs' option portfolios as proxies for overconfident CFOs (Campbell et al., 2011). The following is how the average moneyness is calculated.

$$\frac{\text{The realizable value per option}_{i,t} = \text{The total realizable value of the exercisable options}_{i,t}}{\text{The number of exercisable options}_{i,t}} \quad (4.4)$$

$$\frac{\text{The estimate of the average exercise price of options}_{i,t} = \text{The stock price at the fiscal year end}_{i,t} - \text{The realizable value per option}_{i,t}}{\text{The average percent moneyness of the options}_{i,t}} \quad (4.5)$$

$$\frac{\text{The average percent moneyness of the options}_{i,t} = \text{The realizable value per option}_{i,t}}{\text{The estimate of the average exercise price of the options}_{i,t}} \quad (4.6)$$

Therefore, $Holder67CFO_{i,t-1}$, an indicator variable, equals one when CFOs hold vested options that are at least 67% in the money (the lagged value of the *average percent moneyness of the option*_{*i,t*}) for the first time until the end of their tenure, and zero otherwise (Chen et al., 2022).³⁶

4.4.2 Baseline regression model

This section investigates the association between CFO overconfidence and firm-specific stock price crash risk using the following model.

$$\begin{aligned} SCR_{i,t} = & \beta_0 + \beta_1 Holder67CFO_{i,t-1} + \beta_2 CFO_equityincentive_{i,t-1} + \beta_3 CFO_male_{i,t-1} \\ & + \beta_4 Dturn_{i,t-1} + \beta_5 SCR_Ncskew_{i,t-1} + \beta_6 Sigma_{i,t-1} \\ & + \beta_7 Ret_{i,t-1} + \beta_8 MTB_{i,t-1} + \beta_9 ROA_{i,t-1} + \beta_{10} FirmSize_{i,t-1} \\ & + \beta_{11} Leverage_{i,t-1} + \beta_{12} AbsAEM_{i,t-1} + Firm\ Fixed\ Effects \\ & + Year\ Fixed\ Effects + \varepsilon_{i,t}, \end{aligned} \quad (4.7)$$

where, $SCR_{i,t}$ is one of three stock price crash risk proxies ($SCR_Crash_{i,t}$, $SCR_Ncskew_{i,t}$, and $SCR_Duvol_{i,t}$); The variable of interest is $Holder67CFO_{i,t-1}$, a proxy of overconfident CFOs; β_1 captures the relationship between CFO overconfidence and stock price crash risk. As this study predicts that there is a positive relationship between CFO overconfidence and stock price crash risk, this study expects that β_1 is significantly positive.

In the regression, this study also includes control variables based on previous stock price crash risk studies. This study controls for some CFO characteristics. Given that prior studies find that CFOs with high equality incentives (Kim et al., 2011a) and male CFOs (Li and Zeng, 2019) are able to increase future stock price crash risks, this study also controls CFOs' equality

³⁶ Results remain robust if this study requires CFOs to retain vested options that are at least 67% in the money at least twice.

incentives ($CFO_equityincentive_{i,t-1}$) and gender ($CFO_male_{i,t-1}$). Besides, following previous studies on crash risk (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b), this study also controls for the proxy of differences of opinions between investors, the detrended stock trading volume ($Dturn_{i,t-1}$), as investor belief heterogeneity predicts future crash likelihood (Hong and Stein, 2003). Chen et al. (2001) find the probable persistence of the third moment of stock returns (i.e., return skewness in the current year is related to return skewness in the last year). To account for the potential serial correlation of negative skewness of firm-specific weekly returns ($SCR_Ncskew_{i,t}$), this study includes the lag value of $SCR_Ncskew_{i,t}$ (i.e., $SCR_Ncskew_{i,t-1}$) (Kim et al., 2011a, 2011b; Kim et al., 2014; Kim, Wang, et al., 2016). The reason for controlling prior return volatility ($Sigma_{i,t-1}$) is that more volatile stocks are more likely to crash (Chen et al., 2001). This study further controls for the average firm-specific weekly return over the past year ($Ret_{i,t-1}$) as firms with high past returns are potentially more crash-prone (Chen et al., 2001). Moreover, following Hutton et al. (2009), this study also controls for the standard control variables, market-to-book ratio ($MTB_{i,t-1}$), return on assets ($ROA_{i,t-1}$), firm size ($FirmSize_{i,t-1}$), and financial leverage ($Leverage_{i,t-1}$). In addition, this study also controls for earnings management as AEM increases the future crash risk (Hutton et al., 2009). Firm and year dummies are included in all regressions to control for the firm- and time-fixed effects. The Appendix C contains detailed variable measurements.

4.4.3 Data and descriptive statistics

4.4.3.1 Sample selection

This study collects information on U.S.-listed firms from numerous databases. Accounting information is gathered from the CCM and CRSP databases. Information from the ExecuComp database is used to calculate the compensation of CFOs and CEOs. In the cross-sectional tests, the E index is downloaded from Bebhuk, Cohen, and Ferrell (2009), and the analyst forecast information is collected from the I/B/E/S database. Because CFO and CEO compensation information has been accessible in the ExecuComp database since 1992, this study's sample period in the main tests runs from 1993 to

2019.³⁷ Following previous studies (Conyon and He, 2012; Kim, Wang, et al., 2016; Bellemare, Masaki, and Pepinsky, 2017), this study uses the lagged values of independent and control variables in the regressions to mitigate the reverse causality concern.³⁸ This study excludes financial institutions (SIC: 6000-6999) and utility firms (SIC: 4900-4999). Finally, all continuous variables are winsorized at the 1st and 99th percentiles. The detailed steps of sample generation are shown in Table 4.1.

Table 4.1. Sample selection.

Steps	Details	Observations
Step 1	Initial data of U.S.-listed firms from CCM database	178,295
Step 2	Minus observations that do not include CFOs' compensation information in the ExecuComp database	(137,142)
	Observations with data available in CCM and ExecuComp databases	41,153
Step 3	Minus observations in the financial industry (SIC: 6000-6999)	(7,154)
Step 4	Minus observations in the utility sector (SIC: 4900-4999)	(2,151)
	Observations before deleting the missing values in various regressions	31,848
Step 5	Number of observations after deleting observations with missing values	17,519

4.4.3.2 Descriptive statistics

The descriptive statistics of all variables included in the model (equation (4.7)) are shown in Table 4.2.

Panel A of Table 4.2 displays the summary statistics for the full sample. The mean value of $SCR_Crash_{i,t}$ is 0.212, indicating about 21.2% unconditional likelihood of a firm-specific stock price crash in a year. The average values of $SCR_Crash_{i,t}$, $SCR_Ncskew_{i,t}$, and $SCR_Duvol_{i,t}$ are slightly higher than those reported by Kim et al. (2011b), implying that this study's sample of firm-years

³⁷ The sample for the cross-sectional test of governance ends in 2006 due to the limited availability of E index data prior to 2006.

³⁸ Thanks for the anonymous reviewer's suggestion. This study realizes that overconfident CFOs might self-select into risky firms. Specifically, candidates might choose firms (or firms might hire candidates) with similar characteristics (Graham, Harvey, and Puri, 2013). Overconfident candidates have a higher risk tolerance than non-overconfident candidates (Ben-David et al., 2013; Hsieh et al., 2018). Thus, overconfident CFOs (i.e., risk-tolerant CFOs) might seek jobs in riskier firms, raising the concern of reverse causality. To further mitigate reverse causality, this study also conducts PSM-DID in section 4.5.2.1.

is more crash-prone than that of [Kim et al. \(2011b\)](#).³⁹ The mean and standard deviation values of $Holder67CFO_{i,t-1}$ are comparable to those reported in [Chen et al. \(2022\)](#). Over half of CFOs are overconfident, indicating that overconfidence is a common trait of top managers ([Goel and Thakor, 2008](#)). The distribution of the control variables is similar to what has been observed in previous studies. For example, this study finds the male dominant in CFO gender (mean value: 0.920), consistent with the findings of [Barua et al. \(2010\)](#). Panel B of Table 4.2 shows the results of T-tests for differences between the overconfident CFO sample and the non-overconfident CFO sample. The significant difference in the means of stock price crash risk, measured by $SCR_Crash_{i,t}$, $SCR_Ncskew_{i,t}$, and $SCR_Duvol_{i,t}$, between non-overconfident and overconfident CFO samples shows that firms run by overconfident CFOs have a significantly higher crash risk than firms run by non-overconfident CFOs, supporting the hypothesis 1.

Table 4.2. Summary statistics.

Panel A: Full sample descriptive statistics

Variable	N	Mean	St.Dev	p25	Median	p75
$SCR_Crash_{i,t}$	17,519	0.212	0.408	0	0	0
$SCR_Ncskew_{i,t}$	17,519	0.141	0.714	-0.280	0.121	0.538
$SCR_Duvol_{i,t}$	17,519	0.097	0.476	-0.219	0.091	0.412
$Holder67CFO_{i,t-1}$	17,519	0.550	0.497	0	1	1
$CFO_equityincenti$	17,519					
$ve_{i,t-1}$		0.156	0.125	0.065	0.122	0.211
$CFO_male_{i,t-1}$	17,519	0.920	0.271	1	1	1
$Dturn_{i,t-1}$	17,519	0.004	0.082	-0.028	0.002	0.033
$SCR_Ncskew_{i,t-1}$	17,519	0.154	0.687	-0.270	0.125	0.537
$Sigma_{i,t-1}$	17,519	0.045	0.020	0.030	0.041	0.056
$Ret_{i,t-1}$	17,519	-				
		0.116	0.106	-0.152	-0.082	-0.043
$MTB_{i,t-1}$	17,519	3.343	3.195	1.579	2.411	3.848
$ROA_{i,t-1}$	17,519	0.046	0.091	0.021	0.055	0.090
$FirmSize_{i,t-1}$	17,519	7.284	1.555	6.145	7.148	8.300
$Leverage_{i,t-1}$	17,519	0.201	0.163	0.043	0.193	0.312
$AbsAEM_{i,t-1}$	17,519	0.040	0.040	0.013	0.028	0.054

Panel B: Mean differences in proxies of stock price crash risks and control variables for non-overconfident and overconfident CFOs samples

³⁹ The sample period of [Kim et al. \(2011b\)](#) is 1995-2008.

Variable	<i>Holder67CFO_{i,t-1}</i> = 0 (N = 7875)	<i>Holder67CF</i> <i>O_{i,t-1}</i> = 1 (N = 9644)	T-statistics for tests of difference in means (non-OverCFO- OverCFO)
<i>SCR_Crash_{i,t}</i>	0.201	0.220	-0.019**
<i>SCR_Ncskew_{i,t}</i>	0.105	0.171	-0.066***
<i>SCR_Duval_{i,t}</i>	0.066	0.122	-0.057***
<i>CFO_equityincentiv</i> <i>e_{i,t-1}</i>	0.124	0.183	-0.059***
<i>CFO_male_{i,t-1}</i>	0.921	0.920	0.002
<i>Dturn_{i,t-1}</i>	-0.001	0.007	-0.008***
<i>SCR_Ncskew_{i,t-1}</i>	0.154	0.154	0.001
<i>Sigma_{i,t-1}</i>	0.044	0.045	-0.001*
<i>Ret_{i,t-1}</i>	-0.115	-0.118	0.003
<i>MTB_{i,t-1}</i>	2.701	3.868	-1.166***
<i>ROA_{i,t-1}</i>	0.028	0.061	-0.033***
<i>FirmSize_{i,t-1}</i>	7.356	7.225	0.131***
<i>Leverage_{i,t-1}</i>	0.212	0.192	0.020***
<i>AbsAEM_{i,t-1}</i>	0.039	0.042	-0.003***

Notes: Panel A of Table 4.2 contains the descriptive statistics for the entire sample. The descriptive statistics for the subsample sample are shown in Panel B of Table 4.2. T-tests are used to determine whether there are differences in the means between the overconfident and non-overconfident CFOs samples. Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.4.3.3 Pairwise correlations

Table 4.3 shows the correlation matrix. Without considering other factors, the *Holder67CFO_{i,t-1}* shows significant positive associations with three stock price crash risk proxies, supporting the hypothesis that overconfident CFOs are more likely to increase stock crash risk relative to non-overconfident CFOs. In addition, the correlations between the independent and control variables do not exceed 0.5, and the untabulated values of VIFs are less than the threshold of 10, suggesting that multicollinearity is not a concern when examining the regression findings (Gujarati et al., 2012).

Table 4.3. Correlation matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) <i>SCR_Crash_{i,t}</i>	1							
(2) <i>SCR_Ncskew_{i,t}</i>	0.623***	1						
(3) <i>SCR_Duval_{i,t}</i>	0.471***	0.887***	1					
(4) <i>Holder67CFO_{i,t-1}</i>	0.024***	0.046***	0.059***	1				
(5) <i>CFO_equityincentive_{i,t-1}</i>	0.022***	0.036***	0.041***	0.236***	1			
(6) <i>CFO_male_{i,t-1}</i>	-0.015**	-0.009	-0.015**	-0.003	-0.003	1		
(7) <i>Dturn_{i,t-1}</i>	0.002	0.011	0.018**	0.049***	0.015*	-0.008	1	
(8) <i>SCR_Ncskew_{i,t-1}</i>	0.009	0.005	0.004	0.000	-0.015**	-0.008	0.055***	1
(9) <i>Sigma_{i,t-1}</i>	-0.087***	0.018**	0.030***	0.021***	-0.215***	0.020***	0.186***	0.113***
(10) <i>Ret_{i,t-1}</i>	0.093***	-0.011	-0.023***	-0.014*	0.179***	-0.018**	-0.186***	-0.089***
(11) <i>MTB_{i,t-1}</i>	0.014*	0.037***	0.045***	0.182***	0.333***	-0.011	0.045***	-0.029***
(12) <i>ROA_{i,t-1}</i>	0.063***	0.060***	0.068***	0.180***	0.220***	-0.037***	0.044***	-0.014*
(13) <i>FirmSize_{i,t-1}</i>	0.014*	-0.003	-0.004	-0.042***	0.379***	-0.017**	0.001	-0.003
(14) <i>Leverage_{i,t-1}</i>	-0.030***	-0.031***	-0.034***	-0.062***	0.009	0.053***	0.040***	-0.008
(15) <i>AbsAEM_{i,t-1}</i>	-0.020***	0.024***	0.031***	0.033***	-0.053***	0.014*	0.057***	0.016**

(This table is continued on the next page.)

Table 4.3. Correlation matrix (continued)

	Variable	(9)	(10)	(11)	(12)	(13)	(14)	(15)
(9)	<i>Sigma_{i,t-1}</i>	1						
(10)	<i>Ret_{i,t-1}</i>	-0.973***	1					
(11)	<i>MTB_{i,t-1}</i>	-0.077***	0.051***	1				
(12)	<i>ROA_{i,t-1}</i>	-0.336***	0.346***	0.230***	1			
(13)	<i>FirmSize_{i,t-1}</i>	-0.466***	0.412***	0.048***	0.119***	1		
(14)	<i>Leverage_{i,t-1}</i>	-0.079***	0.065***	0.082***	-0.150***	0.353***	1	
(15)	<i>AbsAEM_{i,t-1}</i>	0.261***	-0.248***	0.052***	-0.083***	-0.198***	-0.080***	1

Notes: Pearson correlation coefficients are shown in Table 4.3. Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.5 Main empirical analysis results

4.5.1 Baseline regression result

The relationship between CFO overconfidence and the stock price crash risk is examined using fixed-effect models.⁴⁰

The findings of the impact of CFO overconfidence and stock price crash risk (equation (4.7)) are shown in Table 4.4. The first three columns show the regression results without controlling for $CFO_equityincentive_{i,t-1}$ and $CFO_male_{i,t-1}$. The coefficient on $Holder67CFO_{i,t-1}$ is positive at a 5% significance level in column (1), suggesting a positive relationship between $Holder67CFO_{i,t-1}$ and $SCR_Crash_{i,t}$. Similarly, in columns (2) and (3), $Holder67CFO_{i,t-1}$ has a significantly positive coefficient, showing that the positive relationship between CFO overconfidence and stock price crash risk holds across different measures of crash risk. In columns (4) to (6), this study includes $CFO_equityincentive_{i,t-1}$ and $CFO_male_{i,t-1}$ as prior studies document that CFO equity incentive and gender have a substantial impact on stock crashes (Kim et al., 2011a; Li and Zeng, 2019). As shown in columns (4) to (6), $Holder67CFO_{i,t-1}$ remains with a significantly positive coefficient, showing that this study's findings on the influence of CFO overconfidence are not driven by the CFOs' equity incentive and gender.

So far, this study has documented that a positive relationship between CFO overconfidence and stock price crash risk is statistically significant. In addition, this study finds that the results have economic significance. Using the coefficient on $Holder67CFO_{i,t-1}$ in columns (5) and (6) as examples, this study finds that an overconfident CFO will lead to a 29.787% ($= 0.042/0.141$) increase in $SCR_Nc skew_{i,t}$ at the mean and a 35.052% ($= 0.034/0.097$) increase in $SCR_Duvol_{i,t}$ at the mean. This study provides statistically and economically significant evidence that overconfident CFOs increase the risk of future stock price crashes, supporting the hypothesis 1. These findings are consistent with

⁴⁰ To adjust for the effects of time-invariant firm characteristics and factors that are common to all firms for a given fiscal year, this study employs two-way fixed-effect models: firm-fixed effect and year-fixed effect. Furthermore, when compared to random effect and pooled OLS models, the untabulated F, LM, and Hausman tests show that fixed-effect models are the best choice for this study's investigation. For the same reasons, the fixed-effect models are employed in the subsequent regressions, which this study will not repeat for brevity.

the idea of [McCann \(2014\)](#) that CFOs' cognitive biases might lead to devastating effects on firm performance.

The coefficients on control variables are broadly consistent with prior research findings. Specifically, consistent with [Chen et al. \(2001\)](#), this study finds that the coefficient on $Dturn_{i,t-1}$ is significantly positive in columns (1) and (4), implying that investors' belief heterogeneities increase stock price crash probability. Besides, in consonance with the findings of [Callen and Fang \(2015b\)](#), this study finds the negative coefficients on $SCR_Ncskew_{i,t}$, showing that stock price crash risk is negatively autocorrelated over adjacent years. Moreover, return volatility ($Sigma_{i,t-1}$) has a positive coefficient on columns (2) and (5), confirming that volatile stocks are more likely to crash ([Chen et al., 2001](#)). This study also finds the positive coefficients on historical return ($Ret_{i,t-1}$) in columns (2) and (5), indicating that firms with high past returns are potentially more crash-prone ([Chen et al., 2001](#)).

Regarding firm characteristics, market-to-book ratio ($MTB_{i,t-1}$), return on assets ($ROA_{i,t-1}$) and firm size ($FirmSize_{i,t-1}$) are positively associated with the probability of crashes, whereas the leverage level ($Leverage_{i,t-1}$) is negatively related to the stock price crash risk, which is in line with the findings of [Callen and Fang \(2015a\)](#) and [Hutton et al. \(2009\)](#).

Table 4.4. Baseline regression result- CFO overconfidence and stock price crash risk

Variables	(1) <i>SCR_Crash_{i,t}</i>	(2) <i>SCR_Ncskew_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>	(4) <i>SCR_Crash_{i,t}</i>	(5) <i>SCR_Ncskew_{i,t}</i>	(6) <i>SCR_Duval_{i,t}</i>
<i>Holder67CFO_{i,t-1}</i>	0.019** (0.009)	0.047*** (0.016)	0.037*** (0.011)	0.018** (0.009)	0.042** (0.016)	0.034*** (0.011)
<i>CFO_equityincentive_{i,t-1}</i>				0.026 (0.043)	0.116 (0.077)	0.076 (0.050)
<i>CFO_male_{i,t-1}</i>				-0.015 (0.018)	-0.020 (0.035)	-0.027 (0.023)
<i>Dturn_{i,t-1}</i>	0.123*** (0.040)	0.073 (0.065)	0.073 (0.046)	0.123*** (0.040)	0.072 (0.065)	0.072 (0.046)
<i>SCR_Ncskew_{i,t-1}</i>	-0.032*** (0.005)	-0.102*** (0.009)	-0.062*** (0.006)	-0.032*** (0.005)	-0.101*** (0.009)	-0.062*** (0.006)
<i>Sigma_{i,t-1}</i>	-0.193 (0.964)	2.993* (1.645)	1.009 (1.098)	-0.166 (0.969)	3.115* (1.648)	1.088 (1.100)
<i>Ret_{i,t-1}</i>	0.252 (0.158)	0.533** (0.260)	0.192 (0.178)	0.256 (0.159)	0.553** (0.261)	0.206 (0.178)
<i>MTB_{i,t-1}</i>	0.003** (0.002)	0.014*** (0.003)	0.011*** (0.002)	0.003* (0.002)	0.013*** (0.003)	0.010*** (0.002)

(The table is continued on the next page.)

Table 4.4. Baseline regression result- CFO overconfidence and stock price crash risk (continued)

Variables	(1) <i>SCR_Crash_{i,t}</i>	(2) <i>SCR_Ncskew_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>	(4) <i>SCR_Crash_{i,t}</i>	(5) <i>SCR_Ncskew_{i,t}</i>	(6) <i>SCR_Duval_{i,t}</i>
<i>ROA_{i,t-1}</i>	0.197*** (0.049)	0.525*** (0.085)	0.389*** (0.058)	0.195*** (0.049)	0.517*** (0.085)	0.384*** (0.058)
<i>FirmSize_{i,t-1}</i>	0.046*** (0.009)	0.103*** (0.015)	0.062*** (0.010)	0.045*** (0.009)	0.098*** (0.016)	0.059*** (0.010)
<i>Leverage_{i,t-1}</i>	-0.076** (0.039)	-0.205*** (0.070)	-0.149*** (0.047)	-0.074* (0.039)	-0.195*** (0.071)	-0.142*** (0.047)
<i>AbsAEM_{i,t-1}</i>	-0.033 (0.093)	0.166 (0.149)	0.120 (0.103)	-0.033 (0.092)	0.165 (0.149)	0.119 (0.103)
Constant	0.031 (0.131)	-0.578*** (0.178)	-0.372*** (0.137)	0.052 (0.132)	-0.539*** (0.182)	-0.331** (0.139)
Observations	17,519	17,519	17,519	17,519	17,519	17,519
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.042	0.027	0.040	0.042	0.027	0.040

Notes: The associations between CFO overconfidence and stock price crash risk are shown in Table 4.4. The standard errors clustering at the firm level are displayed in parentheses. The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.5.2 Robustness tests

In this section, this study conducts several tests to mitigate the endogeneity problems. Specifically, this study conducts the PSM-DID to alleviate the potential reverse causality, change the overconfidence measurement to lessen the mismeasurement, and rule out another explanation for the option-based measure.

4.5.2.1 PSM-DID

Although this study finds that CFO overconfidence positively correlates with future stock price crash risk, this study recognizes that overconfident CFOs might not be hired by firms randomly. Specifically, candidates might self-select into firms (or firms might hire candidates) with similar characteristics ([Graham et al., 2013](#)). Overconfident candidates have a higher risk tolerance than non-overconfident candidates ([Chen et al., 2022](#)). Thus, overconfident CFOs (i.e., risk-tolerant CFOs) might seek work in risky firms, leading to the potential reverse causality concern. While this study alleviates the reverse causation issue by predicting stock price crash risk using lagged CFO overconfidence, the concern may remain if CFO overconfidence is persistent over time. Thus, this study uses PSM-DID to mitigate the potential endogeneity concern.

This study uses a difference-in-difference approach to test the influence of overconfident CFOs on crash risks around turnover. This, following [Ahmed and Duellman \(2013\)](#) and [Lin et al. \(2020\)](#), utilizes CFO turnover as a shock. To ensure that CFOs have enough time to impact firms' choices, this study demands that former CFOs work for at least four years, and new CFOs are at least three years in office. As previous studies document that CEOs have the power to influence CFOs' decisions ([Feng et al., 2011](#); [Friedman, 2014](#)) and that overconfident CEOs significantly affect stock price risk ([Kim, Wang, et al., 2016](#)), this study deletes the concurrent CEO and CFO changes to reduce the potential impact of CEOs. This study defines a firm in the treatment group when the former CFO is non-overconfident and the new CFO is overconfident. The control groups include firms where former and new CFOs are non-overconfident. This study uses the one-to-one nearest neighbor approach with a caliper of 5% to verify that firms in the treatment and control groups are comparable. This study matches treatment and control groups based on the

control variable provided in equation (4.7). This process leaves 150 observations.

Panel A of Table 4.5 reports the result of PSM. As shown in column (7), the P-values of $SCR_Ncskew_{i,t-1}$, $ROA_{i,t-1}$, $FirmSize_{i,t-1}$, and $Leverage_{i,t-1}$ are less than 1 in the unmatched sample and larger than 1 in the matched sample. Thus, there is no significant difference in control variables between the control and treatment groups in the matched sample. Next, this study generates the difference-in-difference regression model as follows:

$$SCR_{i,t} = \beta_0 + \beta_1 Treat_i \times Post_{i,t} + Controls + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \varepsilon_{i,t}, \quad (4.8)$$

where, $Treat_i$ equals one if the former CFO is not overconfident and the new CFO is, and zero if both the former and new CFOs are not overconfident; $Post_{i,t}$ equals one if observations exist in the first year following the CFO's departure. $Post_{i,t}$ equals zero when observations exist in the last year before the CFO's departure. This study includes firm fixed effect and year fixed effect, so this study excludes $Treat_i$ and $Post_{i,t}$ to avoid multiple collinearities. Control variables are consistent with equation (4.7). Detailed variable information is shown in Appendix C.

Panel B of Table 4.5 displays the result of DID estimation based on the PSM matched sample. In columns (2) and (3), the interaction term, $Treat_i \times Post_{i,t}$, has a significantly positive coefficient, indicating that overconfident CFOs tend to increase firms' stock price crash risk.

Table 4.5. PSM-DID**Panel A: PSM**

	Sample type (U=unmatched sample; M=matched sample)	Mean		Bias		T-test	
Variable		Treated	Control	%bias	%reduct bias	t	p> t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>CFO_equityincentive_{i,t-1}</i>	U	0.132	0.121	10.500		0.920	0.358
	M	0.124	0.118	6.200	40.900	0.420	0.672
<i>CFO_male_{i,t-1}</i>	U	0.103	0.094	3.100		0.260	0.793
	M	0.095	0.083	4	-30	0.270	0.788
<i>Dturn_{i,t-1}</i>	U	-0.010	-0.001	-10.500		-0.900	0.370
	M	-0.009	-0.007	-2.100	79.600	-0.140	0.888
<i>SCR_Ncskew_{i,t-1}</i>	U	-0.030	0.144	-24.500		-2.100	0.036
	M	0.002	-0.012	1.900	92.200	0.130	0.900
<i>Sigma_{i,t-1}</i>	U	0.041	0.042	-6.400		-0.540	0.593
	M	0.041	0.042	-3.600	43.600	-0.240	0.811
<i>Ret_{i,t-1}</i>	U	-0.102	-0.109	6.700		0.540	0.586
	M	-0.103	-0.106	3.100	53.600	0.200	0.840

(This table is continued on the next page.)

Panel A: PSM (continued)

Variable	Sample type (U=unmatched sample; M=matched sample)	Mean		Bias		T-test	
		Treated	Control	%bias	%reduct bias	t	p> t
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>MTB_{i,t-1}</i>	U	2.935	2.698	10.200		0.780	0.434
	M	2.887	2.703	7.900	22.200	0.510	0.611
<i>ROA_{i,t-1}</i>	U	0.048	0.018	31.300		2.360	0.019
	M	0.046	0.042	3.900	87.500	0.300	0.767
<i>FirmSize_{i,t-1}</i>	U	7.291	7.666	-23.100		-1.900	0.058
	M	7.307	7.258	3	86.800	0.220	0.827
<i>Leverage_{i,t-1}</i>	U	0.179	0.220	-26.900		-2.240	0.026
	M	0.181	0.170	6.800	74.500	0.460	0.643
<i>AbsAEM_{i,t-1}</i>	U	0.039	0.034	12.700		1.120	0.265
	M	0.040	0.042	-6.300	50.300	-0.420	0.678

(This table is continued on the next page.)

Table 4.5. PSM-DID (continued)**Panel B: DID**

Variables	(1) <i>SCR_Crash_{i,t}</i>	(2) <i>SCR_Ncskew_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>
<i>Treat_i × Post_{i,t}</i>	0.232 (0.140)	0.697*** (0.232)	0.522*** (0.181)
Constant	-0.274 (1.553)	-6.927*** (2.352)	-6.361*** (1.851)
Observations	150	150	150
Controls in equation (4.7)	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adj. R ²	0.002	0.022	0.069

Notes: Panel A of Table 4.5 summarizes the results of PSM. The results of DID are shown in Panel B of Table 4.5. The standard errors clustering at the firm level are displayed in parentheses. The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.5.2.2 The alternative overconfidence measurement

In the main regression, following [Malmendier and Tate \(2005\)](#), this study uses $Holder67CFO_{i,t-1}$ to capture overconfident CFOs. The threshold, 67%, is from the theoretical framework of [Hall and Murphy \(2002\)](#). However, some studies (i.e., [Campbell et al., 2011](#)) use a different threshold, 100%. To mitigate the measurement error, this study adopts 100% as an alternative threshold of overconfidence measure. Specifically, this study defines $Holder100CFO_{i,t-1}$ as equals one from the time when CFOs are reluctant to exercise their options that are more than 100% in the money, and zero otherwise. Table 4.6 reports the regression results of using the alternative measurement. The coefficient on $Holder100CFO_{i,t-1}$ is significantly positive in columns (1) to (3) in Table 4.6, suggesting that the positive relationship between overconfident CFOs and stock price crash risk holds under alternative overconfidence measurement.

Table 4.6. Alternative measurement: $Holder100CFO_{i,t-1}$

Variables	(1) $SCR_Crash_{i,t}$	(2) $SCR_Ncskew_{i,t}$	(3) $SCR_Duvol_{i,t}$
$Holder100CFO_{i,t-1}$	0.025** (0.010)	0.043** (0.017)	0.032*** (0.011)
Constant	0.060 (0.132)	-0.522*** (0.182)	-0.318** (0.139)
Observations	17,410	17,410	17,410
Controls in equation (4.7)	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adj. R ²	0.043	0.027	0.041

Notes: $Holder100CFO_{i,t-1}$ is an alternative measurement of CFO overconfidence. The standard errors clustering at the firm level are displayed in parentheses. The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.5.2.3 Rule out another explanation of option-based overconfidence measurement

Another possible explanation for the late option exercise behavior is that CFOs have insider information regarding the firm's future performance. In this case, CFOs keep the deeply in-the-money options to pursue their own benefits rather than overconfidence.

Persistence is a key difference between the concept of overconfidence used in this paper and private information (Malmendier and Tate, 2005; Huang et al., 2016). This study's definition of overconfidence ($Holder67CFO_{i,t-1}$) is when CFOs hold vested options that are at least 67 % in the money for the first time until the end of their tenure, whereas private information is often short-lived and random (Huang et al., 2016; Malmendier & Tate, 2005). This study would not expect CFOs to receive positive news on a regular basis. Therefore, the option-based overconfident measurement ($Holder67CFO_{i,t-1}$) should be different from insider trading.

Given that abnormal earnings can capture favorable private information, this study empirically includes abnormal earnings ($AbEarnings_{i,t-1}$) into the main regression (equation (4.7)) in accordance with Huang et al. (2016).⁴¹ If this study's measure of CFO overconfidence also captures the influence of private information, this study anticipates the estimated coefficient on $Holder67CFO_{i,t-1}$ to be smaller and less significant if this study includes $AbEarnings_{i,t-1}$ in the main regression.

However, as shown in Table 4.7, when $AbEarnings_{i,t-1}$ is included, the estimated coefficient on $Holder67CFO_{i,t-1}$ is negligibly affected compared to this study's documented findings in the column (4) to (6) of Table 4.4. In light of the above, this study dismisses the private information alternate explanation.⁴²

⁴¹ Detailed variable information is shown in the Appendix C.

⁴² Thanks for the anonymous reviewer's suggestion. This study also uses the decomposition method to rule out this explanation. Specifically, this study first regresses $Holder67CFO_{i,t-1}$ (dependent variable) on $AbEarnings_{i,t-1}$ (independent variable) to get the residual. This residual represents that the effect of $Holder67CFO_{i,t-1}$ cannot be explained by $AbEarnings_{i,t-1}$. Next, this study replaces $Holder67CFO_{i,t-1}$ with this residual in equation (4.7). Unreported results find that the coefficient of residual is significantly positive, indicating that CFO overconfidence positively affects stock price crash risk after controlling for the effect of insider information.

Table 4.7. Rule out-private information

Variables	(1) <i>SCR_Crash_{i,t}</i>	(2) <i>SCR_Ncskew_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>
<i>Holder67CFO_{i,t-1}</i>	0.023** (0.011)	0.045** (0.020)	0.031** (0.013)
<i>AbEarnings_{i,t-1}</i>	-0.036 (0.035)	-0.196*** (0.057)	-0.125*** (0.043)
Constant	-0.356*** (0.090)	-0.881*** (0.195)	-0.591*** (0.136)
Observations	13,527	13,527	13,527
Controls in equation (4.7)	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Adj. R ²	0.051	0.035	0.048

Notes: This study adds an additional control variable, *AbEarnings_{i,t-1}*, in this regression. The standard errors clustering at the firm level are displayed in parentheses. Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.6 Cross-sectional tests

This section will identify channels, analyze the joint effect of CEO overconfidence and CFO overconfidence, and discuss the influence of governance and information asymmetry.

4.6.1 Underpinning mechanisms

4.6.1.1 Risk-taking activities

This study has found a positive relationship between CFO overconfidence and stock price crash risk. This section examines whether overconfident CFOs positively affect stock price crash risk due to their risk tolerance. This study uses aggressive tax avoidance as a proxy for CFOs' risk-taking attitude. According to [Hanlon and Heitzman \(2010\)](#), aggressive tax avoidance refers to the most extreme type of tax avoidance activity that challenges tax law. Firms that successfully challenge tax laws might face large penalties and political costs ([Lisowsky, 2009](#); [Wilson, 2009](#); [Mills, Nutter, and Schwab, 2013](#)). In addition, aggressive tax avoidance might damage the reputations of firms, board members, and top managers ([Graham et al., 2014](#); [Lanis et al., 2019](#)). Aggressive tax avoidance is, therefore, more likely to reflect CFOs' attitude to risk.

This study, following [McGuire, Wang, and Wilson \(2014\)](#), uses firms' cash effective tax rate ($CETR_{i,t-1}$) and effective tax rate ($ETR_{i,t-1}$) to capture firms' aggressive tax avoidance behaviors.⁴³ This study generates an indicator variable, $Low_CETR_{i,t-1}$ ($Low_ETR_{i,t-1}$) equals one if $CETR_{i,t-1}$ ($ETR_{i,t-1}$) is lower than the mean tax avoidance level of industry in the same year, and zero otherwise. Columns (1) to (3) of Table 4.8 show the result of the moderating effect of the high level of tax avoidance proxied by $LowCETR_{i,t-1}$ on the relationship between CFO overconfidence and stock price crash risk. In columns (2) and (3), $Holder67CFO_{i,t-1} \times LowCETR_{i,t-1}$ has a significant and positive coefficient. Similarly, this study finds that the coefficient on $Holder67CFO_{i,t-1} \times LowETR_{i,t-1}$, is significantly positive in column (5), indicating that overconfident CFOs who adopt aggressive tax strategies raise stock crash risk. Overall, this study finds evidence to support that overconfident CFOs increase stock price crash risk due to risk-taking, confirming the hypothesis 2.

⁴³ Detailed variable information is shown in the Appendix C.

Table 4.8. Channels

Variables	(1) SCR_Cras $\bar{h}_{i,t}$	(2) SCR_Ncske $w_{i,t}$	(3) SCR_Duvo $\bar{l}_{i,t}$	(4) SCR_Crash $_{i,t}$	(5) $SCR_Ncskew_{i,t}$	(6) SCR_Duvo $\bar{l}_{i,t}$	(7) $SCR_Crash_{i,t}$	(8) SCR_Ncske $w_{i,t}$	(9) SCR_Duvol $_{i,t}$
$Holder67CFO_{i,t-1}$	0.013 (0.012)	0.015 (0.021)	0.013 (0.014)	0.018 (0.012)	0.012 (0.021)	0.022 (0.014)	0.008 (0.012)	0.015 (0.022)	0.016 (0.014)
$LowCETR_{i,t-1}$	0.003 (0.011)	-0.001 (0.019)	-0.011 (0.013)						
$Holder67CFO_{i,t-1} \times LowCETR_{i,t-1}$	0.010 (0.014)	0.052** (0.026)	0.040** (0.017)						
$LowETR_{i,t-1}$				-0.007 (0.011)	-0.044** (0.019)	-0.015 (0.013)			
$Holder67CFO_{i,t-1} \times LowETR_{i,t-1}$				-0.000 (0.014)	0.057** (0.025)	0.021 (0.017)			
$PositiveAEM_{i,t-1}$							-0.016 (0.010)	-0.024 (0.018)	-0.016 (0.012)

(The table is continued on the next page.)

Table 4.8. Channels (continued)

Variables	(1) <i>SCR_Crash</i> <i>i,t</i>	(2) <i>SCR_Ncske</i> <i>w_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>	(4) <i>SCR_Cras</i> <i>h_{i,t}</i>	(5) <i>SCR_Ncske</i> <i>w_{i,t}</i>	(6) <i>SCR_Duvo</i> <i>l_{i,t}</i>	(7) <i>SCR_Cras</i> <i>h_{i,t}</i>	(8) <i>SCR_Ncskew_{i,t}</i>	(9) <i>SCR_Duvo</i> <i>l_{i,t}</i>
<i>Holder67CF</i> <i>O_{i,t-1}</i> × <i>PositiveAEM_{i,t-1}</i>							0.017	0.047**	0.031**
Constant	0.032 (0.137)	-0.584*** (0.191)	-0.335** (0.148)	0.044 (0.132)	-0.501*** (0.185)	-0.309** (0.143)	(0.014) 0.060 (0.132)	(0.024) -0.519*** (0.183)	(0.016) -0.318** (0.140)
Observations	16,860	16,860	16,860	17,231	17,231	17,231	17,519	17,519	17,519
Controls in equation (4.7)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.042	0.029	0.041	0.041	0.026	0.040	0.042	0.027	0.041

Notes: The tables show the moderating effects of risk-taking and bad news hoarding on the relationship between CFO overconfidence and stock price crash risk. The standard errors clustering at the firm level are displayed in parentheses. Controls include control variables in equation (4.7). Please note that when examining the effect of *PositiveAEM_{i,t-1}*, this study removes one control variable from equation (4.7), *AbsAEM_{i,t-1}*, to avoid multicollinearity. This study's results remain similar when controlling for CEO characteristics (*Holder67CEO_{i,t-1}*, *CEO_equityincentive_{i,t-1}*, and *CEO_male_{i,t-1}*). The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.6.1.2 Bad news hoarding

This section tests another potential channel, bad news hoarding. Previous research supports the notion that bad news hoarding causes firm stock price crashes. Bad news accumulated over a long period of time can cause share prices to fall when a tipping point is breached suddenly. Income-increasing earnings management is the most common way for managers to conceal bad news (Hutton et al., 2009; Loureiro and Silva, 2022). Therefore, overconfident CFOs may increase crash risk by manipulating earnings upward. This study uses the modified Jones model to measure AEM ($AEM_{i,t-1}$).⁴⁴ The modified Jones model is introduced by Dechow et al. (1995), which is widely used in AEM studies. This study defines income-increasing AEM, $Positive_AEM_{i,t-1}$, as an indicator variable that equals one if $AEM_{i,t-1}$ is positive, and zero otherwise. Columns (7) to (9) of Table 4.8 report the result of the moderating effect of income increasing AEM on the relationship between CFO overconfidence and stock price crash risk under different measures of stock price crash risk. In columns (8) and (9), $Holder67CFO_{i,t-1} \times PositiveAEM_{i,t-1}$ has a significant and positive coefficient, showing that overconfident CFOs increase stock price crash risk via the bad news hoarding channel, confirming the hypothesis 3.

4.6.2 CEO overconfidence, CFO overconfidence, and stock price crash risk

This section firstly compares the effect of CEO and CFO overconfidence on stock price crash risk. Relying on the power circulation theory framework, this study predicts that CFO overconfidence outweighs CEO overconfidence in influencing stock price crash risk. Empirically, to consider the effect of CEOs, this study adds CEO overconfidence ($Holder67CEO_{i,t-1}$), CEO equity incentives ($CEO_equityincentive_{i,t-1}$), and CEO gender ($CEO_male_{i,t-1}$) into this study's main regression (equation (4.7)). As shown in Table 4.9, $Holder67CFO_{i,t-1}$ has a positive and significant coefficient in columns (1) to (3). The coefficient on $Holder67CEO_{i,t-1}$ is insignificant in columns (1) and (2).⁴⁵ The coefficient on $Holder67CFO_{i,t-1}$ is larger than that on $Holder67CEO_{i,t-1}$ in column (3). This evidence shows that CFO overconfidence has more explanatory power for stock

⁴⁴ Detailed variable information is shown in the Appendix C.

⁴⁵ Unreported results show that the coefficient on $Holder67CEO_{i,t-1}$ is significantly positive when this study removes the $Holder67CFO_{i,t-1}$ from the regression, which is in line with the findings of Kim, Wang, et al. (2016).

price crash risk than CEO overconfidence, which is in line with the hypothesis 4.

In addition, based on the false consensus effect theory, this study predicts that the stock price crashes increase when both CFOs and CEOs are overconfident. Table 4.9 shows the regression results for the joint effect of CEO overconfidence and CFO overconfidence on stock price crash risk. The variable of interest is the interaction term, $Holder67CFO_{i,t-1} \times Holder67CEO_{i,t-1}$. In columns (5) and (6), $Holder67CFO_{i,t-1} \times Holder67CEO_{i,t-1}$ has a significantly positive coefficient, showing that overconfident CEOs amplify the positive relationship between CFO overconfidence and stock price crash risk, which is in line with this study's prediction and confirm the hypothesis 5.

Table 4.9. CEO overconfidence, CFO overconfidence, and stock price crash risk

Variables	(1) <i>SCR_Crash_{i,t}</i>	(2) <i>SCR_Ncskew_{i,t}</i>	(3) <i>SCR_Duval_{i,t}</i>	(4) <i>SCR_Crash_{i,t}</i>	(5) <i>SCR_Ncskew_{i,t}</i>	(6) <i>SCR_Duval_{i,t}</i>
<i>Holder67CFO_{i,t-1}</i>	0.019* (0.010)	0.037** (0.018)	0.027** (0.012)	0.013 (0.016)	-0.013 (0.028)	-0.005 (0.019)
<i>Holder67CEO_{i,t-1}</i>	-0.000 (0.010)	0.021 (0.018)	0.024** (0.012)	-0.002 (0.012)	-0.003 (0.022)	0.008 (0.015)
<i>Holder67CFO_{i,t-1} ×</i> <i>Holder67CEO_{i,t-1}</i>				0.007 (0.018)	0.068** (0.033)	0.044** (0.022)
<i>CEO_equityincentive_{i,t-1}</i>	-0.010 (0.030)	0.021 (0.054)	0.029 (0.037)	-0.006 (0.030)	0.022 (0.055)	0.030 (0.037)
<i>CEO_male_{i,t-1}</i>	-0.012 (0.033)	0.017 (0.062)	0.016 (0.036)	-0.017 (0.032)	0.016 (0.060)	0.016 (0.035)
Constant	-0.075 (0.084)	-0.716*** (0.145)	-0.390*** (0.093)	0.067 (0.138)	-0.551*** (0.192)	-0.343** (0.143)
Observations	17,519	17,519	17,519	17,519	17,519	17,519
Controls in equation (4.7)	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.043	0.027	0.041	0.042	0.027	0.041

Notes: This table shows the effect of CEO overconfidence on the relationship between CFO overconfidence and stock price crash risk. The standard errors clustering at the firm level are displayed in parentheses. The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study is interested in.

4.6.3 Stronger governance, CFO overconfidence, and stock price crash risk

This section analyzes how governance affects the link between overconfident CFOs and stock price crash risk. [Baker and Wurgler \(2013\)](#) suggest that to make managers who are not completely rational have a positive impact, corporate governance should limit their ability. In the same vein, [Kim, Wang, et al. \(2016\)](#) find that corporate governance mechanisms designed to solve traditional agency problems also aid in the restraint of overconfident managers' behaviors.

Therefore, this study anticipates that overconfident CFOs will reduce risk-taking and bad news hoarding behaviors under strong governance monitoring (e.g., [Brennan and Solomon, 2008](#); [Stein, 2008](#)). However, this study might get a different result if strong governance cannot change the overconfident CFOs' decisions as some studies argue that governance has a limited effect on overconfident managers' behaviors (e.g., [Ahmed and Duellman, 2013](#)). Thus, whether effective corporate governance might influence the behaviors of overconfident CFOs is an open empirical question. This study employs the management entrenchment index (E index) to capture monitoring following previous research. [Bebchuk et al. \(2009\)](#) award each firm a score ranging from zero to six. Lower E index values indicate better corporate governance. Following [Hsu, Novoselov, and Wang \(2017\)](#), this study defines strong monitoring ($LowEindex_{i,t-1}$) as an indicator variable that equals one if E index is less than three, and zero otherwise.

The results are reported in the first three columns of Table 4.10. In columns (1) to (3), the coefficient on $Holder67CFO_{i,t-1} \times LowEindex_{i,t-1}$ is negative. However, the coefficient on $Holder67CFO_{i,t-1} \times LowEindex_{i,t-1}$ is only significant in column (1), suggesting that this study finds limited evidence to support that strong governance alters the positive relationship between CFO overconfidence and stock price crash risk. This study's findings differ from those of [Ahmed and Duellman \(2013\)](#), who find that overconfident CEOs insist on their decisions under strong governance. It may be because CFOs have a higher turnover rate than CEOs when firms have low reporting quality ([Hennes et al., 2008](#)), which raises overconfident CFOs' career concerns. Thus, overconfident CFOs tend to reduce bad news hoarding and risk-taking behaviors under strong governance.

Table 4.10. Governance and information asymmetry

Variables	(1) <i>SCR_Crash</i> <i>i,t</i>	(2) <i>SCR_Ncskew</i> <i>i,t</i>	(3) <i>SCR_Duval</i> <i>i,t</i>	(4) <i>SCR_Crash</i> <i>i,t</i>	(5) <i>SCR_Ncskew</i> <i>i,t</i>	(6) <i>SCR_Duval</i> <i>i,t</i>	(7) <i>SCR_Crash</i> <i>i,t</i>	(8) <i>SCR_Ncskew</i> <i>i,t</i>	(9) <i>SCR_Duval</i> <i>i,t</i>
<i>Holder67CFO_{i,t-1}</i>	0.060*	0.000	0.020	0.034***	0.064***	0.040***	0.036***	0.070***	0.042***
	(0.034)	(0.061)	(0.040)	(0.012)	(0.021)	(0.014)	(0.012)	(0.022)	(0.015)
<i>LowEindex_{i,t-1}</i>	0.056	0.180**	0.069						
	(0.050)	(0.081)	(0.051)						
<i>Holder67CFO_{i,t-1} × LowEindex_{i,t-1}</i>	-0.103**	-0.076	-0.072						
	(0.049)	(0.082)	(0.054)						
<i>LowError_{i,t-1}</i>				0.029***	0.067***	0.036***			
				(0.011)	(0.019)	(0.013)			
<i>Holder67CFO_{i,t-1} × LowError_{i,t-1}</i>				-0.028**	-0.059**	-0.029*			
				(0.014)	(0.024)	(0.016)			

(This table is continued on the next page.)

Table 4.10. Governance and information asymmetry (continued)

Variables	(1) <i>SCR_Crash</i> <i>i,t</i>	(2) <i>SCR_Ncskew</i> <i>i,t</i>	(3) <i>SCR_Duval</i> <i>i,t</i>	(4) <i>SCR_Crash</i> <i>i,t</i>	(5) <i>SCR_Ncskew</i> <i>i,t</i>	(6) <i>SCR_Duval</i> <i>i,t</i>	(7) <i>SCR_Crash</i> <i>i,t</i>	(8) <i>SCR_Ncskew</i> <i>i,t</i>	(9) <i>SCR_Duval</i> <i>i,t</i>
<i>LowDispersion_{i,t-1}</i>							0.029**	0.057***	0.039***
<i>Holder67CFO_{i,t-1} × LowDispersion_{i,t-1}</i>							(0.012) -0.026*	(0.021) -0.063**	(0.013) -0.032*
Constant	0.251 (0.389)	-0.217 (0.449)	-0.105 (0.295)	0.048 (0.139)	-0.593*** (0.194)	-0.366** (0.144)	(0.015) 0.013 (0.146)	(0.026) -0.639*** (0.195)	(0.017) -0.376** (0.148)
Observations	2,602	2,602	2,602	17,245	17,245	17,245	16,448	16,448	16,448
Controls variables in equation (4.7)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R ²	0.015	0.044	0.072	0.041	0.027	0.041	0.041	0.027	0.042

Notes: The table shows the moderating effect of strong governance on the relationship between CFO overconfidence and stock price crash risk. The standard errors clustering

at the firm level are displayed in parentheses. Controls include control variables in equation (4.7) and CEO characteristics (*Holder67CEO_{i,t-1}*, *CEO_equityincentive_{i,t-1}*, and *CEO_male_{i,t-1}*). The Appendix C contains detailed information on the variables. *, **, and *** denote 0.10, 0.05, and 0.01, respectively. The variables highlighted in bold are the ones this study interested in.

4.6.4 Information asymmetry, CFO overconfidence, and stock price crash risk

This study has found that overconfident CFOs affect stock price crash risk via making risky decisions and hoarding bad news. As a transparent information environment reduces CFOs' motivations, opportunities, and capacity to take more risks and delay disclosing bad news (LaFond and Watts, 2008), CFOs are less likely to take risky actions and hide bad news when firms have lower asymmetric information. Accordingly, this study predicts that a low level of information asymmetry mitigates the influence of CFO overconfidence on stock price crash risk.

This study uses two proxies, analyst forecast error and analyst forecast dispersion, to measure information asymmetry following prior studies.⁴⁶ The low level of information asymmetry indicates a transparent information environment. The $LowError_{i,t-1}$ ($LowDispersion_{i,t-1}$) is an indicator variable that equals one if analyst forecast error (analyst forecast dispersion) is lower than the mean value of the same industry in the same year, and zero otherwise. The moderating effect of information asymmetry on the relationship between CFO overconfidence and stock price crash risk is shown in columns (4) to (9) of Table 4.10. The coefficient on $Holder67CFO_{i,t-1} \times LowError_{i,t-1}$ is significantly negative in columns (4) to (6). In columns (7) to (9), $Holder67CFO_{i,t-1} \times LowDispersion_{i,t-1}$ has a negative and significant coefficient. These findings suggest that a transparent information environment mitigates the effect of overconfident CFOs on stock price crash risk.

4.7 Conclusion

In this study, this paper sheds light on the association between CFO overconfidence and firm-specific stock price crash risk. Using a large sample of U.S-listed firms from 1993 to 2019, this study finds that overconfident CFOs increase future stock price crash risk. To mitigate the adverse causality concern, this study conducts the PSM-DID test. Compared to firms where former and new CFOs are non-overconfident, firms that change their CFOs from non-overconfidence to overconfidence increase the possibility of crash risk, which supports this study's main finding. Besides, this study's findings is robust under

⁴⁶ Detailed variable information is shown in the Appendix C.

three stock price crash risks and two overconfidence measures. Moreover, the influence of CFO overconfidence on stock price risk is not driven by insider trading incentives.

In the cross-sectional tests, this study proves that overconfident CFOs affect stock price crash risk through two channels, taking more risky activities and hoarding bad news. This study further shows that CFO overconfidence exceeds CEO overconfidence in affecting stock return tail risks. Firms with both overconfident CEOs and CFOs raise stock price crash risk. In addition, this study documents that the positive effect of overconfident CFOs on stock price crash risk is lessened when CFOs are strongly monitored or their firms have low information asymmetry.

This study's findings contribute to the literature and theory and have substantial practical implications. In terms of the contributions to the literature, this study complements and extends the study of [Kim, Wang, et al. \(2016\)](#) on the influence of CEO overconfidence on stock price crash risk by testing the effect of CFO overconfidence and jointly considering the CEO and CFO overconfidence. This study also extends the research on CFO overconfidence and answers the calls made by [Black and Gallemore \(2013\)](#) and [Malmendier et al. \(2022\)](#). Theoretically, the findings of this study reveal that CFOs' psychological characteristics significantly affect their decisions, providing more empirical evidence to support overconfidence and upper echelon theories. The dominating effect of CFO overconfidence in the stock price crash contributes to the power circulation theory. This study's findings on the joint effects of CFO overconfidence and CEO overconfidence on crash risk contribute to the false consensus effect theory. In terms of contributions to practice and policy, given that a sharp drop in stock prices may result in severe losses for investors' portfolios ([Hong and Stein, 2003](#)), this study's findings should serve as a warning to financial statement users to keep an eye on the information disclosure of overconfident CFOs.

Compared with the research on CEO overconfidence, the research on CFO overconfidence is very limited. As an increasing number of CFOs are involved in corporate strategy decision-making, this study suggests that future studies should investigate the effect of CFO overconfidence and how it interacts with CEO overconfidence in a series of strategic decisions.

Chapter 5: Conclusion and Recommendations

5.1 Overall summary

This thesis is comprised of three empirical papers that investigate the impact of CFO overconfidence on corporate decisions. Due to current literature largely ignoring the effect of CFO overconfidence and focusing on CEO overconfidence, the thesis seeks to explore the impact of overconfident CFOs on two areas where CFOs play a major role, namely earnings management and accounting conservatism. It also aims to examine the long-term consequences (i.e., increasing stock price crash risk) of CFO overconfidence.

To attain these objectives, this thesis adheres to an epistemological philosophy and adopts a positivist stance. Regarding the selection of a research paradigm, the three studies stick to the functionalist paradigm and employ a deductive research strategy. Multiple sources of data are utilized to analyze a number of hypotheses on the effects of overconfident CFOs and to assess the application of specific theories, particularly the upper echelons, overconfidence, power circulation, and false consensus effect theories. Overconfident CFOs engage in more AEM and REM activities as they are more likely to underestimate the risks associated with AEM (i.e., turnover risks and the risk of being detected) and REM (i.e., deviating from optimal business strategies) and overestimate their ability to mitigate the costs of REM than overconfident CFOs.

Adopting the same theoretical stance as the first paper, the second paper conjectures that CFO overconfidence significantly affects conditional accounting conservatism decisions. However, this paper proposes two competing hypotheses. From the point of view that the purpose of financial reporting is to increase “contracting efficiency”, investors and directors might demand timely disclosure of bad news if they recognize that overconfident CFOs are less likely to disclose bad news. Thus, the first hypothesis is that there is a positive relationship between CFO overconfidence and conditional accounting conservatism. On the other hand, from the “value relevance view”, overconfident CFOs who deem their firm value to be underestimated tend to accelerate good news recognition and delay bad news recognition to communicate their private information. The second hypothesis is

that there is a negative relationship between CFO overconfidence and conditional accounting conservatism.

Similarly, relying on the upper echelons and overconfidence theories, the third paper predicts a positive relationship between CFO overconfidence and future stock price crash risk. Overconfident CFOs' risk-taking and bad-news hoarding behaviors lead to bad-news accumulation. When bad news accumulates at a certain level, it is exposed to the market all at once, resulting in a sharp decrease in stock price.

Empirically, this thesis employs a quantitative research approach and relies on secondary data to investigate multiple relationships between dependent variables (AEM, REM, conditional accounting conservatism, and stock price crash risk) and the main factor (CFO overconfidence) in consideration of several control variables (i.e., other CFO traits and firm characteristics). The data for this thesis has been collected from different sources (CCM, CRSP, ExecuComp, BoardEx, Thomson-Reuters 13F, and I/B/E/S databases). Numerous statistical models (two-way fixed effect models), techniques (PSM-DID), and software (Stata) are used to implement the basic and robustness analysis.

To provide an in-depth analysis of the main findings, each paper conducts a series of additional tests. To be specific, the first paper discusses the moderating effect of CFO generalist skills, CFO board position, CEO power, overconfident CEO, CEO–CFO team tenure, external financing needs, and information asymmetry on the relationship between CFO overconfidence and earnings management. The second paper investigates the effect of CFO power and CEO overconfidence on the relationship between CFO overconfidence and conditional accounting conservatism. It further examines whether overconfident CFOs reduce conditional accounting conservatism in order to improve earnings transparency and financial flexibility, as well as how CFO overconfidence affects unconditional accounting conservatism. The third paper examines the impact of CEO overconfidence, governance, and information transparency on the association between CFO overconfidence and stock price crash risk.

The findings are summarized in the next sections.

5.2 Summary of research findings

The thesis has achieved the aim of investigating the influence of CFO cognitive biases (i.e., overconfidence) on firms' earnings management (AEM and REM), accounting conservatism (conditional and unconditional accounting conservatism), and stock price crash risks. All of the research questions have been answered, yielding a series of interesting findings.

Firstly, to answer the first research question, "What is the relationship between CFO overconfidence and earnings management?", the first paper, through the lens of the combination of upper echelons and overconfidence theories and using a large sample of 11,321 observations of U.S. firms from 1999 to 2019, finds that overconfident CFOs engage in more AEM and REM than non-overconfident CFOs. These findings remain after a series of robustness tests, including using entropy balancing, PSM-DID estimation, and changing the measurements of main variables.

Next, the first paper conducts multiple groups of subsample analyzes to explore through which channel (s) CFO overconfidence affects earnings management. As overconfident CFOs tend to underestimate the risks of detection of their AEM activities and have low career concerns, the first paper finds that overconfident CFOs are more likely to engage in AEM than non-overconfident CFOs. Overconfident CFOs conduct REM because they underestimate the cost of deviating from optimal operational decisions and overestimate their managerial ability to mitigate the deteriorating effect of REM on firm performance.

Then, the first paper tests the impact of the CFO board position, CEO power and overconfidence, the relationship between CEOs and CFOs, debt and equity financing needs, and information asymmetry on overconfident CFOs' earnings management behaviors. The first paper finds that the effects of CFO overconfidence on AEM and REM are particularly significant in firms with non-board CFOs, powerful CEOs, overconfident CEOs, long CEO–CFO team tenure, and high information asymmetry. When CFOs have (do not have) generalist skills and enterprises have equity (debt) funding needs, the positive association between CFO overconfidence and AEM (REM) is higher.

Later, underlining upper echelons and overconfidence theories, the second paper explores the second research question, "What is the relationship

between CFO overconfidence and conditional accounting conservatism?”. By analyzing the large sample of U.S. firm data (21,626 firm-year observations) from 1992 to 2019, this study finds that overconfident CFOs use less conditional accounting conservatism than non-overconfident CFOs. These findings are robust under the PSM-DID test, using an alternative overconfidence measure, ruling out the explanation of the option-based overconfidence measure and considering the effect of CEOs’ traits (i.e., overconfidence, gender, and ownership) and governance. In addition to conditional accounting conservatism, this study also finds that overconfident CFOs tend to adopt less unconditional accounting conservatism.

Then, the second paper tests the moderating effect of CFO power on the association between CFO overconfidence and conditional accounting conservatism. This study finds that overconfident CFOs with high power are more likely to reduce conditional accounting conservatism.

Afterwards, as the second paper predicts that overconfident CFOs tend to accelerate the confirmation of good news and delay the recognition of bad news because they would like to convey private information, this paper tests and finds that overconfident CFOs reduce conditional accounting conservatism, increasing earnings informativeness and financial flexibility, confirming the predictions.

Next, the third paper sheds light on the third research question, “What is the relationship between CFO overconfidence and stock price crash risk?” Underlining upper echelons and overconfidence theories and using a large sample of U.S.-listed firms from 1993 to 2019, this study finds that overconfident CFOs lead to future stock price crash risk. This finding passes a series of robustness tests, including the PSM-DID test and an alternative overconfidence measure, ruling out CEOs’ insider trading incentives.

The third paper then tests through which channel(s) CFO overconfidence affects stock price crash risk. This study finds significant evidence that overconfident CFOs are more likely to increase stock price crash risk due to their high risk-taking and bad-news hoarding incentives.

Finally, the third paper investigates how CEO overconfidence and monitoring influence the relationship between CFO overconfidence and stock price crash risk. According to this study’s findings, CFO overconfidence

outperforms CEO overconfidence in influencing stock return tail risks, and the effect of overconfident CFOs on stock price crash risks is reduced when CFOs are well monitored or their firms have less information asymmetry.

Table 5.1. Summary of research questions and results

Research questions	Discussion in the thesis	Results
Chapter 2 (Paper 1)		
1. What is the relationship between CFO overconfidence and earnings management?	Hypothesis 1 was developed in paper 1: <i>H1: There is a positive association between overconfident CFOs and earnings management.</i>	Supported H1
Chapter 3 (Paper 2)		
2. What is the relationship between CFO overconfidence and conditional accounting conservatism?	Hypotheses 1a and 1b were developed in paper 2: <i>H1a: (“contracting efficiency view”) There is a positive association between CFO overconfidence and conditional accounting conservatism.</i>	Not Supported H1a Supported H1b

	<i>H1b: (“value relevance view”) There is a negative association between CFO overconfidence and conditional accounting conservatism.</i>	
Chapter 4 (Paper 3)		
3. What is the relationship between CFO overconfidence and stock price crash risk?	Hypothesis 1 was developed in paper 3: <i>H1: There is a positive relationship between CFO overconfidence and stock price crash risk.</i>	Supported H1

5.3 Research implications

This thesis has several important implications for investors, the board of directors, regulators, and policymakers.

Firstly, this thesis reveals the influence of CFO overconfidence, which helps investors make decisions effectively. Prior studies focus on CEO overconfidence and largely ignore CFO overconfidence (e.g., [Malmendier and Tate, 2005](#); [Kim, Wang, et al., 2016](#); [Hribar and Yang, 2016](#)), which leads to the investors cannot recognize this CFO cognitive bias from past research. To complement prior studies, the thesis provides evidence that overconfident CFOs are more likely to manipulate earnings than their non-overconfident counterparts. Aggressive earnings management might mislead investors' decisions, affecting their interests. Specifically, [Cohen and Zarowin \(2010\)](#) suggest that firms nearing SEOs tend to use AEM and REM to boost their stock price. However, these SEO firms that engage in REM have poor post-SEO performance. More importantly, aggressive earnings management increases the possibility of financial fraud, causing the loss of investors. For instance, Enron's financial fraud harmed stakeholders and the American economy significantly ([Davis, 2002](#)). Lucent, Cendant, and MicroStrategy abused earnings management, resulting in stock market losses of approximately 34 billion dollars in three days ([Magrath and Weld, 2002](#)).

In addition, this thesis suggests that overconfident CFOs' initial delay in bad news disclosure reflects an optimistic bias that tends to convey private information. However, due to this bias, these firms with overconfident CEOs are more likely to suffer stock price crashes in succeeding periods. These findings are consistent with the notion of [McCann \(2014\)](#), the deputy editor of *CFO Magazine*, "Because CFOs are not actually superhuman, but just people like everyone else, they too are subject to a lengthy list of cognitive biases that influence our decisions and actions. In the corporate finance context, these biases, if unchecked, can have devastating consequences for company performance." Since sharp stock price drops may result in severe losses for investors ([Hong and Stein, 2003](#)), this thesis's findings remind investors that they should continue to pay attention to the information disclosure of overconfident CFOs.

Secondly, these thesis findings will benefit the board of directors in increasing the monitoring effectiveness of CFOs' behaviors. Specifically, after considering the effect of board governance, this thesis still finds a positive relationship between CFO overconfidence and aggressive earnings management, suggesting that boards cannot effectively restrict overconfident CFOs from manipulating earnings. On the other hand, this thesis suggests that overconfident CFOs reduce conditional accounting conservatism, increasing the earnings informativeness that benefits investors' evaluations and financial flexibility. These findings suggest that boards also need to be aware of the pros of CFO overconfidence in disclosing private information, especially when firms need external funding. In addition, this thesis reveals that firms with overconfident CFOs reduce stock price crash risk under strong governance, showing the benefit of effective governance. Overall, this thesis reminds directors to strengthen the effectiveness of their supervision of overconfident CFOs, as governance quality significantly affects directors' reputations and shareholders' wealth (Fich and Shivdasani, 2007).

Thirdly, this thesis's findings inform regulators regarding the effect of CFO overconfidence in information disclosure. Prior studies demonstrate that conditional accounting conservatism may drive managers to forgo investments with strong growth potential, distorting earnings information and decreasing business value (Barth et al., 2014; Heflin et al., 2015). Thus, FASB and IASB opposed conservative accounting and removed the requirement for accounting conservatism from the joint conceptual framework in 2010 because they believed neutrality to be a more appropriate financial quality objective (FASB, 2010; IASB, 2010). However, their decisions have aroused much controversy. The findings of this thesis partially support their decisions by showing that overconfident CFOs delay bad news disclosure to convey private information, increasing earnings informativeness. However, the thesis finds that overconfident CFOs who hoard bad news for a long-time lead to stock price crashes. These findings remind regulating authorities, such as the Securities and Exchange Commission, that they need to conduct a long-term oversight of overconfident CFOs' information disclosure behaviors to ensure firms comply with U.S. securities laws.

Fourthly, given that policymakers play an important role in corporate governance (Adegbite, Shrives, and Nichol, 2011), they can interpret the findings of this thesis as motivation to revise or implement the law. The SOX Act mandates the CEOs and CFOs of publicly listed firms to certify the appropriateness and fairness of financial reports, strengthening the CFOs' and CEOs' responsibilities (Cohen et al., 2008). However, Hsieh et al. (2014) find that SOX has fewer restrictions on overconfident CEOs' earnings management activities, suggesting that SOX is less likely to lessen the effect of managerial overconfidence on earnings management. A large number of studies suggest that overconfidence is a common trait among CEOs and CFOs (Chen et al., 2022; Malmendier et al., 2022). Besides, this thesis suggests that the impact of overconfidence on earnings management and stock price crash risk will be magnified when CEOs and CFOs are overconfident. Thus, policymakers should be aware that managerial cognitive bias can hinder the implementation of SOX. More importantly, the force of SOX has declined since 2005 (Kedia, Koh, and Rajgopal, 2015). Policymakers should consider modifying SOX or enacting new laws to ensure the integrity and reliability of accounting information.

5.4 Research limitations

Although this thesis conducts a series of tests to increase the robustness of documented findings, there are two main limitations regarding data availability and research method.

Firstly, due to the data limitation, this thesis can only use option-based overconfidence measurement. Specifically, the thesis uses a modified option-based overconfidence method proposed by Campbell et al. (2011) that is based on the traditional measure. The traditional option-based method is created by Malmendier and Tate (2005). Malmendier and Tate (2005) define managers as overconfident if their in-the-money stock options are greater than 67%. Given that most of the studies lack the same level of specific data as Malmendier and Tate (2005), Campbell et al. (2011) propose a modified option-based method using ExecuComp data rather than the detailed proprietary data. Most papers that are published in high-quality journals lack detailed manager option exercise information following the method proposed by Campbell et al. (2011) to

calculate managerial overconfidence (e.g., [Ahmed and Duellman, 2013](#); [Hsieh et al., 2014](#); [Huang et al., 2016](#); [Kim, Wang, et al., 2016](#)).

Some studies compare the methods of [Malmendier and Tate \(2005\)](#) and [Campbell et al. \(2011\)](#). They find that overconfident CEOs defined by these two methods have a slight difference. For example, [Hribar and Yang \(2016\)](#) use the method of [Campbell et al. \(2011\)](#) to define approximately 46% of CEOs as overconfident, and the method of [Malmendier and Tate \(2005\)](#) to define about 35% of CEOs as overconfident. However, [Hribar and Yang \(2016\)](#) conclude that their documented findings are consistent under these two overconfidence measures, indicating that the validity of both measures is similar. Due to the lack of detailed proprietary data, this thesis cannot use the method of [Malmendier and Tate \(2005\)](#) and only adopts the approach of [Campbell et al. \(2011\)](#) to measure CFO overconfidence.

This thesis tries to increase the validity of the option-based measure method by using different moneyness threshold values and ruling out other explanations for this measure. Specifically, the choice of 67% in the money by [Malmendier and Tate \(2005\)](#) is based on the model of [Hall and Murphy \(2002\)](#). The model of [Hall and Murphy \(2002\)](#) acknowledges that risk-averse executives often hold undiversified portfolios. If they are rationally expected to be utility maximizers, managers should exercise options early. [Campbell et al. \(2011\)](#), on the other hand, use 100% of the money as the threshold value because it is more valid for their study. In the overconfidence studies, most studies use 67% as the overconfidence threshold value ([Ahmed & Duellman, 2013](#); [Hsieh, et al., 2014](#); [Huang et al., 2016](#); [Kim et al., 2016](#)) and some studies use 100% ([Campbell et al., 2011](#); [Hribar and Yang, 2016](#)), showing that there is no consensus or best standard. Thus, this thesis uses both 67% and 100% as threshold values to mitigate the mismeasurement due to the threshold value.

Moreover, some studies propose other explanations of option-based measures rather than attempting to measure overconfidence. For example, managers exercise their options late because they are risk-tolerant rather than overconfident ([Malmendier and Tate, 2005](#); [Huang et al., 2016](#); [Kim, Wang, et al., 2016](#)). Thus, following [Huang et al. \(2016\)](#), this thesis controls for CFO and CEO risk tolerance and finds that controlling for CFO and CEO risk tolerance has a negligible effect on documented results. Another possible explanation for

the late option exercise behavior is that managers have insider information regarding the firm's future performance (Malmendier & Tate, 2005; Huang, et al., 2016; Kim, et al., 2016). In this case, managers would keep the deeply in-the-money options to pursue their own benefits rather than show overconfidence. To rule out this concern, following Huang et al. (2016), this thesis follows the control of the proxy of insider information and finds that documented results remain.

In addition, except for the option-based measure, this thesis cannot adopt other CEO overconfidence measures in the CFO studies. For example, Ahmed and Duellman (2013) use firms' overinvestment to capture CEO overconfidence, as overconfident managers tend to make more investments. It might not work well when using this method to measure CFO overconfidence, as CEOs play a more dominant role in investment decisions. Besides, some studies use net buyers to measure managers' overconfidence (i.e., Malmendier and Tate, 2005; Hsieh et al., 2018). Overconfident managers are those who have a net purchasing behavior of their own firm stock that is greater than 50% of the time during the sample period. However, this thesis cannot use this method as this study cannot get access to detailed net buyer information. Moreover, some studies use press (e.g., The Wall Street Journal, The Economist, Business Week, Financial Times, Forbes, Fortune, Time, and The New York Times) portrayals of the CEO to measure CEO overconfidence (Hribar and Yang, 2016). They compare the number of articles describing the CEO using overconfident terms like "confident," "confidence," and "optimistic" to the number of articles describing the CEO using non-overconfident terms like "steady," "practical," and "conservative." This thesis tries to apply this method to construct CFO overconfidence. However, compared with a large number of articles reporting on CEOs and only a few articles reporting on CFOs, using this press-based method to capture CEO and CFO overconfidence might lead to biased inference when comparing the effect of CEO and CFO overconfidence. It might be why none of the CFO overconfidence studies used this method (Hsieh et al., 2018; Chen et al., 2022; Malmendier et al., 2022).

In short, while the option-based measure is the most popular and robust overconfidence measure (Malmendier and Tate, 2015), and this thesis attempted to increase the validity of overconfidence, the validity of overconfidence

proxies may limit the applicability of this thesis, as overconfidence is notoriously difficult to capture.

Data limitation not only affects the overconfidence measure of this thesis but also curbs this thesis's ability to provide some more interesting and in-depth analyzes. For example, many studies document how SOX affects managers' earnings management decisions (Cohen et al., 2008). However, Hsieh et al. (2014) find that SOX has a limited effect on overconfident CEOs' earnings management choices. It is unclear what the influence of SOX is on the positive relationship between CFO overconfidence and earnings management is, and it is worth exploring. Due to the data limitations, this thesis cannot investigate this interesting question. Specifically, the thesis considers the effect of governance on overconfident CFOs' earnings management decisions. The data relating to corporate governance was available from BoardEx starting in 1999. However, there were many missing values in 1999, so the effective samples started in 2000. Besides, the recession in the early 2000s affected the United States from March to November 2001, so this thesis cannot distinguish between the confounding effect of SOX and the recession on earnings management activities. If the confounding effect is ignored, the results will be biased. Due to data limitations, it is not possible to perform a test to compare firms' earnings management before and after SOX.

Secondly, the thesis collects data from several secondary databases (e.g., CCM, ExecuComp, BoardEx) and uses the quantitative method to study overconfident CFOs' behaviors following most of the prior studies (Hsieh et al., 2018; Chen et al., 2022; Malmendier et al., 2022). One interesting study, Ben-David et al. (2013) use ten years of quarterly surveys to collect more than 13,300 S&P 500 forecasts made by CFOs to investigate the influence of CFO overconfidence from the notion of miscalibration. Because primary data is collected directly from a given population, it may be more accurate than the other CFO overconfidence measure based on secondary data (Saunders et al., 2009). In addition to using the quantitative method to test the impact of CFO overconfidence on corporate decisions, this thesis tended to conduct qualitative research to explore why CFOs are overconfident by collecting primary data from the survey and interview. Due to time and resource limitations, this thesis is not able to collect large amounts of primary data from CFOs in U.S.-listed

firms. Thus, another limitation of this thesis is that it cannot use qualitative or mixed methods research.

5.5 Directions for further research

Although this thesis has presented several interesting findings concerning CFO overconfidence, earnings management, accounting conservatism, and stock price crash risk, there are several areas where it would be beneficial to undertake additional study.

Firstly, this thesis uses two different thresholds, 67% and 100% in the money, to define CFO overconfidence following prior studies (e.g., [Malmendier and Tate, 2005](#); [Campbell et al., 2011](#)). Some studies further discuss the different levels of managerial overconfidence in corporate decisions. For example, [Campbell et al. \(2011\)](#) find that a moderate level of CEO optimism helps the CEO select the optimal investment decisions. Over (under) optimism leads to overinvesting (underinvesting). [Hirshleifer et al. \(2012\)](#) show a U-shaped relationship between low overconfidence and extremely overconfident CEOs and higher patent count and patent citations. Moderate overconfidence is not related to increased patenting activities. The existing literature does not investigate the effects of varying levels of CFO overconfidence. Given that the thesis identifies certain pros and cons of CFO overconfidence, it would be interesting to delve more into the various levels of CFO overconfidence in order to provide comprehensive analyzes of its benefits and drawbacks.

Secondly, a growing number of studies shed light on the determination of non-Generally Accepted Accounting Principles (non-GAAP) earnings from a managerial characteristics perspective. Non-GAAP earnings mean that managers are able to redefine earnings based on GAAP by removing expenses or revenues that are not anticipated to reoccur in the future ([Abdel-Meguid et al., 2021](#)). A large number of studies suggest that non-GAAP earnings provide investors with a more relevant earnings signal ([Bradshaw and Sloan, 2002](#); [Bradshaw et al., 2016](#)). Early studies focus on the effect of firm characteristics on non-GAAP earnings ([Doyle, Lundholm, and Soliman, 2003](#)). Recently, studies have begun to investigate the influence of managers' traits. For example, [Abdel-Meguid et al. \(2021\)](#) explore the association between CEO narcissism and opportunistically excluding expenses from non-GAAP earnings. They show

that narcissistic CEOs are more inclined to eliminate expenses opportunistically when determining non-GAAP earnings, suggesting managers' psychological traits significantly affect firms' non-GAAP earnings. However, narcissism and overconfidence have significant differences.

Contrary to narcissistic managers, overconfident managers are devoid of exploitative traits that may cause interpersonal conflicts (Schaefer et al., 2004). In the existing literature, it is unknown how managerial overconfidence, specifically CFO overconfidence, impacts non-GAAP earnings. In addition, it is unclear if the incentives for overconfident CFOs to release non-GAAP information are to convey private information to investors or to exploit opportunities for their own gain. These studies will be highly insightful, expand existing research and theory, and have implications for investors.

Thirdly, people are concerned about how firms benefit or hurt social welfare (e.g., Sprinkle and Maines, 2010; Taurigana and Chithambo, 2015; Yekini, Adelopo, and Adegbite, 2017; Adegbite et al., 2019; Johnston et al., 2021; Ullah et al., 2022). Corporate initiatives in this area are measured by the level of Corporate Social Responsibility (CSR) taken or Environmental, Social, and Governance (ESG) investment (Boutin-Dufresne and Savaria, 2004; Amaeshi, Adegbite, Ogbechie, et al., 2016; Amaeshi, Adegbite, and Rajwani, 2016; Boakye et al., 2020; Yekini, Omoteso, and Adegbite, 2021). According to the Governance & Accountability Institute, 86% of S&P 500 companies published sustainability or corporate responsibility reports in 2018, up from just under 20% in 2011 (Institute, 2018). A few recent studies link CEO overconfidence and CSR/ESG. For instance, McCarthy, Oliver, and Song (2017) investigate the relationship between CEO overconfidence and CSR. Prior studies suggest that CSR is regarded as a hedging device (Boutin-Dufresne and Savaria, 2004; Humphrey, Lee, and Shen, 2012). Overconfident CEOs are less likely to engage in hedging activities, as these CEOs have confidence that the probability of positive and lucky events outweighs the probability of negative and unfortunate events (Weinstein, 1980). Thus, McCarthy et al. (2017) find that firms led by overconfident CEOs have fewer CSR activities. In addition, Sauerwald and Su (2019) suggest that CEO overconfidence increases the gap between how firms disclose about CSR and what they do about CSR. This piece

of evidence suggests that firms with overconfident CEOs are less likely to engage in CSR activities, especially high-quality ones.

The relationship between CFO overconfidence and CSR/ESG is unknown in the literature. Underlining the overconfidence theory, this cognitive bias may drive CFOs to engage in fewer CSR/ESG initiatives. However, prior studies show plenty of benefits for firms participating in CSR/ESG activities. For example, [El Ghouli et al. \(2011\)](#) suggest that firms' CSR activities are able to reduce the cost of equity. [Sprinkle and Maines \(2010\)](#) states that participating in CSR activities can have tax deductions. These benefits will release the CFOs' financing pressure. More importantly, CFOs, particularly overconfident CFOs, are strong candidates for the role of future CEO ([Goel and Thakor, 2008](#)). Thus, overconfident CFOs are more concerned with the firms' future performance. Firms that participate in CSR/ESG activities gain reputation, attract and retain talent, and increase employee motivation, which are long-term benefits for firms ([Sprinkle and Maines, 2010](#)). From this notion, firms with overconfident CFOs are more likely to engage in CSR/ESG activities. Therefore, it is worthwhile to investigate the influence of CFO overconfidence and/or the interactive effect of CEO and CFO overconfidence on CSR/ESG activities.

Fourthly, in addition to studying the effect of individual managers' overconfidence or the joint effect of CEO and CFO overconfidence, future studies might also consider the effect of TMT overconfidence diversity on corporate decision-making. Early studies, relying on the traditional upper echelons theory ([Hambrick and Mason, 1984](#)), pay much attention to the effect of the individual TMT member's traits, such as the characteristic of CEOs, CFOs, Chief Operating Officers (COOs), Chief Marketing Officers (CMOs), and Chief Strategy Officers (CSOs). However, in the updated upper echelons theory, [Hambrick \(2007\)](#) states, "I have long thought that there needs to be much more attention paid to the 'structure' of TMTs, to complement—and improve—our understanding of TMT composition and processes". Thus, a growing number of studies suggest TMT functional diversity ([Bunderson, 2003](#); [Auh and Menguc, 2005](#); [Boone and Hendriks, 2009](#)), educational diversity ([Ensley and Hmieleski, 2005](#)), tenure diversity ([Milliken and Martins, 1996](#); [Bowers, Pharmer, and Salas, 2000](#)), experience diversity ([Carpenter and Fredrickson, 2001](#); [Carpenter, 2002](#)), and gender diversity ([Klenke, 2003](#); [Parola, Ellis, and](#)

[Golden, 2015](#)) significantly affect corporate decisions. However, the influence of TMT's overconfidence is largely unknown. Given that overconfidence prevails in the TMT ([Chen et al., 2022](#)), it is worth investigating the effect of TMT's overconfidence diversity on firm decisions.

Appendix A: Variable definitions - Supplement to Chapter 2

Variables	Definition
<i>AbsAEM_{it}</i>	Modified Jones model (Dechow et al., 1995). See section 2.4.2.1 for details.
<i>AbsREM_{it}</i>	The method of Roychowdhury (2006) modified by Srivastava (2019) (called the revised measure (3)). See section 2.4.2.1 for details.
<i>Holder67CFO_{it}</i>	An indicator variable that equals one if CFOs are reluctant to exercise vested options that are no less than 67% in the money for the first time, and zero otherwise (Campbell et al., 2011). See section 2.4.2.3 for details.
<i>Holder67CEO_{it}</i>	An indicator variable that equals one if CEOs are reluctant to exercise vested options that are no less than 67% in the money for the first time, and zero otherwise (Campbell et al., 2011). See section 2.4.2.3 for details.
<i>CFOEquityIncentive_{it}</i>	ONEPCT/(ONEPCT+Salary+Bonus). The variable ONEPCT represents the dollar change in the value of the CFOs' stock and option holdings as a result of a 1% increase in the firm stock price. (Bergstresser and Philippon, 2006). (Data source: ExecuComp database)

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Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>MaleCFO_{it}</i>	An indicator variable equals one if the CFO is a male, and zero otherwise (Data source: ExecuComp database)
<i>CEOEquityIncentive_{it}</i>	ONEPCT/(ONEPCT+Salary+Bonus). The variable ONEPCT represents the dollar change in the value of the CEOs' stock and option holdings as a result of a 1% increase in the firm stock price. (Bergstresser and Philippon, 2006). (Data source: ExecuComp database)
<i>MaleCEO_{it}</i>	An indicator variable equals one if the CEO is a male, and zero otherwise. (Data source: ExecuComp database)
<i>MTB_{it}</i>	Divide equity market value ($PRCC_F \times CSHO$) by equity book value (SEQ) (Demerjian, Lewis-Western, and McVay, 2020).
<i>FirmSize_{it}</i>	The natural logarithm of total assets (AT) (Jiang et al., 2010).
<i>Leverage_{it}</i>	Sum of long-term debt (DLTT) and short-term debt (DLC) over total assets (AT) (Hsieh et al., 2014).
<i>FirmAge_{it}</i>	The natural logarithm of the number of years, starting with the first year that firm information was available from the Compustat database (Capalbo et al., 2018). (Data source: Compustat database)

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Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>Big4_{it}</i>	An indicator variable equals one if the audit firm (AU) belongs to PwC, EY, KPMG, or Deloitte, and zero otherwise (Hsieh et al., 2014).
<i>CashFlow_{it}</i>	Cash flow (OANCF) divided by total assets (AT) (Hsieh et al., 2014).
<i>VolSale_{it}</i>	Standard deviation of sale (SALE) divided by total assets (AT) computed over year t-4 to t (Jiang et al., 2010).
<i>MarketShare_{it}</i>	The percentage of the firm's total sales (SALE) to the total industry sales (Badertscher, 2011).
<i>InsHoldings_{it}</i>	The percentage of ownership owned by institutional investors (INSTOWN_PERC) (Zang, 2012). (Data source: Thomson-Reuters 13F database)
<i>CEOduality_{it}</i>	An indicator variable equals one if the CEO is also board chair, and zero otherwise (Krishnan et al., 2011). (Data source: BoardEx database)
<i>BoardSize_{it}</i>	The natural log of number of directors (Krishnan et al., 2011). (Data source: BoardEx database)
<i>BoardIndependence_{it}</i>	The number of independent non-executive directors divided by the total number of directors (El Diri et al., 2020). (Data source: BoardEx database)
<i>Robustness tests</i>	

(This table is continued on the next page.)

Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>Alter_AbsAEM_{it}</i>	The spline correction method (Banker et al., 2019). See section 2.6.1. for details.
<i>Alter_AbsREM_{it}</i>	The method of Roychowdhury (2006) modified by Srivastava (2019) (called the cohort-adjusted measure). See section 2.6.1. for details.
<i>Holder100CFO_{it}</i>	An indicator variable that equals one if CFOs are reluctant to exercise vested options that are no less than 100% in the money for the first time, and zero otherwise (Hirshleifer et al., 2012). See section 2.6.1 for details.
<i>Treat_i</i>	An indicator variable, it equals one if a firm changes from a non-overconfident CFO to an overconfident one, and it equals zero if a firm replaces a non-overconfident CFO with another non-overconfident one.
<i>Post_{it}</i>	An indicator variable, equals one in the first three years after CFO turnover and equals zero in the last three years before CFO turnover.
Channel tests	
<i>HighLIT_{it}</i>	An indicator variable that equals one if the firm is in the following industries: pharmaceutical/biotechnology (SIC codes 2833–2836, 8731–8734), computer (3570–3577, 7370–7374), electronics (3600–3674), or retail (5200–5961), and zero otherwise (Jiang et al., 2010).

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Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>CFO_LongCareerHorizons_{it}</i>	Following Lee, Park, and Folta, 2018, this study's CFO career horizon measure compares CFOs in the same four-digit SIC industry along two dimensions: current age and tenure: $CFOcareerhorizon_{it} = (CFOage_{Ind.Avg\ t} - CFOage_{it}) + (CFOtenure_{Ind.Avg\ t} - CFOtenure_{it})$ <i>CFO_LongCareerHorizons_{it}</i> equals one if <i>CFOcareerhorizon_{it}</i> is higher than the sample median, and zero otherwise. (Data source: BoardEx database)
<i>PoorFinancialHealth_{it-1}</i>	An indicator variable that equals one if firms' financial health is lower than the sample median, and zero otherwise. Where, Zscore = $1.2 \times (\text{working capital divided by book assets}) + 1.4 \times (\text{retained earnings divided by book assets}) + 3.3 \times (\text{earnings before interest and taxes divided by book assets}) + 0.6 \times (\text{market value of equity divided by total liabilities}) + 0.999 \times (\text{net sales divided by book assets})$ (Altman, 1968)

(This table is continued on the next page.)

Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>LowAbility_{it}</i>	An indicator variable that equals one if the managerial ability score is lower than the sample median, and zero otherwise. The management ability score measure is based on the idea that stronger managers effectively convert firms' resources to income. They employ data envelopment analysis (DEA) to evaluate firm efficiency within industries by comparing the sales generated by each firm based on the resource inputs it utilises. The DEA technique produces a firm efficiency metric that is attributed to both the firm and the management. By conducting a Tobit regression model by industry that adjusts for firm-specific variables like age, size, and competition, the firm-specific component of the DEA efficiency measure is separated from the manager-specific component. The management ability score is the residual from their Tobit model. (Data source: Demerjian, Lev, and McVay, 2012)
<i>Additional tests</i>	
<i>GeneralistCFO_{it}</i>	An indicator variable that equals one if the CFOs have an MBA degree, and zero otherwise (Datta and Iskandar-Datta, 2014). (Data source: BoardEx database)
<i>CFOBoardposition_{it}</i>	An indicator variable that equals one if the CFOs are board members, and zero otherwise.

(This table is continued on the next page.)

Appendix A: Variable definitions - Supplement to Chapter 2 (continued)

Variables	Definition
<i>PowerfulCEO_{it}</i>	An indicator variable that equals one if the CEO is chairman of the board and (CEO total compensation divided by mean total compensation for the top three executives excluding the CEO and CFO) is in the top quartile, and zero otherwise (Baker et al., 2019). (Data source: ExecuComp database)
<i>LongCEOCFOtenure_{it}</i>	An indicator variable that equals one if the total working time of the CEO and CFO is greater than the sample median, and zero otherwise. (Data source: BoardEx database)
<i>EquityIssuer_{it}</i>	ChangeEquity is net equity financing measured as the proceeds from the sale of common and preferred stock (SSTK) less cash payments for the purchase of common and preferred stock (PRSTKC) less cash payments for dividends (DV) (Bradshaw, Richardson, and Sloan, 2006). <i>EquityIssuer_{it}</i> equals one if ChangeEquity is greater than 0, and zero otherwise.
<i>DebtIssuer_{it}</i>	ChangeDebt is net debt financing measured as the cash proceeds from the issuance of long-term debt (DLTIS) less cash payments for long-term debt reductions (DLTR) less the net changes in current debt (DLCCH) (Bradshaw et al., 2006). <i>DebtIssuer_{it}</i> equals one if ChangeDebt is greater than 0, and zero otherwise.
<i>LowAnalystFollow_{it}</i>	An indicator variable that equals one if the analyst following is lower than the sample median, and zero otherwise. (Data source: I/B/E/S database)

HighAnalystError_{it}

AnalystForecastError is the absolute value of the difference between consensus earnings forecast and actual earnings, divided by the stock price at the end of last year ([Jiao et al., 2012](#)). *HighAnalystError_{it}* equals one if the *AnalystForecastError* is higher than the sample median, and zero otherwise. (Data source: I/B/E/S database)

Appendix B: Variable Information -Supplement to Chapter 3

Variable name	Variable measurement	Data source
<i>Dependent variables</i>		
Conditional Accounting Conservatism ($C_score1_{i,t}$)	The method of Khan and Watts (2009) . Detailed information is provided in section 3.4.2.1.	CCM; CRSP
Conditional Accounting Conservatism ($C_score2_{i,t}$)	The method of Banker et al. (2016) . Detailed information is provided in section 3.4.2.1.	CCM; CRSP
<i>Independent variables</i>		
CFO Overconfidence ($Holder67CFO_{i,t}$)	The method of Campbell et al. (2011) and Chen et al. (2022) . Detailed information is provided in section 3.4.2.2.	ExecuComp
Low conditional accounting conservatism ($RevC_score1_{i,t}$)	The $C_score1_{i,t}$ multiplied by -1. The higher value of $RevC_score1_{i,t}$ indicates low conditional accounting conservatism.	CCM; CRSP
Low conditional accounting conservatism ($RevC_score2_{i,t}$)	The $C_score2_{i,t}$ multiplied by -1. The higher value of $RevC_score2_{i,t}$ indicates low conditional accounting conservatism.	CCM; CRSP
CFO power ($CFO_rank_{i,t}$)	An indicator variable that equals one if the CFO is among the three highest-paid managers, and zero otherwise (Florackis and Sainani, 2021).	ExecuComp
CFO power ($CFO_topquartile_{i,t}$)	An indicator variable that equals one if the total CFO compensation is divided by the total compensation of the top three executives excluding the CEO or CFO in the top quartile of the sample, and zero otherwise (Baker et al., 2019).	ExecuComp

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable measurement	Data source
CFO power ($CFO_payslice_{i,t}$)	The ratio of the CFO total compensation to the top five executives' total compensation. If fewer than five executives' compensations are reported, this study assumes that the remaining top five unreported executives get the same level of salary as the lowest-paid executive among those disclosed (Feng et al., 2011).	ExecuComp
Control variables		
CEO Overconfidence ($Holder67CEO_{i,t}$)	The method of Campbell et al. (2011) and Chen et al. (2022). Detailed information is provided in section 3.4.2.2.	ExecuComp
CFO gender ($CFO_male_{i,t}$)	An indicator variable that equals one if CFO is male, and zero otherwise (Francis et al., 2015).	ExecuComp
CFO ownership ($CFO_ownership_{i,t}$)	The percentage of share outstanding excluded options held by the CFO (Lafond and Roychowdhury, 2008)	ExecuComp
Market to book ratio ($MTB_{i,t}$)	Equity market value divided by equity book value (Ahmed and Duellman, 2013)	CCM
Sales growth ($SaleGrowth_{i,t}$)	The percentage of annual growth in total sales (Ahmed and Duellman, 2013)	CCM
Sales volatility ($VolSale_{i,t}$)	The standard deviation of sale measured from fiscal year t-5 to fiscal year t-1 deflated by the total asset (Wang, Xie, and Xin, 2018)	CCM

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable measurement	Data source
Cash Flow (<i>CashFlow_{i,t}</i>)	Cash flow divided by total assets (Hsieh et al., 2014)	CCM
Firm Size (<i>FirmSize_{i,t}</i>)	The natural logarithm of total assets (Jiang et al., 2010).	CCM
Leverage (<i>Leverage_{i,t}</i>)	Total debt divided by total assets (Ahmed and Duellman, 2013)	CCM
R&D expense and advertising expense (<i>RDAD_{i,t}</i>)	Total research and development expense plus advertising expense deflated by total sales (Ahmed and Duellman, 2013)	CCM
Audit firm (<i>Big_four_{i,t}</i>)	An indicator variable that equals one if the audit firm belongs to one of the big four auditor firms, Deloitte, EY, KPMG, and PwC, and zero otherwise.	CCM
High litigation risk (<i>High_LIT_{i,t}</i>)	An indicator variable that equals one if firms' litigation risk is in the top decile of the sample, and zero otherwise (Gao, Li, and Ma, 2021). The coefficients from the model (2) in Table 7 of Kim and Skinner (2012) are used to calculate the litigation risk.	CCM; CRSP
Unconditional accounting conservatism (<i>UnAC_{i,t}</i>)	Income before extraordinary items minus cash flows from operations plus depreciation expense divided by total assets, and averaged over the preceding three years, multiplied by negative one (Givoly and Hayn, 2000 ; Ahmed et al., 2002).	CCM

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable measurement	Data source
<i>Additional variables used in robustness tests</i>		
$Treat_i$	An indicator variable that equals one if the outgoing CFO is non-overconfident and the incoming CFO is overconfident, and zero if both the outgoing CFO and incoming CFO are non-overconfident.	ExecuComp
$Post_{i,t}$	An indicator variable that equals one when observations occur in the first year after CFO turnover, and zero when observations occur in the last year before CFO turnover.	ExecuComp
Alternative CFO Overconfidence measurement ($Holder100CFO_{i,t}$)	An indicator variable that equals one from the first time that CFOs hold vested options that are at least 100% in the money to the end of their tenure, and zero otherwise (Hirshleifer et al., 2012).	ExecuComp
Alternative CEO Overconfidence measurement ($Holder100CEO_{i,t}$)	An indicator variable that equals one from the first time that CEOs hold vested options that are at least 100% in the money to the end of their tenure, and zero otherwise (Hirshleifer et al., 2012).	ExecuComp
CFO risk tolerance ($CFO_vega_{i,t}$)	Natural logarithm of CFOs' Vega plus one (Huang et al., 2016). Vega is measured following the method of Core and Guay (2002).	CRSP

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable name	Data source
CEO risk tolerance (<i>CEO_vega_{i,t}</i>)	Natural logarithm of CEOs' Vega plus one (Huang et al., 2016). Vega is measured following the method of Core and Guay (2002) .	CRSP
CEO gender (<i>CEO_male_{i,t}</i>)	An indicator variable that equals one if CEO is male, and zero otherwise (Francis et al., 2015).	ExecuComp
CEO ownership (<i>CEO_ownership_{i,t}</i>)	The percentage of share outstanding excluded options held by the CEO (LaFond and Watts, 2008)	ExecuComp
Strong governance (<i>StrongCG_{i,t}</i>)	Firms have strong governance if they meet three of the four criteria listed below: First, the CEO is not simultaneously the Chairman. Second, the percentage of outside directors is greater than the sample's median figure. Third, the institutional ownership percentage is more than the sample's median figure. Fourth, the percentage of inside directors is lower than the median value of the sample (Ahmed and Duellman, 2013).	Thomson Reuters Institutional (13f) Holdings; BoardEx
<i>Additional variables used in additional tests</i>		
Cash (<i>Cash_{i,t}</i>)	The sum of cash and cash equivalents scaled by total assets (Lee, 2010)	CCM

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable name	Data source
Volatility of cash flow (<i>VolCashFlow_{i,t}</i>)	The standard deviation of cash flow measured from fiscal year t-5 to fiscal year t-1 deflated by the total asset (Wang et al., 2018)	CCM
Value-weighted 12-month market-adjusted returns (<i>Vwretd_{i,t}</i>)	Value-weighted 12-month market-adjusted returns (Lee, 2010)	CRSP
Returns volatility (<i>SdVwretd_{i,t}</i>)	12-month market-adjusted returns volatility (Lee, 2010)	CRSP
Net working capital (<i>NWC_{i,t}</i>)	Working capital less cash scaled by total assets (Lee, 2010)	CCM
Capital expenditure (<i>CAPEX_{i,t}</i>)	Capital expenditure scaled by total assets (Lee, 2010)	CCM
Acquisition expenditure (<i>ACQ_{i,t}</i>)	Acquisition expenditure scaled by total assets (Lee, 2010)	CCM

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Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable name	Data source
R&D expenditure ($R\&D_{i,t}$)	Research and development expenditure scaled by total assets (Lee, 2010)	CCM
Dividend payer ($Dividend_{i,t}$)	An indicator variable that equals one the firm is a dividend payer, and zero otherwise (Lee, 2010).	CCM
Stock return ($R_{i,t}$)	The annual buy-and-hold stock return (Shu, 2021)	CRSP
Last year earnings per share ($Earn_{i,t-1}$)	Earnings per share for fiscal year t-1 scaled by the stock price at the beginning of year t (Shu, 2021)	CCM
Earnings per share ($Earn_{i,t}$)	Earnings per share for fiscal year t scaled by the stock price at the beginning of year t (Shu, 2021)	CCM
The sum of earnings per share for fiscal year t+1 to t+3 ($Earn_{i,t+3}$)	The sum of earnings per share from fiscal year t+1 to t+3 scaled by the stock price at the beginning of year t (Shu, 2021)	CCM
The sum of stock return for fiscal year t+1 to t+3 ($R_{i,t+3}$)	The sum of annual buy-and-hold stock return from fiscal year t+1 to t+3 (Shu, 2021)	CCM
Firm age ($FirmAge_{i,t}$)	The sum of years from the firm that appears in the Compustat database (Shu, 2021)	Compustat

(The table is continued on the next page.)

Appendix B: Variable Information -Supplement to Chapter 3 (continued)

Variable name	Variable name	Data source
Investment ($Invest_{i,t}$)	R&D expenses plus capital expenditures minus sales of fixed assets scaled by total assets (Shu, 2021)	CCM
Property, Plant & Equipment ($PPE_{i,t}$)	The net property, plant, and equipment scaled by total assets (Shu, 2021)	CCM
Negative earnings per share ($Loss_{i,t}$)	An indicator variable that equals to one if the firm has negative earnings per share, zero otherwise (Shu, 2021)	CCM
Number of analysts ($Analyst_number_{i,t}$)	The natural logarithm of one plus the number of analysts (Shu, 2021)	I/B/E/S
Unconditional accounting conservatism ($UnACI_{i,t}$)	The difference between cash flow skewness and earnings skewness. The skewness of earnings (cash flows) is equal to $(x - \mu)^3 / \sigma^3$, where μ and σ are the mean and standard deviation of earnings (cash flows) for the last five years. All variables are deflated by the total assets (Givoly and Hayn, 2000).	CCM

Appendix C: Variable Information -Supplement to Chapter 4

Variables	Definition	Database
<i>Dependent variables</i>		
$SCR_Crash_{i,t}$	The chance of a crash (Kim et al., 2011a, 2011b)	CCM; CRSP
$SCR_Ncskew_{i,t}$	Negative conditional return skewness (Chen et al., 2001).	CCM; CRSP
$SCR_Duvol_{i,t}$	Down-to-up volatility (Kim et al., 2011a).	CCM; CRSP
<i>Independent variables</i>		
$Holder67CFO_{i,t-1}$	CFO overconfidence: $Holder67CFO_{i,t-1}$, an indicator variable, equals one when CFOs hold vested options that are at least 67% in the money for the first time until the end of their tenure, and zero otherwise (Chen et al., 2022).	ExecuComp
$CFO_equityincentive_{i,t-1}$	CFOs' equity-based incentives: $ONEPCT/(ONEPCT+Salary+Bonus)$. The variable $ONEPCT$ represents the dollar change in the value of the CFOs' stock and option holdings as a result of a 1% increase in the firm stock price. (Bergstresser and Philippon, 2006).	ExecuComp
$CFO_male_{i,t-1}$	Male CFO: an indicator variable equals one if the CFO is a male, and zero otherwise.	ExecuComp

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Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
$Dturn_{i,t-1}$	Stock trading volume: <i>Average monthly share turnover in year t – Average monthly share turnover in year $t-1$</i> (Note: $Monthly\ share\ turnover = \frac{Monthly\ trading\ volume}{The\ total\ number\ of\ shares\ outstanding\ during\ the\ month}$) (Kim et al., 2011a)	CCM; CRSP
$SCR_Ncskew_{i,t-1}$	Negative conditional return skewness in year $t-1$. (Kim et al., 2011a)	CCM; CRSP
$Sigma_{i,t-1}$	Return volatility: the standard deviation of firm-specific weekly returns over the fiscal year period (Kim et al., 2011a).	CCM; CRSP
$Ret_{i,t-1}$	Average firm-specific weekly return: the mean of firm-specific weekly returns over the fiscal year period, times 100. (Kim et al., 2011a)	CCM; CRSP
$MTB_{i,t-1}$	Market to book ratio: equity market value ($PRCC_F \times CSHO$) divided by equity book value (SEQ) (Demerjian et al., 2020)	CCM
$ROA_{i,t-1}$	Return on asset: divide income before extraordinary items (IB) by the total asset (AT) (Hsieh et al., 2014).	CCM

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Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
$FirmSize_{i,t-1}$	Firm size: the natural logarithm of total assets (AT) (Jiang et al., 2010).	CCM
$Leverage_{i,t-1}$	Leverage: sum of long-term debt (DLTT) and short-term debt (DLC) over total assets (AT) (Hsieh et al., 2014).	CCM
$AbsAEM_{i,t-1}$	The absolute value of earnings management: This study uses the measurement proposed by Banker et al. (2019) for the construct earnings management. $\frac{TA_{it}}{A_{it-1}} = \beta_0 + \beta_1 \frac{1}{A_{it-1}} + \beta_2 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \beta_3 \frac{PPE_{it}}{A_{it-1}} + \gamma_1 spSGR_{1it} + \gamma_2 spSGR_{2it} + \gamma_3 spSGR_{3it} + \gamma_4 spSGR_{4it} + \gamma_5 spSGR_{5it} + \varepsilon_{it},$ where, TA_{it} refers to the total asset calculated by the balance sheet ((ACT - CHE) - (LCT - DLC) - (DP)). $spSGR_{kit}$ is the spline variable which is calculated as follows:	CCM

(The table is continued on the next page.)

Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
	$spSGR_{kit} = \begin{cases} 0 & \text{if } SGR_{it} \text{ is below quintile } k \\ SGR_{it} - spSGR_k^{low} & \text{if } SGR_{it} \text{ is in quintile } k \\ spSGR_k^{high} - spSGR_k^{low} & \text{if } SGR_{it} \text{ is above quintile } k, \end{cases}$ where, SGR_{it} is the sale growth rate $((SALE - L. SALE) / L. SALE)$. The lower limit of sales growth rate quintile k is . The upper limit of sales growth rate quintile k is . The discretionary accrual (AEM_{it}) is residual. This study uses the lagged absolute value of AEM ($AbsAEM_{i,t-1}$) to capture the magnitude of AEM.	
Variables in the robustness tests		
$Holder100CFO_{i,t-1}$	CFO overconfidence: $Holder100CFO_{i,t-1}$, an indicator variable, equals one when CFOs hold vested options that are at least 100% in the money (the lagged value of the <i>average percent moneyness of the option</i>_{i,t}) for the first time until the end of their tenure, and zero otherwise.	ExecuComp

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Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
$AbEarnings_{i,t-1}$	The difference between this year's and last year's earnings per share is divided by the fiscal year-end stock price. (Huang et al., 2016)	CCM
<i>Variables in the cross-sectional tests</i>		
$PositiveAEM_{i,t-1}$	Income increasing earnings management: $\frac{TA_{it}}{A_{it-1}} = \beta_0 + \beta_1 \frac{1}{A_{it-1}} + \beta_2 \frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} + \beta_3 \frac{PPE_{it}}{A_{it-1}} + \varepsilon_{it},$ where, TA_{it} is the total accrual calculated from the cash flow statement (CCM variable: IBC - (OANCF - XIDOC)). β_0 is the unscaled intercept. ΔREV_{it} is the change of revenue (REVT - L. REVT). ΔREC_{it} is the change of accounts receivable (RECT - L. RECT). PPE_{it} is the property, plant, and equipment (PPEGT). A_{it-1} is the lagged total asset (L. AT). The discretionary accrual (AEM_{it}) is the estimated residual from the equation. This study uses lagged discretionary accrual (AEM_{it-1}). This study defines income-increasing AEM, $Positive_AEM_{it-1}$, as an indicator variable that equals one if AEM_{it-1} is positive and zero otherwise.	CCM

(The table is continued on the next page.)

Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
$LowCETR_{i,t-1}$	The low level of firms' cash effective tax rate: Cash effective tax rate ($CETR_{i,t}$) is calculated by cash taxes paid (TXPD) divided by pre-tax book income (PI) less special items (SPI). $Low_CETR_{i,t-1}$ equals one if $CETR_{i,t-1}$ is lower than the mean tax avoidance level of industry in the same year, and zero otherwise.	CCM
$LowETR_{i,t-1}$	The low level of firms' effective tax rate: Effective tax rate ($ETR_{i,t}$) is calculated by the total tax expense (TXT) divided by pre-tax book income (PI) less special items (SPI) (Dyreng, Hanlon, and Maydew, 2008). $Low_ETR_{i,t-1}$ equals one if $ETR_{i,t-1}$ is lower than the mean tax avoidance level of industry in the same year, and zero otherwise.	CCM

(The table is continued on the next page.)

Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
$Holder67CEO_{i,t-1}$	CEO overconfidence: $Holder67CEO_{i,t-1}$, an indicator variable, equals one when CEOs hold vested options that are at least 67% in the money (the lagged value of the <i>average percent moneyness of the option</i> $_{i,t}$) for the first time until the end of their tenure, and zero otherwise.	ExecuComp
$CEO_equityincentive_{i,t-1}$	CEOs' equity-based incentives: $ONEPCT/(ONEPCT+Salary+Bonus)$. The variable $ONEPCT$ represents the dollar change in the value of the CEOs' stock and option holdings as a result of a 1% increase in the firm stock price. (Bergstresser and Philippon, 2006).	ExecuComp
$CEO_male_{i,t-1}$	Male CEO: an indicator variable equals one if the CEO is a male, and zero otherwise.	CCM
$LowEindex_{i,t-1}$	The low value of the E index: an indicator variable that equals one if E index is less than three, and zero otherwise (Hsu et al., 2017).	Bebchuk et al. (2009)

(The table is continued on the next page.)

Appendix C: Variable Information -Supplement to Chapter 4 (continued)

Variables	Definition	Database
<i>LowError_{i,t-1}</i>	The low level of analyst forecast error: analyst forecast error is calculated by the absolute value of the difference between the mean value of the analyst forecast and actual earnings in year t-1 divided by the absolute value of actual earnings in year t-1 (Li and Zhao, 2008). <i>LowError_{i,t-1}</i> is an indicator variable that equals one if analyst forecast error is lower than the mean value of the same industry in the same year, and zero otherwise.	I/B/E/S
<i>LowDispersion_{i,t-1}</i>	The low level of analyst forecast dispersion: Analyst forecast dispersion is measured using the standard deviation of analyst forecasts in year t-1 divided by the absolute value of the median value of analyst forecasts in year t-1 (Richardson, 2000). <i>LowDispersion_{i,t-1}</i> is an indicator variable that equals one analyst forecast dispersion is lower than the mean value of the same industry in the same year, and zero otherwise.	I/B/E/S

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