The Impact of Credit Ratings and CEOs' Work Experience on Earnings Management and Post-issue Performance of U.S. IPOs

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DECLARATION

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Abstract

The IPO market is characterised by a high level of information asymmetry; thus, self-interested managers have strong incentives to overstate earnings during the IPO to inflate stock prices. Prior literature has provided evidence of earnings manipulation by managers around IPOs. If managers opportunitically manipulate earnings in the IPO year, the reported earnings will not be sustainable, and the IPO firms will exhibit negative abnormal stock returns in subsequent periods due to investors' downward adjustment of their evaluation of the firm value. Another common phenomenon of the IPO markets is the underperformance of IPO firms in the post-issue periods, with nearly a third of issuers either failing or being acquired within five years of going public. Therefore, in this thesis, I aim to examine potential factors contributing to restraining the level of earnings management undertaken by IPO firms and improving the post-issue long-term performance. Specifically, I investigate the impact of credit ratings and CEOs' work experience on earnings management and post-issue performance of newly listed firms.

I uncover strong evidence that newly listed firms going public with a credit rating are less likely to engage in income-enhancing earnings management through both accruals and real operating activities manipulation. Moreover, while unrated IPO firms manipulate earnings to mislead investors, rated issuers tend to employ accounting discretion for informative purposes. I also study the association between CEOs' financial experience and earnings management around IPOs and find that IPO firms with financial expert CEOs are less likely to manage earnings through accruals. Furthermore, financial expert CEOs tend to be informative in financial reporting to allow investors to properly gauge the fair value of the firm. In addition, I investigate the influence of CEOs' specialist managerial experience on the probability of failure and survivability of IPO firms. My findings suggest that specialist CEOs enhance the ability of IPO firms to remain viable for a longer period of time.

My research not only contributes to a wide range of literature on IPOs, credit ratings, earnings management and managerial attributes but also provides several practical implications for regulators in monitoring IPO firms' financial reporting, for investors in making investment decisions, and for firms in considering relevant work experience for CEO appointment.

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List of abbreviations

2SLS: Two-stage Least Squares

CEO: Chief Executive Officer

CFO: Chief Financial Officer

CPA: Certified Public Accountant

CRA: Credit Rating Agency

CRSP: Center for Research in Security Prices

EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization

EBIT: Earnings Before Interest and Taxes

e.g.: for example

EM: Earnings Management

FD: Fair Disclosure

i.e.: that is

IPO: Initial Public Offering

IV: Instrumental Variable

MLE: Maximum Likelihood Estimation

OLS: Ordinary Least Squares

PCA: Principal Component Analysis

PCM: Propensity Score Matching

PPE: Property, Plant and Equipment

R&D: Research and Development

ROA: Return on Assets

SDC: Securities Data Corporation

SEC: Securities and Exchange Commission

SG&A: Selling, General, and Administrative

S&P: Standard & Poor’s

UK: United Kingdom

US: United States (of America)

VIF: Variance Inflation Factor

Chapter 1 – Introduction

1.1. Background and motivation

Initial public offering (IPO) is an important period in which a firm transforms its status from a privately held to a public company. The IPO provides previously private firms an opportunity to gain a number of advantages such as expanding capital, becoming publicly traded, and enhancing public image (Ritter and Welch 2002; Brau and Fawcett 2006). However, it involves various disadvantages such as complex procedures of going public, stringent requirement of information disclosure, and increased litigation risks (Jain and Kini 2000; Jain and Kini 2008). As part of the going public process, IPO firms are required to file a prospectus, which discloses useful information for investors to make informed investment decisions such as a description of the business, biographies of top executives and their compensation, risk factors, and especially financial statements up to previous three years (Teoh et al. 1998b). The prospectus is the main source of public information regarding the IPO firm. Due to the scarcity of public information available to investors, the IPO market is characterised by a high level of information asymmetry (Ritter and Welch 2002). Much information about the firm is held by managers, leaving outside investors with a great deal of information uncertainty (Cheung and Krinsky 1994; Barzel et al. 2006; Balatbat 2006).

The information disparity induces two opposing incentives of managers. Managers of high quality firms may want to convey useful private information to less informed investors to signal the firm's future prospects. However, self-interested managers may want to exploit this opaque information environment to act against the interests of shareholders. These different incentives can be fulfilled through a channel – financial reporting. Managers can exercise their accounting discretion to communicate the timing, risks, and magnitude of future cash flows to less informed investors so that investors will be able to properly evaluate the firm's value. In contrast, self-interested managers can take advantage of the flexibility in accounting policies to manipulate earnings to mislead investors and influence short-term stock prices (Fields et al. 2001). Prior literature (for example, Alhadab et al. (2014), Marquardt and Wiedman (2004), DuCharme et al. (2004), Roosenboom et al. (2003), DuCharme (2001), Teoh et al. (1998a), Teoh et al. (1998b), Friedlan (1994), and Aharony et al. (1993)) provides evidence that managers of IPO firms tend to engage in opportunistic earnings

management (EM) to increase stock prices around the offering. Prior studies document several determinants of EM around IPOs such as the participation of large auditing firms (Gul et al. 2009; Krishnan 2003; Becker et al. 1998), reputable underwriters (Lee and Masulis 2011; Jo et al. 2007), and venture capitalists (Wongsunwai 2013; Hochberg 2012; Lee and Masulis 2011; Morsfield and Tan 2006). In my thesis, I examine additional factors explaining EM of IPO firms which have been scarcely explored in the literature. Specifically, I analyse the association between credit ratings and CEOs' financial experience and EM around IPOs. Moreover, I further investigate whether firms that have a credit rating before going public and those whose CEOs have past financial experience provide more informative financial reporting.

Another important phenomenon witnessed in the IPO market that has been widely examined in the IPO literature is the long-term underperformance. The IPO involves substantial organisational transformations and fundamental changes in operational structures that considerably influence the competitive position of the firm (Jain and Kini 2008). Moreover, IPO firms are exposed to more stringent scrutiny from regulators and capital market participants (Ball and Shivakumar 2008). These shifts threaten the survival of IPOs. Prior empirical evidence suggests that IPO firms show substantial initial returns, but demonstrate poor long-run performance, with one third of firms either failing or being acquired within five years following the offering (Ritter 2003; Ritter and Welch 2002; Loughran et al. 1994; Ritter 1991). Being intrigued by the impact of CEOs' work experience on firms' decisions and outcomes, I question whether the career experience of CEOs contributes to the long-term IPO surviablity.

The next three sections of this chapter provide a brief summary of the motivation, methodology, findings, and contributions of the three previously discussed research areas of this thesis.

1.2. Credit ratings and earnings management around IPOs

Credit rating agencies (CRAs) are an important information intermediary and gatekeeper of the capital markets. They provide investors with their independent assertion of the creditworthiness of a borrowing entity or a debt issue. Since CRAs are excluded from the Regulation Fair Disclosure (FD), they can have access to private information relevant to their assessment of the issuer (Jorion et al. 2005). Therefore, credit ratings convey both private and public information and CRAs have been appreciated by their

contribution to reducing the information asymmetry in the IPO market (An and Chan 2008; Chan and Lo 2011). Besides their informational function, CRAs also exert their monitoring impacts in both the initial rating and post-issue surveillance procedures (Arnoud et al. 2006; Bannier and Hirsch 2010; Bonsall et al. 2015). Due to the significance of CRAs in the capital markets, I am motivated to fill the gap in the literature and explore EM by rated IPO firms. I argue that the monitoring of CRAs and the reduced information asymmetry due to the provision of a credit rating may weaken the incentives of rated IPO firms to opportunistically manipulate earnings since their financial reporting misbehaviours are more likely to be detected. Moreover, the lower information asymmetries may encourage high quality rated IPO firms to signal their future prospects by employing accounting discretion to convey private information to less informed investors because investors are more likely to accurately interpret that information.

In order to investigate the impact of credit ratings on EM around IPOs, I aim to address two main research questions: (1) Whether rated IPO firms are less likely to engage in EM in the offering year, and (2) Whether managers of rated IPO firms exercise their accounting discretion for informative purposes. I analyse both accrual-based and real EM to have a complete view of EM undertaken by IPO firms. Moreover, I acknowledge the potential issue of self-selection bias, which occurs when the firm can choose to have a credit rating, and endogeneity, which exists when there is a correlation between EM determinants and factors influencing the firm's decision to have a credit rating. I address this endogenous selection problem by employing several econometric methods commonly used in the literature including the instrumental variable model, Heckman's (1979) two-step treatment effect model, and the maximum likelihood treatment effect model.

I document that IPO firms with a credit rating are associated with a lower level of income-increasing accrual-based and real EM. I also find that the level of income-increasing EM in the offering year of rated IPO firms is positively linked with subsequent accounting performance, but insignificantly related to long-term post-issue abnormal stock returns. The results suggest that managers of IPO firms going public with a credit rating are less likely to engage in EM in the offering year to overstate earnings. Moreover, they tend to use their accounting discretion to better inform the market about the firm's future prospects.

This research contributes to the literature in a number of ways. I provide new empirical evidence on the role of CRAs in reducing EM around IPOs, thereby extending

the literature on determinants of EM. My study also compliments the research on the significance of information environment around IPOs in determining managers' intent to undertake EM. Moreover, my findings have important implications for capital market participants and regulators in assessing financial reports of rated IPO firms.

1.3. Financial expert CEOs and earnings management around IPOs

Studies on EM mainly focus on examining the significance of firm characteristics in explaining the variation in EM across firms. Researchers have recently paid increasing attention to the effects of managerial characteristics. Studies on managerial influence on corporate decisions are primarily based on predictions of the well-known upper echelons theory developed by Hambrick and Mason (1984). The theory predicts that managerial personalities, backgrounds, and past experiences can affect how managers interpret business circumstances and deal with problems, thereby influencing organisational outcomes. Voluminous empirical evidence across a wide array of managerial attributes confirms the validity of the theory. Functional track is an important background characteristic suggested by the upper echelons theory as having a considerable impact on managers' strategic perspectives, knowledge, and skills. I expect that CEOs with financial experience will have superior finance and accounting understanding, which may positively enhance the financial reporting process. Thus, I am motivated to examine the linkage between CEOs' financial experience and EM among IPO firms. The empirical evidence on this topic is scarce. There is a study by Jiang et al. (2013) which examines the association between CEOs' financial experience and EM among Chinese listed firms. My study is conducted in the IPO market which is a more favourable setting to examine not only the magnitude of EM but also the incentives of managers behind undertaking this financial reporting misbehaviour because managerial opportunism is more strongly driven by information asymmetries (Dye 1988; Trueman and Titman 1988).

The research questions that I aim to answer in order to understand whether the financial experience of CEOs influences the magnitude of EM around IPOs are: (1) Whether financial expert CEOs are associated with lower EM in the offering year, and (2) Whether financial expert CEOs use their accounting discretion to better inform investors. I analyse detailed biographical information of CEOs and extract data from their past financial experience prior to becoming the CEO of the current IPO firm. I address the potential selection bias due to the endogenous matching between CEOs and firms by

employing various econometric techniques including the propensity score matching, the instrumental variable approach, Heckman (1979) two-step treatment effect model, and the maximum likelihood treatment effect model.

I find that financial expert CEOs are less likely to engage in EM in the IPO year. I also document a positive association between at-issue managed earnings and subsequent accounting performance and an insignificant linkage between aggressive EM in the issue year and long-run post-issue stock performance for IPO firms managed by financial expert CEOs. The results suggest that financial expert CEOs not only contribute to curtailing EM of IPO firms but also enhance the informativeness of reported earnings.

To the best of my knowledge, this research provides the first empirical evidence on the influence of financial expert CEOs on EM around IPOs. My findings also add to the growing literature on the impact of managerial characteristics on EM. Moreover, my results confirm the upper echelons theory's prediction about the influence of managerial functional experience on corporate decisions. Last but not least, my study offers practical implications for investors in assessing financial reporting outcomes of IPO firms managed by financial expert CEOs, and for firms in deciding to hire CEOs having prior financial experience.

1.4. Specialist CEOs and IPO survival

The work experience of CEOs has been documented to influence corporate strategic choices such as corporate investment (Hu and Liu 2015), divesture (Huang 2014), strategic and social novelty (Crossland et al. 2014), cost of equity (Mishra 2014), financial policies (Custódio and Metzger 2014), and acquisitions (Custódio and Metzger 2013). Nevertheless, little has been done regarding the effect of CEOs' work experience on organisational performance. Since I am interested in examining the overall future survival profiles of IPO firms rather than any particular strategic decisions, I focus on a more general metric of work experience instead of the functional experience of CEOs. Specifically, I investigate the extent to which CEOs' general managerial ability influences IPO survival.

I examine the association between CEOs' specialist managerial ability and the survival profiles of IPO firms. I extract the details of CEOs' lifetime work histories prior to rising to the current CEO position and construct a general managerial ability index following the method by Custódio et al. (2013). The general managerial ability index is

the first factor of the principal component analysis on the five aspects of CEOs' prior work experience: the number of roles, the number of firms, the number of industries, CEO experience in another firm, and experience in a conglomerate firm. A CEO is categorised as a generalist if the index is equal to or above the sample median, and a CEO is classified as a specialist if the index is below the sample median.

I conduct the survival analysis to examine the differences in the survival and hazard curves of IPO firms with specialist CEOs and those with generalist CEOs, and to analyse the association between specialist CEOs and the probability of failure and survival rates in the periods following the issue. I find that IPO firms with specialist CEOs have a lower probability of failure and higher survival rates. Particularly, the failure risk of IPO firms with specialist CEOs is 35% that of firms with generalist CEOs.

My findings contribute to the large body of literature on the influence of managerial characteristics on corporate choices by offering novel empirical evidence of the relationship between CEOs' specialist managerial experience and the probability of failure and time to survive in periods subsequent to the stock issuance. My study also provides useful insights into the determinants of IPO survival. Particularly, it suggests that hiring more costly generalist CEOs may not be desirable for longer survivability of IPO firms, and firms may want to consider specialist managerial skills in making CEO recruitment decisions.

The rest of my thesis proceeds as follows. Chapter 2, 3, and 4 present my studies on the previously discussed research topics in the format of three papers. Specifically, Chapter 2 investigates the influence of credit ratings on EM around IPOs. Chapter 3 explores the association between financial expert CEOs and EM among IPO firms. Chapter 4 examines the role of CEOs with specialist managerial experience in enhancing the IPO survival. Finally, Chapter 5 provides concluding remarks.

Chapter 2 – Credit ratings and earnings management around IPOs

2.1. Introduction

In November 2010, General Motors Co. (GM) made one of the largest IPOs in the US history, raising a record US$20.1 billion. This highlighted GM's remarkable comeback after its government-backed reorganisation and Chapter 11 bankruptcy protection filing in June 2009. GM showed a notable turnaround and reported earnings before interest and tax (EBIT) of US$2.0 billion, an EBIT margin of 6.1%, and US$3.8 billion in cash from its operating activities. One month before its planned IPO on the New York Stock Exchange, and for the first time since being under bankruptcy protection, GM received ratings from all three of the largest credit rating agencies (CRAs)[1]. GM's reported profitability and credit ratings may have favourably influenced its IPO. However, it is questionable whether we can regard the firm's reported earnings as a credible measure of its future prospects as its earnings may have been manipulated to appear attractive to investors, and whether the existence of credit ratings provided the investors with certainty about the quality of GM's reported earnings.

Earnings are an important indicator of firm performance, and investors commonly rely on them to value stocks; thus, managers have strong incentives to manipulate earnings to influence short-term stock prices. The incentives of managers are stronger around an initial stock issuance due to the high level of information asymmetry between managers and outside investors. Various studies investigating earnings management (EM) in the IPO market find evidence of opportunistic income-increasing EM around IPOs and a negative association between EM and post-issue long-run stock performance that suggests the incapability of market participants to adequately adjust for EM in their firm valuation (Aharony et al. 1993; Friedlan 1994; Teoh et al. 1998a; Teoh et al. 1998b; Roosenbloom and Van De Goot 2003; DuCharme et al. 2004; Gramlich and Sorensen 2004). The accounting research also demonstrates that certain parties, such as the audit committee, the board of directors, external auditors, venture capitalists, and underwriters

[1] Standard & Poor's assigned GM a corporate credit rating of BB- with a stable outlook because of the company's improved balance sheet and prospects for profitability and positive free operating cash flow. This rating is one level higher than that of GM's rival, Ford Motor Co. Fitch gave the same rating, and Moody's gave a rating of one level higher (Ba2).

can restrain managers' incentives to manipulate earnings (Becker et al. 1998; Klein 2002; Morsfield and Tan 2006; Lee and Masulis 2011). However, to my knowledge, few studies have examined the role of CRAs in influencing IPO issuers' EM activities.

I hypothesise that CRAs disincentivise IPO firms from engaging in EM through their two main economic functions as an information intermediary and a monitor. By acting as an information intermediary, CRAs provide an independent assessment of the creditworthiness of a borrowing entity or a debt issue. In evaluating the firm, credit analysts thoroughly review both public sources of information and relevant private information provided by managers. Particularly, after the enactment of the Regulation Fair Disclosure (FD), credit analysts can have access to confidential information which is not made available to other investment professionals such as equity analysts (Jorion et al. 2005). Therefore, CRAs provide the market with information beyond publicly available sources, contributing to alleviating information asymmetries in the IPO markets (An and Chan 2008; Chan and Lo 2011). Besides their informational role, CRAs also play an important function as a monitor (Arnoud et al. 2006; Bannier and Hirsch 2010; Bonsall et al. 2015). CRAs conduct due diligence on the issuer in the initial rating and subsequently keep track of the developments that may affect its risk profiles to adjust the rating accordingly. Moreover, CRAs' incentives to thoroughly monitor are strengthened due to their reputational concerns and heightened regulatory oversight (Cheng and Neamtiu 2009). The monitoring of CRAs and the reduced information asymmetry due to the provision of a credit rating may weaken the incentives of rated IPO firms to opportunistically manipulate earnings since their financial reporting misbehaviours are more likely to be detected. Moreover, the lower information asymmetries may encourage high quality rated IPO firms to signal their future prospects by employing accounting discretion to convey private information to less informed investors because investors are more likely to accurately interpret that information.

Due to the distinct roles of CRAs in the capital markets and the gap in the literature on the influence of CRAs on EM around IPOs, I seek to answer these research questions: (1) whether rated IPO firms are less likely to engage in EM in the offering year, and (2) whether rated IPO firms use accounting discretion to better inform the market. To address these questions, I analyse a sample of common share US IPOs over the period 1991–2011. In order to establish a complete view of EM, I investigate two EM methods: (1) accrual-based EM, which involves exploiting the accounting discretion over the recognition of accruals, and (2) real EM, which concerns altering the timing or structuring

of real economic activities. Moreover, I account for the self-selection bias, which occurs due to the firm's choice to obtain a credit rating, and the endogeneity problem, which happens due to the potential correlation between EM determinants and factors influencing the firm's decision to solicit a credit rating. To account for the endogenous selection issue, I employ alternative econometric techniques including Heckman's (1979) two-step treatment effect model, the maximum likelihood treatment effect model, and the instrumental variable model.

My primary finding is that IPO firms with a credit rating are less likely to manipulate accruals and real operating activities to achieve higher reported earnings. Credit rating levels, however, do not appear to explain the variation in EM around IPOs. This suggests that the monitoring of CRAs and the reduced information asymmetry due principally to the provision of a credit rating are significant in preventing rated firms from engaging in EM. The impact of CRAs on constraining EM around IPOs is less pronounced when controlling for the interaction effects of CRAs and venture capitalists, investment banks, and auditing firms, whose roles in inhibiting EM have been documented in prior literature. For firms without a venture capitalist, CRAs still significantly reduce both accrual-based and real EM. For IPOs not being underwritten by a top-tier investment bank, CRAs only significantly reduce accrual-based EM, but not real EM. Particularly, for issuers not having their financial reports audited by a high quality auditor, I do not find a significant association between CRAs and either accrual-based or real EM. The findings suggest that the coordination between CRAs and the other financial intermediaries is important in inhibiting EM around IPOs; especially, the presence of experienced auditors is crucial for the restraining impact of CRAs on EM to work.

Furthermore, rating existence not only influences income-increasing EM in the offering year but also affects managers' intention of using their discretion to report higher earnings. I document that at-issue income-increasing EM of rated firms is positively related to subsequent accounting performance. The relationship is insignificant for firms without a credit rating. Analysing post-issue stock performance, I document that while at-issue income-increasing EM is negatively linked to post-issue long-run stock performance for unrated issuers, the long-run stock returns of rated firms are not associated with the extent of EM in the issue year. The evidence indicates that while unrated firms tend to manage earnings upward to mislead investors, managers of rated companies are more likely to exercise their discretion in accounting and operating

decisions to signal the firm's future prospects. It also supports the role of a credit rating in reducing the information asymmetry around IPOs. Lower information asymmetry reduces information uncertainty and allows investors to more immediately recognise EM and adjust for it in their stock valuation; therefore, the post-issue long-term stock returns are insignificantly related to at-issue EM.

My study makes several contributions to the IPO, EM, and credit rating literature. Prior studies document opportunistic accrual-based EM around IPOs (Aharony et al. 1993; Friedlan 1994; Teoh et al. 1998a; Teoh et al. 1998b; Roosenbloom and Van De Goot 2003; DuCharme et al. 2004) and highlight the roles of financial intermediaries including auditors, venture capitalists and investment banks in restraining IPO firms' EM (Morsfield and Tan 2006; Venkataraman et al. 2008; Lee and Masulis 2011; Hochberg 2012; Wongsunwai 2013). My findings provide new empirical evidence to support the impact of another important intermediary in the capital markets – CRAs on EM around IPOs. I also examine both the accrual-based and real EM in order to have more complete insights into the EM activities. In addition, Chen et al. (2013) argue that the extent of information uncertainty surrounding IPO firms affects managers' intent to involve in EM. Specifically, high-information-uncertainty issuers opportunistically manipulate earnings, meanwhile low-information-uncertainty firms manage earnings for informative purposes. Prior research on CRAs in the IPO markets (for example, An and Chan (2008), Chan and Lo (2011)) suggests that credit ratings convey useful information that can reduce the information asymmetry around IPOs. I present further empirical evidence of the importance of information environment around IPOs in influencing managerial incentives in engaging in EM. I show that the provision of a credit rating reduces information uncertainty, allowing investors more accurately interpret managers' messages, thereby motivating managers of rated firms to signal their value through informative EM. Moreover, several studies (e.g., Teoh et al. (1998a), Teoh et al. (1998b), and Morsfield and Tan (2006)) show that abnormal accruals in the offering year predict the underperformance of IPO firms. I provide additional evidence that the relationship between at-issue EM and post-issue underperformance is significant among unrated IPO firms only. For rated issuers, since the accounting discretion is employed for informative purposes instead of misleading the market, at-issue EM does not explain the post-IPO underperformance. The research also provides important implications for practitioners and regulators in evaluating the quality of the financial reporting of firms going public with a credit rating. For sophisticated investors, my results suggest that the presence of a

credit rating can signal higher quality financial reporting in terms of lower opportunistic EM around IPOs.

The rest of the chapter is organized as follows. Section 2.2 discusses related literature. Section 2.3 explains hypothesis development. Section 2.4 describes the sample and methodology in details. Section 2.5 presents the empirical models of the impact of credit ratings on EM around IPOs and the association between at-issue EM and post-issue accounting and stock performance. Section 2.6 presents the empirical results. Section 2.7 provides additional tests and robustness checks for my findings. Finally, Section 2.8 concludes the chapter.

2.2. Literature review

2.2.1. Theoretical framework

The theoretical underpinning of the study is agency theory. An important feature of this theory is that it views the firm as a nexus of contracting relationships such as those between executives and stakeholders. It is largely concerned with the principal-agent problem due to the conflict of interests between the principal (e.g., shareholders) and the agent (e.g., company executives) that arise when information asymmetry exists between the two parties (Jensen and Meckling 1976). The information asymmetry mainly involves the problem of adverse selection and moral hazard. An adverse selection problem occurs when managers have access to private information relevant to decision making. On the other hand, a moral hazard problem happens when managers make decisions which are inappropriate from the view of shareholders or not aligned with shareholders' interests, yet shareholders are unable to observe these actions.

The IPO market is characterised by high information asymmetries. When information asymmetries are present, accounting choices can serve as a channel through which better informed insiders can effectively convey information about the magnitude, timing, and risk of future cash flows to less informed outsiders; however, compensation, reputation or other self-interested incentives may induce managers to take advantage of the information disparity to inflate earnings to influence stock prices (Fields et al. 2001). When a firm goes public, it discloses its financial information for the first time in the prospectus, which includes financial statements for up to the most recent three years. Public sources of information about private firms are limited; therefore, much private and valuable information about the IPO issuer prior to the offering is in possession of its managers, preventing outside investors from thoroughly understanding the firm (Cheung

and Krinsky 1994; Barzel et al. 2006; Balatbat 2006). This information disparity between investors and issuers and the lack of reliable independent information sources make it difficult for investors to evaluate the appropriateness of reported accounting figures in reflecting the firm's future performance. Thus, self-interested managers have strong incentives to opportunistically manipulate reported earnings at the time of the IPO to inflate stock prices. In the immediate post-IPO period, the lock-up restriction for the managerial sale of shares, earnings projections, and risks of future lawsuits due to an abnormal drop in stock prices are argued to induce managers to continue to manage earnings upward to maintain high stock prices at the end of the IPO year (Teoh et al. 1998b).

2.2.2. Accrual-based earnings management around IPOs

Research on EM around IPOs mainly analyses managers' use of accruals in the period of taking their firms public and documents accrual manipulation by IPO issuers. Initial studies by Aharony et al. (1993) and Friedlan (1994) suggest income-increasing accrual-based EM by managers before the offering. Teoh et al. (1998b) further provide evidence of high positive abnormal accruals in the IPO year. Moreover, Teoh et al. (1998a) report that issue-year abnormal accruals are negatively correlated with post-issue long-run stock returns. This is consistent with the notion that managers opportunistically manipulate earnings to achieve higher offer prices while investors are unable to immediately recognise this behaviour. Subsequent studies also confirm the aggressive use of accruals by managers around IPOs (DuCharme 2001; Roosenboom et al. 2003; DuCharme et al. 2004; Marquardt and Wiedman 2004; Morsfield and Tan 2006; Lee and Masulis 2011; Alhadab et al. 2014). However, Ball and Shivakumar (2008) provide a contrary finding. They argue that IPOs attract the attention of regulators and various parties such as auditors, analysts, investors, and the press; therefore, IPO firms are more pressured to provide higher quality financial reports. Examining a sample of UK firms whose financial statements filed as private firms are comparable to those restated and presented in the IPO prospectuses, they document that IPO firms tend to report more conservatively in response to increasing demand for higher quality financial reporting by capital market participants. Nevertheless, Lo (2008) argues that sophisticated managers are more likely to provide non-comparable reports to make their earnings manipulation less detectable; therefore, the restrictive sample selection by Ball and Shivakumar (2008)

may exclude IPO firms that engage in EM and the conclusion of no income-enhancing EM by IPO firms may not hold.

2.2.3. Real earnings management around IPOs

Besides accrual-based EM, increasing interest has been placed on real EM as another method to manipulate earnings. Contrary to accrual-based EM, which involves making within generally accepted accounting principles (GAAP) accounting choices to bias reported earnings, real EM occurs when managers deliberately alter the timing or structure of actual operating, investment or financing transactions to achieve desirable financial reporting results. While accrual-based EM does not affect cash flows because it is undertaken solely through the choice of accounting methods used to recognise business transactions, real EM affects operating activities and ultimately cash flows. There are several reasons for managers' greater preference to undertake real EM than accrual-based EM. First, managing earnings through real activities is less likely to draw scrutiny from auditors and regulators than through accruals (Graham et al. 2005; Roychowdhury 2006; Cohen et al. 2008). Moreover, relying solely on accrual manipulation to meet earnings targets is risky. Since accrual-based EM occurs at the end of the fiscal period, if reported earnings being manipulated by accrual-based EM fall short of the desired threshold, managers will be unable to adjust real activities at the end of the fiscal year (Cohen and Zarowin 2010; Gunny 2010). Zang (2012) reports that managers adjust the degree of accrual-based EM used at the end of the fiscal year based on the amount of real activities manipulation realised during the year. In addition, managers' flexibility to opportunistically manipulate earnings through accrual-based EM in the current year decreases with the extent of manipulated accruals in previous years as the balance sheet accumulates all the effects of previous accounting choices (Barton and Simko 2002). Hence, firms that extensively engage in accrual-based EM in earlier periods tend to undertake real EM in the current period (Gunny 2010).

Despite the extensive research on accrual-based EM around IPOs, evidence of real EM by IPO issuers is less documented. The survey of 400 executives conducted by Graham et al. (2005) reports that managers are reluctant to make within-GAAP accounting choices to manage earnings. Instead, they manage real activities to maintain financial reporting outcomes. In order to meet an earnings target, 80% of respondents would choose to decrease discretionary expenses on research and development (R&D), advertising, and maintenance, while 55% would postpone a new project even if such delay

could cause a minor loss in firm value. Darrough and Rangan (2005) provide evidence that IPO firms upwardly manage earnings in the IPO year by reducing R&D expenses. Roychowdhury (2006) indicates that firms avoid reporting annual losses by utilising multiple real EM tools. Specifically, managers may offer price discounts and lenient credit terms to boost sales. They may also increase production to allocate overheads to larger inventory, thereby lowering cost of goods sold and improving operating margins. In addition, managers may reduce discretionary expenses such as advertising, R&D, and selling, general and administrative (SG&A) expenses to increase earnings. Cohen and Zarowin (2010) find evidence of real EM around seasoned equity offerings (SEOs) and document a greater decrease in operating performance due to real EM than due to accrual-based EM in the post-SEO period. Alhadab et al. (2014) report that UK IPO firms engage in both accrual-based and real EM during the offering year to overstate earnings. They document that issuers with a higher magnitude of EM in the issue year subsequently have a higher probability of IPO failure and lower survival rates.

2.3. Hypothesis development

2.3.1. Credit rating agencies and earnings management around IPOs

I hypothesize that CRAs can influence EM around IPOs by alleviating the agency problem via two mechanisms: information dissemination and monitoring.

Informational role of credit rating agencies

CRAs provide the market with their independent assessment of the firm's creditworthiness based on publicly disclosed information in securities filings and relevant private information gathered in the due diligence process. They assess the likelihood that an issuer will default on its financial obligations by reviewing both financial and non-financial factors such as macroeconomics environment, market conditions, competitive trends, corporate governance, growth prospects, operations and risk management, business plan, and financial position statements. Credit analysts also conduct in-depth interviews and discussions with company managers to obtain additional information and clarification about management policies, current positions, and future plans that may influence the rating. Research on the informational content of rating announcements (e.g., Holthausen and Leftwich (1986), Hand et al. (1992), Dichev and Piotroski (2001)) shows that rating changes significantly influence stock prices, suggesting that CRAs provide valuable information to market participants. Particularly, in 2000, the Securities and

Exchange Commission (SEC) enacted the Regulation FD which prohibits publicly traded companies from selectively disclosing private material information to their preferred investment professionals. Since CRAs are excluded from the Regulation FD, managers can provide credit analysts with relevant private information of the firm. Therefore, credit ratings convey additional information to the market beyond what is publicly disclosed, contributing to bridging the information gap between issuers and investors. Jorion et al. (2005) show that the informational impact of credit ratings is significantly strengthened after the implementation of the Regulation FD. Prior studies also document the role of credit ratings in reducing information asymmetry problem in the IPO markets (e.g., An and Chan (2008), Chan and Lo (2011)).

Monitoring role of credit rating agencies

The economic role of CRAs goes beyond mitigating information asymmetries. CRAs are widely considered as important gatekeepers of the capital markets. Employing their expertise, established methodologies, and access to a wide pool of both public and private information, they provide the market with their assessment of the issuer's creditworthiness. Through the initial investigation, CRAs exert monitoring impacts on the issuer (Bonsall et al. 2015). CRAs' monitoring function is also apparent in their surveillance procedure. After the initial rating, credit analysts maintain periodic contact with the issuer's management to track developments that may affect the issuer's credit risk profiles. As a result of the surveillance analysis, CRAs may adjust the credit rating to timely reflect changes in their opinion of the issuer's creditworthiness. Bannier and Hirsch (2010) argue that CRAs appear to have fulfilled an active monitoring role through their rating review procedures. Moreover, CRAs' incentives to monitor are strengthened by their reputational concerns. Since credit rating market is concentrated with a limited number of competitors, the survival and future profitability of CRAs are largely dependent on their reputation. The reputation of CRAs is directly affected by the performance of the issuer after the rating. Therefore, to maintain and improve their established reputation, it is important for CRAs to closely follow the issuer to assign timely and accurate ratings.

There is a prevalent concern that CRAs' monitoring may be weakened by the conflict of interests inherent in the issuer-pay model (i.e., the issuer pays the CRA for the rating). CRAs' independence may also be compromised when the agency engages in other ancillary business services with the issuer besides the rating. In addition, CRAs have faced widespread criticism for the lack of rating timeliness in predicting prominent

bankruptcies in the past decade such as Enron in 2001, World.com in 2002, Parmalat in 2003, and the subprime mortgage crisis in 2007-2008. In the aftermath of the financial crisis, CRAs have come under increased scrutiny. Several regulatory reforms have been implemented to enhance the regulation of CRAs such as the Credit Rating Agency Reform Act of 2006 and the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 in the U.S. and European Union directives such as the Capital Requirements Directive of 2006. Failing to properly monitor the issuer and timely adjust ratings to predict a decline in credit quality is costly to CRAs, especially in terms of potential loss of reputation, additional regulatory burdens, and deterioration in future profitability. Cheng and Neamtiu (2009) show that CRAs improve their credit analysis when their market power is threatened by increased regulatory oversight and reputational concerns.

Another relevant issue regards the monitoring of CRAs over the financial reporting process. Rating agencies largely rely on public and private information voluntarily provided by management; hence, the accuracy of their assessment depends considerably on the complete and honest information disclosure. In evaluating the issuer, credit analysts use a substantial amount of information from financial statements; therefore, a crucial part of the rating analysis entails the assessment of the quality of reported accounting numbers (Jorion et al. 2009). Although CRAs count on the verification service of auditors and do not repeat their auditing work, following the aftermath of the internet bubble period, CRAs recruit trained accountants to perform forensic accounting analysis and assist credit analysts in interpreting financial statements (Coffee 2006). Jorion et al. (2009) document that CRAs rationally employ stricter rating criteria to firms that engage in aggressive EM and adjust their ratings downward to appropriately reflect the firms' true underlying economics.

Overall, the reduced information asymmetry due to the provision of credit ratings and the monitoring of CRAs will make it more likely for financial reporting misbehaviours to be discovered. IPO firms will face severe consequences such as reputation loss, high costs of capital, and litigation risks if they are found to engage in accounting manipulation. Therefore, I expect that managers of rated IPO firms will have weaker incentives to manipulate earnings to influence stock prices. Based upon existing empirical evidence, I examine both accrual-based and real EM by IPO issuers during the offering year and predict that rated IPO firms are less likely to engage in both accrual-based and real EM to overstate earnings. My first hypothesis is:

H1: *Rated IPO firms are less likely to engage in income-increasing EM (accrual-based EM and real EM) than unrated IPO firms in the offering year.*

2.3.2. At-issue earnings management and post-issue performance of rated IPO firms

Two opposing streams of literature have emerged regarding the managerial intent in managing earnings around IPOs. One stream supports the view that IPO is an opportunity for initial investors to cash their stock. Therefore, opportunistic managers have a motive to overstate earnings to maximize stock prices. Various studies support this view of managerial opportunism around IPOs (e.g., Aharony et al. (1993), Friedlan (1994), Teoh et al. (1998a), Teoh et al. (1998b), DuCharme et al. (2004), Morsfield and Tan (2006), Lee and Masulis (2011)). The other stream views IPO as an external financing occasion; therefore, opportunistic EM is undesirable as managed accruals will be reversed in subsequent periods and consequently hurt post-IPO stock performance. In order to improve price efficiency and reduce the cost of capital, managers will seek to signal firm value to external investors. EM, in this view, is a means by which managers communicate private information about the firm's future prospects to the market (Watts and Zimmerman 1978; Healy and Palepu 1993; Guay et al. 1996; Subramanyam 1996; Fields et al. 2001; Kallunki and Martikainen 2003; Louis and Robinson 2005; Herbohn et al. 2010).

The extent of information uncertainty may influence managerial intent in managing earnings. In the presence of high information uncertainty, self-interested managers have stronger incentives to opportunistically manipulate earnings because their financial reporting misbehavours are less likely to be detected (Dye 1988; Trueman and Titman 1988; Healy and Wahlen 1999; Lo 2008). Meanwhile, managers whose incentives are to enhance price efficiency and lower the cost of capital may hesitate to voluntarily disclose private information since investors are less likely to correctly interpret that information (Dutta and Trueman 2002; Fishman and Hagerty 2003; Suijs 2007; Chen et al. 2013). However, in less uncertain environment, stronger detection risks may refrain self-interested managers from manipulating earnings. In addition, managers of high quality firms can more effectively exercise their accounting discretion to convey inside information to the market because investors can more accurately realise and incorporate the information into their valuation. Chen et al. (2013) examine EM around IPOs operating in the environments of different levels of information uncertainty and find that

while high-information-uncertainty firms manipulate earnings opportunistically, low-information-uncertainty firms manage earnings for informative purposes. Along these lines, I expect that lower information uncertainty around IPOs due to the provision of a credit rating before the offering will also influence managerial incentives in undertaking EM. Managers of rated firms will utilise their accounting choices to mitigate the information asymmetry problem and signal the firm's future prospects instead of opportunistically manipulate earnings for short-term self-interests. If managers of rated firms draw on their inside information and exercise their accounting discretion to better inform the market about the firm's future earnings, the extent of income-increasing EM in the offering year will be positively related to subsequent accounting performance. My second hypothesis is:

> ***H2***: *At-issue income-increasing EM is positively related to post-issue accounting performance for rated IPO firms.*

Extant literature (e.g., Teoh et al. (1998a), Teoh et al. (1998b), and Morsfield and Tan (2006)) documents a negative association between at-issue EM and post-issue long-run stock returns, suggesting that managers opportunistically manage earnings to achieve higher offer prices while investors are unable to immediately recognise this behaviour. If managers manipulate earnings upward to inflate stock prices, in subsequent years, the reversal of accruals will drive down future earnings. High stock prices reflect investors' optimistic expectations of the firm's future profitability. Yet, if future earnings do not meet investors' earlier expectations, they will adjust their evaluation of the firm downwards. Therefore, IPO firms that opportunistically manage earnings upward in the offering year exhibit poorer long-run stock performance in the post-issue periods. However, Fields (2001) suggest that accounting discretion can be employed to convey inside information to external investors so that the stock price can be fairly evaluated. Fan (2007) argues that high-quality IPO firms can manage earnings upward to a certain level as a signalling device to separate themselves from low-quality firms. The author also documents that investors can accurately interpret the effect of EM when estimating the firm's fundamental value. Chan and Lo (2011) find that rated IPO firms experience more immediate price correction and do not exhibit abnormal long-term stock performance. Their findings indicate that the provision of a credit rating before the new issue lowers information asymmetries and enables investors to correctly estimate the firm's fair market

value. Since rated IPO firms tend to employ accounting choices to communicate private information to the market, I predict that the lower information uncertainty around rated IPO firms will allow the market to infer EM and correctly adjust for it in valuing the firm. Therefore, the post-issue long-run abnormal stock returns is expected to have no association with the at-issue income-increasing EM. This leads us to my third hypothesis:

> ***H3***: *At-issue income-increasing EM is not related to post-issue long-run stock performance for rated IPO firms.*

2.4. Sample and methodology

2.4.1. Sample selection

I construct a sample of common share US IPOs over the period January 1, 1991 to December 31, 2011 from the Securities Data Corporation (SDC) New Issues database[2]. Following the literature, I exclude IPOs with an offer price below $5 per share, unit offerings, limited partnerships, leveraged buyouts (LBOs), rights issues, American depositary receipts (ADRs), closed-end funds, real estate investment trusts (REITs), financial institutions, spin-offs, and privatizations. I then match this sample with Compustat database where I obtain accounting information, and with the Center for Research in Security Prices (CRSP) where I collect stock returns. After imposing the aforementioned restrictions, I arrive at the final sample of 2,602 IPO firms. Credit ratings are collected from Compustat and represent Standard & Poor's (S&P) long-term domestic issuer credit ratings. In my sample of 2,602 IPO firms, 153 firms have S&P credit ratings one month prior to the issue.

2.4.2. Earnings management methodology

2.4.2.1. Accrual-based earnings management

In measuring the estimates of abnormal accruals, I employ the modified Jones (1991) model described in Dechow et al. (1995). Since its development, the model has been widely used in the EM literature. Various recent EM research continues to employ the model to measure abnormal accruals (Ye 2014; Doukakis 2014; Franz et al. 2014).

[2] Compustat covers credit rating data from 1985. However, statement of cash flows data are available for all firms in Compustat from 1988 and I require past year data to measure earnings management proxies. Moreover, the post-issue long-run performance analysis examines the three-year period after the stock issuance. Therefore, the sample period starts from 1991 until 2011.

Jones (1991) assumes that the changes in sales and gross property, plant and equipment (PPE) are two main determinants of the firm's accruals. Thus, total accruals are modelled as a function of sales growth and PPE. The total accruals are disaggregated into two components: expected accruals and abnormal accruals. The expected accruals reflect the firm's economic conditions and are predicted by the change in sales and PPE. The abnormal accruals reflect managerial discretion and are determined by the residuals. However, sales revenues are susceptible to managerial manipulation since managers can influence credit policies to induce sales. Therefore, Dechow et al. (1995) enhance the power of the Jones model by deducting the accounts receivable growth from revenue growth to account for the possibility of management manipulation in credit sales.

In applying the modified Jones model, I first estimate for each year the following Jones model cross-sectionally for all firms in the same two-digit SIC industry as the IPO firm yet excluding firms going public in three years' time:

$$\frac{TACC_{i.t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{PPE_{i.t}}{TA_{i,t-1}} + \varepsilon_{i,t} \qquad (2.1)$$

where $TACC_{i,t}$ is total accruals computed as earnings before extraordinary items and discontinued operations less cash flow from operations; $TA_{i.t-1}$ is lagged total assets; $\Delta SALES_{i,t}$ is the change in total sales from the fiscal year before the offering to the fiscal year of the IPO; and $PPE_{i,t}$ is the gross value of property, plant and equipment. I use the cash flow method instead of the balance sheet approach to measure total accruals since Hribar and Collins (2002) show that measuring accruals directly from the statement of cash flows is a superior method to avoid the non-articulation problem of the balance sheet approach. All variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers. I require at least ten firms in an industry in a year to run the regressions. This cross-sectional approach, which is introduced by DeFond and Jiambalvo (1994), helps control for changes in economic conditions for specific years and industries that might influence total accruals independent of any managerial manipulation. The coefficient estimates from Equation (2.1) are then used to estimate the expected component of total accruals ($NACC_{i.t}$) for the IPO sample as follows:

$$NACC_{i.t} = \hat{\beta}_0 \frac{1}{TA_{i,t-1}} + \hat{\beta}_1 \frac{\Delta SALES_{i,t} - \Delta REC_{i.t}}{TA_{i,t-1}} + \hat{\beta}_2 \frac{PPE_{i.t}}{TA_{i,t-1}} \quad (2.2)$$

where $\Delta REC_{i.t}$ is the change in receivables from the fiscal year before the offering to the fiscal year of the IPO. The abnormal accruals ($DACC_{i.t}$) are computed as the difference between total accruals and expected accruals:

$$DACC_{i,t} = \frac{TACC_{i,t}}{TA_{i,t-1}} - NACC_{i.t} \quad (2.3)$$

Several studies in the literature raise concerns that the abnormal accruals measured using the Jones model are correlated with firms' performance; therefore, the Jones model is misspecified when being applied to firms experiencing extreme performance (Dechow et al. 1995). To mitigate this problem, I apply the procedure suggested by Kothari et al. (2005) to match the abnormal accruals of the IPO firm to those of a non-IPO firm in the same two-digit SIC industry and year with the closest prior-year ROA. I exclude firms whose matched non-IPO firm has ROA outside the range of +/- 10% of the IPO firm's ROA. The matched firms' abnormal accruals are deducted from the IPO firms' abnormal accruals to yield the performance-matched abnormal accruals for the IPO firms.

I also acknowledge that accruals models may not adequately isolate between abnormal and normal accruals; consequently, estimated abnormal accruals may capture normal components of accruals. However, it should be noted that I use abnormal accruals as a dependent variable. The effect of measurement error in the dependent variable is less severe than measurement error in the independent variable. If the measure of abnormal accruals suffers from measurement error, the consequences will be lower explanatory power (R^2) of the model, but unbiased estimated coefficients, larger estimated standard errors, and hence wider confidence intervals.

For robustness check, I employ another commonly used model by Dechow and Dichev (2002) to measure abnormal accruals. Dechow and Dichev (2002) map short-term working capital accruals to present, past, and future cash flows based on the notion that accruals predict future cash receipt or payment. Their model does not address distortions caused by long-term accruals; therefore, I follow McNichols (2002) and Francis et al. (2005) to modify the model by adding growth in revenue and PPE to reflect performance

and depreciation. I estimate the following regression cross-sectionally for each year and all non-IPO firms in each two-digit SIC industry with at least ten firms:

$$\frac{TCA_{i.t}}{TA_{i.t-1}} = \beta_0 \frac{1}{TA_{i.t-1}} + \beta_1 \frac{CFO_{i.t-1}}{TA_{i.t-1}} + \beta_2 \frac{CFO_{i.t}}{TA_{i.t-1}} + \beta_3 \frac{CFO_{i.t+1}}{TA_{i.t-1}} + \beta_4 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \beta_5 \frac{PPE_{i,t}}{TA_{i.t-1}} + \varepsilon_{i.t} \quad (2.4)$$

where

$$TCA_{i,t} = (\Delta CA_{i,t} - \Delta Cash_{i,t}) - (\Delta CL_{i,t} - \Delta STD_{i,t})$$
$$CFO_{i,t} = NIBE_{i,t} - (TCA_{i,t} - DEPN_{i,t})$$

$TCA_{i,t}$ is total current working capital accruals, $CFO_{i,t}$ is cash flows from operations, $TA_{i,t-1}$ is lagged total assets, $\Delta SALES_{i,t}$ is the change in sales, $PPE_{i,t}$ is the gross value of plant, property and equipment, $\Delta CA_{i,t}$ is the change in current assets, $\Delta Cash_{i,t}$ is the change in cash, $\Delta CL_{i,t}$ is the change in current liabilities, $\Delta STD_{i,t}$ is the change in short-term debt, $NIBE_{i,t}$ is net income before extraordinary items, $DEPN_{i,t}$ is depreciation and amortization expenses. All changes are between the fiscal year before the offering to the fiscal year of the IPO. I winsorize all variables at the 1st and 99th percentiles to moderate the effect of outliers. The estimated coefficients of Equation (2.4) are used to estimate the normal level of current accruals of IPO firms. The IPO firms' abnormal current accruals are then computed as the difference between the firms' actual total current accruals and their normal level of current accruals.

2.4.2.2. Real earnings management

I measure real EM proxies based on the model developed by Dechow et al. (1998), implemented by Roychowdhury (2006), and later used by various real EM research (Cohen et al. 2008; Cohen and Zarowin 2010; Zang 2012; Alissa et al. 2013). Roychowdhury (2006) documents that managers avoid reporting annual earnings losses by manipulating real activities including temporarily increasing sales through price discounts or more lenient credit terms, overproducing to decrease the cost of goods sold, and reducing discretionary expenditures. Therefore, if managers exercise their discretion in operating decisions related to sales, production, and discretionary expenses to boost earnings, firms will exhibit an unusually low level of cash flow from operations and discretionary expenses, and unusually high production costs. I use three metrics as proxies for real EM: abnormal cash flow from operations, abnormal production costs, and abnormal discretionary expenses.

The normal level of cash flow from operations is expressed as a linear function of sales and change in sales in the current period:

$$\frac{CFO_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (2.5)$$

where $CFO_{i,t}$ is cash flows from operations, $TA_{i,t-1}$ is lagged total assets, $SALES_{i,t}$ is total sales, $\Delta SALES_{i,t}$ is the change in sales from the fiscal year before the issue to the fiscal year of the IPO.

The model for normal production costs is estimated as a function of current sales, change in current sales, and change in past sales:

$$\frac{PROD_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \beta_3 \frac{\Delta SALES_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (2.6)$$

where $PROD_{i,t}$ is the production costs computed as the sum of the cost of goods sold and the change in inventory from the fiscal year before the IPO to the fiscal year of the IPO. $\Delta SALES_{i,t-1}$ is the change in sales from the fiscal year two years before the issue to the fiscal year prior to the IPO.

The normal discretionary expenses are expressed as a linear function of lagged sales:

$$\frac{DISEXP_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (2.7)$$

where $DISEXP_{i,t}$ is the discretionary expenses computed as the sum of SG&A, R&D, and advertising expenses. $SALES_{i,t-1}$ is total sales in the fiscal year prior to the IPO.

All the three equations (2.5), (2.6), (2.7) are estimated cross-sectionally for each industry-year with at least ten observations. I winsorize all variables at 1st and 99th percentiles to mitigate the issue of outliers. The abnormal level of each real EM proxy is calculated as the actual level minus the normal level estimated using the coefficients from the regressions (2.5), (2.6), and (2.7). Moreover, I match real EM measures of IPO firms to those of non-IPO peers based on year, industry, and ROA to generate performance-matched real EM measures. I also multiply the estimated abnormal cash flow from operations and abnormal discretionary expenses by (-1) so that higher values reflect higher real EM. Besides analysing the individual effect of each real EM activity, I also

measure the aggregate effect of all three metrics by calculating two combined measures *REM1* and *REM2*. Following Cohen and Zarowin (2010), I compute *REM1* as the sum of *abnormal production costs* and *abnormal discretionary expenses* and *REM2* as the sum of *abnormal cash flow from operations* and *abnormal discretionary expenses.* Abnormal production costs and abnormal cash flows from operations are not combined because the same activities that create high abnormal production costs also create low abnormal cash flow from operations, so adding the two measures would result in double counting (Roychowdhury 2006; Cohen and Zarowin 2010). The higher *REM1*, the more likely that firms increase production and cut discretionary expenses to manipulate earnings upward. Similarly, the higher *REM2*, the more likely that firms manipulate sales and reduce discretionary expenses to report higher earnings.

2.4.3. Sample descriptive statistics

Table 2.2 presents the distribution of the sample by year, industry, and credit rating level. I observe a larger flow of IPOs in the 1990s, which is consistent with the recovery and expansion period of the US economy after the 1990 recession. The early 2000s recession caused a downturn in the stock market. Subsequently, the overall IPO activity showed some improvement before declining again due to the financial crisis of 2007-2008. The sample covers 57 industries identified by the two-digit SIC code. Nearly half of the firms are concentrated in computer and high-technology industries (SIC codes 35, 36, 38, and 73). Rated issuers, however, are more strongly presented in manufacturing, transportation and public utilities, and wholesale and retail trade industries. There are 153 IPOs with credit ratings one month prior to the stock issuance. The highest rating level is AAA and the lowest is CCC+. Approximately 2% of the issuers are in the A rating category and 4% receive investment grade credit ratings. Nearly half of the firms obtain the rating of B+. The credit ratings of IPO firms are clustered in the rating categories of BB-, B+, and B. The ratings distribution is consistent with recent research on credit ratings of IPO firms (for example, An and Chan (2008)).

Panel A of Table 2.3 illustrates descriptive statistics of firm characteristics and EM proxies for the overall sample and the sub-samples of IPOs with and without a credit rating. Panel B of Table 2.3 presents the correlation matrix, and no multicollinearity is detected among the variables. Regarding firm characteristics, IPO firms are in operation for an average of 16 years. They have the mean market value at the time of listing of 446 million dollars, the mean leverage ratio of 0.73, and the mean industry-adjusted ROA of

-0.17. The average proportion of firms reporting a loss in the fiscal year prior to the offering is 37%. The mean ratio of capital expenditures to total assets is 0.41. On average, 36% of IPOs are underwritten by reputable investment banks, 92% are audited by big six accounting firms, and 51% are venture-backed.

Firm-specific characteristics also appear to differ between rated and unrated IPOs. The mean differences are strongly statistically significant for all firm characteristics except for capital expenditures. Rated IPOs (average age of 37 years) are older than unrated ones (average age of 15 years). Rated issuers have the mean market value at the time of listing of 1,252 million dollars, which is considerably larger than unrated issuers (market value of 396 million dollars). Rated firms have higher leverage than unrated ones with the mean ratio of total liabilities to total assets of 96% for the rated and 71% for the unrated. While 39% of unrated issuers report losses in the previous fiscal year prior to the IPO, this figure is only 8% for rated issuers. Rated IPOs are more profitable than unrated ones, which is suggested by the mean industry-adjusted ROA of -0.01 for the rated and -0.18 for the unrated. The mean proportion of rated IPOs underwritten by top-tier investment banks (68%) doubles that of unrated IPOs. Slightly more firms with a credit rating (96%) are audited by big six auditors than firms without a credit rating (92%). While more than half (53%) of unrated IPOs are venture-backed, only 18% of rated IPOs are supported by venture capitalists. My results are consistent with prior literature. Denis and Mihov (2003) and Faulkender and Petersen (2006) also report that large, mature, profitable and highly leveraged companies are more likely to issue public debts and obtain credit ratings.

With respect to EM proxies, I rely on the median for statistical inference since the median is less likely than the mean to be affected by extreme observations. For the whole sample of IPO firms, the median value of abnormal accruals (0.02) is significantly larger than zero; thus, consistent with prior studies, I find evidence of the manipulation of accruals to report higher earnings around IPOs. The median *abnormal cash flow from operations* (0.03) is also significantly positive, implying that managers of IPO firms tend to manipulate sales to bias earnings upward. Meanwhile, the median values of *abnormal production costs* (-0.08), *abnormal discretionary expenses* (-0.25), *REM1* (-0.30), and *REM2* (-0.21) are all negative and strongly significant. The finding that IPO firms engage in income-increasing real EM through sales manipulation but not through overproduction and discretionary expenses is intuitive. First, sales manipulation is less likely to be discovered given that newly listed firms are expected to have growth in sales. Moreover,

increasing sales while at the same time reducing discretionary expenses such as advertising and SG&A expenses is not only difficult to accomplish but also likely to attract attention and scrutiny from auditors, regulators, and investors. In addition, production cost manipulation can only be fully employed by manufacturing firms (Roychowdhury 2006). My IPO sample consists of a small proportion of manufacturing firms; thus, the inability to fully exploit production-based real EM may deter IPO firms from undertaking this method to manage earnings upward.

Similar to the overall sample, unrated IPO firms have significantly positive median *abnormal accruals* (0.03) and *abnormal cash flow from operations* (0.03), yet significantly negative median *abnormal production costs* (-0.09), *abnormal discretionary expenses* (-0.29), *REM1* (-0.40), and *REM2* (-0.24). This indicates that unrated IPO firms tend to engage in income-increasing EM through accruals and sales manipulation, yet make conservative operating decisions related to production and discretionary expenses. On the other hand, for rated IPO firms, all EM measures apart from *REM1* are not significantly different from zero. This suggests that rated IPO issuers appear not to engage in EM through manipulation of accruals, sales, production, or discretionary expenses. Tests of the differences in EM between the two samples of rated and unrated IPOs show significant results and suggest that rated IPO issuers are less likely to manage earnings through accruals and real operating activities in the issue year than unrated IPO issuers.

The results so far show an initial insight into the relation between credit ratings and EM. Overall, IPO firms exhibit income-increasing EM through accruals and sales manipulation, yet are conservative in decisions related to production and discretionary expenses. Rated IPO firms, on the other hand, do not engage in either accrual-based or real EM in the issue year. Comparing a sample of rated and unrated IPO firms, the results reveal that rated IPOs exhibit less EM through both accruals and real activities than unrated IPOs. In order to establish more concrete evidence, I provide multivariate analysis controlling for several determinants of EM in the next section.

2.5. Empirical models

2.5.1. Credit ratings and earnings management around IPOs

I estimate the following regression model to examine the association between credit ratings and EM around IPOs:

$$EM_i = \alpha_0 + \beta_1 Rating\ existence_i + \beta_2 Log(1 + firm\ age)_i + \beta_3 Ln(market\ value)_i + \beta_4 Leverage_i + \beta_5 Loss_i + \beta_6 Highly\ ranked\ underwriter_i + \beta_7 Big6\ auditor_i + \beta_8 Venture\ capitalist_i + \beta_9 Industry\ adjusted\ ROA_i + \beta_{10} CAPEX_i + \sum_{1991}^{2011} \beta\ Year + \varepsilon_i \quad (2.8)$$

where EM_i is the positive value of an EM measure including *abnormal accruals*, *abnormal cash flow from operations*, *abnormal production costs*, *abnormal discretionary expenses*, *REM1*, or *REM2* in the fiscal year of the offering. $Rating\ existence_i$ is the main variable of interest that equals to one if the IPO firm has a credit rating, and zero otherwise. I include control variables in Equation (2.8) as suggested by prior EM literature. Definitions of all variables are presented in Table 2.1.

I account for several firm characteristics that may determine the level of EM undertaken in the issue year. First of all, I include *log(1+ firm age)* to control for firm age. Firms that have been in operation for a longer period develop more solid management and accounting systems. On the other hand, starter companies often show poor financial performance and less stable earnings; thus, they have more incentives to manipulate earnings. I control for firm size by including *ln(market value).* Larger firms normally have more complex financial structures, which creates incentives for managers to exercise discretion over accounting policies to manage earnings; however, they face closer scrutiny from regulators and capital market players, which may discourage managers from engaging in dishonest activities (Lee and Masulis 2011).

Moreover, DeFond and Jiambalvo (1994) suggest that firms with high leverage are more likely to manipulate accruals to avoid debt covenant violations. Franz et al. (2014) also find that firms close to debt covenant violations tend to engage more in EM than firms far from the violation. Hence, I include *leverage* to control for the possibility that firms with high leverage tend to upwardly manage earnings. Further, Burgstahler and Dichev (1997) posit that firms manage earnings to avoid losses. Degeorge et al. (1999) also argue that executives engage in EM to exceed the positive profit threshold. Thus, I include *loss* to account for the probability of higher income-increasing EM among firms operating at a loss.

Prior literature documents that financial intermediaries participating in the IPO process can contribute to curtailing EM. Jo et al. (2007) suggest that EM around SEOs is significantly lower in the presence of reputable investment banks. Lee and Masulis (2011)

report a negative association between underwriter reputation and EM by IPO issuers. Therefore, I include *highly ranked underwriter* to control for this effect of top-tier underwriters. Furthermore, I include *big6 auditor* to capture the capability of experienced auditing firms in detecting misrepresentations in accounting reports as suggested by Becker et al. (1998), Krishnan (2003), and Gul et al. (2009). I also include *venture capitalist* as a determinant of EM since venture capitalists can play a monitoring role and restrain EM around IPOs (Morsfield and Tan 2006; Lee and Masulis 2011; Hochberg 2012; Wongsunwai 2013).

In addition, investors face higher uncertainty in evaluating high-growth firms since their value is substantially derived from future uncertain growth opportunities; therefore, managers of these firms have better chances to mislead investors through earnings manipulation (Fan 2007). To control for growth opportunities, I use the average capital expenditures in the offering year and one year after scaled by total assets at the beginning of the offering year, *CAPEX*, as a proxy for growth. I also account for a firm's financial performance using *industry-adjusted ROA*.

The variable of interest is *rating existence* which indicates whether the IPO firm has a credit rating before the offering. The provision of a credit rating may not be random across firms as they can partially choose to have a credit rating. A firm's decision to have a credit rating may depend on various firm-specific characteristics which make the existence of a credit rating beneficial to the firm. For instance, Faulkender and Petersen (2006) claim that firms with longer time in operation, larger size, greater profitability, higher leverage, and more tangible assets tend to issue public debts and have a credit rating. Firm characteristics which induce firms to issue debts and obtain a credit rating may also determine firms' choice to undertake EM. Thus, there exists the potential issue of selection bias and endogeneity which would result in a biased coefficient estimate of *rating existence*.

To address this issue, I follow related literature (Faulkender and Petersen 2006; An and Chan 2008; Karampatsas et al. 2014) to account for the endogenous selection issue by employing several econometric models including Heckman's (1979) two-step treatment-effect model, the maximum likelihood estimation (MLE) treatment-effect model, and the two-stage least squares (2SLS) instrumental variable (IV) model. These econometric approaches require the estimation of a selection model that accounts for factors influencing firms' choice to obtain a credit rating. It is important to select variables which are correlated with the probability of having a rating in the selection model but not

directly explain EM in the outcome model. Therefore, instead of including firm characteristics in the selection model, I account for industry-specific characteristics and exclude industry-fixed effects in the regressions to avoid weak instrument biases and invalid inferences. Faulkender and Petersen (2006) argue that firms operating in an industry with a large proportion of public debt issuers tend to have lower information costs because the bond market is already familiar with the industry and competitors. Lower information costs also mean that it is more likely for the bank to underwrite a bond issue. Therefore, a firm is more likely to issue public debts and obtain a credit rating if it operates in an industry with more rated firms. To account for this effect, I create the variable *industry fraction*, which is calculated as the logarithm of one plus the percentage of firms that have credit ratings in the same three-digit SIC industry as the IPO firm in the fiscal year end prior to the offering. Johnson (1997) and Cantillo and Wright (2000) demonstrate that firms in more profitable and less risky industries are more likely to gain access to public debt markets due to their low default probability. Hence, I control for the significance of industry profitability and risks in determining the probability of a firm holding a credit rating. I measure *industry profitability* as the median ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total assets of the IPO firm's three -digit SIC industry in the fiscal year prior to the offering. *Industry risk* is computed as the standard deviation of the industry's profitability.

The Heckman (1979) correction for self-selection bias involves two-step estimation. In the first step, I estimate the selection equation using a probit regression of *rating existence* on *industry fraction, industry profitability,* and *industry risk*. The self-selection correction term, i.e. the inverse Mills ratio, is estimated and added to the outcome Equation (2.8) and the linear regression is estimated as normal. For MLE treatment effect model, the selection and outcome equations are estimated simultaneously by maximum likelihood estimation. This method is more efficient than the two-step treatment effect model if the error terms in the selection and outcome equations have a bivariate normal distribution (An and Chan 2008). Using 2SLS IV involves two-stage estimation. In the first stage, I estimate the regression of *rating existence* on all exogenous variables in the main Equation (2.8) and the instruments, namely, *industry fraction, industry profitability*, and *industry risk* to get the fitted probabilities of having a credit rating. In the second stage, the main regression is estimated with the endogenous variable *rating existence* being replaced with the predicted value from the first stage.

2.5.2. At-issue earnings management and post-issue accounting performance

I examine the relation between the magnitude of income-increasing EM in the offering year and subsequent accounting performance in order to evaluate whether managers of IPO firms exercise their accounting discretion to mislead investors or to better inform the market. Subramanyam (1996) documents that the positive association between accounting discretion and subsequent operating cash flows indicates the informative role of EM in signaling future performance. Using cash flow from operations (CFO) as a measure of future performance can avoid the correlation between current accruals and future earnings due to accrual reversals; however, CFO lacks timeliness as a performance measure (Dechow 1994; Bowen et al. 2008). Another widely used performance measure is return on assets (ROA), which is a direct measure of future profitability. ROA is less likely to have the timeliness issue; yet ROA tends to be influenced by accrual reversals since the extent of accruals employed in the past may be correlated with the magnitude of accruals used in the future and ultimately with ROA (Bowen et al. 2008). Each performance measure has its own strengths and weaknesses. In order to provide more robust findings, I employ both measures of accounting performance in the analysis. I also analyse future accounting performance using CFO and ROA being adjusted for the median measures of the firm's two-digit SIC code industry.

I estimate the following regression to examine the relation between at-issue income increasing EM and accounting performance in the subsequent year:

$$CFO_{i,t=1} = \alpha_0 + \beta_1 EM_{i,t=0} + \beta_2 EM_{i,t=0} * Rating\ existence_{i,t=0} + \beta_3 CFO_{i,t=0} + \beta_4 CAPEX_{i,t=0} + \sum \beta\ Industry + \sum_{1991}^{2011} \beta\ Year + \varepsilon_i \quad (2.9)$$

$$ROA_{i,t=1} = \alpha_0 + \beta_1 EM_{i,t=0} + \beta_2 EM_{i,t=0} * Rating\ existence_{i,t=0} + \beta_3 ROA_{i,t=0} + \beta_4 CAPEX_{i,t=0} + \sum \beta\ Industry + \sum_{1991}^{2011} \beta\ Year + \varepsilon_i \quad (2.10)$$

where $CFO_{i,t=1}$ is cash flow from operations scaled by lagged total assets in the fiscal year following the IPO; $ROA_{i,t=1}$ is net income scaled by lagged total assets in the fiscal year following the IPO; $EM_{i,t=0}$ is the positive value of *abnormal accruals, abnormal cash flow from operations, abnormal production costs, abnormal discretionary expenses,*

REM1, and *REM2* in the offering year; $EM_{i,t=0} * Rating\ existence_{i,t=0}$ is an interaction term between *EM* and *Rating existence*. I include current performance measures ($CFO_{i,t=0}$, $ROA_{i,t=0}$) to control for potential mean-reversion in the measures of accounting performance (Barber and Lyon 1996; Bowen et al. 2008). I also include *CAPEX* to account for the effect of the investment of proceeds on the post-issue performance (Teoh et al. 1998b).

If managers manipulate either accruals or operating activities to overstate earnings for opportunistic purposes to mislead investors, the earnings will not be sustainable and the magnitude of income-increasing EM employed in the offering year will not reflect the firm's future prospects. On the other hand, if managers engage in EM with the aim of communicating private information to the market and to signal firm value, firms will show positive earnings in subsequent periods and at-issue EM will explain the firm's future performance. I expect that managers of rated IPO firms tend to engage in income-enhancing EM to signal their value; therefore, the sum of the estimated coefficients (β_1+β_2) will be significantly positive.

2.5.3. At-issue earnings management and post-issue long-run stock performance

To examine the impact of at-issue income-increasing EM on post-issue long-run stock performance, I regress the IPO post-issue buy-and-hold abnormal returns (BHARs) on EM in the offering year. The regression model is estimated as follows:

$$BHAR_i = \alpha_0 + \beta_1 EM_i + \beta_2 EM_i * Rating\ existence_i + \beta_3 Underpricing_i + \beta_4 Log(1 + firm\ age)_i + \beta_5 Market\ BHR_i + \beta_6 Book\ to\ market_i + \beta_7 Ln(market\ value)_i + \beta_8 ROA_i + \beta_9 Highly\ ranked\ underwriter_i + \beta_{10} Big6\ auditor_i + \beta_{11} High\ tech\ industry_{\ i} + \sum_{1991}^{2011} \beta\ Year + \varepsilon_i \quad (2.11)$$

where $BHAR_i$ is the IPO firm's three-year post-issue buy-and-hold abnormal return calculated starting from the day after the annual financial report date in the offering year to the earlier of the three year anniversary date and the delisting date; EM_i is the positive value of *abnormal accruals, abnormal cash flow from operations, abnormal production costs, abnormal discretionary expenses, REM1,* and *REM2* in the offering year; $EM_i * Rating\ existence_i$ is an interaction term between *EM* and *Rating existence*. I include

control variables in Equation (2.11) as suggested by prior studies (Ritter 1991; Teoh et al. 1998a; Chen et al. 2013). Definitions of these variables are presented in Table 2.1. The existence of a credit rating reduces the information uncertainty, creating incentives for managers of rated firms to release private information through accounting discretion to signal their quality, and also allowing investors to better interpret this information and incorporate it into their firm valuation. Price adjustment will occur in the short-run, leaving insignificant long-run abnormal stock returns. Therefore, I expect at-issue EM of rated firms will be unrelated to long-run stock performance, and the sum of the estimated coefficients ($\beta_1 + \beta_2$) will be insignificantly different from zero.

As an additional check, I examine the long-run stock performance using the calendar-time portfolio approach[3]: the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. The regression model estimated based on Fama and French (1993) three-factor model is as follows:

$$POSEM_{pt} - NEGEM_{pt} = \alpha_p + \beta_m MKT_t + \beta_s SMB_t + \beta_h HML_t + \varepsilon_t \qquad (2.12)$$

where $POSEM_{pt} - NEGEM_{pt}$ is the return from taking a long position in a portfolio of IPO firms that manage earnings upward and a short position in a portfolio of IPO firms that manage earnings downward for each calendar month in the sample period. MKT_t is the excess monthly return on the value-weighted CRSP index for each calendar month in the sample period. SMB_t is the difference in the returns of value-weighted portfolios of small and large stocks for each calendar month in the sample period. HML_t is the difference in the returns of value-weighted portfolios of high book-to-market and low book-to-market stocks for each calendar month in the sample period.

IPO firm returns are included in the portfolio returns for the period of three years after the IPO fiscal year end. The Carhart four-factor model adds to the Fama and French three-factor model an additional factor to account for one-year momentum price return. The factors for those models are retrieved from Professor Kenneth French's website[4]. The

[3] Buy-and-hold returns are representative of investors' investment experience, therefore, they are commonly used to examine long-run stock performance. However, Fama (1998) points out several concerns regarding the use of buy-and-hold returns in long-run performance studies including the exaggeration of short-term estimation errors through compounding, the skewness in the distribution of buy-and-hold returns, and the cross-correlation problems caused by time-period overlap. Fama (1998) also advocates the use of calendar-time approach to examine the long-run performance since the approach can account for the clustering of events and cross-correlation problems, and better approximate the normal distribution, therefore, can produce more reliable statistical inferences.

[4] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

regression is estimated for separate samples of unrated and rated IPO firms. The intercept of the factor models represents the average monthly abnormal return. Following Chen (2013), I use an intercept test to examine the difference in the post-IPO stock performance between issuers with aggressive EM and those with conservative EM. In the case that the provision of a credit rating reduces information asymmetry and allows investors to better gauge the managerial intention in EM and adjust accordingly, the future stock returns will be unrelated to EM in the offering year. Therefore, I expect the intercept is insignificantly different from zero.

2.6. Empirical results

2.6.1. Credit ratings and earnings management around IPOs

Table 2.4 reports my regression analyses of the association between accrual-based EM and rating existence using the three estimation methods: Heckman's two-step treatment effect model, MLE treatment effect model, and 2SLS IV model. The regression results using the performance-matching modified Jones (1991) model and Dechow and Dichev (2002) model to measure abnormal accruals are reported in Panels A and B respectively. My results are consistent across all econometric models and for both methodologies used to estimate abnormal accruals.

Evidence from the three estimation approaches confirms the presence of endogenous selection problem. The inverse Mills ratio from the Heckman two-step treatment effect model is significant at the 5% level, suggesting the issue of selection bias. The likelihood ratio test of the correlation between the two error terms of the selection and outcome equations from the MLE treatment effect model provides a strongly significant result. This indicates that unobservable firm characteristics determining the decision to obtain a credit rating also influence EM activities. The Durbin-Wu-Hausman test of endogeneity from the 2SLS IV model also verifies the endogeneity problem.

The coefficients on *rating existence* are negative and statistically significant at either 1% or 5% levels, suggesting that rated IPO firms are less likely to engage in income-increasing EM. The signs of the coefficients on control variables are generally in line with prior literature. I document that IPOs with longer operating history, lower leverage, less growth, and venture-backing are less likely to manage earnings. Among the three industry specific variables in the selection equation, *industry fraction* is positively associated with *rating existence* across all specifications. This is similar to the findings

of earlier studies that the probability of having a credit rating increases for firms in industries with more rated debt issuers.

Table 2.5 presents multiple regression analyses of different measures of real activities manipulation on rating existence. The results of the inverse Mills ratio test, the likelihood ratio test, and the Durbin-Wu-Hausman test confirm the endogenous selection problem. Panels A, B, and C report the results of the regressions estimated using the three econometric techniques: Heckman two-step treatment effect model, MLE treatment effect model, and 2SLS IV model.

The results consistently hold for the alternative econometric models and different measures of real EM. The coefficients on all individual metrics of real EM — *abnormal cash flow from operations, abnormal production costs*, and *abnormal discretionary expenses* and the combined real EM measures - *REM1* and *REM2* are significantly negative. This supports the conjecture that rated IPOs are less likely to manage earnings through real activities manipulation. The control variables have the expected signs. I document significantly lower real EM for IPO firms that are older, larger, less leveraged, less growth, more profitable, underwritten by reputable investment banks, and venture-backed. With regard to variables in the selection equation, *industry fraction* is consistently highly significant across all specifications. Overall, the results support the first hypothesis that rated IPO firms demonstrate less income-enhancing accrual-based and real EM in the issue year than unrated IPO firms.

2.6.2. At-issue earnings management and post-issue accounting performance

I present the results of the regressions of post-issue accounting performance on at-issue income-increasing EM in Table 2.6. In Panel A, I determine future accounting performance using CFO in the fiscal year following the offering. The results are consistent for regressions using raw CFO and industry-adjusted CFO as dependent variables. The coefficients on *EM* is insignificant for all EM measures, except for *abnormal discretionary expenses.* This suggests that managers of unrated IPO firms tend to engage in income-increasing EM in the offering year without the aim of signalling to the market about the firm's future performance. The coefficients on the interaction term *EM*Rating existence* are significantly positive at either 1% or 5% level for all EM measures. Moreover, the sums of the estimated coefficients of *EM* and *EM*Rating existence* are significantly positive. The results indicate that managers of rated IPO firms tend to employ EM in the issue year for informative purposes; therefore, the level of

income-enhancing EM in the offering year is positively related to post-IPO operating cash flows.

In Panel B, I employ ROA as a measure of accounting performance. I analyse both raw ROA and industry-adjusted ROA. For regressions using raw ROA, the coefficients on *EM* is significantly negative at either 5% or 10% level for *abnormal accruals, abnormal cash flow from operations,* and *abnormal discretionary expenses.* The coefficients on the interaction term *EM*Rating existence* are positive and strongly significant for all EM measures. Except for *abnormal discretionary expenses,* the sums of the estimated coefficients of *EM* and *EM*Rating existence* are positively significant for all other EM measures. For regressions using industry-adjusted ROA, the coefficients on EM are also significantly negative at the 10% level for *abnormal cash flow from operations* and *abnormal discretionary expenses.* The coefficients on the interaction term and the p-value of the F-test of (*EM + EM*Rating existence)* are similar to regressions using raw ROA described above apart from a minor difference that the coefficient on *EM*Rating existence* for *abnormal discretionary expenses* is still positive but insignificant. In general, the results of the analysis of post-issue ROA indicate that for unrated issuers, future earnings are more likely to worsen with the extent of income-increasing EM in the issue year; while for rated issuers the extent of income-increasing EM during the IPO year is positively linked to subsequent future earnings. This is consistent with the results in Panel A. As a robustness check, besides CFO and ROA in the fiscal year following the IPO, I analyse the average CFO and ROA over the three years after the IPO. I also estimate the equations (2.9) and (2.10) again including both the main effects of *EM* and *Rating existence* in the regressions. In untabulated results, I obtain consistent results which indicate the informative purposes of rated IPO firms' managers in employing EM in the offering year. Overall, the findings support the second hypothesis that at-issue income-increasing EM is positively associated with subsequent accounting performance for rated IPO firms. This is consistent with the notion that managers of rated IPO firms exercise their accounting and operating discretion with the aim of better informing the market.

2.6.3. At-issue earnings management and post-issue long-run stock performance

I report the results of the cross-sectional regression analyses of post-issue long-run stock performance in Table 2.7. Panel A presents the results for the regressions of

post-issue three-year BHARs on at-issue income-increasing EM. The coefficients on *EM* are significantly negative for regressions using *abnormal accruals*, *abnormal cash flow from operations,* and *abnormal production costs* as EM measures. This suggests that managers of unrated IPO firms generally manipulate earnings in the issue year for opportunistic purposes to mislead investors; therefore, the post-issue long-run stock performance deteriorates with the extent of upward EM through accruals and operating activities related to sales, and production. In a high information asymmetry environment, investors are less likely to recognise managers' manipulation activities; hence, when actual earnings in the future do not meet their expectation, they revise downward their valuation, leading to negative abnormal stock returns in the post-issue period. The coefficients on *EM*Rating existence* is significantly positive for specifications using *abnormal accruals* as an EM measure, implying that in comparison with unrated issuers, the long-run stock performance of rated IPO firms improves with the extent of accrual-based EM. The insignificance of the F-tests of [*EM + EM*Rating existence* = 0] across all regressions with different EM measures indicates that for rated IPO firms, post-issue long-run stock performance is generally unrelated to the extent of income-increasing EM in the offering year. Panel C presents the intercept estimates of Fama and French three-factor model and Carhart four-factor model. The results are consistent for both factors models. The intercept estimate of the regression using *abnormal accruals* to measure EM is negative and significant at the 1% level for the sample of IPOs without credit ratings. The finding holds for *abnormal cash flow from operations,* but the significance level is lower at the 10%. This indicates that unrated IPO issuers aggressively employ accrual-based EM and real EM through sales manipulation underperform those conservatively undertaking these EM tools. However, for the sample of rated IPO firms, the intercept estimates are insignificantly different from zero across all specifications of EM measures apart from *abnormal production costs* which is marginally significantly negative. This suggests that for rated issuers, the difference in post-issue long-run abnormal stock returns is not significant between aggressive and conservative issuers.

Taking together the results from the analysis of long-term stock performance using BHARs and factors models, I find that issue-year income-increasing accrual-based EM predicts the post-issue deterioration in stock performance for IPO firms without credit ratings. This is consistent with prior literature (e.g., Teoh et al. (1998a), Teoh et al. (1998b), and Morsfield and Tan (2006)). However, the finding of the association between at-issue abnormal accruals and post-issue underperformance is not applicable to rated IPO

firms. For rated issuers, the at-issue EM does not explain post-issue IPO underperformance. The results support the third hypothesis that the post-issue long-run stock performance is unrelated to the extent of at-issue income-increasing EM for rated IPO issuers. The managers of rated firms tend to exercise their discretion in the offering year to better inform the market of the firm's future prospects. Plus, lower information asymmetry due to the provision of a credit rating allows investors to more accurately interpret the information conveyed by managers through EM and incorporate it into their firm valuation, resulting in insignificant long-run stock performance.

2.7. Additional tests and robustness checks

In the main analysis, I document that IPO firms with credit ratings have a significantly lower level of both accrual-based and real EM than those without credit ratings. In this section, I provide additional auxiliary tests to check the validity of the findings.

2.7.1. Credit rating levels and earnings management around IPOs

The results so far indicate that the presence of a credit rating prior to the stock issue is associated with the lower level of income-increasing EM in the offering year. Specifically, managers of rated IPOs are less likely to manipulate either accruals or real activities to distort reported earnings. In this section, I further examine whether credit rating levels can signal the extent of EM in the IPO year. I create the variable *rating level* which takes the value from 1 to 22, equivalent to the lowest rating D to the highest rating AAA. A higher rating corresponds to a higher value. I regress different EM proxies on *rating level* and other controls for determinants of EM as previously discussed in Section 2.5.1.

I continue to employ the instrumental variable method to correct for the potential endogeneity of credit rating levels. I also include *industry profitability* and *industry risk* in the first-stage regression. In addition, to control for the average credit rating level of rated firms in an industry, I substitute *industry fraction* with *industry level*, which is computed as the median credit rating level of all rated firms in the same three-digit SIC industry as the IPO firm in the fiscal year end prior to the offering. I report the results of the regressions of income-increasing EM on credit rating levels in Table 2.8. The estimated coefficients on *rating level* across all specifications are insignificant at conventional levels. The result suggests that credit rating levels do not predict the

magnitude of EM in the offering year. What matters in influencing EM undertaken by IPO issuers are the presence of CRAs and the existence of credit ratings. Managers have fewer incentives to manipulate earnings under additional scrutiny of CRAs and in lower information asymmetry environment due to the provision of credit ratings. As an additional check, I create an indicator variable equal to one if the credit rating is investment grade and test whether EM is different among firms with investment grade credit ratings. In untabulated results, the coefficients on the indicator variable of investment grade are insignificant across regressions using different EM measures, indicating that credit rating investment grades do not explain the variation in EM by IPO issuers. Moreover, since the majority (96%) of IPO firms in the sample have non-investment grade credit ratings (BB+ and above) and the rating levels cluster in the range of 7 to 12 (equivalent to B- to BB+), I also check the results on the sample of IPO firms whose rating levels range from 7 to 12 and obtain similar results.

2.7.2. Interaction effects of credit rating agencies and other financial intermediaries

Auditors, venture capitalists, and investment banks are financial intermediaries that are closely involved in the IPO process. Several studies indicate the constraining effects of these intermediaries on EM by IPO firms. Venkataraman et al. (2008) report that auditors are more conservative in auditing IPO firms' financial reports due to greater litigation exposure in the IPO market. Morsfield and Tan (2006), Hochberg (2012), and Wongsunwai (2013) suggest that the monitoring of venture capitalists can restrain EM by IPO firms. Jo et al. (2007) argue that due to reputational concerns and litigation risks, prestigious underwriters make an effort to constrain firms' EM. Lee and Masulis (2011) document a negative association between EM and more reputable venture capitalists and investment banks. In the main analysis, I find evidence that the presence of CRAs reduces EM by IPO issuers. In this section, I examine whether CRAs exert influence on EM decisions by IPO firms which are venture backed, underwritten by reputational investment banks, or audited by big six accounting firms. I create an interaction term between *rating existence* and each of the variables *venture capitalist, highly ranked underwriter,* and *big6 auditor*. I then run regressions separately for each interaction effect. The results are presented in Table 2.9.

Panel A reports the results of the regressions of EM on rating existence controlling for the interaction effect between CRAs and venture capitalists. The coefficients on *rating*

existence remain significantly negative, indicating that for IPOs without venture backing, having a credit rating is still associated with less EM. The F-tests of [*Rating existence + Rating existence*Venture capitalist]* give significant negative results in regressions employing *abnormal accruals, abnormal cash flow from operations,* and *REM2* as dependent variables. This suggests that for venture-backed IPOs, issuers with credit ratings have a lower level of accrual-based EM, sales-based real EM, and the combination of sales and discretionary expense manipulation than those without credit ratings.

The results presented in Panel B account for the interaction effect between CRAs and top-tier underwriters. The coefficient on *rating existence* is significantly negative only for the regression with the dependent variable of *abnormal accruals.* For IPO firms not being underwritten by top-tier investment banks, having a credit rating is associated with lower accrual-based EM, but not with lower real EM. The findings suggest that the presence of a reputable underwriter is important in contributing to the reduction effect of credit ratings on real EM. Moreover, I obtain significant negative results for the F-tests of [*Rating existence + Rating existence*Highly ranked underwriter]* for specifications using *abnormal accruals, abnormal cash flow from operations, abnormal discretionary expenses,* and *REM2* as EM measures. This indicates that among IPO firms being underwritten by reputable investment banks, firms with credit ratings have significantly less EM through accruals, sales and discretionary expenses than those without credit ratings.

Panel C shows the results of the regressions controlling for the interaction effect between CRAs and big six auditing firms. For IPOs not being audited by big six auditors, the presence of a CRA is not significantly related to lower levels of either accrual-based or real EM. This implies that the certification of financial statements by an experienced auditing firm is important for a CRA to effectively exert its influence on EM by an IPO firm. For IPOs being audited by the big six, rated firms are less likely to engage in accrual-based EM and real EM through sales and discretionary expenses manipulation.

To summarize, without a venture capitalist, rating existence remains negatively related to the level of EM in the offering year. However, without a top-tier underwriter, the negative association between credit rating and EM holds for accrual-based EM, but not real EM. Going public without a big six auditor indicates that the restraining effect of CRAs on EM no longer holds. In the presence of a venture capitalist, a reputable investment bank, or a big six auditor, rated issuers are less likely to undertake accrual-based EM and some real EM methods than unrated ones.

2.7.3. Other robustness tests

First of all, I conduct a robustness control for the existence of multicollinearity. In the main analysis, I provide a correlation matrix and show that there is no multicollinearity among the variables. Besides the bivariate method to examine whether there is a relationship between one variable and one of the other variables, I also check the severity of multicollinearity in the regression analysis using variance inflation factor (VIF). VIF measures the extent to which the variance of the estimated coefficients is inflated due to collinearity among independent variables in the regression. Panel A of Table 2.10 presents the VIFs of the estimated coefficients in each of the regressions of EM proxies (i.e., *abnormal accruals, abnormal cash flows from operations, abnormal production costs, REM1,* and *REM2*) on *rating existence.* The VIFs of the estimated coefficients across all regressions range from just above 1 to less than 2.5, indicating low multicollinearity among independent variables in the regressions.

The credit rating sector is highly concentrated with the three largest CRAs (i.e. S&P, Moody's, and Fitch) covering approximately 95% of the rating business. For robustness, I expand the sample of rated IPOs to include firms obtaining ratings from either of the three CRAs. The data for long-term corporate credit ratings from Moody's and Fitch are extracted from Bloomberg. This increases the sample of rated IPOs to 174 firms. There are 47 firms having credit ratings from more than one rating agency. I re-estimate the main regressions and report the results in Panel B of Table 2.10. I continue to report that rated firms are less likely to engage in accrual-based and real EM.

In addition, concerns have been raised regarding the ability of CRAs to give advance warning of financial crises. For example, during the internet bubble period, S&P and Moody's assigned investment grade ratings to Enron, World.com, and Parmalat just a short period before they went bankrupt[5]. In July 2007, the US market witnessed a mass significant downgrade by CRAs for thousands of residential mortgage-backed securities that were issued a year earlier. To control for these turbulent periods, I include in the main model an indicator variable *dotcom* that equals to one if the IPO took place during the

[5] In the Internet bubble period, S&P and Moody's assigned investment grade ratings to Enron until November 27, 2001 - six days before its bankruptcy; Moody's and S&P gave Worldcom investment grade ratings about two months before its bankruptcy; Parmalat also received an investment grade rating from S&P until 18 days before its bankruptcy on December 27, 2003 (Coffee 2006).

dot-com bubble period 1999–2000 and zero otherwise, and an indicator variable *crisis* that equal to one if the IPO occurred during the financial crisis 2007–2008 and zero otherwise. Another important event that may affect the results is the passage of Sarbanes-Oxley Act (SOX). SOX was passed by the US Congress and enacted in 2002 as a reaction to a series of corporate scandals including those affecting Enron and World.com. The bill aims to restore investor confidence in financial reporting and assure the integrity of capital markets. It entails a number of strict regulations to strengthen financial disclosures and protect investors from potential fraudulent accounting practices. Lobo and Zhou (2006) report that SOX's requirement for the certification of financial statements by CEOs and CFOs influences managerial accounting discretion towards higher conservatism in financial reporting. Cohen et al. (2008) also document changes in managerial choice of EM methods towards more real EM after the passage of SOX. To capture the effect of SOX, I create an indicator variable *SOX* that equals to one for IPOs occurring after the passage of SOX and zero otherwise. I re-run the main regressions with three additional indicator variables *dotcom, crisis,* and *SOX*. To avoid multicollinearity, I do not include year fixed effects in the regressions. The results are presented in Panel C of Table 2.10. I still obtain similar results with the main findings. Specifically, there is strong evidence that rated IPO firms are less likely to undertake accrual-based and real EM than unrated IPO firms.

2.8. Conclusion

This study provides new empirical evidence regarding the effect of credit ratings on EM around IPOs. Particularly, firms with credit ratings are associated with lower EM in the offering year. CRAs are highly capable of identifying managers' misbehaviours due to their profound expertise, experience, and access to a large pool of both private and public information. Moreover, reputational concerns and litigation risks strengthen the incentives of CRAs to thoroughly monitor and detect reporting misrepresentations of the issuer. The additional monitoring from CRAs and reduced information asymmetry due to the provision of a credit rating weaken the incentives of rated IPO firms to bias reported earnings through accrual and real activities manipulation because their misbehaviours are more likely to be detected. Additionally, I find no evidence that rating levels explain the variation in EM around IPOs. Particularly, I document that the impact of CRAs in restraining EM is less pronounced when controlling for the interaction effects between

CRAs and other financial intermediaries including venture capitalists, investment banks, and big six auditors. For IPOs without a venture capitalist, CRAs still restrain both accrual-based and real EM. For issuers without a top-tier underwriter, the negative association between credit ratings and EM holds for accrual-based EM, but not real EM. For firms going public without a high quality auditor, the restraining effect of CRAs on EM no longer holds. Thus, the involvement of experienced auditors in certifying accounting information is essential for CRAs to impose their impacts on reducing EM around IPOs.

In my analysis, I examine both accrual-based and real EM and employ various measures of EM. I also control for the endogenous selection problem in the firm's choice to obtain a credit rating by employing different econometric approaches including Heckman's (1979) two-step treatment effect model, MLE treatment effect model, and 2SLS IV model. Furthermore, the results remain robust when I use ratings from S&P, Moody's, and Fitch to determine the existence of a credit rating. The findings still remain consistent when controlling for critical periods that may affect the influence of CRAs on EM including the Internet bubble (1999–2000), the financial crisis (2007–2008), and the post-Sarbanes Oxley Act (2002).

Additionally, I examine the influence of having a credit rating on managerial intent to exercise accounting and operating discretion to inflate earnings in the IPO year. I find that income-increasing EM in the offering year of rated IPOs is positively linked to subsequent accounting performance, which is consistent with the notion that managers of rated IPO firms tend to exercise their accounting discretion to communicate to the market about the firm's future prospects. The insignificant association between at-issue income-increasing EM and future earnings for unrated firms suggest that they are more likely to opportunistically manage earnings. Analysing post-issue long-run stock performance, I reveal that while abnormal accruals in the offering year explain the variation in post-issue IPO underperformance for unrated firms, they are not related to post-IPO long-run stock performance of rated issuers. This indicates that investors are unable to see through the opportunistic EM by unrated IPO issuers; however, for rated IPO issuers, investors are more likely to accurately interpret the information conveyed by managers through at-issue EM and derive the fair market value of the stock, resulting in insignificant post-issue long-run abnormal stock returns. The overall evidence suggests the importance of CRAs in explaining the extent of income-increasing EM around IPOs and managers' purposes in exercising their discretion to report higher financial outcomes.

Table 2. 1 Variable definition

Variable	Definition
Measures of earnings management	
Abnormal accruals	Abnormal accruals computed using the modified Jones model and adjusted for abnormal accruals of a performance-matched non-IPO firm. The methodology to estimate abnormal accruals is explained in Section 2.4.2.1.
Abnormal cash flow from operations	Abnormal cash flow from operations multiplied by minus one. The methodology to estimate abnormal cash flow from operations is explained in Section 2.4.2.2.
Abnormal production costs	Abnormal production costs, where production costs are the sum of cost of goods sold and change in inventories. The methodology to estimate abnormal production costs is explained in Section 2.4.2.2.
Abnormal discretionary expenses	Abnormal discretionary expenses multiplied by minus one, where discretionary expenses are the sum of advertising expenses, R&D expenses, and SG&A expenses. The methodology to estimate abnormal discretionary expenses is explained in Section 2.4.2.2.
REM1	First measure of overall level of real earnings management computed as the sum of abnormal production costs and abnormal discretionary expenses.
REM2	Second measure of overall level of real earnings management computed as the sum of abnormal cash flow from operations and abnormal discretionary expenses.
Credit rating variables	
Rating existence	Indicator variable that equals to one if the firm has a credit rating one month prior to the offering, and zero otherwise (*Compustat*).
Rating level	Credit rating level that ranges from 1 (D rating) to 22 (AAA rating) (*Compustat*).
Firm and offering characteristics	
Firm age	Age of the firm in years. Firm age is the difference between the firm's offering year and its founding year. Company founding years are collected from the Field-Ritter dataset.[6]
Market value	Market value of the firm in the year of the offering (*Compustat* PRCC_F*CSHO).

[6] The Field-Ritter dataset is available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/FoundingDates.htm.

Leverage	Ratio of total debts to total assets (*Compustat* (DLC + DLTT)/AT).
Loss	Indicator variable that equals to one if the firm has negative earnings before interest and taxes (*Compustat* EBIT) in the fiscal year prior to the offering, and zero otherwise.
CAPEX	Average capital expenditures (*Compustat* CAPX) in the offering year and one year after scaled by total assets (*Compustat* AT) in the beginning of the offering year.
ROA	The ratio of net income to total assets (*Compustat* NI/AT).
CFO	Cash flow from operations to total assets (*Compustat* OANCF/AT).
Industry-adjusted ROA	Industry-adjusted ROA that is calculated by subtracting the median ROA (*Compustat* NI/AT) of the two-digit SIC industry group from the firm's ROA.
Industry-adjusted CFO	Industry-adjusted CFO that is calculated by subtracting the median CFO (*Compustat* OANCF/AT) of the two-digit SIC industry group from the firm's CFO.
Big6 auditor	Indicator variable that equals to one if the IPO firm is audited by a big six audit firm, and zero otherwise. Big six audit firms include Arthur Andersen, Coopers & Lybrand, Ernst & Young, Deloitte & Touche, KPMG, and PricewaterhouseCoopers (*Compustat* AU).[7]
Venture capitalist	Indicator variable that equals to one if the firm is venture-backed, and zero otherwise (*SDC*).
Highly ranked underwriter	Indicator variable that equals to one if the firm is underwritten by most reputable underwriters, and zero otherwise (*SDC*). Most reputable underwriters are those with a ranking score of 9.0 or above based on Jay Ritter's underwriter rankings.[8]
Book-to-market	Ratio of book value to market value at the end of the fiscal year of the offering (*Compustat* CEQ/PRCC_F*CSHO).

[7] Coopers & Lybrand merged with Pricewaterhouse on July 1, 1998. Arthur Andersen ceased to operate after Enron scandal in 2002.

[8] IPO underwriter reputation rankings are available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/ipodata.htm.

High-tech industry	Indicator variable that equals to one if the firm is in the high-tech industry, and zero otherwise. High-tech industries are those with a SIC code of 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), 7371-7375, 7378, 7379 (software) (*SDC*).
Stock returns variables	
BHAR	Three-year post-issue buy-and-hold abnormal return is calculated as the difference between the three-year buy-and-hold return of the firm and the three-year buy-and-hold return of the benchmark. The three-year period starts from the day after the annual financial report in the offering year to the earlier of the three year anniversary date and the delisting date. Stock returns are collected from *CRSP*, the benchmark used is the CRSP market index.
Market BHR	Three-year buy-and-hold value weighted market index return (*CRSP*).
Underpricing	Stock return of the firm on the first day of trading (*CRSP)*.
POSEM	Monthly return of the portfolio of IPO firms that undertake income-increasing EM in the offering year.
NEGEM	Monthly return of the portfolio of IPO firms that undertake income-decreasing EM in the offering year.
MKT	Excess monthly return on the value-weighted CRSP index. The factor is retrieved from Professor Kenneth French's website[9].
SMB	Difference in the monthly returns of value-weighted portfolios of small and large stocks. The factor is retrieved from Professor Kenneth French's website.
HML	Difference in the monthly returns of value-weighted portfolios of high book-to-market stocks and low book-to-market stocks. The factor is retrieved from Professor Kenneth French's website.
Instrumental variables	
Industry fraction	Logarithm of one plus the percentage of firms having credit ratings in the same three-digit SIC industry as the IPO firm (*Compustat*).
Industry level	Median credit rating level of firms having credit ratings in the same three-digit SIC industry as the IPO firm. Credit rating level ranges from 1 (D rating) to 22 (AAA rating) (*Compustat*).

[9] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Industry profitability	Median ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets (*Compustat* EBITDA/AT) of firms in the same three-digit SIC industry as the IPO firm.
Industry risk	Standard deviation of the ratio of earnings before interest, taxes, depreciation and amortization (EBITDA) to total assets (*Compustat* EBITDA/AT) of firms in the same three-digit SIC industry as the IPO firm.

Table 2. 2 IPO characteristics and distribution

The table presents the characteristics and distribution of US IPOs from 1991 to 2011. *N* denotes the number of observations. IPO characteristics are measured for the fiscal year of the offering. Credit rating level is categorised from 1 to 22, and a higher rating level takes a higher value.

Panel A: IPO characteristics

	All IPOs (*N* = 2,602)		Rated IPOs (*N* = 153)		Unrated IPOs (*N* = 2,449)	
	Mean	Median	Mean	Median	Mean	Median
Firm age	16.08	9.00	36.86	24.00	14.78	8.00
Initial return	0.22	0.10	0.09	0.05	0.23	0.11
Offer price (in US$)	12.94	12.50	16.23	16.00	12.73	12.00
Proceeds (in US$ million)	85.25	42.90	347.96	140.40	68.83	40.80
Total assets (in US$ million)	317.72	75.94	2,202.45	686.50	201.58	70.03
Total sales (in US$ million)	296.02	56.26	2,104.96	546.25	184.55	51.11
Market value (in US$ million)	545.59	182.87	2,023.18	604.68	456.66	166.12
ROA	-0.49	0.04	0.01	0.02	-0.52	0.05
BHAR	-0.07	-0.43	0.03	-0.01	-0.08	-0.45
Book-to-market	0.34	0.28	0.26	0.29	0.35	0.28

Panel B: Time distribution

Year	All IPOs (*N* = 2,602)		Rated IPOs (*N* = 153)		Unrated IPOs (*N* = 2,449)	
	N	*%*	*N*	*%*	*N*	*%*
1991	111	4.01	7	4.38	104	3.98
1992	185	6.68	9	5.63	176	6.74
1993	226	8.16	14	8.75	212	8.12
1994	186	6.71	4	2.50	182	6.97
1995	214	7.72	9	5.63	205	7.85
1996	301	10.86	11	6.88	290	11.11
1997	213	7.69	9	5.63	204	7.81
1998	140	5.05	6	3.75	134	5.13
1999	243	8.77	11	6.88	232	8.89
2000	167	6.03	7	4.38	160	6.13
2001	35	1.26	2	1.25	33	1.26
2002	40	1.44	3	1.88	37	1.42
2003	37	1.34	7	4.38	30	1.15
2004	95	3.43	10	6.25	85	3.26
2005	80	2.89	8	5.00	72	2.76
2006	91	3.28	14	8.75	77	2.95
2007	99	3.57	5	3.13	94	3.60
2008	12	0.43	1	0.63	11	0.42
2009	31	1.12	5	3.13	26	1.00
2010	52	1.88	10	6.25	42	1.61
2011	44	1.59	1	0.63	43	1.65

Panel C: Industry distribution

Industry name	SIC codes	All IPOs		Rated IPOs		Unrated IPOs	
		N	*%*	*N*	*%*	*N*	*%*
Oil and gas	13	48	1.84	6	3.92	42	1.71
Food products	20	38	1.46	7	4.58	31	1.27
Chemical products	28	218	8.38	9	5.88	209	8.53
Manufacturing	30-34	91	3.49	16	10.45	75	3.07
Computer equipment & services	35, 73	809	31.09	13	8.5	796	32.51
Electronic equipment	36	242	9.30	8	5.23	234	9.55
Scientific instruments	38	193	7.42	8	5.23	185	7.55
Transportation and public utilities	40-49	204	7.83	28	18.29	176	7.18
Wholesale and retail trade	50-59	312	11.99	25	16.34	287	11.72
Entertainment services	70, 78, 79	51	1.96	3	1.96	48	1.95
Health services	80	90	3.46	5	3.27	85	3.47
All others	10, 12, 14-17, 21-27, 29, 37, 39, 72, 75, 76, 82, 83, 87	306	11.78	25	16.34	281	11.46
Total	57	2,602	100	153	100	2,449	100

Panel D: Credit rating level distribution

Credit rating level	Rating level	All rated IPOs	*%*
AAA	22	1	0.65
AA+	21	0	0.00
AA	20	0	0.00
AA-	19	0	0.00
A+	18	0	0.00
A	17	1	0.65
A-	16	1	0.65
BBB+	15	0	0.00
BBB	14	2	1.31
BBB-	13	1	0.65
BB+	12	2	1.31
BB	11	9	5.88
BB-	10	27	17.65
B+	9	66	43.14
B	8	27	17.65
B-	7	12	7.84
CCC+	6	4	2.61
CCC	5	0	0.00
CCC-	4	0	0.00
CC	3	0	0.00
C	2	0	0.00
D	1	0	0.00
	A rating category	3	1.95
	B rating category	146	95.43
	C and D rating category	4	2.61
	Investment grade (BBB- and above)	6	3.91
	Non-investment grade (BB+ and below)	147	96.08

Table 2. 3 Descriptive statistics

The table presents the descriptive statistics of firm characteristics and earnings management proxies for the sample of US IPOs over the period from 1991 to 2011. Panel A illustrates the descriptive statistics for the overall sample and sub-samples of unrated and rated IPO firms. Panel B shows the correlation matrix. T-tests and Wilcoxon sign rank tests are used to examine the difference of means and medians from zero. Tests of difference in means and medians between the two samples of unrated and rated IPOs are based on t-tests and Wilcoxon rank sum tests. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. *N* denotes the number of observations. All variables are defined in Table 2.1.

Panel A: Descriptive statistics for overall sample and sub-samples of unrated and rated IPO firms

	All IPO firms			Unrated IPO firms			Rated IPO firms				
	N	Mean	Median	*N*	Mean	Median	*N*	Mean	Median	Difference in mean (p-value)	Difference in median (p-value)
Firm characteristics											
Firm age	2,602	16.08	9.00	2,449	14.78	8.00	153	36.86	24.00	0.000	0.000
Market value	2,602	445.54	184.23	2,449	395.94	171.38	153	1,252.28	497.43	0.000	0.000
Leverage	2,602	0.73	0.73	2,449	0.71	0.66	153	0.96	0.89	0.000	0.000
Loss	2,602	0.37	0.37	2,449	0.39	0.00	153	0.08	0.00	0.000	0.000
Highly ranked underwriter	2,602	0.36	0.36	2,449	0.34	0.00	153	0.68	1.00	0.000	0.000
Big6 auditor	2,602	0.92	0.92	2,449	0.92	1.00	153	0.96	1.00	0.032	0.063
Venture capitalist	2,602	0.51	0.51	2,449	0.53	1.00	153	0.18	0.00	0.000	0.000
Industry-adjusted ROA	2,602	-0.17	-0.17	2,449	-0.18	-0.00	153	-0.01	-0.01	0.000	0.534
CAPEX	2,602	0.41	0.41	2,449	0.43	0.14	153	0.12	0.07	0.112	0.000
Earnings management proxies											
Abnormal accruals	2,324	-0.03**	0.02***	2,188	-0.03**	0.03***	136	-0.04	-0.01	0.480	0.060
Abnormal cash flow from operations	2,354	0.10***	0.03***	2,217	0.10***	0.03***	137	-0.00	0.02	0.052	0.165
Abnormal production costs	1,038	-0.11***	-0.08***	938	-0.12***	-0.09***	100	-0.01	-0.01	0.107	0.008
Abnormal discretionary expenses	2,211	-0.65***	-0.25***	2,088	-0.69***	-0.29***	123	0.02	0.02	0.000	0.000
REM1	968	-0.80***	-0.30***	879	-0.88***	-0.40***	89	0.06	0.08**	0.000	0.000
REM2	2,179	-0.56***	-0.21***	2,059	-0.59***	-0.24***	120	0.02	0.01	0.000	0.000

Panel B: Correlation matrix

	Rating existence	Log(1+firm age)	Ln(market value)	Leverage	Loss	Highly ranked underwriter	Big6 auditor	Venture capitalist	Industry-adjusted ROA	CAPEX
Rating existence	1.000									
Log(1 + firm age)	0.216	1.000								
Ln(market value)	0.217	0.069	1.000							
Leverage	0.125	0.070	-0.048	1.000						
Loss	-0.146	-0.400	0.126	0.042	1.000					
Highly ranked underwriter	0.165	0.101	0.453	-0.023	0.020	1.000				
Big6 auditor	0.036	-0.006	0.164	-0.076	0.015	0.161	1.000			
Venture capitalist	-0.164	-0.274	0.091	-0.136	0.390	0.021	0.175	1.000		
Industry-adjusted ROA	0.078	0.270	-0.032	-0.356	-0.615	0.028	0.018	-0.247	1.000	
CAPEX	-0.025	-0.122	0.032	0.110	0.080	0.020	0.005	0.029	-0.179	1.000

Table 2. 4 Regressions of accrual-based earnings management on credit rating existence

The table presents the regression analyses of the association between abnormal accruals and credit rating existence for the sample of US IPOs over the period 1991-2011 using the three estimation approaches: Heckman's two-step treatment effect model, maximum likelihood estimation (MLE) treatment effect model, and instrumental variable (IV) model. Panel A and Panel B show the results of the regressions with abnormal accruals being measured using the performance-matching modified Jones (1991) model and Dechow and Dichev (2002) accruals model, respectively. All regressions control for year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Modified Jones (1991) model with performance matching

Dependent variable: Abnormal accruals						
	Heckman		MLE		IV	
	Selection	Outcome	Selection	Outcome	Selection	Outcome
Rating existence		-0.650***		-0.283***		-1.207**
		(-2.79)		(-4.58)		(-2.04)
Log(1+ firm age)		-0.185***		-0.184***	0.066***	-0.106*
		(-5.32)		(-5.18)	(2.92)	(-1.79)
Ln(market value)		0.001		0.001	0.044***	0.050
		(0.11)		(0.08)	(4.39)	(1.57)
Leverage		0.067**		0.063*	0.046***	0.119**
		(2.14)		(1.94)	(2.67)	(2.34)
Loss		0.074*		0.076*	0.006	0.078
		(1.95)		(1.72)	(0.28)	(1.60)
Highly ranked underwriter		-0.033		-0.036	0.017	-0.014
		(-1.10)		(-1.16)	(0.95)	(-0.36)
Big6 auditor		0.029		0.029	0.008	0.035
		(0.60)		(0.69)	(0.35)	(0.72)
Venture capitalist		-0.056**		-0.049*	-0.047***	-0.109**
		(-2.04)		(-1.85)	(-3.93)	(-2.54)
Industry-adjusted ROA		0.002		0.000	0.012	0.015
		(0.04)		(0.00)	(0.67)	(0.29)
CAPEX		0.014***		0.014***	-0.001	0.013***
		(4.69)		(3.56)	(-1.39)	(3.61)
Intercept	-2.183***	0.381***	-2.217***	0.357***	-0.284***	0.066
	(-15.36)	(3.86)	(-17.58)	(4.03)	(-4.71)	(0.35)
Industry fraction	8.235***		8.564***		0.533**	
	(6.01)		(6.86)		(2.31)	
Industry profitability	0.191		0.288		0.045	
	(0.19)		(0.31)		(0.57)	
Industry risk	-0.004		-0.003		0.000	
	(-0.28)		(-0.48)		(-1.07)	
Inverse Mills ratio	0.265**					
	(2.40)					
Likelihood ratio test against H_0: $\rho = 0$ (p-value)				0.000		
Durbin-Wu-Hausman test against H_0: *variables are exogenous* (p-value)						0.018
Number of observations	1,000	1,000	1,000	1,000	1,000	1,000

Panel B: Dechow and Dichev (2002) accruals model

Dependent variable: Abnormal accruals						
	Heckman		MLE		IV	
	Selection	Outcome	Selection	Outcome	Selection	Outcome
Rating existence		-0.345***		-0.157***		-0.755**
		(-2.85)		(-5.56)		(-2.22)
Log(1 + firm age)		-0.052**		-0.054**	0.000	-0.048
		(-2.24)		(-2.22)	(0.00)	(-1.22)
Ln(market value)		-0.002		-0.003	0.060***	0.041*
		(-0.25)		(-0.38)	(3.79)	(1.66)
Leverage		0.026		0.025	0.093**	0.093**
		(1.50)		(1.10)	(2.51)	(2.11)
Loss		-0.056**		-0.052**	-0.080***	-0.112***
		(-2.23)		(-1.99)	(-2.63)	(-2.60)
Highly ranked underwriter		-0.009		-0.008	0.029	0.011
		(-0.52)		(-0.51)	(1.11)	(0.43)
Big6 auditor		-0.029		-0.030	0.007	-0.025
		(-1.05)		(-0.90)	(0.19)	(-0.60)
Venture capitalist		-0.004		0.001	-0.036	-0.032
		(-0.23)		(0.06)	(-1.29)	(-1.03)
Industry-adjusted ROA		-0.141***		-0.141***	-0.020	-0.155***
		(-5.64)		(-3.38)	(-0.63)	(-3.58)
CAPEX		0.046***		0.046**	-0.038***	0.021
		(4.23)		(2.36)	(-2.72)	(1.02)
Intercept	-1.702***	0.177**	-1.746***	0.168***	0.024	0.183
	(-10.96)	(2.35)	(-12.79)	(3.00)	(0.12)	(1.20)
Industry fraction	5.789***		6.550***		0.761*	
	(3.25)		(3.86)		(1.76)	
Industry profitability	1.127		1.045		-0.008	
	(1.12)		(0.83)		(-0.06)	
Industry risk	-0.013		-0.014		-0.001	
	(-0.91)		(-1.45)		(-1.31)	
Inverse Mills ratio	0.151**					
	(2.41)					
Likelihood ratio test against H_0: $\rho = 0$ (p-value)				0.000		
Durbin-Wu-Hausman test against *H_0: variables are exogenous* (p-value)						0.000
Number of observations	494	494	494	494	494	494

Table 2. 5 Regressions of real earnings management on credit rating existence

The table presents the regression analyses of the association between real earnings management and credit rating existence for the sample of US IPOs over the period 1991-2011 using the three estimation approaches: Heckman's two-step treatment effect model, maximum likelihood estimation (MLE) treatment effect model, and instrumental variable (IV) model. All regressions control for year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Heckman's two-step treatment effect

	Abnormal cash flow from operations		Abnormal production costs		Abnormal discretionary expenses		REM1		REM2	
	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome
Rating existence		-0.504**		-0.671**		-0.675***		-0.812**		-0.825***
		(-2.38)		(-2.04)		(-2.67)		(-2.01)		(-2.63)
Log(1 + firm age)		-0.149***		0.056		-0.078		-0.091		-0.045
		(-3.14)		(0.64)		(-1.48)		(-0.85)		(-0.72)
Ln(market value)		0.008		-0.053*		0.031		-0.113***		0.029
		(0.42)		(-1.69)		(1.40)		(-2.66)		(1.10)
Leverage		0.089**		0.024		0.141**		0.053		0.178***
		(2.35)		(0.34)		(2.30)		(0.50)		(2.89)
Loss		-0.102**		0.090		0.073		0.015		0.013
		(-2.08)		(1.06)		(1.14)		(0.14)		(0.17)
Highly ranked underwriter		-0.084**		-0.082		-0.137***		-0.114		-0.151***
		(-2.20)		(-1.34)		(-2.76)		(-1.38)		(-2.69)
Big6 auditor		0.023		0.153		0.069		0.156		-0.024
		(0.36)		(1.54)		(0.88)		(1.15)		(-0.27)
Venture capitalist		-0.066*		0.009		-0.035		-0.066		-0.053
		(-1.76)		(0.12)		(-0.71)		(-0.66)		(-0.94)
Industry-adjusted ROA		-0.716***		-0.478***		-0.264***		-0.355***		-0.241***
		(-17.75)		(-6.07)		(-3.30)		(-2.95)		(-3.75)

CAPEX		0.018***		0.277***		0.007		0.232*		0.034***
		(4.55)		(4.18)		(0.28)		(1.80)		(2.89)
Intercept	-2.248***	0.311**	-1.778***	0.478	-1.954***	0.196	-1.515***	1.261***	-2.004***	0.262
	(-17.73)	(2.33)	(-10.80)	(1.59)	(-13.06)	(1.21)	(-8.60)	(3.10)	(-14.12)	(1.44)
Industry fraction	9.438***		6.732***		9.418***		6.628***		8.839***	
	(7.46)		(3.58)		(5.65)		(3.26)		(5.61)	
Industry profitability	1.027		1.714*		-0.290		1.199		0.081	
	(1.25)		(1.81)		(-0.33)		(1.29)		(0.10)	
Industry risk	-0.002		0.005		0.005		0.004		0.005	
	(-0.18)		(0.82)		(0.95)		(0.70)		(0.96)	
Inverse Mills ratio	0.182*		0.342*		0.292**		0.409*		0.348**	
	(1.73)		(1.95)		(2.22)		(1.81)		(2.18)	
Number of observations	1,037	1,037	361	361	544	544	266	266	610	610

Panel B: Treatment effect with maximum-likelihood estimation

	Abnormal cash flow from operations		Abnormal production costs		Abnormal discretionary expenses		REM1		REM2	
	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome
Rating existence		-0.424***		-0.518***		-0.475***		-0.643***		-0.547***
		(-5.39)		(-4.38)		(-5.04)		(-3.76)		(-5.01)
Log(1 + firm age)		-0.149***		0.051		-0.080		-0.093		-0.047
		(-3.61)		(0.67)		(-1.64)		(-0.96)		(-0.82)
Ln(market value)		0.007		-0.054*		0.029		-0.116***		0.026
		(0.35)		(-1.80)		(1.20)		(-2.66)		(0.94)
Leverage		0.088*		0.026		0.136		0.051		0.173**
		(1.83)		(0.35)		(1.50)		(0.42)		(2.06)

Loss		-0.101*		0.103		0.073		0.028		0.012
		(-1.91)		(1.14)		(1.02)		(0.21)		(0.15)
Highly ranked underwriter		-0.085**		-0.088		-0.135***		-0.119		-0.152***
		(-2.48)		(-1.57)		(-2.63)		(-1.43)		(-2.69)
Big6 auditor		0.024		0.150		0.069		0.160		-0.021
		(0.49)		(1.47)		(0.95)		(1.20)		(-0.25)
Venture capitalist		-0.064*		0.012		-0.032		-0.066		-0.049
		(-1.65)		(0.20)		(-0.63)		(-0.64)		(-0.78)
Industry-adjusted ROA		-0.718***		-0.479***		-0.269**		-0.351**		-0.247***
		(-10.27)		(-4.10)		(-2.20)		(-2.29)		(-2.58)
CAPEX		0.018***		0.282***		0.006		0.237		0.034***
		(2.75)		(2.72)		(0.30)		(1.21)		(5.11)
Intercept	-2.251***	0.306**	-1.817***	0.484**	-1.997***	0.195	-1.554***	1.242***	-2.032***	0.252
	(-18.60)	(2.57)	(-11.51)	(2.02)	(-14.54)	(1.37)	(-9.55)	(3.73)	(-14.95)	(1.50)
Industry fraction	9.538***		7.235***		10.425***		7.320***		9.712***	
	(7.93)		(4.21)		(6.58)		(4.02)		(6.09)	
Industry profitability	1.117		1.997*		-0.348		1.263		-0.122	
	(1.03)		(1.91)		(-0.38)		(1.30)		(-0.14)	
Industry risk	-0.007		0.001		-0.001		0.001		0.000	
	(-1.62)		(0.33)		(-0.31)		(0.15)		(0.01)	
Likelihood ratio test against H_0: $\rho = 0$ (p-value)		0.000		0.000		0.000		0.000		0.000
Number of observations	1,037	1,037	361	361	544	544	266	266	610	610

Panel C: Instrumental variable regression

	Abnormal cash flow from operations		Abnormal production costs		Abnormal discretionary expenses		REM1		REM2	
	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome	Selection	Outcome
Rating existence		-1.525*		-1.592*		-2.122**		-1.847**		-4.055**
		(-1.82)		(-1.91)		(-2.50)		(-1.98)		(-2.16)
Log(1 + firm age)	0.045*	-0.079	-0.041	0.000	-0.006	-0.076	-0.045	-0.163	0.015	0.036
	(1.76)	(-1.23)	(-0.74)	(0.00)	(-0.18)	(-0.94)	(-0.69)	(-1.17)	(0.46)	(0.24)
Ln(market value)	0.050***	0.080	0.070***	0.059	0.040***	0.113**	0.071***	0.021	0.045***	0.214**
	(5.08)	(1.55)	(3.61)	(0.83)	(3.03)	(2.36)	(2.81)	(0.23)	(3.33)	(1.98)
Leverage	0.033**	0.137**	0.105***	0.197	0.114***	0.382**	0.147**	0.329	0.087***	0.531**
	(2.09)	(2.16)	(2.66)	(1.41)	(3.02)	(2.36)	(2.31)	(1.45)	(3.01)	(2.41)
Loss	-0.042**	-0.154**	-0.008	0.054	-0.024	0.022	-0.006	0.004	-0.004	0.006
	(-2.18)	(-2.11)	(-0.16)	(0.45)	(-0.64)	(0.22)	(-0.09)	(0.02)	(-0.12)	(0.04)
Highly ranked underwriter	0.047***	-0.012	0.038	-0.021	0.079**	0.033	0.065	0.004	0.072**	0.148
	(2.60)	(-0.21)	(1.13)	(-0.24)	(2.53)	(0.31)	(1.60)	(0.03)	(2.55)	(0.79)
Big6 auditor	0.015	0.035	0.041	0.208	0.019	0.092	0.023	0.188	0.031	0.074
	(0.52)	(0.55)	(0.77)	(1.55)	(0.56)	(0.91)	(0.32)	(1.00)	(0.84)	(0.45)
Venture capitalist	-0.056***	-0.155**	-0.074**	-0.112	-0.061***	-0.167**	-0.130**	-0.282*	-0.063***	-0.310**
	(-4.12)	(-2.36)	(-2.10)	(-1.03)	(-2.93)	(-2.00)	(-2.39)	(-1.66)	(-2.99)	(-2.10)
Industry-adjusted ROA	-0.006	-0.717***	0.036	-0.424***	0.010	-0.242*	0.088*	-0.209	0.037*	-0.082
	(-0.52)	(-9.99)	(1.22)	(-3.54)	(0.27)	(-1.72)	(1.74)	(-1.10)	(1.67)	(-0.57)
CAPEX	-0.001	0.017***	-0.074***	0.174*	-0.015**	-0.022	-0.099*	0.071	-0.003*	0.023**
	(-1.37)	(2.76)	(-3.01)	(1.74)	(-2.15)	(-0.80)	(-1.91)	(0.36)	(-1.70)	(2.02)
Intercept	-0.291***	-0.074	-0.126	0.264	-0.266***	-0.319	-0.087	1.051*	-0.275***	-0.809
	(-4.83)	(-0.28)	(-0.62)	(0.61)	(-3.15)	(-1.04)	(-0.32)	(1.84)	(-3.61)	(-1.29)
Industry fraction	0.894***		0.925*		1.034***		1.355**		0.707**	
	(3.74)		(1.94)		(2.75)		(2.20)		(2.09)	

Industry profitability	-0.055		0.131		-0.063		-0.077		-0.053	
	(-0.77)		(0.96)		(-0.46)		(-0.38)		(-0.46)	
Industry risk	-0.001*		0.001		0.000		0.000		-0.000	
	(-1.71)		(0.26)		(0.08)		(0.02)		(-0.20)	
Durbin-Wu-Hausman test against *H_0: variables are exogenous* (p-value)		0.079		0.004		0.000		0.002		0.000
Number of observations	1,037	1,037	361	361	544	544	266	266	610	610

Table 2. 6 Analyses of post-issue accounting performance

The table presents the regression analyses of the association between at-issue earnings management and post-issue accounting performance for the sample of US IPOs over the period 1991-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Analyses of post-issue cash flow from operations

Dependent variable: Cash flow from operations						
	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
EM	-0.034	-0.044	0.035	-0.059***	-0.026	-0.032
	(-1.19)	(-1.51)	(1.31)	(-2.65)	(-1.23)	(-1.31)
EM*Rating existence	0.146***	0.319**	0.230***	0.202***	0.131***	0.293***
	(2.59)	(2.26)	(2.96)	(3.16)	(2.71)	(3.68)
CFO	0.044**	0.062***	0.172***	0.047**	0.156***	0.056*
	(2.15)	(2.93)	(6.63)	(1.99)	(6.38)	(1.66)

CAPEX	0.005	0.009**	-0.093*	0.038	-0.069	0.029
	(1.30)	(2.46)	(-1.92)	(1.53)	(-1.53)	(1.63)
Intercept	0.031	-0.131**	-0.010	-0.021	-0.028	-0.034
	(0.94)	(-2.24)	(-0.57)	(-0.35)	(-0.37)	(-0.68)
P-value of F-test [EM + EM*Rating existence= 0]	0.035	0.058	0.001	0.025	0.041	0.001
R-squared	0.172	0.279	0.547	0.281	0.545	0.227
Number of observations	1,125	1,152	393	601	288	676

Dependent variable: Industry-adjusted cash flow from operations

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
EM	-0.026	-0.044	0.033	-0.043**	-0.023	-0.025
	(-0.94)	(-1.52)	(1.29)	(-2.03)	(-1.09)	(-1.03)
EM*Rating existence	0.163**	0.362***	0.230***	0.158**	0.112**	0.271***
	(2.53)	(2.71)	(2.88)	(2.52)	(2.21)	(3.38)
Industry-adjusted CFO	0.045**	0.061***	0.169***	0.049**	0.155***	0.059*
	(2.35)	(2.96)	(7.09)	(2.22)	(6.95)	(1.79)
CAPEX	0.006	0.009**	-0.089*	0.038	-0.067	0.031*
	(1.47)	(2.56)	(-1.75)	(1.54)	(-1.54)	(1.74)
Intercept	0.028	-0.308***	-0.076***	-0.148**	-0.129*	-0.073
	(0.84)	(-7.38)	(-4.18)	(-2.42)	(-1.87)	(-1.55)
P-value of F-test [EM + EM*Rating existence= 0]	0.028	0.021	0.002	0.069	0.098	0.002
R-squared	0.138	0.212	0.491	0.234	0.480	0.185
Number of observations	1,125	1,152	393	601	288	676

Panel B: Analyses of post-issue ROA

Dependent variable: ROA

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
EM	-0.080*	-0.061*	-0.019	-0.087**	-0.032	-0.024
	(-1.73)	(-1.92)	(-0.57)	(-2.15)	(-1.32)	(-0.68)
EM*Rating existence	0.214***	0.453***	0.255***	0.200**	0.186***	0.319***
	(2.66)	(3.44)	(2.67)	(2.14)	(2.96)	(3.26)
ROA	0.042	0.055***	0.072***	0.022	0.064***	0.040*
	(1.38)	(4.75)	(4.82)	(1.41)	(9.55)	(1.87)
CAPEX	0.016	0.024***	-0.182**	0.023	-0.047	0.016**
	(1.13)	(3.82)	(-2.54)	(1.36)	(-1.20)	(2.35)
Intercept	-0.050	-0.127**	-0.125***	-0.012	-0.121	-0.151**
	(-1.37)	(-2.28)	(-5.80)	(-0.18)	(-1.33)	(-2.39)
P-value of F-test [EM + EM*Rating existence= 0]	0.055	0.004	0.018	0.201	0.016	0.004
R-squared	0.224	0.287	0.528	0.240	0.610	0.299
Number of observations	1,125	1,152	393	601	288	676

Dependent variable: Industry-adjusted ROA

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
EM	-0.068	-0.059*	-0.022	-0.066*	-0.026	-0.012
	(-1.51)	(-1.83)	(-0.70)	(-1.71)	(-1.12)	(-0.35)
EM*Rating existence	0.245**	0.508***	0.259***	0.133	0.160**	0.288***
	(2.45)	(3.72)	(2.77)	(1.58)	(2.41)	(3.00)

Industry-adjusted ROA	0.041	0.056***	0.072***	0.024*	0.065***	0.043**
	(1.47)	(4.84)	(5.20)	(1.68)	(10.35)	(2.00)
CAPEX	0.017	0.024***	-0.174**	0.024	-0.050	0.016**
	(1.27)	(4.03)	(-2.28)	(1.43)	(-1.30)	(2.28)
Intercept	-0.007	-0.260***	-0.144***	-0.112*	-0.129	-0.191***
	(-0.19)	(-6.12)	(-6.65)	(-1.67)	(-1.59)	(-3.19)
P-value of F-test [EM + EM*Rating existence= 0]	0.055	0.004	0.018	0.201	0.016	0.006
R-squared	0.157	0.216	0.484	0.157	0.559	0.231
Number of observations	1,125	1,152	393	601	288	676

Table 2. 7 Analyses of post-issue long-run stock performance

The table presents the regression analyses of the association between at-issue earnings management and post-issue long-run stock performance for the sample of US IPOs over the period 1991-2011. All regressions control for year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Analyses of post-issue long-run stock performance - Event-time approach

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
EM	-0.203*	-0.093*	-0.222**	0.015	-0.133	-0.059
	(-1.80)	(-1.67)	(-2.18)	(0.13)	(-0.95)	(-0.56)
EM*Rating existence	1.224*	0.331	0.007	0.489	0.049	0.359
	(1.90)	(0.63)	(0.02)	(1.29)	(0.21)	(1.09)

Underpricing	-0.137	-0.236**	0.075	-0.234	0.215	-0.309
	(-0.95)	(-2.05)	(0.18)	(-0.87)	(0.34)	(-1.36)
Log(1+firm age)	-0.134	-0.078	0.088	-0.025	0.309*	-0.170
	(-1.22)	(-0.71)	(0.50)	(-0.18)	(1.89)	(-1.18)
Market BHR	0.121	0.481**	0.567	-0.165	-0.004	0.351
	(0.57)	(2.02)	(1.31)	(-0.53)	(-0.01)	(1.11)
Book-to-market	0.179	0.117	-0.097	-0.037	-0.125	0.099
	(1.53)	(1.04)	(-0.61)	(-0.31)	(-0.63)	(0.85)
Ln(market value)	0.005	-0.041	-0.056	0.039	-0.075	0.027
	(0.11)	(-1.01)	(-0.86)	(0.67)	(-0.94)	(0.49)
ROA	0.012	-0.018	-0.000	0.027*	0.014	0.028*
	(1.34)	(-0.62)	(-0.01)	(1.75)	(1.00)	(1.80)
Highly ranked underwriter	0.033	0.038	-0.060	-0.024	-0.073	0.071
	(0.33)	(0.40)	(-0.45)	(-0.20)	(-0.49)	(0.56)
Big6 auditor	0.341***	0.418***	0.318	0.265*	0.388	0.308**
	(3.07)	(3.27)	(1.20)	(1.74)	(1.54)	(2.47)
High-tech industry	0.275***	0.192*	0.115	0.244	0.107	0.308*
	(2.70)	(1.94)	(0.71)	(1.63)	(0.60)	(1.92)
Intercept	-0.673**	-0.914**	-0.438	-0.251	0.087	-0.887*
	(-2.02)	(-2.48)	(-0.64)	(-0.51)	(0.12)	(-1.95)
P-value of F-test [EM + EM*Rating existence= 0]	0.114	0.653	0.572	0.211	0.766	0.397
R-squared	0.086	0.056	0.115	0.079	0.174	0.059
Number of observations	1,087	1,122	393	574	286	642

Panel B: Analyses of post-issue long-run stock performance - Calendar-time approach

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Fama-French three-factor model						
Without credit ratings	-0.007***	-0.004*	-0.004	-0.001	-0.004	-0.003
	(-2.90)	(-1.74)	(-1.35)	(-0.53)	(-1.24)	(-1.26)
With credit ratings	0.001	-0.001	-0.010*	0.004	-0.003	0.002
	(0.23)	(-0.18)	(-1.81)	(0.80)	(-0.53)	(0.26)
Carhart four-factor model						
Without credit ratings	-0.006**	-0.004*	-0.004	-0.002	-0.004	-0.004
	(-2.36)	(-1.82)	(-1.59)	(-0.65)	(-1.47)	(-1.55)
With credit ratings	0.003	-0.004	-0.011*	0.002	-0.007	-0.003
	(0.45)	(-0.56)	(-1.93)	(0.42)	(-0.96)	(-0.45)

Table 2. 8 Instrumental variable regressions of earnings management on credit rating levels

The table presents the results of instrumental variable regressions of earnings management on credit rating levels for the sample of rated US IPOs over the period 1991-2011. All regressions, control for the year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating level	0.111	-0.428	-0.358	0.020	-0.827	-0.001
	(0.96)	(-1.06)	(-1.55)	(0.15)	(-0.48)	(-0.00)
Log(1+ firm age)	-0.272***	0.088	-0.038	-0.089*	-0.254	-0.055
	(-3.01)	(0.35)	(-0.21)	(-1.72)	(-0.46)	(-0.65)
Ln(market value)	-0.057	0.239	0.192	0.013	0.483	0.015
	(-0.99)	(1.02)	(1.05)	(0.22)	(0.37)	(0.12)
Leverage	0.012	0.208	0.374	0.093	1.233	0.153
	(0.21)	(1.41)	(1.40)	(0.58)	(0.48)	(0.65)
Loss	0.083	-0.271	-0.028	0.086	-0.251	0.012
	(1.64)	(-1.37)	(-0.15)	(0.91)	(-0.32)	(0.12)
Highly ranked underwriter	-0.051	0.072	0.034	-0.161	0.395	-0.161
	(-1.22)	(0.41)	(0.24)	(-1.48)	(0.36)	(-0.89)
Big6 auditor	0.024	0.026	0.234	0.075	0.173	-0.022
	(0.48)	(0.22)	(1.23)	(1.02)	(0.32)	(-0.24)
Venture capitalist	0.020	-0.317	-0.243	-0.006	-0.956	-0.030
	(0.30)	(-1.24)	(-1.13)	(-0.06)	(-0.49)	(-0.20)
Industry-adjusted ROA	-0.012	-0.728***	-0.378***	-0.278**	0.161	-0.258*
	(-0.22)	(-8.98)	(-2.65)	(-2.22)	(0.14)	(-1.93)
CAPEX	0.016***	0.016**	0.082	0.010	-0.384	0.034***
	(3.47)	(2.39)	(0.49)	(0.37)	(-0.30)	(3.47)
Intercept	0.671**	-0.861	-0.021	0.256	0.359	0.284
	(2.13)	(-0.74)	(-0.03)	(0.71)	(0.13)	(0.40)
Number of observations	1,000	1,037	361	544	266	610

Table 2. 9 Analyses of interaction effects between credit rating agencies and venture capitalists, top-tier investment banks, and Big Six auditors

The table presents the results of instrumental variable regressions that analyse the association of earnings management and credit rating existence for the sample of US IPOs over the period 1991-2011 controlling for the interaction effects between credit rating agencies and venture capitalists, reputable investment banks, and Big Six auditors. All regressions are controlled for year fixed effects whose coefficients are suppressed. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Interaction effect between credit rating agencies and venture capitalists

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	-1.271**	-1.628*	-1.088*	-2.136**	-1.347**	-3.456**
	(-2.00)	(-1.76)	(-1.87)	(-2.53)	(-2.19)	(-2.47)
Venture capitalist	-0.126**	-0.188**	-0.128	-0.222**	-0.313*	-0.367**
	(-2.51)	(-2.27)	(-1.11)	(-2.35)	(-1.77)	(-2.54)
Rating existence * Venture capitalist	1.044*	1.355*	0.935*	1.910**	1.007*	2.861**
	(1.78)	(1.69)	(1.73)	(2.49)	(1.79)	(2.40)
Log(1 + firm age)	-0.109*	-0.080	-0.014	-0.071	-0.180	-0.017
	(-1.84)	(-1.25)	(-0.15)	(-0.90)	(-1.52)	(-0.14)
Ln(market value)	0.043	0.075	0.009	0.110**	-0.026	0.161**
	(1.47)	(1.49)	(0.18)	(2.31)	(-0.39)	(2.08)
Leverage	0.114**	0.124**	0.107	0.343**	0.182	0.413***
	(2.34)	(2.08)	(1.07)	(2.29)	(1.18)	(2.63)
Loss	0.082*	-0.137**	0.108	0.025	0.064	0.039
	(1.69)	(-2.01)	(1.08)	(0.25)	(0.44)	(0.29)
Highly ranked underwriter	-0.003	-0.014	-0.043	0.011	-0.027	0.081
	(-0.08)	(-0.26)	(-0.61)	(0.11)	(-0.26)	(0.57)
Big6 auditor	0.040	0.046	0.196*	0.101	0.189	0.085
	(0.82)	(0.68)	(1.66)	(0.98)	(1.15)	(0.57)

Industry-adjusted ROA	0.014	-0.720***	-0.452***	-0.281**	-0.287*	-0.138
	(0.27)	(-10.01)	(-3.94)	(-2.05)	(-1.77)	(-1.16)
CAPEX	0.013***	0.017***	0.204**	-0.020	0.117	0.027***
	(3.55)	(2.75)	(2.16)	(-0.74)	(0.63)	(2.82)
Intercept	0.111	-0.031	0.466	-0.267	1.271***	-0.434
	(0.66)	(-0.12)	(1.33)	(-0.91)	(2.78)	(-1.04)
P-value of F-test [Rating existence + Rating existence*Venture capitalist = 0]	0.012	0.067	0.266	0.295	0.134	0.066
Number of observations	1,000	1,037	361	544	266	610

Panel B: Interaction effect between credit rating agencies and top-tier underwriters

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	-2.596**	-3.871	0.448	-1.360	-0.617	-2.336
	(-2.10)	(-1.33)	(0.64)	(-1.31)	(-0.63)	(-1.06)
Highly ranked underwriter	-0.153**	-0.242*	-0.037	-0.218**	-0.171	-0.294*
	(-2.43)	(-1.82)	(-0.40)	(-2.47)	(-1.22)	(-1.96)
Rating existence * Highly ranked underwriter	2.384**	3.540	-0.489	1.164	0.469	2.088
	(1.98)	(1.27)	(-0.73)	(1.17)	(0.51)	(0.98)
Log(1 + firm age)	-0.144***	-0.136**	0.046	-0.086	-0.116	-0.047
	(-2.88)	(-2.00)	(0.58)	(-1.60)	(-1.18)	(-0.67)
Ln(market value)	0.062*	0.100	-0.082*	0.062*	-0.087	0.090
	(1.87)	(1.27)	(-1.74)	(1.67)	(-1.34)	(1.24)
Leverage	0.080**	0.105*	0.017	0.179*	0.043	0.196**
	(2.04)	(1.89)	(0.22)	(1.75)	(0.34)	(2.12)

Loss	0.055	-0.199**	0.114	0.086	0.044	0.030
	(1.00)	(-1.97)	(1.26)	(1.06)	(0.33)	(0.29)
Big6 auditor	0.007	0.011	0.165	0.064	0.156	-0.035
	(0.11)	(0.12)	(1.64)	(0.75)	(1.11)	(-0.33)
Venture capitalist	-0.076**	-0.128**	0.048	-0.051	-0.056	-0.079
	(-2.42)	(-2.00)	(0.76)	(-0.89)	(-0.52)	(-0.99)
Industry-adjusted ROA	-0.007	-0.739***	-0.484***	-0.239*	-0.328**	-0.204*
	(-0.14)	(-10.24)	(-4.05)	(-1.84)	(-1.96)	(-1.84)
CAPEX	0.014***	0.018***	0.260***	-0.002	0.179	0.033***
	(3.98)	(2.97)	(2.63)	(-0.10)	(0.93)	(4.67)
Intercept	0.118	-0.059	0.530*	0.036	1.120***	0.009
	(0.73)	(-0.18)	(1.87)	(0.18)	(3.18)	(0.03)
P-value of F-test [Rating existence + Rating existence* Highly ranked underwriter = 0]	0.001	0.027	0.618	0.011	0.250	0.034
Number of observations	1,000	1,037	361	544	266	610

Panel C: Interaction effect between credit rating agencies and Big Six auditors

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	-9.104	-11.382	6.351	-19.558	-0.862	-12.664
	(-1.10)	(-0.91)	(0.99)	(-1.46)	(-0.31)	(-1.20)
Big6 auditor	-0.315	-0.605	0.564	-0.845***	0.102	-0.566*
	(-1.25)	(-0.96)	(1.61)	(-2.80)	(0.35)	(-1.73)
Rating existence * Big6 auditor	8.899	11.038	-6.362	19.156	0.721	12.412
	(1.08)	(0.90)	(-1.00)	(1.43)	(0.26)	(1.18)

Log(1 + firm age)	-0.255***	-0.289	0.142	-0.310***	-0.122	-0.158
	(-3.18)	(-1.64)	(1.07)	(-3.27)	(-1.08)	(-1.37)
Ln(market value)	0.080	0.141	-0.169*	0.178**	-0.096	0.172*
	(1.41)	(1.02)	(-1.72)	(2.06)	(-1.17)	(1.67)
Leverage	0.043	0.044	0.053	0.184*	0.032	0.143*
	(1.01)	(0.68)	(0.66)	(1.70)	(0.25)	(1.69)
Loss	-0.009	-0.241	0.155	-0.141	0.034	-0.052
	(-0.09)	(-1.39)	(1.54)	(-1.15)	(0.26)	(-0.47)
Highly ranked underwriter	-0.088*	-0.095	0.011	-0.320**	-0.126	-0.310**
	(-1.84)	(-1.43)	(0.10)	(-2.46)	(-1.25)	(-2.34)
Venture capitalist	-0.070**	-0.089*	0.055	-0.070	-0.045	-0.055
	(-2.06)	(-1.72)	(0.76)	(-1.10)	(-0.44)	(-0.82)
Industry-adjusted ROA	-0.040	-0.755***	-0.466***	-0.328***	-0.358**	-0.231**
	(-0.61)	(-9.08)	(-3.80)	(-2.62)	(-2.28)	(-2.36)
CAPEX	0.014***	0.017***	0.292***	0.012	0.188	0.032***
	(3.63)	(2.74)	(2.86)	(0.40)	(0.96)	(4.48)
Intercept	0.442***	0.484*	0.505**	0.759**	1.205***	0.323
	(2.99)	(1.88)	(2.02)	(2.00)	(3.83)	(1.58)
P-value of F-test [Rating existence + Rating existence* Big6 auditor = 0]	0.048	0.093	0.907	0.001	0.171	0.025
Number of observations	1,000	1,037	361	544	266	610

Table 2. 10 Other robustness tests

The table presents other robustness tests regarding the analysis of the association between earnings management and credit rating existence. Panel A shows the variance inflation factor of the estimated coefficients for all variables in the regressions of different earnings management proxies on rating existence. Panel B presents the results for the regressions in which the sample of rated IPOs is expanded to include IPO firms with either S&P, Moody's or Fitch credit rating. Panel C provides the results of the regressions controlling for periods of the Internet bubble (1999-2000), financial crisis (2007-2008), and post-Sarbanes-Oxley (after 2002). One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity. All variables are defined in Table 2.1.

Panel A: Variance inflation factor

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	1.19	1.27	1.43	1.27	1.51	1.29
Log(1+ firm age)	1.30	1.39	1.51	1.39	1.52	1.42
Ln(market value)	1.92	2.02	1.82	2.06	1.90	1.99
Leverage	1.29	1.31	1.35	1.32	1.51	1.37
Loss	2.07	2.37	2.35	2.04	2.22	2.27
Highly ranked underwriter	1.40	1.35	1.26	1.45	1.31	1.41
Big6 auditor	1.17	1.17	1.26	1.17	1.26	1.16
Venture capitalist	1.32	1.39	1.66	1.42	1.85	1.45
Industry-adjusted ROA	2.23	2.18	1.93	1.91	2.15	2.04
CAPEX	1.11	1.07	1.24	1.16	1.21	1.14

Panel B: The sample of rated IPOs is expanded to include IPO firms with either S&P, Moody's or Fitch credit rating

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	-0.974**	-1.512*	-1.119**	-1.685***	-1.308**	-2.872***
	(-2.08)	(-1.87)	(-2.12)	(-3.00)	(-2.28)	(-2.65)
Log(1 + firm age)	-0.125**	-0.087	0.010	-0.102	-0.167	-0.014
	(-2.50)	(-1.42)	(0.10)	(-1.42)	(-1.32)	(-0.13)
Ln(market value)	0.044	0.080	0.027	0.097**	-0.016	0.167**
	(1.54)	(1.58)	(0.51)	(2.44)	(-0.23)	(2.26)
Leverage	0.109**	0.142**	0.146	0.343**	0.241	0.442***
	(2.34)	(2.19)	(1.33)	(2.48)	(1.37)	(2.70)
Loss	0.070	-0.153**	0.043	0.006	-0.040	-0.031
	(1.48)	(-2.12)	(0.40)	(0.06)	(-0.27)	(-0.24)
Highly ranked underwriter	-0.015	-0.012	-0.024	0.024	-0.003	0.080
	(-0.40)	(-0.20)	(-0.32)	(0.27)	(-0.03)	(0.62)
Big6 auditor	0.037	0.038	0.220*	0.114	0.218	0.079
	(0.81)	(0.59)	(1.80)	(1.20)	(1.29)	(0.58)
Venture capitalist	-0.103**	-0.155**	-0.102	-0.170**	-0.255*	-0.263**
	(-2.55)	(-2.39)	(-1.03)	(-2.26)	(-1.72)	(-2.36)
Industry-adjusted ROA	0.010	-0.709***	-0.446***	-0.243*	-0.262	-0.110
	(0.19)	(-9.81)	(-3.89)	(-1.79)	(-1.54)	(-0.89)
CAPEX	0.014***	0.017***	0.201**	-0.017	0.107	0.026***
	(3.60)	(2.75)	(2.11)	(-0.66)	(0.55)	(2.66)
Intercept	0.106	-0.069	0.269	-0.227	1.057**	-0.537
	(0.65)	(-0.26)	(0.77)	(-0.92)	(2.32)	(-1.27)
Number of observations	1,000	1,037	361	544	266	610

Panel C: **Controlling for time periods of the Internet bubble (1999-2000), financial crisis (2007-2008), post-Sarbanes-Oxley (after 2002)**

	Abnormal accruals	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Rating existence	-1.277**	-1.361**	-1.579*	-1.867**	-2.335*	-3.244**
	(-2.14)	(-2.09)	(-1.90)	(-2.31)	(-1.83)	(-1.99)
Log(1 + firm age)	-0.114*	-0.085	-0.058	-0.083	-0.234	-0.019
	(-1.91)	(-1.43)	(-0.47)	(-1.12)	(-1.34)	(-0.15)
Ln(market value)	0.055*	0.069*	0.050	0.096**	0.087	0.178*
	(1.76)	(1.71)	(0.70)	(2.06)	(0.71)	(1.94)
Leverage	0.132**	0.144**	0.198	0.356**	0.440*	0.471**
	(2.57)	(2.33)	(1.52)	(2.32)	(1.65)	(2.40)
Loss	0.086*	-0.151**	-0.014	0.066	-0.087	0.016
	(1.70)	(-2.20)	(-0.11)	(0.69)	(-0.45)	(0.12)
Highly ranked underwriter	-0.013	-0.021	0.016	0.037	0.095	0.087
	(-0.33)	(-0.41)	(0.18)	(0.36)	(0.54)	(0.54)
Big6 auditor	0.026	0.019	0.184	0.090	0.237	0.060
	(0.53)	(0.30)	(1.39)	(0.95)	(1.08)	(0.41)
Venture capitalist	-0.120***	-0.143**	-0.109	-0.174**	-0.326*	-0.282**
	(-2.73)	(-2.49)	(-0.97)	(-2.12)	(-1.67)	(-2.03)
Industry-adjusted ROA	0.029	-0.719***	-0.451***	-0.164	-0.202	-0.097
	(0.54)	(-9.89)	(-3.59)	(-1.11)	(-0.99)	(-0.72)
CAPEX	0.014***	0.018***	0.124	-0.013	-0.009	0.024**
	(3.69)	(2.84)	(1.24)	(-0.45)	(-0.04)	(2.46)
SOX	0.039	-0.026	0.069	0.165	0.244	0.276
	(0.71)	(-0.41)	(0.78)	(1.37)	(1.62)	(1.38)
Crisis	-0.171*	-0.074	-0.096	-0.220	-0.448	-0.589*
	(-1.90)	(-0.76)	(-0.47)	(-0.93)	(-1.28)	(-1.70)
Dotcom	0.192***	0.084	0.088	0.227*	0.275	0.232
	(2.75)	(1.11)	(0.67)	(1.85)	(1.32)	(1.42)
Intercept	0.158	0.106	0.057	-0.199	0.285	-0.542
	(0.87)	(0.51)	(0.18)	(-0.76)	(0.49)	(-1.02)
Number of observations	1,000	1,037	361	544	266	610

Chapter 3 – Financial expert CEOs and earnings management around IPOs

3.1. Introduction

Earnings are commonly used by investors to evaluate the prospective performance of the firm. Therefore, managers may be tempted to manipulate earnings to influence short-term stock prices. The incentives to manage earnings are stronger around initial public offerings (IPOs) due to the high level of information asymmetry between managers and investors. Previous research on earnings management (EM) around IPOs provides evidence of positive abnormal accruals in the issue year and a negative relation between at-issue EM and post-issue long-run stock performance, suggesting that managers manipulate earnings to mislead investors (Aharony et al. 1993; Friedlan 1994; Teoh et al. 1998a; Teoh et al. 1998b; Roosenbloom and Van De Goot 2003; DuCharme et al. 2004; Gramlich and Sorensen 2004).

Researchers have attempted to understand factors driving EM such as firm-level factors (e.g., firm size, firm performance, leverage, growth, corporate governance, financing needs, target beating, the involvement of external parties such as underwriters, venture capitalists, and auditors), and external factors (e.g., capital requirements, and regulations) (see Dechow et al. (2010) for a review). Based on the upper echelons theory (Hambrick and Mason 1984; Hambrick 2007) which predicts that managerial background characteristics can partially influence top managers' decision making, increasing attention has been drawn to examine another potential determinant of accounting choices: managerial specific factors. Particularly, various studies link earnings quality with some managerial characteristics such as CEO reputation (Francis et al. 2008), superstar CEOs (Malmendier and Tate 2009), and managerial ability (Demerjian et al. 2013). However, to the best of my knowledge, the impact of CEOs' financial experience on EM around IPOs remains unexplored.

The financial experience of CEOs may play an important role in determining the quality of financial reporting. Past financial experience equips CEOs with a deeper understanding of financial and accounting issues and structures, thus, allows them to be more capable of providing higher quality financial reports. Moreover, financial expert CEOs tend to have an affiliation with or accreditation from professional organisations,

which requires them to adhere to ethical codes of conduct. This considerably influences their risk attitudes towards more conservatism in financial reporting. In addition, misrepresentations in financial reporting will reflect badly on the career and adversely affect the reputation of financial expert CEOs. Thus, financial expert CEOs will have lower incentives to manipulate earnings. Although CEOs are not directly involved in overseeing the financial reporting process, they can set the tone from the top and influence the decisions of the Chief Financial Officers (CFOs) (Feng et al. 2011). Additionally, the financial knowledge also facilitates the communication between CEOs and CFOs and allows them to work efficiently with each other to develop sound accounting policies. Moreover, financial expert CEOs are more likely to appreciate the importance of accounting information in influencing investors' evaluation of the firm and better aware of the types of information demanded by capital market participants. Therefore, they are more likely to effectively communicate financial information to the market (Custódio and Metzger 2014).

Therefore, I am motivated to investigate whether the variation in an IPO firm's EM is partially attributable to a CEO's past financial experience. I pose two main research questions: (1) whether IPO firms with financial expert CEOs exhibit lower EM in the offering year, and (2) whether financial expert CEOs exercise their accounting discretion for informative purposes. To address these questions, I examine a sample of US common share IPOs over the period 2003-2011. I gather detailed CEOs' biographies from BoardEx and prospectuses. I define financial expert CEOs as those having past experience in either banking or investment firms, large auditing firms, or financial related roles such as an accountant, a treasurer, a VP of finance, and a CFO. I also test the robustness of the results using more specific measures of financial expertise, specifically, experience as a CFO and a CPA certification. In addition, utilising the detailed data on the CEO's work history, I measure the variety of CEO financial experience and examine the association between financial experience variety and EM. I use four variables to proxy for the variety: the number of firms in which the CEO had financial experience, the number of financial related roles that the CEO held, the financial experience at another firm, and the length of time of the financial experience. I also use the principal component analysis to create a single variable - financial experience variety index that accounts for the effects of all the four individual factors. The results are robust to alternative measures of CEOs' financial experience.

An important concern of the study of the impact of managerial characteristics on corporate decisions is the selection bias which occurs due to the non-random matching of CEOs to firms. With this study, EM may be driven by some unobserved firm and/or CEO characteristics that are correlated with CEOs' financial experience. To account for the endogenous selection bias issue, I employ the propensity score matching method. I also check the robustness of the findings using alternative econometric approaches which are commonly used to address the selection concern: propensity score matching, instrumental variable two-stage least square model, Heckman (1979) two-step treatment effect model, and maximum likelihood treatment effect model. The results remain robust after controlling for the endogenous selection.

I find that financial expert CEOs are less likely to engage in EM around IPOs. The influence of financial expert CEOs on EM is strengthened when the CEO has more decision-making power. Specifically, among IPO firms with financial expert CEOs, EM in the offering year is lower for firms with more powerful CEOs. I also document the positive link between at-issue abnormal accruals and subsequent accounting performance for IPO firms with financial expert CEOs; however, the relationship is insignificant for firms with non-financial expert CEOs. In terms of stock performance, while IPO firms with non-financial expert CEOs that engage in aggressive EM in the issue year exhibit negative post-issue long-run stock performance, the stock performance of IPO firms with financial expert CEOs following the issue is not associated with the EM in the offering year. The evidence suggests that while non-financial expert CEOs tend to manage earnings to mislead investors, financial expert CEOs are more likely to provide investors with informative financial figures to allow them to better gauge the fair value of the firm.

My study makes several contributions to the IPO, EM, and management literature. First of all, it adds to the growing literature on determinants of EM by highlighting managerial financial experience as a new dimension of influencing factors which can be further explored in future research. In terms of managerial skills, Demerjian et al. (2013) argue that managerial ability is positively related to earnings quality. They measure the ability of managers based on the extent of their efficiency in utilising the firm's resources. My research is distinguishable from their study because I examine a different perspective of managerial skills - the functional experience of managers. Specifically, I show that the financial skills and experience that managers have accumulated over their career will equip them with relevant understanding to make proper accounting decisions, thereby improving the financial reporting process. Jiang et al. (2013) examine Chinese listed firms

and document that CEOs who have past financial experience are less likely to engage in real EM. My research is different from the study by Jiang et al. (2013) because I analyse the impact of financial expert CEOs on EM in the US IPO context. Differences in institutional and regulatory characteristics between Chinese and the US markets may not ensure the consistency and validity of the results. Moreover, the IPO market is a more favourable setting to explore the incentives of managers in undertaking EM because managerial opportunism is more strongly driven by information asymmetries (Dye 1988; Trueman and Titman 1988), which are strongly manifested in the IPO context. Moreover, I focus on accrual-based EM rather than real EM because accrual-based EM mainly involves financial reporting, to which the financial background is more relevant. To the best of my knowledge, my study provides the first empirical evidence on the association between CEOs' financial experience and EM around IPOs. This research also contributes to the literature of upper echelons theory by providing consistent evidence with the theory's prediction of the influence of managerial functional experience on corporate strategic choices. Moreover, my findings provide implications for investors in assessing financial reports of IPO firms led by financial expert CEOs and for firms in considering to recruit CEOs with financial experience.

The chapter is organised as follows. Section 3.2 discusses related literature and hypothesis development. Section 3.3 describes the sample and methodology. Section 3.4 explains the empirical models of the impact of financial expert CEOs on EM around IPOs and the association between at-issue EM and the post-issue accounting and stock performance. Section 3.5 presents the empirical results. Section 3.6 provides additional tests and robustness checks. Finally, Section 3.7 concludes the chapter.

3.2. Related literature and hypothesis development

3.2.1. Earnings management around IPOs

The main theory governing this study is agency theory. The theory is primarily concerned with the principal-agent problem which occurs due to the conflicts of interests between the principal, who provides capital for the firm such as shareholders, and the agent, who manages day to day activities of the firm such as company executives. The principal-agent issue arises when information asymmetry is present between the two parties (Jensen and Meckling 1976). Since the principal does not involve directly in the management of the firm and cannot monitor the agent completely, they have less information about the firm and the agent's intentions. The information asymmetry creates

the problem of adverse selection, which happens when managers have more information relevant to decision making than outside investors, and moral hazard, which occurs when informed managers behave inappropriately from the perspective of less informed investors. Information asymmetry is an inherent issue in the IPO markets. Managers can mitigate the problem by exercising their accounting discretion to communicate information about the timing, magnitude, and risk of future cash flows to the market; however, self-interested managers may be tempted to exploit the information disparity to mislead less informed investors and manipulate earnings to influence stock prices (Fields et al. 2001).

There are two contrasting arguments over EM around IPOs. The first argument suggests that IPO can be viewed as an external financing opportunity. Thus, managers have the incentive to alleviate the information asymmetry to improve price efficiency and lower the cost of capital. They will employ accounting choices to convey private information to the market to signal the firm's future prospects (Watts and Zimmerman 1978; Healy and Palepu 1993; Guay et al. 1996; Subramanyam 1996; Fields et al. 2001; Kallunki and Martikainen 2003; Louis and Robinson 2005; Herbohn et al. 2010). The opposing argument postulates that the IPO is an event for primary investors to cash their stock. Thus, managers have strong incentives to maximize their gains by overstating earnings to increase short-term stock prices. If managers manipulate accruals to boost current reported earnings, the reversal of accruals in the subsequent period will deteriorate future earnings. This causes investors to adjust downward their firm evaluation, resulting in the decrease in stock prices in the long-run. Therefore, opportunistic EM in the issue year will adversely influence stock performance in the post-issue period. This notion of opportunistic EM around IPOs is supported by various studies. The early studies of Aharony et al. (1993) and Friedlan (1994) state that managers involve in accrual-based EM before the stock offering in an effort to increase reported earnings. Teoh et al. (1998a) find positive abnormal accruals in the issue year and a negative association between the accruals and post-issue long-run stock performance, indicating that managers manipulate earnings around IPOs to mislead investors. Several later studies also attest the aggressive use of accruals during the stock offerings to overstate earnings (DuCharme 2001; Roosenboom et al. 2003; DuCharme et al. 2004; Marquardt and Wiedman 2004; Morsfield and Tan 2006; Lee and Masulis 2011; Alhadab et al. 2014). On the other hand, Ball and Shivakumar (2008) suggest that the stringent monitoring from various parties such as regulators, auditors, analysts, and the press will discourage IPO firms to engage

in aggressive EM. In their study, they analyse a sample of UK firms whose financial statements filed as private firms are comparable to those restated and included in the IPO prospectuses. They find that IPO firms tend to be conservative in their financial reporting. However, Lo (2008) argues that the restriction in the sample selection by Ball and Shivakumar (2008) may exclude firms that engage in EM since managers tend to hide their misbehaviours by providing non-comparable reports. Thus, the finding of lower EM among UK IPO firms reported by Ball and Shivakumar (2008) may not hold.

3.2.2. CEO's financial experience and earnings management around IPOs

The neoclassical view of the firm assumes that managers are homogenous; thus, different managers will make the same rational choices if they are confronted with the same economic circumstances (Bertrand and Schoar 2003; Ge et al. 2011). Under this view, corporate policies will not be affected by managerial characteristics. In contrast, the upper echelons theory emphasises the influence of managerial heterogeneity on corporate outcomes. The theory suggests that managerial personalities, backgrounds, and experiences such as age, socioeconomics background, formal education, and functional track can partially affect managers' interpretations of the situations and problems they have to deal with and, in turn, impact their decision making (Hambrick and Mason 1984; Hambrick 2007).

Since the development of the upper echelons theory, voluminous studies have empirically examined the correlation between various managerial specific characteristics and corporate decisions and provided findings consistent with the theory. Prior empirical studies have shown that managerial heterogeneity has significant explanatory power for corporate decisions and performance (Bertrand and Schoar 2003; Adams et al. 2005; Malmendier and Tate 2005, 2009; Malmendier et al. 2011; Malmendier and Tate 2008; Graham et al. 2013). Most studies focus on education (Malmendier and Tate 2005), personal characteristics (Kaplan et al. 2012), and personal traits (Malmendier and Tate 2005, 2008; Malmendier et al. 2011; Graham et al. 2013). Recent research has further examined the work experience of CEOs. Custódio and Metzger (2013); Custódio et al. (2013) study CEOs' work experience in the context of diversifying M&A and show that CEOs with industry expertise perform better in deal negotiations and pay a lower premium for the target. The findings of Custódio et al. (2013) suggest that CEOs with more general managerial skills are better paid than specialist CEOs, suggesting the importance of general managerial skills over firm and industry specific expertise in hiring

CEOs. Moreover, Custódio and Metzger (2014) provide evidence that CEOs' past financial experience influences firms' financial policies such as cash holdings, leverage, and payout policies.

Prior literature also documents that managers' characteristics can affect their accounting choices. Bamber et al. (2010) argue that idiosyncratic differences in managers play a significant role in firms' voluntary financial disclosure choices. Specifically, managers with financial, accounting, and legal backgrounds, those born before World War II, and those with past military service tend to be more conservative in disclosures. Additionally, Dyreng et al. (2010) document that individual executive effects significantly influence firms' tax avoidance. Moreover, Francis et al. (2008) report a negative association between earnings quality and CEO reputation which is measured by press coverage. They argue that the reason for this correlation is because firms with poor earnings quality tend to hire reputable CEOs for the expertise that they can bring to the firm, rather than CEOs taking actions to manipulate earnings to influence the market's perceptions. Malmendier and Tate (2009) investigate behaviour changes of CEOs after winning prestigious awards in the business press and find that EM increases considerably subsequent to the award. Regarding managerial skills, Demerjian et al. (2013) show that managerial ability is associated with greater earnings quality represented by fewer subsequent restatements, higher earnings persistence, fewer errors in bad debt provision, and better accrual estimations. Jiang et al. (2013) study Chinese listed firms and find evidence that the appointment of financially experienced CEOs reduces real EM, and thus provides higher quality earnings information.

Despite prior findings of the influence of managerial characteristics on accounting decisions, it remains an empirical question of whether CEOs' financial experience manifests itself in IPO firms' financial reporting behaviours – in other words, whether IPO firms with financial expert CEOs provide higher quality financial information. Demerjian et al. (2013) provide evidence of the association between earnings quality and managerial ability. However, they analyse the overall managerial ability and estimate this measure based on how efficient managers utilise the firm's resources such as cost of goods sold, SG&A expenses, PPE, operating leases, R&D, goodwill, and other intangible assets. I investigate a more specific skill set of managers, that is the financial expertise of CEOs in terms of their work experience in the financial sector such as banking or investment firms and auditing firms and in finance related roles such as an accountant, a treasurer, a VP of finance, and a CFO. I argue that CEOs who have the financial

experience in their past career will have more technical training and deeper understanding of accounting and financial concepts and structures. According to the upper echelons theory, managers with financial experience will rely on their prior work experience when making accounting decisions. Therefore, I expect that financial expert CEOs will be more capable of monitoring the accounting process and providing higher quality financial statements.

Poor financial reporting will also reflect badly on the career of CEOs with a track record as a financial expert. Furthermore, CEOs with financial experience tend to be affiliated with or accredited by professional organisations; thus, they are required to adhere to strict ethical codes of conduct. This considerably affects their risk attitudes towards financial reporting; specifically, they will be more conservative in their financial reporting. Moreover, since IPO firms face stringent monitoring from SEC and various parties such as auditors, investors, analysts, and the press, if the financial reporting misbehaviours are detected, it will severely affect the reputation of financial expert CEOs. Therefore, I expect that financial expert CEOs will have lower incentives to engage in EM around IPOs.

In addition, although CFOs are directly involved in overseeing the accounting process and the preparation of financial statements, CEOs may set the tone from the top and influence the decisions of CFOs (Feng et al. 2011). The conjecture that the financial expertise of CEOs may influence their accounting decisions is further supported by the theory of top management teams (Bunderson and Sutcliffe 2002; Cannella et al. 2008). This theory posits that common functional backgrounds facilitate the communication among top management team members. Therefore, a CEO with financial background will be able to monitor the firm's CFO more effectively to strengthen the firm's accounting policies.

I focus on investigating the effects of financial expert CEOs on accrual-based EM rather than real EM. Real EM involves adjusting real operating activities such as those related to sales, production, and discretionary expenditures to bias reported earnings. Since it involves real actual business decisions, managers may need to employ other general managerial abilities and skills besides the functional experience in finance and accounting in order to effectively implement strategies to influence the profit margin. On the other hand, accrual-based EM happens when managers exploit the flexibility in accounting policies that is permitted within GAAP to manage earnings towards their

preferable direction. Accrual-based EM is largely related to financial accounting; therefore, financial experience, skills, and knowledge accrued over their career will be relevant to managers in order to have better control over the accounting process.

Based on existing theories and empirical evidence, I predict that IPO firms with financial expert CEOs will exhibit lower accrual-based EM and pose the first hypothesis as follows.

Hypothesis 1: IPO firms with financial expert CEOs are less likely to engage in accrual-based EM in the offering year.

CEOs who have past financial experience can understand better how investors view the firm's financial statements and reports. Moreover, their intensive interactions with the market over their lifetime career allow them to be highly aware of the information needs and the types of information demanded by capital market participants. They will also be conscious of the importance of disclosing relevant and useful information to the market in order to lower the cost of capital for the firm (Custódio and Metzger 2014). Therefore, their financial expertise allows them to effectively communicate financial information to investors. Furthermore, as mentioned before, the understanding of CEOs about financial and accounting issues will enhance the communication between CEOs and CFOs. Thus, financial expert CEOs will be able to work more efficiently with the firm's CFO to develop a financial reporting strategy in which accounting choices can serve as a channel to convey private information to the market to signal the firm's prospects. Therefore, I expect that financial expert CEOs will be more likely to provide investors with informative financial reporting. If financial expert CEOs use EM in the offering year for informative purposes, the managed accruals in the offering year will be positively linked to the accounting performance in the subsequent period. Moreover, since the earnings in the offering year truly reflect the firm's prospective performance, there will be no significant abnormal stock returns in the post-issue period. This leads us to the following hypotheses:

Hypothesis 2a: At-issue abnormal accruals are positively associated with post-issue accounting performance for IPO firms with financial expert CEOs.

Hypothesis 2b: At-issue abnormal accruals are not related to post-issue long-run abnormal stock returns for IPO firms with financial expert CEOs.

3.3. Sample and methodology

3.3.1. Sample selection

I retrieve my sample of common share US IPOs from 1st January 2003 to 31st December 2011 from the Securities Data Corporation (SDC) New Issues database. I start the sample from 2003 since I focus on examining the EM of IPOs after the Sarbanes-Oxley Act (2002). The U.S. Congress passed the Sarbanes-Oxley Act in 2002 as a respond to a number of corporate accounting scandals such as the cases of Enron and World.com in the early 2000s. The Act includes many stringent regulations to strengthen financial disclosures and improve corporate governance practices. Lobo and Zhou (2006) find that the SEC's requirement that financial statements be certified by CEOs and CFOs influences managerial behaviours towards more conservatism in financial reporting. Furthermore, Cohen et al. (2008) also report a decrease in accrual-based EM in the post-Sarbanes-Oxley period. Thus, I aim to examine EM of IPO firms after the passage of the Act and mitigate the potential effects of the Act on my findings. I require data three years after the IPO to analyse post-issue long-term performance; hence, my sample ends in 2011.

Following prior IPO literature, I exclude IPOs with an offer price of below five dollars per share, limited partnerships, unit offerings, rights issues, American depositary receipts (ADRs), leveraged buyouts (LBOs), closed-end funds, real estate investment trusts (REITs), spin-offs, privatizations, and financial institutions. After applying the restrictions, there are 688 IPOs. Then, I match the sample with BoardEx database to obtain managerial characteristics such as CEO age, gender, work experience, and education. I also search the SEC's EDGAR database for IPO firms' prospectuses and proxy statements to gather data on executive compensation and board meetings. Regarding CEO reputation, I use Factiva to track the number of business related articles in which the CEO is cited over the five-year period before the offering. In my search for the articles, I include both the CEO's full name and the company name, and limit the results to selected business publications including major U.S. newspapers (Wall Street Journal, New York Times, Washington Post, USA Today), top international publications (FT, Asian Wall Street Journal, European Wall Street Jmynal, International Herald Tribune), and press releases (PR Newswire, Business Wire). Additionally, I perform the data match with Compustat to obtain accounting information, and with the Centre for

Research in Security Prices (CRSP) to collect stock prices. Definitions of all variables are presented in Table 3.1.

3.3.2. Earnings management methodology

I compute abnormal accruals as a proxy for EM using the cross-sectional modified Jones (1991) model described in Dechow et al. (1995). I run the following cross-sectional OLS regression in Equation (3.1) for each industry-year with at least ten observations. The industry is identified by its two-digit SIC code, and I exclude firms going public in three years' time. This cross-section approach partially controls for industry-wide changes in economic conditions that influence total accruals independent of managerial manipulation (DeFond and Jiambalvo 1994; Kasznik 1999).

$$\frac{TACC_{i.t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{PPE_{i.t}}{TA_{i,t-1}} + \varepsilon_{i,t} \tag{3.1}$$

where $TACC_{i,t}$ is total accruals computed as earnings before extraordinary items and discontinued operations less cash flow from operations[10]; $TA_{i.t-1}$ is lagged total assets; $\Delta SALES_{i,t}$ is the change in total sales from the fiscal year before the IPO to the fiscal year of the offering; and $PPE_{i,t}$ is the gross value of property, plant and equipment. All continuous variables are winsorized at the 1st and 99th percentiles to mitigate the influence of outliers.

The expected component of total accruals ($NACC_{i.t}$) for the IPO sample is computed using the coefficient estimates from Equation (3.1) as follows.

$$NACC_{i.t} = \hat{\beta}_0 \frac{1}{TA_{i,t-1}} + \hat{\beta}_1 \frac{\Delta SALES_{i,t} - \Delta REC_{i.t}}{TA_{i,t-1}} + \hat{\beta}_2 \frac{PPE_{i.t}}{TA_{i,t-1}} \tag{3.2}$$

where $\Delta REC_{i.t}$ is the change in receivables from the fiscal year before the IPO to the fiscal year of the offering. The abnormal accruals ($DACC_{i.t}$) are computed as the difference between total accruals and expected accruals.

[10] Following Hribar and Collins (2002), I compute total accruals using the cash flow approach to avoid the non-articulation problem of the balance sheet method.

In addition, to mitigate the potential correlation between the abnormal accruals measured using the Jones model and firms' performance (Dechow et al. 1995), I employ the performance matching procedure suggested by Kothari et al. (2005) to match an IPO firm to a non-IPO firm in the same two-digit SIC industry and year with the closest ROA in the fiscal year before the offering. I allow the difference in ROA to be within the range of +/- 10% of the IPO firm's ROA. The matched firm's abnormal accruals are deducted from the IPO firm's abnormal accruals to get the performance-matched abnormal accruals for the IPO firm.

3.3.3. Sample descriptive statistics

Table 3.2 presents the distribution of the IPO sample by time and industry. The majority of IPOs are concentrated from 2004 to 2007, which is consistent with the recovery of the U.S. economy after the early 2000s recession. Subsequently, the IPO activity shows a considerable decline due to the 2008 financial crisis before improving again from 2010. The industry clustering is also observed in the sample, specifically, approximately 40% of IPOs are in the computer and high-tech industries (SIC codes of 35, 36, 38, and 73).

Table 3.3 provides descriptive statistics for the overall IPO sample and the comparison between IPO firms with financial expert CEOs and those with non-financial expert CEOs. I winsorize all continuous variables at the 1st and 99th percentiles to mitigate the issue of outliers. Panel A shows the descriptive statistics of CEO characteristics. Following Custódio and Metzger (2014), I define financial expert CEOs as those having past experience in either banking or investment firms, large auditing firms (Pricewaterhouse, Deloitte, Ernst & Young, KPMG, Arthur Andersen, Coopers, Touche Ross), or finance related roles (accountant, treasurer, VP of finance, CFO). On average, 26% of IPO firms in the sample have financial expert CEOs. In particular, 11% of the overall CEOs have past experience as a CFO, 10% in accounting-related roles (i.e., auditor, accountant, and treasurer), 5% in banking, 3% as a VP of finance, and 13% in other financial roles.

In general, CEOs are approximately 51 years old, have been working as a CEO in the firm for around 4.5 years, and hold roughly 11% ownership of the firm. Moreover, only 3% of the CEOs are female, 7% are a firm founder, and 44% are also the chairman of the board. Firms with financial expert CEOs and those with non-financial expert CEOs have the mean values of CEO age, gender, tenure, ownership, founder, and duality in line

with those of the overall sample; and there are no significant differences in these CEO characteristics between the two samples.

Furthermore, 77% of the CEOs hold a bachelor's degree, 48% a master's degree, 29% an MBA, 10% a Ph.D., and 5% a CPA certification. 16% of the CEOs are Ivy League alumni. IPO firms with financial expert CEOs and those with non-financial expert CEOs show significant differences in their CEOs' education background. Specifically, compared to non-financial expert CEOs, on average, more financial expert CEOs appear to have a bachelor's degree (82% versus 76%), an advanced management degree such as an MBA (36% versus 26%), and a professional certification such as a CPA (15% versus 1%). However, a research degree such as a Ph.D. is less popular among financial expert CEOs (6% of financial expert CEOs versus 11% of non-financial expert CEOs). In addition, financial expert CEOs are more likely to have graduated from an Ivy League institution than non-financial expert CEOs (20% and 15% respectively).

Moreover, 69% of the CEOs are recruited from outside the firm. Financial expert CEOs are less likely to be hired externally than non-financial expert CEOs (64% and 71% respectively). A typical CEO became a CEO either at the IPO firm or another firm at the age of around 43. Regarding reputation, on average, there are around 23 articles in major U.S. and international newspapers and newswires over five years before the IPO mentioning about the CEO. Concerning CEO compensation, the mean equity compensation is $400 thousand, and the mean total compensation is $1.2 million. There are no significant differences in the press coverage and the compensation between firms with and without financial expert CEOs.

Panel B illustrates firm and offering characteristics for all firms, and those with and without financial expert CEOs. Regarding firm characteristics, on average, IPO firms are in operation for 20 years. They have a mean leverage ratio of 0.42. In terms of profitability, approximately 40% of firms report a loss in the fiscal year prior to the offering. The average Altman's Z-score is -5.86, suggesting that IPO issuers appear to be in financial distress. The mean industry-adjusted ROA of -0.1 also indicates the underperformance of IPO firms compared to the industry. Since IPO firms are generally not profitable, the mean ratio of retained earnings to total equity is also negative (-0.71). The mean ratio of total capital expenditures to total assets is 0.12 and R&D to total assets 0.11. Moreover, 16% of IPO firms have more than one business segment, and 35% are operating in the high-tech industry. The IPO firms' board of directors meet quite frequently for an average of nearly eight meetings a year.

Regarding offering characteristics, issuers raise an average of $166 million in the stock offering. They have the mean market value at the time of listing of $476 million and an average initial return of 11%. The mean value of Tobin's Q of 4.11 and the book-to-market ratio of 0.30 reflect potential perceived growth opportunities for IPO firms. On average, 45% of IPOs are underwritten by top-tier investment banks, 83% audited by big four accounting firms, and 49% venture-backed. In addition, IPO firms have the mean buy-and-hold abnormal returns of 4% three years after the offering.

Some of the firm and offering characteristics appear to differ between IPOs with financial expert CEOs and those with non-financial expert CEOs. Compared to firms with non-financial expert CEOs, those with financial expert CEOs tend to be younger (mean firm age of around 18 years versus 21 years), have a lower leverage ratio (mean leverage ratio of 0.38 versus 0.44), more profitable (mean industry-adjusted ROA of -0.06 versus -0.11), and less R&D intensive (mean ratio of R&D to total assets of 0.09 versus 0.12). Moreover, on average, a smaller proportion of IPOs with financial expert CEOs are audited by big four auditors and supported by venture capitalists (80% and 41% respectively) than issuers with non-financial expert CEOs (84% and 52% respectively).

With respect to the EM proxy - abnormal accruals, I rely on the median for statistical inferences because the median is less likely than the mean to be influenced by extreme observations. The median value of abnormal accruals (-0.07) is significantly lower than zero, suggesting that IPO firms are less likely to engage in income-increasing EM. Since my sample covers the period from 2003 to 2011, this finding is consistent with prior literature which documents that the magnitude of EM tends to decrease in the post-Sarbanes-Oxley (2002) period. IPO firms with financial expert CEOs and those with non-financial expert CEOs also show significantly negative median abnormal accruals. However, issuers with financial expert CEOs have lower abnormal accruals in the offering year than those with non-financial expert CEOs (-0.13 versus -0.06). The difference is strongly significant at the 1% level. This suggests that IPO firms with financial expert CEOs tend to be more conservative in their financial reporting than those with non-financial expert CEOs. I also present the correlation matrix of variables used in my empirical analysis in Panel C. No multicollinearity is detected among variables.

My initial univariate result shows that IPO firms with financial expert CEOs are less likely to engage in EM than non-financial expert CEOs. In order to provide more concrete empirical evidence, I conduct the multivariate analysis of the association

between EM and financial expertise of CEOs controlling for various determinants of EM in the next section.

3.4. Empirical models

3.4.1. Financial expert CEOs and earnings management around IPOs

To investigate the association between CEOs' financial experience and EM, I model abnormal accruals as a function of CEOs' financial experience and various firm characteristics which have been identified by prior research as important determinants of EM. The model is summarised as follows. The definitions of all variables are presented in Table 3.1.

$$\begin{aligned} Abnormal\ accruals_i = {} & \alpha_0 + \beta_1 Financial\ expert\ CEO_i + \\ & \beta_2 Log(firm\ age)_i + \beta_3 Ln(market\ value)_i + \beta_4 Big4\ auditor_i + \\ & \beta_5 Top-tier\ investment\ bank_i + \beta_6 Venture\ capitalist_i + \beta_7 Leverage_i + \\ & \beta_8 Loss_i + \beta_9 Altman's\ Z-score_i + \beta_{10} Tobin's\ Q_i + \beta_{11} CAPEX_i + \\ & \beta_{12} Industry-adjusted\ ROA_i + \beta_{13} Board\ meetings_i + \\ & \beta_{14} External\ hire_i + \beta_{15} Log(equity\ compensation)_i + \beta_{16} CEO- \\ & Chairman_i + \beta_{17} CEO-founder_i + \beta_{18} Log(CEO\ ownership)_i + \\ & \beta_{19} Log(CEO\ age)_i + \beta_{20} CEO\ gender_i + \beta_{21} Log(CEO\ tenure)_i + \\ & \beta_{22} Log(age\ first\ became\ CEO)_i + \beta_{23} Ivy\ League\ alumnus_i + \\ & \beta_{24}\ \mathrm{Log}(CEO\ press\ coverge)_i + Industry\ dummies + Year\ dummies + \varepsilon_i \end{aligned} \tag{3.3}$$

Prior research suggests several firm characteristics influencing the level of EM. Firm age is an important factor since younger firms appear to have more volatile earnings and less solid accounting systems, which creates more incentives for managers to manipulate earnings. The size of the firm also matters since managers of larger firms tend to have more discretion over the accounting policies due to the complexity in financial structures of these firms compared to smaller ones. However, more stringent scrutiny from regulators and market participants over larger firms may discourage the financial reporting misbehaviours. I include the firm's market value at the time of listing as a control variable to account for firm size.

In addition, financial intermediaries participating in the IPO process can exert an influence on the degree of EM among IPO firms. Specifically, Jo et al. (2007) and Lee and Masulis (2011) document that the reputation issue creates strong incentives for top-

tier investment banks to detect financial reporting misrepresentations; thus, EM is reduced among IPO firms underwritten by reputable investment banks. Morsfield and Tan (2006), Hochberg (2012), and Wongsunwai (2013) find that the monitoring of venture capitalists also contributes to lowering EM around IPOs. Moreover, Becker et al. (1998), Krishnan (2003), and Gul et al. (2009) report that higher quality audit provided by big four accounting firms discourages managers from manipulating earnings. Therefore, I control for the effects of reputable underwriters, venture capitalists, and big four auditors on restraining EM.

Prior literature also documents that firms close to debt covenant violations or under financial distress are more likely to engage in EM to overstate earnings (DeFond and Jiambalvo 1994; Franz et al. 2014; DeAngelo et al. 1994). Moreover, loss firms have more incentives to manage earnings upward to exceed the positive threshold (Burgstahler and Dichev 1997; Degeorge et al. 1999). Therefore, I include the leverage ratio, Altman's Z-score, and the incidence of a loss in the fiscal year prior to the offering as control variables.

Furthermore, Fan (2007) argues that the uncertainty in high-growth firms creates stronger incentives and better chances for managers of these firms to manipulate earnings to mislead investors. I capture the effect of growth opportunities by including in my model the level of capital expenditures and Tobin's Q as proxies for growth. I also control for the influence of firm performance on EM by including the variable industry-adjusted ROA (Kothari et al. 2005).

Additionally, corporate governance mechanisms play a substantial role in constraining managers from manipulating earnings. The degree of board interactions and activities is documented to be positively related to corporate governance (Vafeas 1999). Xie et al. (2003) further find that board meeting frequency is associated with a lower level of EM. Moreover, the greater independence of the board will enhance its overseeing roles (Klein 2002). The dual role of CEO and chairman reduces the board independence, and thus, adversely affects the effectiveness of the board's monitoring activities. Therefore, I include the number of board meetings and CEO duality as control variables. Furthermore, the ownership structure is documented to influence the level of EM (Dempsey et al. 1993; Kim and Yi 2006; Yeo et al. 2002; Fan and Wong 2002; Fan 2007; Huang et al. 2013).To account for this effect, I control for CEO ownership and whether a CEO is also a founder of the firm.

Various prior studies indicate that managers have strong incentives to engage in EM to maximise their compensation (Healy 1985; Holthausen et al. 1995; Guidry et al. 1999; Balsam 1998). Particularly, Bergstresser and Philippon (2006) find that earnings manipulation is more pronounced when CEO compensation is more closely tied to stocks and options. To control for this effect of executive compensation on EM practices, I include a control variable for CEOs' equity compensation.

Previous research shows that various CEO characteristics can influence financial and accounting policies (Bertrand and Schoar 2003; Malmendier and Tate 2005; Bamber et al. 2010; Demerjian et al. 2013; Ge et al. 2011). To mitigate the issue of omitted variables on the CEO level (e.g., CEOs' financial experience may be correlated with other CEO characteristics that drive the results), I control for various CEO characteristics, especially those documented in prior research as determinants of EM. I control for CEO gender since Srinidhi et al. (2011) find that firms with female directors exhibit higher quality financial reporting. Moreover, Kuang et al. (2014) argue that compared with CEOs appointed from within the firm, CEOs hired externally have more incentives to demonstrate their abilities; thus, they tend to engage in income-increasing EM in the early years of service. Ali and Zhang (2015) provide evidence that managers are more likely to overstate earnings in their initial years of tenure to exert a favourable influence on the market's perception of their ability. Thus, I include CEO age, CEO tenure, and external hire as control variables. Additionally, Francis et al. (2008) document that CEO reputation, which is proxied by press coverage, is negatively associated with earnings quality. I also use the number of articles about the CEO over the five-year period before the offering to control for the linkage between CEO reputation and EM. Last but not least, the work experience of CEOs may capture the CEO innate talent instead of accumulated skills (Custódio et al. 2013; Custódio and Metzger 2014). Following Custódio and Metzger (2013), Custódio et al. (2013), and Custódio and Metzger (2014) I include the variables Ivy League alumnus and the age first became CEO as proxies for innate talent.

3.4.2. At-issue earnings management and post-issue performance

I examine the association between abnormal accruals in the issue year and subsequent accounting performance to shed light on whether financial expert CEOs are more likely to provide informative financial reporting. Subramanyam (1996) posits that the positive relationship between abnormal accruals and subsequent operating cash flows suggests the informative role of EM in signalling the firm's future prospects. Although

cash flows from operations (CFO) are less influenced by accrual reversals which are the problem of using ROA as a performance measure, it is more likely to have the timeliness issue than ROA as a performance measure (Dechow 1994; Bowen et al. 2008). Therefore, in order to provide more robust evidence, I analyse both CFO and ROA as accounting performance measures. I estimate the following regressions to examine the association between at-issue abnormal accruals and subsequent accounting performance.

$$\begin{aligned} CFO_{i,t=1} \text{ or } ROA_{i,t=1} = \alpha_0 + \beta_1 Abnormal\ accruals_{i,t=0} + \\ \beta_2 Abnormal\ accruals_{i,t=0} * Fiancial\ expert\ CEO_{i,t=0} + \beta_3 CFO_{i,t=0} + \\ \beta_4 CAPEX_{i,t=0} + Industry\ dummies + Year\ dummies + \varepsilon_i \end{aligned} \quad (3.4)$$

where $CFO_{i,t=1}$ is cash flows from operations scaled by lagged total assets in the fiscal year following the offering; $ROA_{i,t=1}$ is net income scaled by lagged total assets in the fiscal year following the offering. Definitions of all variables are presented in Table 3.1. I include the current CFO to control for potential mean-reversion in accounting performance measures (Barber and Lyon 1996; Bowen et al. 2008). I also account for the effect of the investment of proceeds on post-issue performance by including capital expenditure (CAPEX) as a control variable (Teoh et al. 1998b).

Besides accounting performance, I also analyse the post-issue stock performance. If managers engage in EM for informative purposes, investors will more accurately incorporate the information into their firm valuation. The price adjustment will happen in the short-term, leading to insignificant long-term abnormal stock returns. First of all, I use buy-and-hold returns to examine long-run stock performance. Since buy-and-hold returns mimic investors' investment experience, they are widely used in long-run performance studies. I run the following regression of post-issue three-year buy-and-hold abnormal returns (BHARs) on at-issue aggressive EM to examine the effect of at-issue aggressive EM on post-issue long-run stock performance.

$$\begin{aligned} BHAR_i = \alpha_0 + \beta_1 Aggressive\ earnings\ management_i + \\ \beta_2 Aggressive\ earnings\ management_i * Financial\ expert\ CEO_i + \\ \beta_3 Log(firm\ age)_i + \beta_4 Ln(market\ value)_i + \beta_5 Venture\ capitalist_i + \\ \beta_6 Book\ to\ market_i + \beta_7 ROA_i + \beta_8 Underpricing_i + \beta_9 Market\ BHR_i + \\ \text{Industry dummies} + \text{Year dummies} + \varepsilon_i \end{aligned} \quad (3.5)$$

where $BHAR_i$ is the IPO firm's post-issue three-year buy-and-hold abnormal return calculated starting from the day after the annual financial report date in the offering year to the earlier of the three year anniversary date and the delisting date; $Aggressive\ earnings\ management_i$ is an indicator variable which equals to one if the firm's abnormal accruals are greater than the 75th percentile of the overall IPO sample, and zero otherwise. I include control variables in the Equation (3.5) as suggested by prior literature (Ritter 1991; Teoh et al. 1998a; Chen et al. 2013). Definitions of all variables are presented in Table 3.1.

Fama (1998) raises several concerns about using buy-and-hold returns to examine long-run performance such as the skewness in the distribution of buy-and-hold returns, the exaggeration of short-term estimation errors through compounding, and the cross-correlation problems caused by time-period overlap. He suggests employing the calendar-time approach to mitigate the weaknesses of the use of buy-and-hold returns. Therefore, for robustness check, I examine the long-run stock performance using the following calendar-time portfolio approaches: the Fama and French (1993) three-factor model and the Carhart (1997) four-factor model. I estimate the following regression based on Fama and French (1993) three-factor model.

$$POSEM_{pt} - NEGEM_{pt} = \alpha_p + \beta_m MKT_t + \beta_s SMB_t + \beta_h HML_t + \varepsilon_t \qquad (3.6)$$

where $POSEM_{pt} - NEGEM_{pt}$ is the return from taking a long position in a portfolio of IPO firms that aggressively manage earnings and a short position in a portfolio of IPO firms that conservatively manage earnings for each calendar month in the sample period. MKT_t is the excess monthly return on the value-weighted CRSP index for each calendar month in the sample period. SMB_t is the difference in the returns of value-weighted portfolios of small and large stocks for each calendar month in the sample period. HML_t is the difference in the returns of value-weighted portfolios of high book-to-market and low book-to-market stocks for each calendar month in the sample period. The portfolio returns include returns of IPO firms for three years after the IPO fiscal year end. The Carhart four-factor model adds to the Fama and French three-factor model a factor to account for one-year momentum price return. The factors for both models are retrieved

from Professor Kenneth French's website[11]. The regression is estimated separately for the sample of IPO firms with financial expert CEOs and those with non-financial expert CEOs. The intercept of the factor model represents the average monthly abnormal return. The intercept test indicates the difference in post-issue stock performance between firms with aggressive EM and those with conservative EM.

3.5. Empirical results

3.5.1. Financial expert CEOs and earnings management around IPOs

Table 3.4 presents the results of the OLS regression analysis of the association between financial expert CEOs and EM around IPOs. The regressions include both year and industry fixed effects, and the standard errors are adjusted for heteroskedasticity. Specification (1) reports the estimates of an OLS regression of abnormal accruals on financial expert CEO dummy variable and a set of firm-level control variables. Specification (2) presents the estimates of an OLS regression of abnormal accruals on financial expert CEO dummy variable and both firm-level and CEO-level control variables. The results are consistent for both regressions. The coefficients on the variable *Financial expert CEO* are negative and statistically significant at the 1% level. This suggests that IPO firms managed by CEOs with financial experience are less likely to engage in EM in the offering year. The signs of the control variables are generally in line with prior literature. EM is positively associated with the level of leverage and negatively related to growth opportunities measured by Tobin's Q. In terms of CEO characteristics, CEOs recruited externally are less likely to manipulate earnings in the offering year, and those graduated from Ivy League institutions also tend to engage less in EM, but CEO reputation is positively linked to the level of EM around IPOs.

3.5.2. At-issue earnings management and post-issue performance

Table 3.5 presents the regression results on whether the EM in the issue year explains the firm performance in the post-issue periods. Panel A illustrates the analysis of post-issue accounting performance measured by CFO and ROA. Specification (1) shows the result of the regression with ROA as the dependent variable, and Specification (2) reports the result of the regression with CFO as the dependent variable. I include industry and year fixed effects and adjust standard errors for heteroskedasticity. The

[11] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

results are consistent for both regressions. The coefficients on *Abnormal accruals* are insignificant, suggesting that the level of abnormal accruals of IPO firms with non-financial expert CEOs is unrelated to subsequent accounting performance. This supports the conjecture that non-financial expert CEOs tend to manipulate earnings opportunistically. If managers manipulate accruals to overstate earnings to mislead investors, the managed earnings will not be sustainable in the subsequent period. Thus, the level of abnormal accruals in the offering year will not reflect future performance. The coefficients on the interaction term *Abnormal accruals*Financial expert CEO* are positive and significant at the 10% level. Additionally, the sum of the estimated coefficients of *Abnormal accruals* and *Abnormal accruals*Financial expert CEO* are significantly positive at the 1% level. The results suggest that financial expert CEOs tend to use accruals to communicate private information to the market to signal the firm's future prospects; thus, the degree of abnormal accruals in the issue year is positively related to future accounting performance.

Panel B presents the regression analysis of the post-issue long-run stock performance. I include both the industry and year fixed effects and adjust the standard errors for heteroskedasticity. The coefficient on *Aggressive EM* is negative and significant at the 5% level. This indicates that non-financial expert CEOs engage in aggressive EM in the issue year to mislead investors. When actual earnings are revealed and do not meet the expectations, investors revise downward their valuation, leading to negative abnormal stock returns in the post-issue period. The coefficient on the interaction term *Aggressive EM*Financial expert CEO* is significantly positive, indicating that for IPO firms with financial expert CEOs, the post-issue long-run stock performance improves with the existence of aggressive EM in the issue year. In addition, the sum of the estimated coefficients of *Aggressive EM* and *Aggressive EM*Financial expert CEO* are insignificantly different from zero. This finding confirms that financial expert CEOs tend to exercise their accounting discretion to communicate private information to the market, allowing investors better gauge the firm value. Price adjustment will occur in the short-run, leaving insignificant long-run abnormal stock returns.

Panel C presents the intercept estimates of the Fama and French three-factor model and Carhart four-factor model. Both models provide consistent results. The intercept estimates are significantly negative for the sample of IPO firms with non-financial expert CEOs. However, for the sample of IPO firms with financial expert CEOs, the intercept estimates are insignificantly different from zero. The results suggest that

while IPOs managed by non-financial expert CEOs that engage in aggressive EM in the issue year underperform those that employ conservative financial reporting, IPOs managed by financial expert CEOs exhibit no significant difference in post-issue long-run stock performance between aggressive and conservative issuers.

Overall, the findings from the analysis of both accounting and stock performance in the post-issue period are consistent with my conjecture that financial expert CEOs tend to employ their accounting discretion to better convey the firm's prospects to the market.

3.6. Additional tests and robustness checks

3.6.1. Endogeneity control

The literature on the influence of CEO characteristics on corporate behaviours and outcomes commonly raises the concern about the endogenous CEO-firm matching which may bias the estimation of the impact of CEO characteristics on corporate decisions. For instance, IPO firms that are committed to providing high-quality financial information to investors may have preferences to hire managers with financial experience, but according to the upper echelons theory, managers with financial backgrounds are more likely to draw on their past finance and accounting experience to implement proper accounting policies. The endogeneity of CEO selection makes it unclear whether the variation in EM is attributable to CEOs' financial experience or due to the non-random assignment of CEOs to firms.

To address the endogeneity of CEO selection problem, I employ the propensity score matching procedure (PSM). Using this method, I can compare the EM of a firm that appoints a financial expert CEO with the EM of the same firm if it had appointed a non-financial expert CEO. In order to perform the matching, I measure the propensity score, which is the conditional probability of receiving the treatment (having a financial expert CEO) given a firm's pre-treatment characteristics, for all the IPOs by estimating a probit regression for the likelihood of firms having a financial expert CEO based on various observable CEO, firm, and industry characteristics. I then match each observation in the treated group with the control group based on its propensity score obtained from the predicted probability taken from the first stage probit estimation.

Panel A of Table 3.6 presents the results for the average treatment effect on the treated (ATET) on EM for IPO firms with financial expert CEOs and those with non-financial expert CEOs. The matching variables include firm-level factors (firm age, firm size, big four auditor, top-tier investment bank, venture capitalist, leverage, loss,

Altman's Z-score, Tobin's Q, capital expenditures, R&D intensity, retained earnings, diversification, ROA, and board meetings), CEO-level factors (dual position of CEO and Chairman, founder, ownership, age, gender, tenure, innate talent proxied by age first became CEO and Ivy League alumnus, CEO reputation measured by press coverage), industry factor (high-tech industry), and year effects. The ATET is negative and strongly significant at the 1% level, indicating that IPO firms with financial expert CEOs are associated with significantly lower EM. This finding is consistent with the results presented previously on my baseline regression (Equation 3.3).

I also check the robustness of my results using other commonly used econometric methods for addressing endogeneity concerns including two-stage least squares instrumental variable (2SLS IV), Heckman (1979) two-step treatment effect, and maximum likelihood estimation (MLE) treatment effect. These econometric approaches all require the estimation of a selection model accounting for the assignment of financial expert CEOs to firms. Custódio and Metzger (2014) document that financial expert CEOs are more likely to be matched to firms in the mature stage of their life cycle, while non-financial expert CEOs are more likely to be appointed by growth firms. Therefore, in the selection model, I control for firm characteristics associated with firms' life cycle as suggested by Custódio and Metzger (2014) including R&D intensity, retained earnings, diversification, and an indicator controlling for high-tech industries. For the 2SLS IV model, in the first stage, I estimate the regression of the endogenous variable *Financial expert CEO* on instrumental variables and exogenous variables to obtain the fitted probabilities of having a financial expert CEO. In the second stage, I run the original regression (Equation 3.3) with the endogenous variable replaced by the fitted value from the first stage regression. For the two-step treatment effect model, in the first stage, I estimate the selection equation using a probit regression of the likelihood that a firm appoints a financial expert CEO. The estimated self-selection correction term, inverse Mills ratio, is added to the original regression (Equation 3.3) and the linear outcome regression is estimated as normal. For the MLE model, both the selection and the outcome regressions are estimated simultaneously by maximum likelihood estimation. MLE is more efficient than the two-step treatment effect model if the error terms in the selection and outcome equations have a bivariate normal distribution.

Panel B of Table 3.6 presents the results of the regressions of abnormal accruals on financial expert CEO using the three estimation models: 2SLS IV, Heckman two-step treatment effect, and MLE treatment effect. The results hold for the alternative

econometric models. For the 2SLS IV model, the Durbin-Wu-Hausman test of endogeneity is significant at the 5% level, indicating the endogeneity problem. The inverse Mills ratio from the Heckman two-step treatment effect model is significant at the 10% level, suggesting the issue of selection bias. The likelihood ratio test of the correlation between the two error terms of the selection and outcome equations from the MLE treatment effect model shows a strongly significant result at the 1% level. The evidence from the endogeneity tests of the three estimation approaches confirms the potential endogenous selection issue in my sample. In terms of the instruments, the variable *Retained earnings* is significantly positive, which is in line with prior literature. The level of retained earnings is greater in mature firms and as shown in Custódio and Metzger (2014) financial expert CEOs are more likely to be appointed among firms in the mature stage of their life cycle. Most importantly, the coefficients on the variable *Financial expert CEO* are all significantly negative, which is consistent with the result obtained using the baseline OLS regression (Equation 3.3) and the result from the PSM method.

3.6.2. CEO's financial experience, CEO power, and earnings management

In this section, I examine whether the CEO power and CEOs' financial experience interact and further reduce EM around the stock offerings. Prior research suggests that CEOs with more decision-making power can impose a significant impact over corporate financial strategies and firm performance (Daily and Johnson 1997; Adams et al. 2005; Veprauskaitė and Adams 2013; Chikh and Filbien 2011). Particularly, CEOs may set the tone from the top and influence CFOs' decisions (Feng et al. 2011). Therefore, I expect that the influence of financial expert CEOs over EM will be more pronounced if the CEOs have more power over the board and other executives. I employ four dimensions suggested by Finkelstein (1992) to measure CEO power, namely, structural power, ownership power, expertise power, and prestige power. These power sources are widely used in research on CEO power, for example, Adams et al. (2005), Chikh and Filbien (2011), Veprauskaitė and Adams (2013). Structural power is based on the organizational structure. The authority earned at a higher rank allows managers to have a greater degree of control over their subordinates. To proxy for structural power, I use *CEO duality*, which occurs when the CEO is also the chairman of the board. Regarding ownership power, managers will have a stronger position in the agent-principal relationship if they have more ownership in the firm. To proxy for ownership power, I use *CEO ownership*,

which is the percentage of shares owned by the CEO before the offering. In addition, being a founder of the firm also strengthens the relationship between the CEO and the board; thus, I include another proxy for ownership power – *CEO founder*, which takes the value of one if the CEO is also a founder of the firm. Regarding expertise power, relevant expertise that is critical to the organisation allows managers to more effectively handle both internal and external factors influencing the organisational success. I use *CEO tenure* as a proxy for expertise power since the CEO's understanding of the firm accumulates over the time that the CEO works in the firm. Concerning prestige power, managerial prestige enhances the power of managers in many ways, for example, by conveying to other executives about their personal importance and adding value to the firm through their external connections. I use the variable *Ivy League alumnus* as a proxy for prestige power because CEOs graduated from Ivy League institutions not only possess top qualifications but also tend to have more powerful friends and contacts.

I standardize and aggregate the five variables (i.e., *CEO-Chairman, CEO-Founder, CEO ownership, CEO tenure, and Ivy League alumnus*) to generate the variable *CEO power* accounting for the effects of all four sources of managerial power. I create the interaction term between *CEO power* and *Financial expert CEO* and run the original regression (Equation 3.3) including the interaction effect. The result is presented in Table 3.7. The coefficient on the variable *Financial expert CEO* remains negative and strongly significant at the 1% level. The coefficient on the interaction term is also significantly negative, indicating that the CEO power strengthens the effect of financial expert CEOs on EM. Moreover, the F-test of the sum of the coefficients of the variable *Financial expert CEO* and the interaction term *Financial expert CEO***CEO power* gives a significant negative result. This suggests that among IPO firms with financial expert CEOs the level of EM is lower for firms whose CEOs have more power in decision making. Overall, my results confirm the importance of CEO power in facilitating the influence of financial expert CEOs on financial reporting.

3.6.3. Alternative measures of financial expertise

In the main analysis, I examine the association between EM and the CEO's financial experience. I define financial experience broadly to cover past financial experience of the CEO in either a banking or investment firm, auditing firm, and other financial related roles. In this section, I check the robustness of my results with more specific measures of financial expertise: CFO experience, CPA certification, and both

CFO experience and CPA certification. CFOs are directly responsible for overseeing financial reporting process, so the past experience as a CFO equips the managers with relevant knowledge and skills which can influence their decisions on the firm's accounting choices. In order to gain the accreditation by the American Institute of Certified Public Accountants (AICPA), CPA holders need to meet both the knowledge and professional experience requirements. They also need to keep their knowledge up to date and adhere to ethical codes of conduct. Thus, I postulate that CEOs having a CPA certification show a greater understanding of financial reporting and higher professional ethics.

I run the regressions of abnormal accruals on CFO experience and CPA certification. All control variables are similar to the original regression model (Equation 3.3). The regression analyses are presented in Panel A of Table 3.8. The coefficients on the variables *CFO*, *CPA*, and *CFO&CPA* are all significantly negative. This suggests that CEOs who have past CFO experience, hold a CPA certification, or possess both the CFO experience and CPA certification are less likely to manipulate earnings in the offering year.

Utilising my data on the detailed work experience history of CEOs, I expand to investigate whether the variety of CEOs' financial experience influences the degree of EM around IPOs. I examine four aspects of financial experience variety: (1) the number of firms in which the CEO has past financial experience, (2) the number of financial and accounting related roles that the CEO holds in their past work history, (3) whether the CEO has past financial experience at another firm, and (4) the length of time of CEO financial experience. For each of these aspects, a higher value is interpreted as greater financial experience variety. I employ the principal component analysis (PCA) to extract common components from the four variables to create a *Financial experience variety index* as the first factor of applying PCA on the four proxies of financial experience variety. Using one variable instead of the five variables individually helps mitigate the multicollinearity problem, reduce measurement errors, and enhance the power of regression tests. In addition, I create an indicator variable *Financial experience variety dummy*, which takes the value of one if the CEO has the financial experience variety index greater than the median of the sample.

To analyse the association between EM and financial experience variety, I run the regressions of EM on each of the variable proxies for financial experience variety, financial experience variety index, and financial experience variety dummy. The results

of the PCA and regressions are presented in Panel B of Table 3.8. All the variables used to proxy for financial experience variety are highly correlated, which is desirable since the single common factor generated by PCA will better summarize the effects of individual factors. Using the PCA method, I obtain only one component with an eigenvalue higher than one (eigenvalue of 3.507). The four variables have positive loadings, being positively correlated with the index. The index gives the highest weight to the number of firms in which the CEO has past financial experience and the lowest weight to the CEO's financial experience at another firm. Regarding the regression results, the coefficients on the individual financial experience variety variables, the index, and the financial experience variety dummy are all negative and significant at the 5% level. The findings indicate that CEOs with more varied financial experience tend to engage less in EM. I also check the robustness of my results on the relationship between abnormal accruals in the offering year and the post-issue performance for IPO firms whose CEOs has prior CFO experience and high-variety of financial experience. The results remain stable and also suggest that financial expert CEOs tend to manage earnings for informative purposes.

3.6.4. Financial expert CEOs and real earnings management

In the main analysis, I argue that financial skills and knowledge provide CEOs with deeper understanding of the accounting process, thereby allowing them to more effectively utilise their discretion in accounting policies to make financial reporting more informative to investors. Meanwhile, real EM involves making actual operating decisions to bias reported earnings. Thus, it requires a strategic perspective from the managers, which relates more to overall managerial experience. In this study, I focus on the CEO's functional experience in finance and accounting, so I emphasize the EM through accounting choices rather than operating activities. Accrual-based EM is, therefore, more relevant to my research. As an additional check, in this section, I further test the association between having a financial expert CEO and real EM of IPO firms. I follow Roychowdhury (2006) and use three proxies for real EM: abnormal cash flow from operations, abnormal production costs, and abnormal discretionary expenses.

The normal level of cash flow from operations is estimated as:

$$\frac{CFO_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (3.7)$$

where $CFO_{i,t}$ is cash flows from operations, $TA_{i,t-1}$ is lagged total assets, $SALES_{i,t}$ is total sales, $\Delta SALES_{i,t}$ is the change in sales from the fiscal year before the issue to the fiscal year of the IPO.

The model for normal production costs is:

$$\frac{PROD_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t}}{TA_{i,t-1}} + \beta_2 \frac{\Delta SALES_{i,t}}{TA_{i,t-1}} + \beta_3 \frac{\Delta SALES_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (3.8)$$

where $PROD_{i,t}$ is the production costs computed as the sum of the cost of goods sold and the change in inventory from the fiscal year before the IPO to the fiscal year of the IPO. $\Delta SALES_{i,t-1}$ is the change in sales from the fiscal year two years before the issue to the fiscal year prior to the IPO.

The normal discretionary expenses are expressed as:

$$\frac{DISEXP_{i,t}}{TA_{i,t-1}} = \beta_0 \frac{1}{TA_{i,t-1}} + \beta_1 \frac{SALES_{i,t-1}}{TA_{i,t-1}} + \varepsilon_{i,t} \quad (3.9)$$

where $DISEXP_{i,t}$ is the discretionary expenses computed as the sum of SG&A, R&D, and advertising expenses. $SALES_{i,t-1}$ is total sales in the fiscal year prior to the IPO.

All the three equations (3.7), (3.8), and (3.9) are estimated cross-sectionally for each industry-year with at least ten observations. I winsorize all variables at the 1st and 99th percentiles to alleviate the problem of outliers. The abnormal cash flows from operations, abnormal production costs, and abnormal discretionary expenses for each IPO firm are computed as the deviation of the actual level from the normal level calculated using the estimated coefficients from the regressions (3.7), (3.8), and (3.9). I then match the real EM measures of IPO firms to those of their non-IPO counterparts based on year, industry, and ROA to produce performance-matched real EM measures. Moreover, I multiply the estimated abnormal cash flow from operations and abnormal discretionary expenses by (-1) so that higher values reflect greater real EM. Besides the three individual metrics, following Cohen and Zarowin (2010), I also compute two aggregate measures of real EM: *REM1* as the sum of *abnormal production costs* and *abnormal discretionary expenses* and *REM2* as the sum of *abnormal cash flow from operations* and *abnormal discretionary expenses.*

I present the results of the association between the presence of financial expert CEOs and real EM in Table 3.9. Consistent with my argument, I do not find significant relationship between CEOs' financial experience and real EM around IPOs, indicating that having financial expert CEOs do not seem to explain the variation in real EM of IPO firms.

3.7. Conclusion

The chapter provides new empirical evidence on the association between CEOs' financial experience and EM around IPOs. I find that IPO firms with financial expert CEOs are associated with lower EM in the offering year. Moreover, the restraining effect of financial expert CEOs on EM is more pronounced if the CEO has more decision-making power over the board of directors. I also test the link between EM in the issue year and post-issue performance to examine whether financial expert CEOs exercise their accounting discretion to opportunistically manipulate earnings or to provide investors with more informative financial reporting. I find the positive relation between at-issue abnormal accruals and subsequent accounting performance measured by both operating cash flows and return on assets for issuers with financial expert CEOs. For issuers with non-financial expert CEOs, on the other hand, the at-issue abnormal accruals are not related to the subsequent accounting performance. In terms of stock performance, I document the negative relationship between the incidence of aggressive EM in the offering year and the post-issue abnormal stock returns for IPO firms with non-financial expert CEOs. The relationship is insignificant for IPO firms with financial expert CEOs. My findings are consistent with the conjecture that financial expert CEOs tend to manage accruals to better inform the investors about the firm's future prospects. The results are robust to alternative measures of CEOs' financial experience and different econometric methods to address the edogenous selection problem. Overall, this chapter provides evidence supporting the role of financial expert CEOs in curtailing EM of IPO firms in the issue year and providing more informative reported earnings to the market.

Table 3. 1 Variable definition

Panel A: CEO characteristics

Variable	Definition
CEO age	Age of the CEO in years (*BoardEx).*
CEO gender	Dummy variable that equals to one if the CEO is female, and zero otherwise (*BoardEx).*
CEO tenure	Number of years working as CEO in the firm (*BoardEx).*
CEO-Chairman	Dummy variable that equals to one if the CEO is also chairman of the board, and zero otherwise (*BoardEx).*
CEO-Founder	Dummy variable that equals to one if the CEO is also founder of the firm, and zero otherwise (*BoardEx).*
CEO ownership	Percentage of shares owned by the CEO before the offering (*SEC's EDGAR).*
Bachelor's degree	Dummy variable that equals to one if the CEO has a bachelor's degree, and zero otherwise (*BoardEx).*
Master's degree	Dummy variable that equals to one if the CEO has a master's degree, and zero otherwise (*BoardEx).*
MBA	Dummy variable that equals to one if the CEO has an MBA degree, and zero otherwise (*BoardEx).*
PhD	Dummy variable that equals to one if the CEO has a Ph.D. degree, and zero otherwise (*BoardEx).*
CPA	Dummy variable that equals to one if the CEO has a CPA certification, and zero otherwise (*BoardEx).*
Ivy League alumnus	Dummy variable that equals to one if the CEO is an alumnus of an Ivy League institution, and zero otherwise (*BoardEx).*
Age first became CEO	Age at which the CEO became CEO for the first time (*BoardEx).*
External hire	Dummy variable that equal to one if the CEO is hired externally, and zero if the CEO is internally promoted (*BoardEx).*
CEO press coverage	Number of articles containing the CEO's name and company in major U.S. newspapers (Wall Street Journal, New York Times, Washington Post, USA Today), top international publications (FT, Asian Wall Street Journal, European Wall Street Journal, International Herald Tribune), and press releases (PR Newswire, Business Wire) (*Factiva).*
Compensation equity	Equity compensation of the CEO which consists of equity incentives and value of options granted (*SEC's EDGAR).*
Compensation total	Total compensation of the CEO which consists of salary, bonus, equity incentives, non-equity incentives, options, and other compensation (*SEC's EDGAR).*
CFO role	Dummy variable that equals to one if the CEO used to be a chief financial officer, and zero otherwise (*BoardEx).*
Financial expert CEO	Dummy variable that equals to one if the CEO has past financial experience in either a banking or investment firm, a large auditing firm (Pricewaterhouse, Deloitte, Ernst & Young, KPMG, Arthur Andersen, Coopers, Touche Ross), or a finance related role (accountant, treasurer, VP of finance, CFO), and zero otherwise (*BoardEx).*

Financial experience variety index	First factor of applying principal component analysis to four proxies of the variety of financial experience: (1) number of firms in which the CEO has past financial experience, (2) number of financial and accounting related roles that the CEO holds in their past career, (3) whether the CEO has past financial experience at another firm, and (4) the length of time of the CEO's financial experience (*BoardEx*).
Financial experience variety dummy	Dummy variable equal to one if the CEO's financial experience variety index is above the sample median, and zero otherwise.

Panel B: Firm and offering characteristics

Variable	**Definition**
Abnormal accruals	Abnormal accruals computed using modified Jones (1991) model and adjusted for abnormal accruals of a performance-matched non-IPO firm based on performance matching procedure suggested by Kothari (2005). The methodology to estimate abnormal accruals is explained in Section 3.3.2.
Abnormal cash flow from operations	Abnormal cash flow from operations multiplied by minus one. The methodology to estimate abnormal cash flow from operations is explained in Section 3.6.4.
Abnormal production costs	Abnormal production costs, where production costs are the sum of cost of goods sold and change in inventories. The methodology to estimate abnormal production costs is explained in Section 3.6.4.
Abnormal discretionary expenses	Abnormal discretionary expenses multiplied by minus one, where discretionary expenses are the sum of advertising expenses, R&D expenses, and SG&A expenses. The methodology to estimate abnormal discretionary expenses is explained in Section 3.6.4.
REM1	First measure of overall level of real earnings management computed as the sum of abnormal production costs and abnormal discretionary expenses.
REM2	Second measure of overall level of real earnings management computed as the sum of abnormal cash flow from operations and abnormal discretionary expenses.
Firm age	Firm age in years measured as the difference between the firm's IPO year and its founding year. Company founding years are collected from the Field-Ritter dataset.[12]
Market value	Market value of the firm in the year of the offering (*Compustat* PRCC_F*CSHO).
Leverage	Ratio of total debts to total assets (*Compustat* (DLC + DLTT)/AT).
Loss	Dummy variable that equals to one if the firm has negative earnings before interest and taxes (*Compustat* EBIT) in the fiscal year prior to the offering, and zero otherwise.
CAPEX	Average capital expenditures (*Compustat* CAPX) in the offering year and one year after scaled by total assets (*Compustat* AT) at the beginning of the offering year.
Industry-adjusted ROA	Industry-adjusted ROA that is calculated by subtracting median ROA of the two-digit SIC industry group from the firm's ROA. ROA is calculated as the ratio of net income to total assets (*Compustat* NI/AT).

[12] The Field-Ritter dataset is available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/FoundingDates.htm.

Big4 auditor	Dummy variable that equals to one if the firm is audited by a big four audit firm, and zero otherwise. Big four audit firms include Ernst & Young, Deloitte & Touche, KPMG, and PricewaterhouseCoopers (*Compustat* AU).
Venture capitalist	Dummy variable that equals to one if the firm is venture backed, and zero otherwise (*SDC*).
Top-tier investment bank	Dummy variable that equals to one if the firm is underwritten by most reputable underwriters, and zero otherwise. Most reputable underwriters are those with a ranking score of 9.0 or above based on Jay Ritter's underwriter rankings.[13]
Book-to-market	Ratio of book value to market value at the end of the fiscal year of the offering (*Compustat* CEQ/PRCC_F*CSHO).
Tobin's q	Tobin's q = (Total assets + Market value of equity – Book value of equity)/Total assets (*Compustat* (AT + PRCC_F*CSHO – CEQ)/AT).
Altman's Z-score	Z-score = 6.56*(Working capital/Total assets) + 3.26*(Retained earnings/Total assets) + 6.72*(Earnings before interest and taxes)/Total assets) + 1.05*(Book value of equity/ Book value of total liabilities) (*Compustat* 6.56*((ACT-LCT)/AT) + 3.26*(RE/AT) + 6.72*(EBIT/AT) + 1.05*(CEQ/LT)).
Board meetings	The number of board meetings in the year of the offering (*SEC's EDGAR*).
R&D	Ratio of research and development expenses to book value of total assets (*Compustat* XRD/AT).
Retained earnings	Ratio of retained earnings to common equity (*Compustat* RE/CEQ).
Diversification	Dummy variable that equals to one if the firm has more than one business segment, and zero otherwise (*Compustat*).
High-tech industry	Dummy variable that equals to one if the firm is in the high-tech industry, and zero otherwise. High-tech industries are those with a SIC code of 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), 7371-7375, 7378, 7379 (software) (*SDC*).

Panel C: Stock returns variables

Variable	**Definition**
BHAR	Post-issue three-year buy-and-hold abnormal return is calculated as the difference between the three-year buy-and-hold return of the firm and the three-year buy-and-hold return of the benchmark. The three-year period starts from the day after the annual financial report in the offering year to the earlier of the three year anniversary date and the delisting date. Stock returns are collected from *CRSP*, the benchmark is the CRSP market index.
Market BHR	Three-year buy-and-hold value weighted market index return (*CRSP*).
Underpricing	Stock return of the firm on the first day of trading (*CRSP)*.
POSEM	Monthly return of the portfolio of IPO firms that undertake aggressive earnings management in the offering year.

[13] IPO underwriter reputation rankings are available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/ipodata.htm.

NEGEM	Monthly return of the portfolio of IPO firms that undertake conservative earnings management in the offering year.
MKT	Excess monthly return on the value-weighted CRSP index. The factor is retrieved from Professor Kenneth French's website[14].
SMB	Difference in the monthly returns of value-weighted portfolios of small and large stocks. The factor is retrieved from Professor Kenneth French's website.
HML	Difference in the monthly returns of value-weighted portfolios of high book-to-market stocks and low book-to-market stocks. The factor is retrieved from Professor Kenneth French's website.

[14] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Table 3. 2 Distribution of IPOs by time and industry

Panel A: Time distribution

Year	All IPOs (*N* = 688)		IPOs with financial expert CEO (*N* = 180)		IPOs with nonfinancial expert CEO (*N* = 508)	
	N	*%*	*N*	*%*	*N*	*%*
2003	41	6	16	9	25	5
2004	129	19	35	19	94	19
2005	113	16	30	17	83	16
2006	113	16	33	18	80	16
2007	126	18	29	16	97	19
2008	16	2	4	2	12	2
2009	35	5	9	5	26	5
2010	59	9	15	8	44	9
2011	56	8	9	5	47	9

Panel B: Industry distribution

Industry name	SIC codes	All IPOs		IPOs with financial expert CEO		IPOs with nonfinancial expert CEO	
		N	*%*	*N*	*%*	*N*	*%*
Oil and gas	13	30	4	9	5	21	4
Food products	20	8	1	3	2	5	1
Chemical products	28	125	18	25	14	100	20
Manufacturing	30-34	23	3	3	2	20	4
Computer equipment & services	35, 73	160	23	57	32	103	20
Electronic equipment	36	60	9	10	6	50	10
Scientific instruments	38	64	9	14	8	50	10
Transportation and public utilities	41, 42, 44-49	57	8	12	7	45	9
Wholesale and retail trade	50-59	61	9	19	11	42	8
Entertainment services	70, 78, 79	9	1	4	2	5	1
Health services	80	15	2	3	2	12	2
All others	01, 12, 15, 17, 22-27, 29, 37, 39, 72, 75, 82, 87, 96	76	11	21	12	55	11
Total	51	688	100	180	100	508	100

Table 3. 3 Descriptive statistics

The table presents descriptive statistics of the sample of US IPOs over the period from 2003 to 2011. CEO characteristics, firm and offering characteristics, and correlation matrix are illustrated in Panel A, B, and C respectively. All variables are defined in Table 3.1. T-tests and Wilcoxon sign rank tests are used to test the difference of means and medians from zero. Tests of difference in means and medians between two samples of IPO firms with a financial and nonfinancial expert CEO are based on t-tests and Wilcoxon rank sum tests. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. *N* denotes the number of observations.

Panel A: CEO characteristics

CEO financial expertise						
	All IPOs					
	N	Mean	*p25*	*p50*	*p75*	*sd*
Financial expert	688	0.26	0.00	0.00	1.00	0.44
CFO	688	0.11	0.00	0.00	0.00	0.32
Banker	688	0.05	0.00	0.00	0.00	0.22
Auditor	688	0.03	0.00	0.00	0.00	0.18
Accountant	688	0.02	0.00	0.00	0.00	0.14
Treasurer	688	0.05	0.00	0.00	0.00	0.22
VP of finance	688	0.03	0.00	0.00	0.00	0.16
Other financial roles	688	0.13	0.00	0.00	0.00	0.34

CEO characteristics									
	All IPOs						IPOs with financial expert CEOs	IPOs with non-financial expert CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean	*p-value*
CEO age	652	51.14	46.00	51.00	57.00	8.05	50.91	51.22	0.338
CEO gender	688	0.03	0.00	0.00	0.00	0.16	0.02	0.03	0.177
CEO tenure	665	4.64	1.56	3.72	6.61	4.11	4.33	4.75	0.118
CEO-Chairman	688	0.44	0.00	0.00	1.00	0.50	0.47	0.43	0.138
CEO-founder	688	0.07	0.00	0.00	0.00	0.25	0.07	0.07	0.405
CEO ownership	663	11.21	2.00	4.50	10.20	18.44	11.10	11.25	0.461
Bachelor’s degree	688	0.77	1.00	1.00	1.00	0.42	0.82	0.76	0.048

Master's degree	688	0.48	0.00	0.00	1.00	0.50	0.51	0.47	0.199
MBA	688	0.29	0.00	0.00	1.00	0.45	0.36	0.26	0.006
PhD	688	0.10	0.00	0.00	0.00	0.30	0.06	0.11	0.014
CPA	688	0.05	0.00	0.00	0.00	0.21	0.15	0.01	0.000
Ivy League alumnus	688	0.16	0.00	0.00	0.00	0.37	0.20	0.15	0.051
External hire	688	0.69	0.00	1.00	1.00	0.46	0.64	0.71	0.061
Age first became CEO	615	42.52	37.00	42.00	49.00	8.34	42.26	42.61	0.324
CEO press coverage	688	23.37	5.00	15.00	31.00	25.92	23.04	23.49	0.422
Equity compensation	673	0.40	0.00	0.01	0.20	1.30	0.37	0.41	0.345
Total compensation	673	1.20	0.38	0.60	1.20	2.00	1.10	1.30	0.169

Panel B: Firm and offering characteristics

	Firm characteristics								
	All IPOs						IPOs with financial expert CEOs	IPOs with non-financial expert CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean	*p-value*
Firm age	676	20.03	6.00	10.00	21.00	24.51	17.67	20.88	0.067
Leverage	512	0.42	0.11	0.32	0.57	0.43	0.38	0.44	0.083
Loss	528	0.43	0.00	0.00	1.00	0.50	0.42	0.44	0.335
Altman's Z-score	558	-5.86	-8.63	-0.53	1.79	15.57	-5.65	-5.93	0.426
Industry-adjusted ROA	688	-0.10	-0.11	0.00	0.02	0.33	-0.06	-0.11	0.050
Retained earnings	514	-0.71	-1.21	-0.16	0.18	3.50	-0.34	-0.86	0.065
CAPEX	587	0.12	0.03	0.07	0.15	0.18	0.13	0.12	0.227
R&D	514	0.11	0.00	0.01	0.15	0.18	0.09	0.12	0.052
Diversification	688	0.16	0.00	0.00	0.00	0.37	0.17	0.16	0.322
High-tech	688	0.35	0.00	0.00	1.00	0.48	0.32	0.37	0.145
Board meetings	670	7.73	5.00	7.00	10.00	3.99	7.47	7.83	0.155

Offering characteristics									
	All IPOs						IPOs with financial expert CEOs	IPOs with non-financial expert CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean	*p-value*
Proceeds	688	165.57	54.00	91.35	169.00	212.65	182.46	159.59	0.108
Market value	688	475.72	0.00	265.68	597.29	679.65	486.67	471.84	0.401
Underpricing	665	0.11	0.00	0.07	0.19	0.17	0.11	0.11	0.433
Tobin's Q	600	4.11	1.95	2.92	4.75	3.63	4.23	4.07	0.323
Book to market	495	0.30	0.15	0.27	0.42	0.23	0.32	0.30	0.160
Top-tier investment bank	686	0.45	0.00	0.00	1.00	0.50	0.43	0.46	0.235
Big4 auditor	686	0.83	1.00	1.00	1.00	0.37	0.80	0.84	0.082
Venture capitalist	688	0.49	0.00	0.00	1.00	0.50	0.41	0.52	0.008
BHAR	513	0.04	-0.59	-0.12	0.38	0.92	0.20	-0.02	0.008

Earnings management proxy									
	All IPOs						IPOs with financial expert CEOs	IPOs with non-financial expert CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Median	Median	*p-value*
Abnormal accruals	551	-0.21	-0.30	-0.07***	0.08	0.89	-0.13***	-0.06***	0.010

Panel C: Correlation matrix

	Financial expert CEO	Log(firm age)	Ln(market value)	Big4 auditor	Top-tier investment bank	Venture capitalist	Leverage	Loss	Altman's Z-score	Tobin's Q	CAPEX
Financial expert CEO	1.000										
Log(firm age)	-0.040	1.000									
Ln(market value)	0.000	0.109	1.000								
Big4 auditor	-0.053	0.064	0.120	1.000							
Top-tier investment bank	-0.028	0.147	0.157	0.281	1.000						
Venture capitalist	-0.092	-0.486	0.053	0.196	0.016	1.000					
Leverage	-0.062	0.160	-0.125	-0.099	0.028	-0.288	1.000				
Loss	-0.019	-0.416	-0.181	0.055	-0.061	0.465	0.005	1.000			
Altman's Z-score	0.008	0.267	0.414	0.005	0.126	-0.222	-0.327	-0.515	1.000		
Tobin's Q	0.019	-0.178	0.124	-0.011	0.001	0.214	-0.001	0.183	-0.132	1.000	
CAPEX	0.031	-0.164	-0.115	-0.172	-0.042	-0.111	-0.079	-0.042	0.052	-0.022	1.000
Industry-adjusted ROA	0.063	0.221	-0.071	-0.023	0.039	-0.263	-0.077	-0.579	0.488	-0.084	0.023
Board meetings	-0.039	-0.187	0.078	0.084	-0.013	0.350	-0.122	0.190	-0.122	0.110	-0.077
External hire	-0.059	-0.059	-0.002	-0.023	0.016	-0.019	0.013	0.007	-0.028	0.001	0.023
Log(equity compensation)	0.014	-0.136	-0.010	0.042	0.033	0.214	-0.024	0.199	-0.078	-0.019	-0.020
CEO-Chairman	0.042	-0.051	0.092	-0.107	-0.036	-0.035	0.012	-0.028	0.068	0.039	0.073
CEO-Founder	0.009	-0.134	0.029	-0.048	-0.050	0.081	-0.078	0.074	-0.065	0.060	0.098
Log(CEO ownership)	0.005	-0.206	0.037	-0.168	-0.092	0.140	-0.116	0.015	0.032	0.189	0.120
Log(CEO age)	-0.017	0.212	-0.007	-0.036	-0.032	-0.223	0.081	-0.092	0.018	-0.150	0.006
CEO gender	-0.035	-0.013	0.041	0.049	-0.003	0.095	-0.035	0.035	-0.054	0.062	0.000
Log(CEO tenure)	-0.050	-0.140	0.174	-0.012	-0.069	0.264	-0.177	0.083	0.015	0.131	-0.073
Log(age first became CEO)	-0.020	0.153	-0.089	0.052	-0.009	-0.193	0.091	-0.104	-0.013	-0.147	0.042
Ivy League alumnus	0.063	-0.047	-0.038	0.091	-0.026	0.133	-0.051	0.062	0.004	0.065	-0.002
Log(CEO press coverage)	-0.011	-0.136	0.125	0.139	0.092	0.315	-0.177	0.231	-0.016	0.126	-0.111

	Industry-adjusted ROA	Board meetings	External hire	Log(equity compensation)	CEO-Chairman	CEO-Founder	Log(CEO ownership)	Log(CEO age)	CEO gender	Log(CEO tenure)	Log(age first became CEO)	Ivy League alumnus	Log(CEO press coverage)
Industry-adjusted ROA	1.000												
Board meetings	-0.084	1.000											
External hire	-0.030	-0.075	1.000										
Log(equity compensation)	-0.138	0.125	-0.013	1.000									
CEO-Chairman	0.029	-0.055	0.084	-0.085	1.000								
CEO-Founder	-0.067	0.014	0.032	-0.016	0.121	1.000							
Log(CEO ownership)	0.002	0.013	0.030	-0.160	0.373	0.123	1.000						
Log(CEO age)	-0.010	-0.104	0.051	-0.032	0.122	-0.013	-0.055	1.000					
CEO gender	0.001	0.039	0.031	0.000	-0.053	0.064	-0.016	0.007	1.000				
Log(CEO tenure)	-0.092	0.192	0.106	-0.069	0.161	0.023	0.365	0.015	0.000	1.000			
Log(age first became CEO)	0.030	-0.100	-0.133	0.016	-0.102	-0.095	-0.313	0.656	0.027	-0.306	1.000		
Ivy League alumnus	-0.050	0.094	-0.040	0.010	0.091	-0.025	0.029	-0.079	0.002	0.024	-0.118	1.000	
Log(CEO press coverage)	-0.108	0.245	0.046	0.097	0.050	0.024	0.066	-0.114	0.013	0.180	-0.159	0.118	1.000

Table 3. 4 Effect of CEOs' financial experience on earnings management

The table illustrates the effect of CEOs' financial experience on abnormal accruals for the sample of US IPOs over the period 2003-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity.

Dependent variable: Abnormal accruals		
	(1)	(2)
Financial expert CEO	-0.242***	-0.296***
	(-2.89)	(-3.45)
Log(firm age)	-0.068	-0.128
	(-0.76)	(-1.20)
Ln(market value)	0.019	0.019
	(0.85)	(0.87)
Big4 auditor	-0.076	-0.043
	(-0.90)	(-0.50)
Top-tier investment bank	-0.022	-0.062
	(-0.35)	(-0.91)
Venture capitalist	0.039	0.040
	(0.36)	(0.36)
Leverage	0.215*	0.292**
	(1.73)	(2.03)
Loss	-0.027	-0.073
	(-0.28)	(-0.63)
Altman's Z-score	0.014	0.016
	(1.34)	(1.48)
Tobin's Q	-0.027**	-0.028**
	(-2.24)	(-2.27)
CAPEX	0.058	0.185
	(0.23)	(0.83)
Industry-adjusted ROA	-0.102	-0.098
	(-0.44)	(-0.36)
Board meetings	0.007	0.009
	(0.81)	(0.81)
External hire		-0.146*
		(-1.93)
Log(equity compensation)		0.016
		(1.38)
CEO-Chairman		-0.032
		(-0.45)
CEO-Founder		-0.047
		(-0.35)
Log(CEO ownership)		-0.080
		(-0.72)
Log(CEO age)		0.746
		(1.14)
CEO gender		-0.177
		(-0.79)
Log(CEO tenure)		0.083
		(1.02)
Log(age first became CEO)		-0.362
		(-0.61)
Ivy League alumnus		-0.214**
		(-2.10)
Log(CEO press coverage)		0.156**
		(2.08)
Intercept	0.325	-0.374
	(1.31)	(-0.44)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
Number of observations	370	323
R-squared	0.467	0.546

Table 3. 5 Effect of at-issue earnings management on post-issue performance

The table illustrates the effect of at-issue earnings management on post-issue accounting and stock performance for the sample of US IPOs over the period 2003-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity.

Panel A: Post-issue accounting performance

	ROA (1)	CFO (2)
Abnormal accruals	0.008	-0.008
	(0.47)	(-0.43)
Abnormal accruals * Financial expert CEO	0.037*	0.038*
	(1.90)	(1.75)
CFO	0.279***	0.216***
	(9.69)	(6.15)
CAPEX	0.022	0.148***
	(0.31)	(2.79)
Intercept	0.061	0.109**
	(1.07)	(2.44)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
P-value of F-test [Abnormal accruals + Abnormal accruals * Financial expert CEO = 0]	0.000	0.009
Number of observations	454	454
R-squared	0.615	0.589

Panel B: Post-issue stock performance (event-time approach)

	BHAR
Aggressive earnings management	-0.274**
	(-2.25)
Aggressive earnings management * Financial expert CEO	0.538*
	(1.76)
Log(firm age)	0.083
	(0.50)
Ln(market value)	-0.001
	(-0.01)
Venture capitalist	-0.057
	(-0.43)
Book-to-market	0.299
	(1.41)
ROA	0.024***
	(3.05)
Underpricing	0.344
	(1.07)
Market BHR	0.095
	(1.00)
Intercept	-1.420***
	(-2.87)
Industry dummies	Yes
Year dummies	Yes
P-value of F-test [Aggressive earnings management + Aggressive earnings management * Financial expert CEO = 0]	0.374
Number of observations	460
R-squared	0.110

Panel C: Post-issue stock performance (calendar-time approach)

Fama-French three-factor model	
Without financial expert CEO	-0.013**
	(-2.04)
With financial expert CEO	-0.006
	(-0.60)
Carhart four-factor model	
Without financial expert CEO	-0.013*
	(-1.95)
With financial expert CEO	-0.007
	(-0.65)

Table 3. 6 Endogeneity control

The table illustrates the analyses of the effect of CEOs' past financial experience on earnings management in the issue year for the sample of US IPOs over the period 2003-2011, controlling for the endogeneity of CEO selection using alternative econometric approaches: propensity score matching, instrumental variable (IV), Heckman's two-step treatment effect, maximum likelihood estimation (MLE) treatment effect. All variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively.

Panel A: Propensity score matching

Matching variables: *R&D, retained earnings, diversification, log(firm age), ln(market value), big4 auditor, top-tier investment bank, venture capitalist, leverage, loss, Altman's Z-score, Tobin's Q, CAPEX, industry-adjusted ROA, board meetings, CEO-Chairman, CEO-Founder, log(CEO ownership), log(CEO age), CEO gender, log(CEO tenure), log(age first became CEO), Ivy League alumnus, log(CEO press coverage), high-tech industry, year dummies*

	Abnormal accruals
ATET	-0.255***
(Financial expert CEO vs. Non-financial expert CEO)	(-3.48)
Number of observations	285

Panel B: Instrumental variable approach and Treatment effect models

Dependent variable: Abnormal accruals

	IV		Heckman		MLE	
	Selection	Outcome	Selection	Outcome	Selection	Outcome
Financial expert CEO		-1.701**		-2.912*		-0.698***
		(-2.00)		(-1.80)		(-3.45)
Log(firm age)	-0.058	-0.075		0.029		-0.013
	(-0.45)	(-0.40)		(0.14)		(-0.15)
Ln(market value)	0.002	0.032		0.037		0.036**
	(0.09)	(0.85)		(0.80)		(1.97)
Big4 auditor	0.057	0.051		-0.045		-0.034
	(0.54)	(0.31)		(-0.24)		(-0.41)
Top-tier investment bank	-0.002	-0.033		-0.040		-0.036
	(-0.03)	(-0.29)		(-0.33)		(-0.60)
Venture capitalist	-0.200**	-0.247		0.012		0.063
	(-2.12)	(-1.06)		(0.07)		(0.62)
Leverage	-0.048	0.119		0.199		0.229*
	(-0.60)	(0.81)		(1.19)		(1.66)
Loss	0.108	0.100		-0.048		-0.065
	(1.04)	(0.52)		(-0.28)		(-0.65)
Altman's Z-score	0.000	0.017**		0.016***		0.017*
	(0.16)	(2.01)		(2.68)		(1.66)
Tobin's Q	-0.001	-0.012		-0.006		-0.011
	(-0.07)	(-0.71)		(-0.31)		(-1.33)
CAPEX	-0.079	-0.126		-0.013		-0.081
	(-0.24)	(-0.27)		(-0.03)		(-0.38)
Industry-adjusted ROA	0.054	-0.070		-0.077		-0.148
	(0.42)	(-0.23)		(-0.33)		(-0.62)
Board meetings	0.002	0.005		0.000		0.005
	(0.19)	(0.32)		(0.03)		(0.55)

External hire	-0.153**	-0.334**		-0.106		-0.119*
	(-1.99)	(-2.07)		(-0.80)		(-1.67)
Log(equity compensation)	0.000	0.016		0.014		0.013
	(0.01)	(0.80)		(0.63)		(1.14)
CEO-Chairman	0.054	0.018		-0.061		-0.077
	(0.74)	(0.16)		(-0.47)		(-1.22)
CEO-Founder	0.007	-0.125		-0.114		-0.136
	(0.07)	(-0.74)		(-0.56)		(-1.14)
Log(CEO ownership)	-0.051	-0.120		-0.036		-0.048
	(-0.53)	(-0.78)		(-0.24)		(-0.54)
Log(CEO age)	0.092	0.435		0.135		0.432
	(0.12)	(0.35)		(0.11)		(0.74)
CEO gender	-0.085	-0.427		-0.344		-0.278
	(-0.61)	(-1.45)		(-1.10)		(-1.33)
Log(CEO tenure)	0.029	0.161		0.121		0.116
	(0.38)	(1.38)		(0.89)		(1.55)
Log(age first became CEO)	0.331	0.389		-0.009		-0.143
	(0.51)	(0.36)		(-0.01)		(-0.27)
Ivy League alumnus	0.137	0.060		-0.127		-0.127
	(1.27)	(0.32)		(-0.74)		(-1.60)
Log(CEO press coverage)	-0.003	0.136		0.139		0.155**
	(-0.03)	(1.20)		(1.02)		(2.06)
Intercept	-0.532	-1.086	-0.492***	0.674	-0.535***	-0.375
	(-0.52)	(-0.72)	(-3.95)	(0.33)	(-4.43)	(-0.50)
R&D	0.237		0.109		0.483	
	(0.88)		(0.23)		(0.95)	
Retained earnings	0.017*		0.041*		0.080**	
	(1.76)		(1.76)		(2.30)	
Diversification	0.038		0.031		0.068	
	(0.40)		(0.15)		(0.37)	
High-tech industry	-0.079		-0.033		0.036	
	(-0.60)		(-0.19)		(0.21)	
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Durbin-Wu-Hausman test against *H_0: variables are exogenous* (p-value)		0.046				
Inverse Mills ratio			1.625*			
			(1.66)			
Likelihood ratio test against *H_0: $\rho = 0$* (p-value)						0.004
Number of observations	285	285	285	285	285	285

Table 3. 7 Analysis of the interaction effect between financial expert CEOs and CEO power

The table illustrates the effect of financial expert CEOs on earnings management controlling for the interaction effect between financial expert CEOs and CEO power for the sample of US IPOs over the period 2003-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. *CEO power* is measured as the sum of the standardised variables: *CEO-Chairman, CEO-Founder, CEO ownership, CEO tenure,* and *Ivy League alumnus.* All other variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity.

	Abnormal accruals
Financial expert CEO	-0.297***
	(-3.69)
Financial expert CEO * CEO power	-0.066*
	(-1.72)
Log(firm age)	-0.120
	(-1.22)
Ln(market value)	0.019
	(0.84)
Big4 auditor	-0.037
	(-0.42)
Top-tier investment bank	-0.055
	(-0.82)
Venture capitalist	0.026
	(0.25)
Leverage	0.258*
	(1.88)
Loss	-0.051
	(-0.45)
Altman's Z-score	0.014
	(1.39)
Tobin's Q	-0.028**
	(-2.20)
CAPEX	0.107
	(0.47)
Industry-adjusted ROA	-0.050
	(-0.19)
Board meetings	0.007
	(0.73)
External hire	-0.137*
	(-1.81)
Log(equity compensation)	0.012
	(1.08)
Log(CEO age)	1.076*
	(1.68)
CEO gender	-0.239
	(-1.10)
Log(age first became CEO)	-0.686
	(-1.37)
Log(CEO press coverage)	0.162**
	(2.17)
Intercept	-0.410
	(-0.52)
Industry dummies	Yes
Year dummies	Yes
P-value of F-test [Financial expert CEO + Financial expert CEO*CEO power = 0]	0.000
Number of observations	323
R-squared	0.548

Table 3. 8 Robustness checks – Alternative measures of financial experience

The table illustrates the analyses of the effect of a CEO's past CFO experience, CPA qualification, and financial experience variety on earnings management in the issue year for the sample of U.S. IPOs over the period 2003-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity.

Panel A: Effect of CEO's past CFO experience and CPA qualification on earnings management

Dependent variable: Abnormal accruals			
	(1)	(2)	(3)
CFO	-0.186**		
	(-2.23)		
CPA		-0.338*	
		(-1.79)	
CFO&CPA			-0.208*
			(-1.78)
Log(firm age)	-0.108	-0.106	-0.111
	(-0.99)	(-0.98)	(-1.03)
Ln(market value)	0.020	0.021	0.021
	(0.93)	(0.95)	(0.95)
Big4 auditor	-0.056	-0.035	-0.048
	(-0.64)	(-0.39)	(-0.55)
Top-tier investment bank	-0.049	-0.071	-0.059
	(-0.72)	(-1.00)	(-0.85)
Venture capitalist	0.105	0.095	0.104
	(0.84)	(0.77)	(0.84)
Leverage	0.312**	0.305**	0.307**
	(2.04)	(2.02)	(2.02)
Loss	-0.112	-0.087	-0.102
	(-1.00)	(-0.75)	(-0.90)
Altman's Z-score	0.016	0.016	0.016
	(1.37)	(1.39)	(1.37)
Tobin's Q	-0.030**	-0.028**	-0.029**
	(-2.39)	(-2.31)	(-2.27)
CAPEX	0.232	0.199	0.206
	(1.03)	(0.88)	(0.90)
Industry-adjusted ROA	-0.119	-0.105	-0.103
	(-0.43)	(-0.39)	(-0.37)
Board meetings	0.008	0.007	0.008
	(0.70)	(0.66)	(0.74)
External hire	-0.133	-0.110	-0.116
	(-1.64)	(-1.39)	(-1.47)
Log(equity compensation)	0.012	0.013	0.014
	(1.00)	(1.04)	(1.14)
CEO-Chairman	-0.052	-0.045	-0.042
	(-0.71)	(-0.64)	(-0.58)
CEO-Founder	-0.043	-0.065	-0.048
	(-0.31)	(-0.46)	(-0.35)
Log(CEO ownership)	-0.081	-0.075	-0.080
	(-0.71)	(-0.66)	(-0.69)
Log(CEO age)	0.694	0.615	0.716
	(1.08)	(0.97)	(1.12)

CEO gender	-0.155	-0.161	-0.153
	(-0.69)	(-0.71)	(-0.67)
Log(CEO tenure)	0.072	0.070	0.076
	(0.87)	(0.85)	(0.91)
Log(age first became CEO)	-0.376	-0.393	-0.423
	(-0.64)	(-0.67)	(-0.73)
Ivy League alumnus	-0.241**	-0.256**	-0.251**
	(-2.23)	(-2.41)	(-2.32)
Log(CEO press coverage)	0.157*	0.166**	0.158**
	(1.95)	(2.08)	(1.98)
Intercept	-0.318	-0.221	-0.301
	(-0.38)	(-0.26)	(-0.35)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	323	323	323
R-squared	0.522	0.526	0.518

Panel B: Effect of CEO's financial experience variety on earnings management

Dependent variable: Abnormal accruals			
	(1)	(2)	(3)
Number of firms	-0.086**		
	(-2.03)		
Number of roles		-0.061**	
		(-2.01)	
Financial experience at another firm			-0.194**
			(-2.48)
Log(firm age)	-0.104	-0.110	-0.090
	(-0.95)	(-1.01)	(-0.82)
Ln(market value)	0.019	0.018	0.020
	(0.88)	(0.83)	(0.92)
Big4 auditor	-0.053	-0.060	-0.043
	(-0.61)	(-0.68)	(-0.50)
Top-tier investment bank	-0.052	-0.051	-0.054
	(-0.76)	(-0.74)	(-0.79)
Venture capitalist	0.103	0.105	0.104
	(0.83)	(0.85)	(0.84)
Leverage	0.317**	0.311**	0.314**
	(2.07)	(2.05)	(2.06)
Loss	-0.118	-0.119	-0.113
	(-1.05)	(-1.05)	(-1.02)
Altman's Z-score	0.016	0.016	0.016
	(1.39)	(1.39)	(1.38)
Tobin's Q	-0.029**	-0.029**	-0.030**
	(-2.33)	(-2.33)	(-2.40)
CAPEX	0.218	0.216	0.248
	(0.95)	(0.95)	(1.10)
Industry-adjusted ROA	-0.125	-0.124	-0.119
	(-0.45)	(-0.44)	(-0.43)
Board meetings	0.009	0.008	0.009
	(0.80)	(0.77)	(0.80)
External hire	-0.128	-0.119	-0.117
	(-1.61)	(-1.52)	(-1.49)

Log(equity compensation)	0.014	0.013	0.012
	(1.14)	(1.10)	(0.97)
CEO-Chairman	-0.045	-0.038	-0.052
	(-0.62)	(-0.52)	(-0.71)
CEO-Founder	-0.046	-0.043	-0.049
	(-0.33)	(-0.31)	(-0.35)
Log(CEO ownership)	-0.078	-0.084	-0.068
	(-0.68)	(-0.73)	(-0.60)
Log(CEO age)	0.698	0.714	0.726
	(1.08)	(1.11)	(1.12)
CEO gender	-0.149	-0.150	-0.166
	(-0.67)	(-0.67)	(-0.74)
Log(CEO tenure)	0.077	0.078	0.069
	(0.92)	(0.93)	(0.83)
Log(age first became CEO)	-0.363	-0.377	-0.343
	(-0.62)	(-0.64)	(-0.58)
Ivy League alumnus	-0.251**	-0.245**	-0.240**
	(-2.34)	(-2.28)	(-2.23)
Log(CEO press coverage)	0.162**	0.157*	0.164**
	(2.01)	(1.96)	(2.06)
Intercept	-0.379	-0.364	-0.490
	(-0.45)	(-0.43)	(-0.57)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	323	323	323
R-squared	0.521	0.520	0.524

Panel B: Effect of CEO's financial experience variety on earnings management (continued)

Dependent variable: Abnormal accruals			
	(4)	(5)	(6)
Log(financial experience time)	-0.192**		
	(-2.20)		
Financial experience variety index		-0.034**	
		(-2.31)	
Financial experience variety dummy			-0.163**
			(-2.34)
Log(firm age)	-0.094	-0.098	-0.103
	(-0.86)	(-0.90)	(-0.94)
Ln(market value)	0.020	0.020	0.023
	(0.93)	(0.89)	(1.03)
Big4 auditor	-0.047	-0.052	-0.049
	(-0.54)	(-0.59)	(-0.56)
Top-tier investment bank	-0.058	-0.053	-0.055
	(-0.84)	(-0.77)	(-0.80)
Venture capitalist	0.108	0.104	0.106
	(0.87)	(0.84)	(0.85)
Leverage	0.313**	0.315**	0.304**
	(2.05)	(2.06)	(2.00)
Loss	-0.112	-0.117	-0.113
	(-1.00)	(-1.04)	(-1.01)
Altman's Z-score	0.016	0.016	0.016
	(1.37)	(1.39)	(1.37)

Tobin's Q	-0.029**	-0.030**	-0.030**
	(-2.36)	(-2.38)	(-2.43)
CAPEX	0.231	0.231	0.235
	(1.02)	(1.02)	(1.04)
Industry-adjusted ROA	-0.116	-0.123	-0.121
	(-0.42)	(-0.44)	(-0.43)
Board meetings	0.008	0.008	0.008
	(0.77)	(0.79)	(0.72)
External hire	-0.125	-0.125	-0.119
	(-1.57)	(-1.57)	(-1.51)
Log(equity compensation)	0.012	0.013	0.011
	(0.98)	(1.03)	(0.90)
CEO-Chairman	-0.046	-0.046	-0.040
	(-0.63)	(-0.63)	(-0.54)
CEO-Founder	-0.053	-0.048	-0.044
	(-0.38)	(-0.35)	(-0.32)
Log(CEO ownership)	-0.071	-0.076	-0.076
	(-0.62)	(-0.67)	(-0.67)
Log(CEO age)	0.699	0.701	0.662
	(1.08)	(1.08)	(1.02)
CEO gender	-0.158	-0.157	-0.168
	(-0.70)	(-0.70)	(-0.75)
Log(CEO tenure)	0.075	0.076	0.079
	(0.89)	(0.91)	(0.94)
Log(age first became CEO)	-0.358	-0.348	-0.347
	(-0.60)	(-0.59)	(-0.59)
Ivy League alumnus	-0.245**	-0.244**	-0.238**
	(-2.29)	(-2.28)	(-2.22)
Log(CEO press coverage)	0.162**	0.162**	0.147*
	(2.03)	(2.02)	(1.84)
Intercept	-0.422	-0.447	-0.327
	(-0.50)	(-0.52)	(-0.39)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Number of observations	323	323	323
R-squared	0.521	0.522	0.523

Pairwise correlation of four aspects of financial experience variety

	Number of firms	Number of roles	Financial experience at another firm	Log(financial experience time)
Number of firms	1.000			
Number of roles	0.908	1.000		
Financial experience at another firm	0.814	0.764	1.000	
Log(financial experience time)	0.853	0.818	0.856	1.000

First component: Eigenvalue of 3.50742 and proportion explained of 0.8769

	Loadings
Number of firms	0.510
Number of roles	0.498
Financial experience at another firm	0.489
Log(financial experience time)	0.503

Panel C: Post-issue accounting performance

	ROA (1)	CFO (2)	ROA (3)	CFO (4)
Abnormal accruals	0.013	-0.006	0.012	-0.007
	(0.82)	(-0.36)	(0.74)	(-0.38)
Abnormal accruals * CFO	0.031	0.049**		
	(1.43)	(2.05)		
Abnormal accruals * Financial experience variety dummy			0.034	0.046**
			(1.64)	(2.08)
CFO	0.276***	0.214***	0.277***	0.215***
	(9.49)	(6.07)	(9.55)	(6.09)
CAPEX	0.033	0.161***	0.034	0.162***
	(0.46)	(2.99)	(0.47)	(3.00)
Intercept	0.062	0.114**	0.065	0.117**
	(1.09)	(2.52)	(1.16)	(2.54)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
P-value of F-test [Abnormal accruals + Abnormal accruals * CFO = 0]	0.000	0.001		
P-value of F-test [Abnormal accruals + Abnormal accruals * Financial experience variety dummy= 0]			0.000	0.002
Number of observations	454	454	454	454
R-squared	0.614	0.589	0.614	0.589

Panel D: Post-issue stock performance

	BHAR (1)	BHAR (2)
Aggressive earnings management	-0.202*	-0.192
	(-1.66)	(-1.51)
Aggressive earnings management * CFO	0.555	
	(1.14)	
Aggressive earnings management * Financial experience variety dummy		0.247
		(0.76)
Log(firm age)	0.071	0.071
	(0.43)	(0.43)
Ln(market value)	-0.006	-0.003
	(-0.12)	(-0.07)
Venture capitalist	-0.072	-0.065
	(-0.54)	(-0.48)
Book-to-market	0.305	0.316
	(1.42)	(1.47)
ROA	0.023***	0.023***
	(3.10)	(3.08)
Underpricing	0.351	0.329
	(1.11)	(1.00)
Market index return	0.110	0.115
	(1.22)	(1.25)
Intercept	-0.417	-0.438
	(-1.03)	(-1.08)
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
P-value of F-test [Aggressive earnings management + Aggressive earnings management * CFO = 0]	0.469	
P-value of F-test [Aggressive earnings management + Aggressive earnings management * Financial experience variety dummy = 0]		0.863
Number of observations	460	460
R-squared	0.103	0.100

Table 3. 9 Effect of CEOs' financial experience on real earnings management

The table illustrates the effect of CEOs' financial experience on real earnings management for the sample of U.S. IPOs over the period 2003-2011. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Table 3.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates. Standard errors are adjusted for heteroskedasticity.

	Abnormal cash flow from operations	Abnormal production costs	Abnormal discretionary expenses	REM1	REM2
Financial expert CEO	0.026	-0.047	0.026	-0.028	-0.005
	(0.42)	(-0.44)	(0.42)	(-0.15)	(-0.05)
Log(firm age)	-0.115	0.023	-0.115	0.272	-0.021
	(-1.29)	(0.18)	(-1.29)	(1.03)	(-0.15)
Ln(market value)	-0.049*	-0.040	-0.049*	-0.005	-0.026
	(-1.88)	(-1.13)	(-1.88)	(-0.09)	(-0.70)
Big4 auditor	-0.007	0.042	-0.007	-0.068	-0.050
	(-0.10)	(0.38)	(-0.10)	(-0.30)	(-0.36)
Top-tier investment bank	0.007	0.031	0.007	0.124	0.097
	(0.12)	(0.36)	(0.12)	(0.80)	(0.98)
Venture capitalist	-0.091	-0.081	-0.091	-0.207	-0.211
	(-1.38)	(-0.70)	(-1.38)	(-0.89)	(-1.45)
Leverage	0.065	0.060	0.065	0.248	0.384***
	(0.82)	(0.53)	(0.82)	(1.16)	(2.87)
Loss	-0.253**	-0.095	-0.253**	0.116	-0.150
	(-2.53)	(-0.68)	(-2.53)	(0.45)	(-0.98)
Altman's Z-score	-0.017***	0.005	-0.017***	0.044***	0.033***
	(-4.19)	(0.74)	(-4.19)	(3.90)	(4.27)
Tobin's Q	0.012	-0.047***	0.012	-0.120***	-0.061***
	(1.32)	(-4.04)	(1.32)	(-4.99)	(-4.20)
CAPEX	0.302	0.563	0.302	0.414	0.123
	(1.57)	(1.21)	(1.57)	(0.59)	(0.38)
Industry-adjusted ROA	-0.056	-0.499	-0.056	-0.558	-0.447**
	(-0.32)	(-1.60)	(-0.32)	(-1.11)	(-1.97)
Board meetings	-0.007	-0.007	-0.007	-0.002	0.006
	(-0.78)	(-0.54)	(-0.78)	(-0.07)	(0.39)
External hire	0.017	0.068	0.017	0.175	0.058
	(0.27)	(0.71)	(0.27)	(0.98)	(0.52)
Log(equity compensation)	0.020*	-0.001	0.020*	-0.024	-0.002
	(1.94)	(-0.09)	(1.94)	(-0.86)	(-0.12)
CEO-Chairman	0.058	0.069	0.058	-0.049	-0.080
	(0.98)	(0.79)	(0.98)	(-0.30)	(-0.78)
CEO-Founder	0.186*	-0.249*	0.186*	-0.273	0.114
	(1.70)	(-1.69)	(1.70)	(-1.03)	(0.74)
Log(CEO ownership)	0.039	-0.252**	0.039	-0.524**	-0.303**
	(0.57)	(-2.20)	(0.57)	(-2.08)	(-2.28)
Log(CEO age)	0.078	0.758	0.078	1.398	1.392
	(0.13)	(0.91)	(0.13)	(0.77)	(1.38)
CEO gender	0.068	0.386	0.068	0.252	-0.008
	(0.26)	(0.91)	(0.26)	(0.44)	(-0.02)
Log(CEO tenure)	-0.031	0.129	-0.031	0.313*	0.139
	(-0.55)	(1.24)	(-0.55)	(1.75)	(1.38)
Log(age first became CEO)	0.113	-0.888	0.113	-1.578	-1.271
	(0.21)	(-1.37)	(0.21)	(-1.03)	(-1.37)
Ivy League alumnus	-0.050	-0.050	-0.050	-0.022	-0.051
	(-0.60)	(-0.39)	(-0.60)	(-0.11)	(-0.37)
Log(CEO press coverage)	0.169**	0.065	0.169**	-0.098	0.038
	(2.50)	(0.68)	(2.50)	(-0.54)	(0.32)
Intercept	-0.391	-0.413	-0.391	-1.026	-0.730
	(-0.50)	(-0.35)	(-0.50)	(-0.46)	(-0.53)
Industry dummies	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes
Number of observations	329	309	329	291	306
R-squared	0.477	0.367	0.477	0.442	0.449

Chapter 4 - Specialist CEOs and IPO survival

4.1. Introduction

In recent decades, there has been substantially increasing attention to the significance of CEOs in the organisational context. In the 1950s, CEOs were not particularly important, most of them ascended within the firm, were rarely fired, and received mainly a basic salary which was slightly higher than for their subordinate executives (Quigley and Hambrick 2015; Frydman and Jenter 2010; Khurana 2002). However, since the 1990s, there have been considerable changes in the perception of CEO significance. CEOs are featured more prominently in the press, more likely to be recruited from outside the firm, more easily fired, and receive much larger compensation packages including not only a salary but also bonuses and equity compensation (Quigley and Hambrick 2015; Kaplan and Minton 2012; Frydman and Jenter 2010; Murphy et al. 2004; Hayward et al. 2004; Khurana 2002). Quigley and Hambrick (2015) investigate the "CEO effect" based on the dataset spanning 60 years and provide the evidence that CEOs are in fact gaining growing significance; particularly, the proportion of the variation in firm performance attributable to CEOs increases considerably over the decades of the study. Another trend in the U.S. business environment is the considerable increase in the percentage of CEOs with diverse career backgrounds and experience (Crossland et al. 2014). General managerial skills which are more readily transferable across firms and industries, as opposed to specialist managerial skills which are specific to particular firms and industries, tend to be more desirable in the executive labour market. Firms are more willing to offer higher pay packages to generalist CEOs than specialist ones (Custódio et al. 2013). Given the growing significance of CEOs in the organisational context and the increasing preference for CEOs with more general managerial ability, I ask whether there is heterogeneity in the long-term performance outcomes of firms led by generalist CEOs compared with firms led by specialist CEOs. In this research, I focus on the IPO market and investigate the survivability of IPO firms in subsequent periods after the offering.

The extant empirical evidence from both the U.S. and international IPO markets indicates that although IPO firms exhibit significant initial returns, they demonstrate poor long-run performance with one-third of issuing firms either failing or being acquired within five years of going public (Ritter 2003; Ritter and Welch 2002; Loughran et al. 1994; Ritter 1991). Newly listed firms face various challenges in the transition from

private to public status such as significant structural changes particularly in ownership and governance mechanisms, stringent monitoring from capital market participants and regulators, intense market competition, and increased susceptibility to changes in capital market conditions. Therefore, sound strategic choices made by top executives are crucial for issuing firms' future growth and survival. Academic researchers have attempted to understand various firm and offering characteristics determining post-issue performance such as firm size, firm age, underpricing, ownership structure (Hensler et al. 1997), governance mechanism (Charitou et al. 2007), high quality audit (Demers and Joos 2007; Jain and Martin 2005; Weber and Willenborg 2003), venture capital participation (Jain and Kini 2000), investment bank prestige (Schultz 1993), and strategic investment choices (Jain and Kini 2008). However, the impact of CEOs' prior career experience on the survivability of IPO firms has remained an unexplored area.

Upper echelons theory (Hambrick and Mason 1984; Hambrick 2007) suggests that personalities, backgrounds, and experiences considerably influence managers' interpretations of business situations, consequently, affect their decision making. Empirical research confirms the significance of managerial heterogeneity in influencing strategic corporate choices and outcomes. Particularly, several recent studies provide evidence of the impact of CEOs' career experience on corporate decisions (for example, Hu and Liu (2015), Huang (2014), Mishra (2014), Crossland et al. (2014), Custódio and Metzger (2014), Custódio and Metzger (2013)). Based on the upper echelons theory and prior literature, I aim to investigate the influence of CEOs' past work experience on the failure risks and survivability of IPO firms. I categorise CEOs' managerial experience into general managerial ability and specialist managerial ability and examine which type of experience contributes to the survivability of IPO firms. I follow Custódio et al. (2013) to define general managerial ability to be knowledge, skills, and experiences that the CEO has obtained from various functional roles, firms, and industries in his lifetime employment. I also use their method to construct a general managerial ability index using the principal component analysis on the five aspects of CEOs' past work experience: the number of roles the CEO has held, the number of firms the CEO has worked for, the number of industries the CEO has worked in, CEO experience in another firm, and experience in a conglomerate firm. If a CEO's general managerial ability index is equal to or above the sample median, the CEO is categorised as a generalist, and specialist otherwise.

This study addresses the main question of whether CEOs with specialist managerial ability are more likely to improve the survival profiles of IPO firms than their counterparts with more general managerial ability. I argue that the incentives of generalist CEOs may be different from specialist CEOs, which may explain the differences in their course of actions and decision making, thereby influencing the failure risks and survivability of IPO firms. Mishra (2014) argues that generalist CEOs tend to be less risk averse than specialist CEOs. Generalist CEOs are more like to engage in job-hopping (Giannetti 2011) and more easily get hired due to their prominent presence in executive search databases (Dasgupta and Ding 2010). Higher employability makes their wealth less contingent on the future of the firm that they manage. Moreover, they may want to undertake riskier strategies to show the market that they have superior ability. Therefore, generalist CEOs may have more incentives to pursue risky projects without much concern about the consequences of such strategies on the firm's future survivability. On the other hand, specialist CEOs face greater career concerns due to their lower job mobility across firms and industries. Since the future wealth of specialist CEOs tend to be dependent on the long-term performance of the firm, they have stronger incentives to ensure that their firm remains viable for a longer time in the future. In addition, specialist CEOs' industry expertise and thorough understanding of the firm may help them develop proper strategic corporate policies that allow the firm to capitalise on post-issue opportunities, thereby, ensuring growth and survivability. Therefore, I expect that specialist CEOs will be associated with lower probability of failure and higher survival rates. Conducting the survival analysis on the sample of common share US IPOs from 1999 to 2009, I find the evidence that IPO firms with specialist CEOs have a lower probability of failure and survive longer in subsequent periods after the offering. The failure risk of IPO firms with specialist CEOs is 35% that of firms with generalist CEOs. The results remain robust after controlling for the selection problem due to the endogenous matching between CEOs and firms using the propensity score matching approach. I also obtain similar results after taking into account the effects of high-tech industries, crisis periods, and CEO power.

My study provides several contributions to the literature. First of all, my findings contribute to the literature that emphasises the influence of managerial characteristics on corporate decisions and outcomes. Previous research in this strand of literature focuses on CEO features such as age (Serfling 2014; Orens and Reheul 2013), education (King et al. 2016), early-life experiences (Malmendier et al. 2011), managers' fixed effects (Bertrand and Schoar 2003), overconfidence (Huang et al. 2016; Malmendier et al. 2011;

Malmendier and Tate 2008, 2005), and risk attitudes (Cain and McKeon 2016; Graham et al. 2013). Regarding CEOs' work experience, prior research examines functional experience (Custódio and Metzger 2014; Malmendier and Tate 2005), industry expertise (Huang 2014; Custódio and Metzger 2013; Orens and Reheul 2013), and career variety (Hu and Liu 2015; Crossland et al. 2014). Those studies mainly link a CEO's characteristics and experience with corporate strategic decisions; little has been done regarding the influence of CEOs' career histories on firm performance, particularly the long-term survivability of IPO firms. Custódio et al. (2013) document that generalist CEOs receive higher pay than specialist CEOs; however, they do not find evidence suggesting that generalist CEOs positively affect firm performance. My findings suggest that generalist CEOs are not only more expensive than specialist CEOs but also associated with higher probability of failure and lower survival rates in the periods after going public. To the best of my knowledge, this is the first study to directly investigate the influence of specialist CEOs on IPO firms' survival profiles. My research also contributes to the literature that tries to understand the variation in the survivability of IPO firms. I find that specialist managerial experience of CEOs is significant for the survivability of IPO firms. My study also complements previous findings that managerial characteristics are an important determinant of corporate performance, which further confirms the predictions of the upper echelons theory. Moreover, identifying the extent to which work experience of CEOs is related to IPO survival provides useful insights into the CEO appointment decisions for IPO issuing firms. My findings suggest that specialist CEOs are not only less costly than generalist CEOs but also contribute positively to IPO firms' survival profiles. Therefore, IPO firms may want to take specialist expertise into more consideration when recruiting a CEO.

The rest of the chapter is organised as follows. The next section reviews relevant literature on managerial work experience and IPO survival. Section 4.3 discusses hypothesis development. Section 4.4 describes data and explains survival analysis methodology. Section 4.5 reports the empirical findings on the impact of specialist CEOs on the probability of failure and time to survive of IPO firms in subsequent periods to the offering. Section 4.6 presents several checks for the robustness of my results. Finally, Section 4.7 provides some concluding remarks.

4.2. Literature review

4.2.1. Theoretical framework

The first theory that governs this study is agency theory. The theory focuses on the principal-agent problem which arises due to the conflict of interests between the principals (e.g., shareholders) and agents (e.g. company executives) in the presence of asymmetric information between the two parties. It also implies that managers can exercise their discretion in the firm to influence corporate decisions to achieve their objective (Bertrand and Schoar 2003). Thus, the moral hazard problem will occur if managers acts for their own benefits which go against the interests of the shareholders. Managers' decisions will be detrimental to the firm if they are not aligned with shareholders' interests. This problem is more severe for IPO firms since the IPO markets demonstrate high information asymmetries.

Moreover, the upper echelons theory proposed by Hambrick and Mason (1984) postulates that managers' decisions (and ultimately corporate outcomes) can be influenced by managerial backgrounds, personalities, values, and past experiences. Extensive research efforts have been put into providing empirical evidence of the association between various managerial specific attributes and corporate decisions and performance. Previous empirical studies have provided findings consistent with the theory and documented that managerial heterogeneity significantly explains firm behaviours and performance. Bertrand and Schoar (2003) find that managers' fixed effects have significant explanatory power for the heterogeneity in various corporate decisions including investment policies (e.g., capital expenditures and acquisition), financial policies (e.g., cash holdings, financial leverage, interest coverage and dividend payouts), and organisational strategies (e.g., R&D, advertising, and diversification). Subsequent studies have investigated the effects of managers' psychological traits such as overconfidence and personal risk attitudes on corporate decisions. For example, Malmendier and Tate (2005) show that overconfident CEOs tend to be more responsive to cash flows when making investment decisions; particularly, they overinvest when internal funds are abundant, but restrain investment when external financing is required. Malmendier and Tate (2008) further explore the linkage between CEO overconfidence and merger decisions. They find that overconfident CEOs are more likely to overpay target firms and engage in value-destroying deals. Malmendier et al. (2011) suggest that overconfident managers prefer to use less risky financing options such as cash and riskless

debt than equity. They also prefer shorter-term debt, especially short-term debt due within 12 months (Huang et al. 2016). Graham et al. (2013) also document the impact of managerial optimism and risk-aversion on corporate financial policies including capital structure and acquisition decisions. Cain and McKeon (2016) show that CEOs' personal risk-taking is positively associated with equity return volatility. Kaplan et al. (2012) investigate specific managerial characteristics and find that managers who have general managerial ability and possess capabilities related to execution skills are more likely to contribute positively to subsequent performance.

Moreover, CEOs' past life events, age, and education have been shown to influence their decision making. Malmendier et al. (2011) suggest that CEOs who grew up during the Great Depression have less trust in capital markets, and hence, rely markedly on internal financing. In addition, CEOs who served in the military tend to prefer risk-taking and undertake more aggressive capital structures. Serfling (2014) argues that older CEOs are more risk averse and less likely to pursue risky investment policies. They undertake fewer R&D projects, engage in more diversifying acquisitions, manage more diversified firms, and maintain lower operating leverage. Orens and Reheul (2013) show that CEO age is positively associated with cash holdings. King et al. (2016) document that CEOs with MBAs make a positive contribution to bank performance; moreover, they tend to be responsive to risk-taking incentives and adopt riskier or more innovative strategies to improve performance. Furthermore, Mackey (2008) shows that the CEO effect explains 29.2 percent of the variation in a firm's performance; and the impact is much more pronounced at the corporate level than the segment level and in diversified firms than focused firms. Overall, previous empirical studies confirm the relevance of managerial heterogeneity to corporate strategies, which ultimately influences firm performance.

4.2.2. CEO work experience and corporate decisions

Along with cognitive abilities, personal trait sand observable demographic backgrounds, work experience represents an important factor suggested by the upper echelons theory as having significant implications for managerial decision making. CEOs' past work experience can exert influence on corporate strategic choices. Various empirical research has provided the evidence on the substantial impact of CEOs' previous professional experience on firms' strategy adoption. Malmendier and Tate (2005) document that CEOs' work experience is relevant for a better understanding of corporate

investment decision making. Specifically, CEOs with an engineering or scientific career experience show higher investment-cash flow sensitivity, while those with a financial career experience display lower sensitivity. Orens and Reheul (2013) document a negative association between cash holdings and CEOs' experience in other industries. Custódio and Metzger (2013) study CEO work experience in the context of diversifying M&A and show that CEOs with industry expertise perform better in deal negotiations and pay a lower premium for the target. Custódio and Metzger (2014) provide evidence that past financial experience of CEOs influences firms' financial policies such as cash holdings, leverage, share repurchases, and pay-out policies. Huang (2014) shows that managers' industry-specific experience influences their corporate divesture decisions. Particularly, CEOs in diversified conglomerates tend to divest divisions in industries in which they have less expertise to refocus on divisions in which they are more specialised; and better firm-CEO match enhances the firm's operating and stock performance following the divesture. Hu and Liu (2015) suggest that strong external experience helps CEOs obtain various social connections and result in better access to external funds; therefore, firms managed by CEOs with more diverse career experience tend to demonstrate lower investment-cash flow sensitivity and raise more external funds such as bank loans and trade credit.

More recent studies have examined the impacts of career variety on corporate strategies. The wide range of career experience broadens an individual's cognitive breadth. As individuals progress through their careers, they encounter various business situations and work in different functions, organisations, and business environment, which helps them gain a broad array of experience and cognitive ability from which they may subsequently draw (Dragoni et al. 2011; Tesluk and Jacobs 1998). Therefore, CEOs with more general managerial ability may develop greater cognitive breadth for handling business situations, while CEOs with specialist managerial ability may prefer to follow more mainstream managerial actions. For instance, Hitt and Tyler (1991) find that executives with more diverse functional experience tend to adopt more criteria to assess acquisition targets. Hambrick et al. (1993) suggest that varied career experience makes CEOs less psychologically committed to current firm strategies. Dragoni et al. (2011) posit that the variety of managerial experience induces executives to analyse business situations from multiple perspectives to address problems.

The breadth of work experience that CEOs have engaged in over the course of their careers reflects their motivations and personality. Crossland et al. (2014) find that

CEO career variety including professional and institutional experience is positively linked with both strategic dynamism, which refers to the degree of change in a firm's allocation of resources over time, and distinctiveness, which relates to the extent of the difference between the firm and the industry average. Furthermore, there are differences in personality of CEOs who undergo many career changes such as risk propensity (Vardaman et al. 2008; Nicholson et al. 2005) and openness to experiences (Zimmerman 2008; Boudreau et al. 2001).

In addition, Mishra (2014) argues that CEOs with more general managerial skills possess greater human capital, have lower incentives to reduce risks, and raise agency issues compared with specialist CEOs. Varied career experiences also broaden their social connections and professional networks (Hu and Liu 2015; Campion et al. 1994).

4.2.3. IPO survival

Extant empirical evidence from both the US and international IPO markets suggests that although IPO firms often offer substantial initial returns, they show poor long-run operating and investment performance with almost 30% of firms either failing or being acquired in five years subsequent to the offering (Jain and Kini 2008) (see Ritter (2003), Ritter and Welch (2002), Jenkinson and Ljungqvist (2001), Loughran et al. (1994) for a review of the US and international evidence on the phenomena). In the transition from private to public ownership, issuing firms face various challenges such as changes in ownership structure, governance mechanisms, more stringent scrutiny from capital market participants, analysts and regulators, increased market competition, and technological change (Jain and Kini 2008; Jain and Kini 2000). All of these challenges can threaten IPO firms' survival.

Research in this area has mainly concentrated on the role of firm and offering characteristics in determining survival profiles of IPO firms. For example, Schultz (1993) documents that underwriter prestige significantly reduces the probability of delisting. Hensler et al. (1997) find that the survival time for IPO firms increases with firm age, firm size, underpricing, IPO activity level, and the proportion of insider ownership, while the survival time decreases with the market level at the time of the issue and the number of risk factors. Willenborg and McKeown (2000) document that IPO issuers receiving an audit qualification about going-concern during the offering are more likely to be delisted for negative reasons within two years after the IPO. Jain and Kini (2000) document that the involvement of venture capitalists enhances the future survivability of IPO firms.

Weber and Willenborg (2003) show that auditor reports of big *N* auditors on smaller IPO firms tend to be predictive of involuntary delisting in the post-issue period. Jain and Martin (2005) suggest that IPO firms audited by high-quality auditors survive longer in the periods after the listing. Demers and Joos (2007) provide evidence that the presence of experienced auditors in the year before the IPO is related to a lower probability of IPO failure for high-tech IPO firms. Charitou et al. (2007) suggest that firms with more efficient boards have a lower likelihood of being involuntary delisted. Jain and Kini (2008) suggest that managerial strategic investment decisions influence the survival of newly public firms; particularly, managerial commitment to R&D and product diversification in the pre-issue period is positively associated with the probability of survival of IPO firms. Alhadab et al. (2014) show that IPO firms with high levels of real and/or accrual earnings management in the offering year tend to have a higher probability of failure and lower survival rates in post-issue periods.

While prior studies have investigated firm and offering characteristics influencing IPO performance and survival, the extant literature provides few insights on the impact of CEOs on the probability of IPO firm survival. CEOs play a major role in the decision-making process of organisational strategies. They are responsible for making important strategic corporate decisions to enable the firm to capitalise on post-IPO opportunities and ensure survival and growth. As reviewed previously, the heterogeneity in CEOs' lifetime career experience can explain the differences in corporate behaviours and outcomes. Therefore, I aim to investigate whether the extent of work histories influences the probability of IPO firms to survive longer in the future. Prior literature has attempted to examine various aspects of executives' experience in functional areas, firms, and industries to capture the differences among different institutional and occupational contexts (for example, Mishra (2014), Crossland et al. (2014), Custódio and Metzger (2014), Custódio and Metzger (2013), Custódio et al. (2013), Bunderson and Sutcliffe (2002)). I follow Custódio et al. (2013) and construct a proxy for general managerial ability of a CEO based on five aspects of his or her past work experience: functional positions, firms, industry sectors, CEO experience in another firm, and experience in a conglomerate firm. Further details on how I arrive at the construct are explained in Section 4.4.

4.3. Hypothesis development

Prior literature provides several empirical evidence of the influence of CEOs' work experience on corporate strategies; however, the study of CEO specialism on the survival outcome of firms remains unexplored. Following Custódio et al. (2013), the general managerial ability of CEOs is defined as a set of knowledge, skills, and experience acquired through employment histories, particularly obtained in a wide array of functional positions, firms, industry sectors, CEO experience in other firms, and experience in conglomerates. General managerial ability provides CEOs with smoother mobility across firms and industries. This ability may be preferred by firms that are conglomerates (Xuan 2009), facing changes in the product market (Hubbard and Palia 1995), technology, and management practices (Garicano and Rossi-Hansberg 2006), undergoing restructuring and acquisitions, experiencing surges in M&A activities, and facing industry shocks and operational distress (Custódio et al. 2013). As opposed to general managerial ability, specialist managerial ability refers to more focused experience gained from a limited number of functional roles, firms, and industry sectors. The skill set is not instantly transferable across firms and industries and may be desirable within a particular firm and industry.

Generalist CEOs may have different incentives from specialist CEOs. Generalist CEOs tend to have less risk-taking incentives than specialist CEOs (Mishra 2014). They are more likely to take advantage of a promising job market and undertake job-hopping (Giannetti 2011). They also tend to feature more prominently in executive search companies' databases and be more easily recruited (Dasgupta and Ding 2010). Thus, they have lower risks of being unemployed and their long-term wealth is less dependent on the future of the firm that they manage. On the contrary, specialist CEOs with work experience concentrated on a particular type of firm or industry may have more limited choices in switching firms and may have a harder time in getting offers from other firms. Hence, their long-term wealth highly depends on the performance and viability of the firm they lead. Specialist CEOs also face greater career concerns. Due to lesser job mobility across firms and industries, the poor performance of the firm will reflect worse on specialist CEOs' employment histories and adversely affect their future employability. Additionally, Crossland et al. (2014) argue that CEOs with high-variety of career experience tend to favour experimentation and change, while those with low-variety of career experience tend to prefer stability and incrementalism. Thus, if the incentives of a

generalist CEO is misaligned with the firm, adopting changes and novel strategies that involve a great deal of uncertainties and risks may be counter-productive and result in failure in the future. On the other hand, specialist CEOs with tighter connection with the firm may have more internal orientation and implement more stability approach to ensure the firm's longevity. In addition, generalist CEOs may attempt to signal to the market that they are high-quality managers and have superior ability by pursuing riskier strategies. Therefore, I argue that generalist CEOs may have stronger incentives to focus more on short-term performance and pursue risky projects without concerning about the consequences of such strategies on the long-term viability of the firm. The incentives of generalist CEOs may be misaligned with those of the firm, and such misalignment is exacerbated with a high level of agency problem inherent in the IPO market. On the other hand, since the long-term interests of specialist CEOs tend to be more closely tied to the long-term performance of the firm, they have stronger incentives to adopt strategies to ensure that the firm remains viable, grow and survive in the long-term.

Moreover, the IPO firm's survival is likely to be influenced by the fit between strategies implemented and competitive environment of the firm (Jain and Kini 2008). CEOs are mainly responsible for making corporate decisions; thus, they can influence strategic resource allocation choices that can result in competitive advantages, thereby, influencing survival time in the post-issue period. The on-going involvement in a specific firm and industry equips specialist CEOs with more industry expertise and thorough understanding of the firm's business situations. Therefore, they are expected to make more proper resource allocation decisions that are best suited for the market conditions of a particular IPO firm and help the firm adjust to various structural changes that result from going public. In addition, CEOs' past work experience constitutes valuable organisational resources. The long-established reputation of specialist CEOs among customers and suppliers will help the firm maintain close business relationships and provide indirect financial support when the firm experiences a shortage of working capital.

The above arguments lead us to expect that specialist CEOs – as opposed to generalist CEOs - will significantly make positive contributions to the survivability of IPO firms. I pose the following hypothesis:

> *Hypothesis: IPO firms with specialist CEOs are more likely to have a lower probability of failure and longer time to survive.*

4.4. Sample and data

4.4.1. Sample selection

I construct the initial sample of common share US IPOs from 1st January 1999 to 31st December 2009[15] from the Securities Data Corporation's (SDC) New Issues database. Following prior IPO literature, I exclude IPOs which have offer prices less than five dollars a share, spin-offs, privatisations, American depositary receipts (ADRs), leveraged buyouts (LBOs), real estate investment trusts (REITs), unit offerings, rights issues, limited partnerships, closed-end funds, and financial institutions.

I obtain financial data on Compustat, stock prices and delist information on the Center for Research in Security Prices (CRSP). I gather detailed biographical information of CEOs from BoardEx to extract data on CEOs' characteristics and work experience. I also complement my dataset with information on share ownership and executive compensation which is manually collected from S-1 filings available on SEC's EDGAR database. I require data availability for all observations. After merging the databases and removing observations with missing values, the final sample consists of 722 IPO firms.

I track each firm on CRSP from the IPO date until the delisting date or the end of 2014, whichever is earlier. CRSP provides codes to indicate the status of the issuing firm, specifically, whether the firm is still trading and specific reasons for delisting such as failure to meet listing standards, corporate governance violation, liquidation, insufficient capital, and bankruptcy. Following prior research (for example, Alhadab et al. (2014), Ahmad and Jelic (2014), Espenlaub et al. (2012), Jain and Kini (2008), Demers and Joos (2007), Jain and Martin (2005), Jain and Kini (2000)), I define failures as IPO firms that are involuntarily delisted (i.e., delisted for negative reasons). Based on CRSP delist codes, I categorise IPO firms into three groups: survived, acquired, and failed firms. All firms that are still trading (i.e., delist code of 100) at the end of 2014 are classified as survived firms. I separate delisted firms into two groups: acquired versus failed. Acquired firms consist of firms acquired in mergers, which have a delist code from 200 to 299. Failed firms include firms with a delist code greater than or equal to 300. These firms are delisted due to various negative reasons such as financial distress, liquidation, and failure to meet listing standards. My sample of 722 IPOs is comprised of 297 survived firms, 342 acquired firms, and 83 failed firms.

[15] Data coverage of BoardEx is from 1997; however, the coverage of U.S. public companies is extremely limited prior to 2000. Therefore, I start my sample in 2000. My sample ends in 2009 because I require five years of post-issue data to assess the survival profiles of issuing firms.

To create a proxy for a CEO's general managerial ability, I extract the information on work histories of the CEO before rising to the current position on BoardEx. I follow Custódio et al. (2013) to use principal component analysis to construct a general managerial ability index based on the CEO's lifetime work experience. This method is also employed by Mishra (2014) to investigate CEOs' general managerial skills. The index is the first factor of applying the principal component analysis to five proxies of general managerial ability based on a CEO's work experience before being appointed to the CEO position: the number of roles the CEO held, the number of firms the CEO worked for, the number of industries the CEO worked in, CEO experience at another firm, and experience in a conglomerate. A higher index refers to a greater degree of general managerial ability. This approach reduces measurement errors and enhances the power of the regression tests by mitigating the multicollinearity issue from using each of the five proxies (Custódio et al. 2013). This index emphasises external career mobility across industries and firms instead of internal mobility within a firm. This is relevant to my analysis since external recruitment is the recent trend observed in the executive labour market; thus, I want to focus on external mobility rather than internal mobility. The index summarises information on the general managerial ability of a CEO and allows me to classify a CEO as a generalist or a specialist. A CEO is categorised as a specialist if his or her general managerial ability index is below the sample median and as a generalist if the index is equal to or above the sample median.

4.4.2. Sample descriptive statistics

Table 4.1 provides the definition of all variables used in my analysis. All the continuous variables are winsorized at the 1st and 99th percentiles to mitigate the issue of outliers.

Table 4.2 presents the distribution by year and industry for three groups of IPO firms: failed, acquired, and survived. Panel A shows the distribution by group of IPOs from 1999 to 2009. Tracking IPO firms in my sample from the offering date to the end of 2014, 41.13% of firms survive, 47.37% are acquired, and 11.50% fail. Tracking the firms for five years after the issue date, 63.99% of firms survive, 28.53% are acquired, and 7.48% fail.

Panel B shows the distribution by issue year for the whole sample and each of the three groups of IPO firms. There is a high volume of IPOs during 1999-2000. However, the stock market crashes in 2001 following the collapse of the Dot-com bubble

considerably reduce the number of IPO deals being initiated in this period. The IPO market gradually rebounds from 2004 to 2007 before crashing once more due to the 2008 financial crisis. Thus, there is a clustering of IPOs in the period of 1999-2000 and 2004-2007. The percentage of firms being delisted for negative reasons within five years after the issue is highest for IPOs in 1999 and 2008 (nearly 15%). The percentage of firms that survive in five years after the offering is lowest for IPOs in 1999 (almost 47%). IPOs in 1999 also have the most percentage of firms being acquired in five years after the issue (around 38%). These figures are consistent with the economic situations in those years. The financial crises have an adverse impact on the survivability of IPO firms.

Panel C displays the distribution by industry for the overall sample and each of the three groups of IPO firms. The industry is classified by its two-digit SIC code. In the overall sample, IPOs cluster in high growth industries that develop high technological products including chemical products, computer equipment and services, electronic equipment, and scientific instruments. Chemical products and computer equipment and services are also the industries with the most number of firms being delisted for negative reasons within five years after the issue, the percentage of IPO failures in these industries is approximately 8%. The industries with the highest percentage of failed firms are food products (20%) and manufacturing industries (23.53%). Thus, these industries also have the lowest percentages of firms that survive in the post-issue period (ranging from 55% to 60%). The proportion of IPOs being acquired subsequent to the offering is highest among high-tech industries including computer equipment and services, electronic equipment, and scientific instruments (more than 30%). This makes sense because these firms tend to be high-tech start-up companies with high growth, making them attractive acquisition targets. Oil and gas sector appears to be the most stable industry with a low percentage of IPO failure (4.55%) and a high proportion of IPO survival (86.36%).

Table 4.3 illustrates the survival distribution by year of issue and industry of the two groups of IPO firms: those with specialist CEOs and those with generalist CEOs. The survival profiles of IPO firms are examined for five years following the offering. Panel A provides the comparison between IPO firms with specialist CEOs and those with generalist CEOs during each year of the sample period regarding the number and percentage of firms as well as the cumulative number and percentage of firms that fail from one to five years after going public. For each year of the sample period, there are differences in the proportion of firms with specialist CEOs and those with generalist CEOs. From 1999 to 2002, the percentage of IPO firms with generalist CEOs increase

steadily from approximately 50% in 1999 to nearly 65% in 2000, and to more than 75% in 2002. However, from 2003, IPO firms with specialist CEOs account for a greater proportion, with the yearly percentage ranging from 50% to 65%. This pattern is indicative of the greater appreciation of CEOs' specialist skills and experience among IPO firms. Regarding the failure rate, the five-year cumulative failure rates by year of issue of firms with specialist CEOs are lower than the failure rates of firms with generalist CEOs in most years. For the overall sample, the cumulative percentage of firms failing within five years after the offering is 5.56% for IPO firms with specialist CEOs compared to 9.37% for issuers with generalist CEOs.

Panel B provides the comparison of the distribution and failure rates of IPO firms with specialist CEOs versus those with generalist CEOs by industry. Among all sectors, the five-year failure rates of IPO firms with specialist CEOs are lower than those of issuing firms with generalist CEOs except for manufacturing, food products, and oil and gas industries. Specialist CEOs have more presence in manufacturing, wholesale and retail trade sectors, and particularly, industries that develop high technological products such as chemical products, computer equipment and services, and electronic equipment. The five-year cumulative failure rates of IPO firms with specialist CEOs are lower than the rates of firms with generalist CEOs in these industries except for manufacturing sector. Overall, the results so far have suggested that IPO firms with specialist CEOs tend to have a lower failure rate than those with generalist CEOs.

Table 4.4 presents the descriptive statistics of the variables used in the empirical analyses. Panel A presents the summary statistics of CEOs' lifetime work experience. In the overall sample, on average, a CEO worked in five different functional areas, five firms, and nearly two industries before becoming the CEO of the current firm. In addition, 52% of CEOs had CEO experience in another firm and 37% used to work for a conglomerate firm. In general, a specialist CEO used to hold approximately three different roles and work for around three employers in one industry. 33% of specialist CEOs used to be a CEO in a different firm, and 13% had career experience in a conglomerate. Generalist CEOs gained experience through nearly seven different positions, seven firms, and two industries. 70% of generalist CEOs had CEO experience in other firms and 61% worked for a conglomerate.

Panel B provides the summary statistics of CEO characteristics for the overall sample and a comparison between specialist CEOs and generalist CEOs. In the whole sample, on average, a CEO is approximately 50 years old and has been working for the

firm for nearly 4.5 years. Only 3% of all CEOs are female, 27% are recruited internally, 37% are in a dual position of both a CEO and a chairman of the board, and 27% are also a founder of the firm. The mean share ownership of a CEO is 12.63%. Regarding compensation, a CEO earns annually an average of 660 thousand dollars in cash compensation, 690 thousand dollars in equity compensation, and nearly 1.7 million dollars in total compensation. Concerning education, 26% of CEOs have an MBA, 10% have a Ph.D., and 17% graduated from an Ivy League institution. Specialist CEOs are significantly different from generalist CEOs in all characteristics examined except for the gender and cash compensation. The majority of specialist and generalist CEOs are male, and the average cash compensation is not significantly different among the two types of CEOs. In comparison between specialist and generalist CEOs, on average, specialist CEOs are younger and have spent more time of his career with the current firm. The mean age of a specialist CEO is around 48, and that of a generalist CEO is nearly 51. The average length of time a specialist CEO has served the firm is approximately five years, which is one year longer than the average tenure of a generalist CEO. A higher percentage of specialist CEOs are hired internally than that of generalist CEOs (29% and 24% respectively). Moreover, specialist CEOs are more likely to hold dual positions of a CEO and a chairman of the board (39% of specialist CEOs are also a chairman compared with 34% of generalist CEOs). The percentage of specialist CEOs who are also a founder (35%) is almost double that of generalist CEOs (20%). Specialist CEOs also have significantly higher share ownership than generalist CEOs (around 14% for specialist CEOs and 11.5% for generalist CEOs). In terms of compensation, while cash compensation is not significantly different between the two groups of CEOs, equity compensation and total compensation are significantly higher for generalist CEOs than specialist CEOs. The average equity compensation of a generalist CEO is approximately 830 thousand dollars, while that of a specialist CEO is approximately 554 thousand dollars. The average total compensation of a generalist CEO is around 1.87 million dollars, while that of a specialist CEO is around 1.47 million dollars. This is consistent with the findings by Custódio et al. (2013) that generalist CEOs are paid significantly higher than specialist CEOs. With regard to education, significantly more generalist CEOs (30%) hold an MBA compared to specialist CEOs (23%). However, for a more specialised degree like a Ph.D., the percentage of specialist CEOs pursued this degree (13%) is significantly higher than that of generalist CEOs (8%). In addition, a greater proportion of generalist CEOs (21%) are Ivy League alumnus than that of specialist CEOs

(14%). The longer tenure and higher percentage of share ownership of specialist CEOs, and the greater proportion of specialist CEOs holding simultaneously the position of a founder of the firm or a chairman of the board indicate that specialist CEOs tend to have a stronger tie with the firm than generalist CEOs. This evidence strengthens my argument that specialist CEOs may have more incentives to ensure the firm's survivability in the future since their wealth is more contingent on the firm's performance and longevity.

Panel C presents the firm and offering characteristics for the overall sample and the two sub-samples of IPO firms with specialist CEOs and those with generalist CEOs. The significance of the mean difference between these two groups is also reported. In general, IPO firms are quite young and small with the mean firm age of approximately 17 years and the average sales of around 400 million dollars. They have an average loss of 3% and the mean leverage ratio of 0.14. The mean number of business segments in which IPO firms operate is 1.38, indicating that IPO firms generally exhibit a low degree of diversification. IPO issuers allocate resources considerably in R&D and capital investments with the mean R&D and capital expenditure intensity of 10% and 6% respectively; meanwhile, the mean advertising intensity is merely 2%. IPO issuers raise an average of approximately 145 million dollars in the offering. They have the mean initial returns of 28% and the mean market to book of 4.12. Around half of IPO firms are underwritten by top-tier investment banks, 57% venture backed, and 92% audited by a big four auditor. 45% of IPO firms are in the high-tech industry. Concerning delisting events, on average, 7% of IPO firms are delisted due to negative reasons within five years after the offering. IPO firms with specialist CEOs are significantly different from those with generalist CEOs in most of the firm and offering characteristics. On average, IPO firms with generalist CEOs are more established with nearly 19 years in operation compared to 16 years for firms with specialist CEOs. The average sales of firms with generalist CEOs (approximately 526 million dollars) nearly double that of firms with specialist CEOs (roughly 277 million dollars). The mean number of business segments is 1.52 for firms with generalist CEOs and 1.24 for firms with specialist CEOs. The proceeds raised in the IPO by issuers with generalist CEOs (around 170 million dollars) are significantly higher than by firms with specialist CEOs (around 119 million dollars). The finding that firms with generalist CEOs are larger and more diversified than those with specialist CEOs is consistent with the literature. Custódio et al. (2013) show that generalist CEOs are preferred in multi-segment firms that are expected to have more complex operations. Investment policies including R&D, advertising intensity and capital

investments are not significantly different between the two groups. In addition, firms with specialist CEOs are more profitable (profitability ratio of -0.01) and less leveraged (leverage ratio of 0.13) than firms with generalist CEOs (profitability ratio of -0.05 and leverage ratio of 0.16). The mean percentage of firms being underwritten by reputable investment banks is higher for issuers with generalist CEOs (54%) than those with specialist CEOs (49%). Notably, IPOs with specialist CEOs are less underpriced than those with generalist CEOs (the initial returns of 24% for firms with specialist CEOs and 32% for those with generalist CEOs). This evidence supports the argument of Mishra (2014) that CEOs with higher general managerial ability may result in higher agency problems due to different risk-taking incentives; thus, investors require higher returns to compensate for increased uncertainties they may face. The two groups of IPO firms are not significantly different in the market-to-book ratio, and the percentage of firms receiving venture capital financing, being audited by a big four accounting firm, and being in the high-tech industry. Regarding the delisting incident, 9% of IPO firms with generalist CEOs are delisted due to negative reasons within five years after the issue, which is significantly higher than the percentage of IPO firms with specialist CEOs being involuntarily delisted (6%). Table 4.5 provides the correlation matrix of variables used in the analysis. No multicollinearity is detected among those variables.

4.5. Empirical analysis of the impact of specialist CEOs on IPO survival

4.5.1. Survival analysis methodology

Survival analysis is a statistical technique that has been used extensively in prior research to examine determinants of IPO survivability (e.g., Alhadab et al. (2014), Espenlaub et al. (2012), Gerakos et al. (2013), Carpentier and Suret (2011), Jain and Martin (2005), Fama and French (2004), Jain and Kini (2000), Hensler et al. (1997)). The primary benefit of survival analysis over regression analyses such as cross-sectional logistic models lies in its ability to account for both event occurrence and time to the event. In addition, survival analysis is also useful in examining censored data and time-series data with different time horizons (Shumway 2001; LeClere 2000), which are both characteristics of the IPO market. The survival time of IPO firms is right censored because many firms do not encounter failure for the duration of the study. The time window is different for each firm depending on the IPO date. For example, in my analysis, IPO firms

are tracked until the end of 2014. Thus, a firm that went public in 1999 is tracked for 15 years compared to 5 years for a firm that went public in 2009.

In analysing the association between specialist CEOs and IPO survival, I employ both nonparametric and semiparametric approaches. Nonparametric estimates of hazard and survival functions allow us to compare the failure risk and survival rates of IPO firms with specialist CEOs and those with generalist CEOs, thereby, determining whether specialist CEOs improve the survival profiles of IPO issuing firms. The hazard function provides the conditional probability of failure given that the firm has survived up to the specified time. If the management of specialist CEOs reduces the failure risk, the hazard function for IPO firms with specialist CEOs will mainly remain below that of IPO firms with generalist CEOs. I estimate the hazard functions for the two groups of IPO firms using the Nelson-Aalen estimator, which is defined as:

$$\widehat{H}(t) = \sum_{t_i \leq t} \frac{d_i}{n_i} \tag{4.1}$$

where d_i is the number of failed firms at time t_i, and n_i is the number of firms that are still trading at time t_i.

The survival function provides the probability that the firm survives up to a particular time. If the management of specialist CEOs enhances the survivability of issuing firms, I expect that the survival function curve of issuers with specialist CEOs will be above that of firms with generalist CEOs. I estimate the survival function of the two groups of IPO firms using the Kaplan-Meier estimator, which is defined as:

$$\hat{S}(t) = \prod_{t_i \leq t} \frac{n_i - d_i}{n_i} \tag{4.2}$$

where d_i is the number of failed firms at time t_i, and n_i is the number of firms that are still trading at time t_i. In addition, I use the log-rank test to examine the difference between the estimated survival curves of IPO firms with specialist CEOs and those with generalist CEOs.

With regard to semiparametric approach, I employ Cox proportional hazards model. The primary advantage of the Cox proportional hazards model over other hazard

models is that the baseline hazard function does not have to be pre-specified and can take any functional form (Allison 2000). In addition, no assumption needs to be made about the distribution of event dates (Alhadab et al. 2014). I estimate the Cox proportional hazards model as follows:

$$h(t) = h_0(t)\exp[\beta_1 Specialist\ CEO_{i,t} + \beta_2 Log(firm\ age)_{i,t} + \beta_3 Log(sales)_{i,t} + \beta_4 Top-tier\ underwriter_{i,t} + \beta_5 Big4\ auditor_{i,t} + \beta_6 Venture\ capitalist_{i,t} + \beta_7 Profitability_{i,t} + \beta_8 Leverage_{i,t} + \beta_9 Market-to-book_{i,t} + \beta_{10} R\&D_{i,t} + \beta_{11} Advertising_{i,t} + \beta_{12} Capital\ expenditure_{i,t} + \beta_{13} Diversification_{i,t} + \beta_{14} Log(proceeds)_{i,t} + \beta_{15} Initial\ returns_{i,t} + \beta_{16} CEO-Chairman_{i,t} + \beta_{17} CEO-Founder_{i,t} + Industry\ dummies + Year\ dummies] \quad (4.3)$$

where $h_0(t)$ is the baseline hazard function, and t is the time to failure (i.e., the duration to the delisting date). The dependent variable indicates the failure risk; thus, a positive (negative) coefficient suggests that failure is more (less) likely to happen and the survival time is shorter (longer). The hazard ratio for each independent variable is computed as the exponentiated coefficient for the variable. It measures the increase in the failure risk for a unit increase in the value of the independent variable. For indicator variables, the risk ratio is the ratio of the estimated hazard for those with the value of one to the estimated hazard for those with the value of zero. For continuous variables, the estimated change in the hazard rate for a unit increase in the independent variable is 100*(hazard ratio – 1) (Alhadab et al. 2014; Jain and Martin 2005; Allison 2000).

The main variable of interest is *Specialist CEO* which indicates whether the CEO has specialist managerial ability. I control for various firm and offering characteristics that are suggested by prior literature as determinants of IPO survival. I include variables *Log(firm age), Log(sales), Log(proceeds)* and *Initial returns* to control for the positive effects of firm age, firm size, and underpricing on IPO survival as documented by Hensler et al. (1997). Schultz (1993) finds the positive association between reputable underwriters and IPO survival. Jain and Kini (2000) indicate that the involvement of venture capitalists in the IPO process improves the survival profile of IPO firms. Jain and Martin (2005) document that IPO firms audited by high-quality auditors survive longer in the following

years. To capture the impacts of these financial intermediaries on IPO survival, I include indicator variables *Top-tier underwriter, Venture capitalist,* and *Big4 auditor*. Moreover, I add the variable *Leverage* to control for the firm's leverage based on the finding of Demers and Joos (2007) that the leverage ratio of IPO firms is positively related to the probability of failure. Additionally, Jain and Kini (2008) argue that managers' strategic investment choices at the time of the IPO may influence the post-issue performance of IPO firms; particularly, the probability of IPO survival is positively associated with R&D intensity and product diversification. I control for the effects of managerial strategic investment decisions by adding variables indicating strategic investments of the firm, namely *R&D, Advertising*, *Capital expenditure,* and *Diversification*. Furthermore, I include controls for firm profitability and growth opportunity which are proxied by the book-to-market ratio as suggested by Alhadab et al. (2014). In addition, I control for the structural power of the CEO by adding variables *CEO-Chairman* and *CEO-Founder*. Since there may be differences in survival profiles of IPO firms in different industries and years, I also add to the model industry and year fixed effects. Definitions of all variables are provided in Table 4.1.

4.5.2. Empirical results

4.5.2.1. Analysis of hazard and survival curves

First of all, I examine the nonparametric estimates of the survival distributions of the IPO sample. The hazard and survival functions for both groups of IPO firms with specialist CEOs and those with generalist CEOs are estimated. The plots of Nelson-Aalen cumulative hazard estimates and Kaplan-Meier survival estimates are provided in Figure 4.1 and Figure 4.2 respectively. In Figure 4.1, the hazard function of IPO firms with specialist CEOs is below that of firms with generalist CEOs. The gap widens as the length of time after the issue increases. On the contrary, as can be seen in Figure 4.2, the survival function of IPO firms with specialist CEOs is above that of the firms with generalist CEOs. The longer the time elapses after the issue, the broader the gap between survival functions of the two groups of firms. I also provide the list of survival functions. The probability of surviving five years after the issue is 93.8% for firms with specialist CEOs, compared to 88.6% for firms with generalist CEOs. The survival probability after ten years after the IPO decreases considerably for firms with generalist CEOs to 79.3%, while this probability is 88.1% for firms with specialist CEOs. In addition, the log-rank test for

the equality of survival functions shows that the estimated survival curves of the two groups are different at the 1% significance level. Therefore, the plots of hazard and survival functions demonstrate that IPO firms with specialist CEOs have a higher survival profile and a lower risk profile compared to firms with generalist CEOs. Overall, the nonparametric approach of the survival analysis provides evidence that specialist CEOs can improve the survival profiles of IPO issuers.

4.5.2.2. Estimation of Cox proportional hazard model

Table 4.6 presents the results of the Cox proportional hazard model of the probability of failure and time-to-failure which assesses the impact of specialist CEOs on IPO survival after controlling for various offering and firm factors influencing the survivability. I report the results of several model specifications.

In Specification (1), the main variable of interest is the dummy variable *Specialist CEO* indicating whether the CEO is a specialist. The coefficient on *Specialist CEO* is negative and significant at the 1% level, indicating that IPO firms with specialist CEOs have a lower probability of failure and longer survival time in the periods following the offering. This result is consistent with the previous finding in the nonparametric analysis discussed in Section 4.5.2.1 that IPO firms with specialist CEOs survive for a longer period than those with generalist CEOs. The risk ratio of 0.351 suggests that the failure risk of IPO firms with specialist CEOs is 35.1% of the failure risk of IPO firms with generalist CEOs.

Specifications (2) to (7) estimate the same regressions as Specification (1) but using the *General ability index*, and five individual measures of general managerial skills employed to generate the index, namely, *Number of roles, Number of firms, Number of industries, CEO experience dummy,* and *Conglomerate experience dummy*. I find a positive and significant coefficients on all those variables. This suggests that IPO firms led by CEOs who possess more general managerial ability in terms of more varied experience in different roles, firms, and industries have a higher probability of failure and shorter time to survive. The risk ratio of 1.443 of the variable *General ability index* suggests that for each unit increase in the general ability index, the failure risk of the firm increases by 44.3%. The variables *Number of roles, Number of firms,* and *Number of industries* have the risk ratios of 1.217, 1.157, and 1.314 respectively. This implies that for each additional number of roles, firms, and industries in which the CEO has worked, the failure risks of the firm increase by 21.7%, 15.7% and 31.4% respectively. Thus, the

variety of industry experience has a stronger impact on the failure risks of IPO firms compared to the variety of experience in functional roles and firms. The variables *CEO experience dummy* and *Conglomerate experience dummy* have the risk ratios of 1.717 and 1.634 respectively. This suggests that the failure risks of firms whose CEOs used to worked as a CEO in other firms and have prior experience in a conglomerate are 172% and 163% the failure risks of firms whose CEOs do not have such experience.

The coefficients on control variables are consistent across all specifications. In general, the signs of the control variables are in line with prior literature. Specifically, more profitable, and higher growth IPO firms tend to have a lower probability of failure and longer time to survive. However, firms with higher underpricing and leverage ratios have a higher likelihood of delisting in subsequent periods and survive for a shorter time. I do not find a significant association between strategic investment decisions including R&D, capital expenditure, and diversification and IPO survival. The coefficient on *Advertising* is just marginally significant. Moreover, the mean values of *R&D, Advertising,* and *Capital expenditure* presented in Table 4.4 do not show significant differences between IPO firms with specialist CEOs and those with generalist CEOs. Therefore, it appears that specialist CEOs influence the survival of IPO firms through a different channel other than strategic investment decisions such as R&D, advertising, capital expenditure, and diversification. Notably, the coefficient on *Leverage* is strongly significant at the 1% level across specifications. Additionally, the mean leverage is significantly different between IPO firms with specialist CEOs and those with generalist CEOs as described in Table 4.4. In line with my argument that specialist CEOs may be more risk-averse than generalist ones, specialist CEOs may want to reduce the firms' overall risks through more conservative financial policies such as maintaining lower leverage ratios. The finding of Hu and Liu (2015) also shows that CEOs with less diverse career experience are less likely to exploit external funds. Therefore, it is plausible that financial leverage may be one channel through which specialist CEOs influence IPO firms' survival profiles.

Overall, the results from both the nonparametric approach and the Cox proportional hazard model support the hypothesis that IPO firms with specialist CEOs tend to have a lower probability of failure and longer time to survive in subsequent periods following the offering.

4.6. Robustness checks

4.6.1. Controlling for high-tech industries and crisis periods

In the first set of robustness tests, I evaluate whether the relation between specialist CEOs and IPO survival differs depending on whether the firm belongs to high-tech industries and whether the firm goes public during financial crisis periods. Firms in high-tech industries tend to have high growth, require continuous technological advancements, and face substantial competitiveness. Crisis periods put considerable financial constraints on the firm. Thus, high-tech industries and crisis periods may create more challenges for the job of a CEO, and require the CEO to make more careful consideration to decide the most plausible actions to help the firm to withstand competitive pressures and market shocks. Therefore, managerial discretion[16] and job demands[17], which are the two moderators of upper echelons predictions, may be different for IPO firms in high-tech industries and crisis periods. This may affect the influence of specialist CEOs on IPO survival.

Table 4.7 presents the results of the Cox proportional hazard model controlling for high-tech industries. Specification (1) provides the results of the baseline Cox proportional hazard model (Equation 4.3) including the interaction effect between *Specialist CEO* and *High-tech industry*. The coefficient on *Specialist CEO* remains negative and significant, indicating that IPO firms led by specialist CEOs have a lower probability of failure and longer time to survive. Controlling for high-tech industries, the risk ratio of 0.537 suggests that the failure risk of IPO firms with specialist CEOs is 53.7% that of firms with generalist CEOs. The coefficient on the interaction term *Specialist CEO*High-tech industry* is not significant. This suggests that the influence of specialist CEOs on IPO survival is not significantly different between firms in the high-tech industries and those not. Specification (2) and (3) provide the results of the baseline Cox

[16] The concept of managerial discretion is introduced by Hambrick and Finkelstein (1987) to reconcile two opposing views about the influence of top managers on corporate outcomes. One view supports the effects of top executives on organisational decisions; while the other view argues that organisations are inertial and constrained by external factors, conventions and norms. Discretion exists when constraint is absent and there are various plausible alternatives; and it comes from environmental conditions, organisational factors, and managers themselves (Hambrick 2007). The implication of managerial discretion for the upper echelons theory is that the influence of managerial characteristics on corporate strategies and performance is proportional to the magnitude of managerial discretion (Hambrick 2007).

[17] The concept of executive job demands is introduced by Hambrick et al. (2005). The difficulty level of executives' job varies in different environments and business situations. Particularly, executive job demands come from task challenges, performance challenges and executive aspirations (Hambrick 2007). The implication of this moderator for the upper echelons theory is that the heavier job demands under which executives are, the more likely that executives rely on their past experience to find solutions to business problems; hence, the influence of managerial characteristics on their corporate strategic choices in the presence of increased job demands is stronger (Hambrick 2007).

proportional hazard model (Equation 4.3) performed on the sub-samples of IPO firms in high-tech industries and those not in high-tech industries. I still find that specialist CEOs improve the survival profiles of IPO firms. For IPO firms in high-tech industries, firms with specialist CEOs have the failure risk of 47.2% the failure risk of firms with generalist CEOs. For IPO firms not in high-tech industries, the failure risk of firms with specialist CEOs is 55.8% that of firms with generalist CEOs.

Table 4.8 reports the results of the Cox proportional hazard model controlling for crisis periods. Specification (1) provides the results of the baseline Cox proportional hazard model (Equation 4.3) including the interaction effect between *Specialist CEO* and *Crisis period.* Consistent with the results reported in the main analysis, I find that having specialist CEOs is associated with a lower probability of failure and longer time to survive. Controlling for crisis periods, the risk ratio of 0.497 implies that the failure risk of firms with specialist CEOs is 49.7% that of issuers with generalist CEOs. The coefficient on the interaction term *Specialist CEO*Crisis period* is not significant. This means that the association between specialist CEOs and IPO firms' survival profiles is not affected by crisis periods. I also re-estimate the Cox proportional hazard model (Equation 4.3) for the two sub-samples of IPO firms in the crisis periods and those not. I also find the negative linkage between specialist CEOs and the probability of failure for these sub-samples. IPO firms led by specialist CEOs in the crisis periods have the failure risk of 8.6% that of firms managed by generalist CEOs. The failure risk of IPO firms not in the crisis periods with specialist CEOs is 37.3% that of firms with generalist CEOs. Overall, the results reported in the main analysis still hold when I control for high-tech industries and crisis periods.

4.6.2. Controlling for CEO power

Adams et al. (2005) argue that more powerful CEOs tend to make decisions with extreme consequences; thus, firms whose CEOs have more power over the board are more likely to exhibit more variation in performance. The power of CEO may influence the association between specialist CEOs and IPO survival; hence, in my second set of robustness tests, I focus on whether my results are driven by CEOs' decision-making power. I follow the literature on CEO power (e.g., Han et al. (2016), Jiraporn et al. (2014), Baldenius et al. (2014), Chikh and Filbien (2011), Liu and Jiraporn (2010); Adams et al. (2005)) and use four power dimensions suggested by Finkelstein (1992), namely, structural power, ownership power, expert power, and prestige power. As a proxy for

structural power, I use *CEO-Chairman* which indicates if the CEO is also the chairman of the board since CEO duality can be considered as the highest rank in the corporate hierarchy. As a proxy for ownership power, I use *CEO-Founder* which specifies if the CEO is also the founder of the firm, and *CEO ownership* which refers to the percentage of shares owned by the CEO. As a proxy for expert power, I use *CEO tenure* which shows the length of time the CEO has worked at the firm. Longer tenured CEOs tend to have more status and more experience with the company and its board. As a proxy for prestige power, I use *Ivy League alumnus* which indicates if the CEO graduated from an Ivy League institution.

I then estimate a CEO power index as the first factor of applying principal component analysis to the five proxies of CEO power. I separate the sample into two groups based on the value of the CEO power index. CEOs are classified as powerful if their power index is greater than the sample median. Otherwise, I deem that they are less likely to be powerful. The dummy variable *Powerful CEO* indicates whether the CEO has decision-making power over the board of directors. The t-test of the difference in the mean of power score between specialist and generalist CEOs shows significant results, suggesting that, on average, specialist CEOs are more powerful than generalist counterparts.

Table 4.9 presents the results of the Cox proportional hazard model controlling for CEO power. In Specification (1), I include an interaction term between *Specialist CEO* and *Powerful CEO* to the baseline Cox model (Equation 4.3). I still find the significant and negative coefficient of *Specialist CEO*, indicating that specialist CEOs are associated with a lower probability of failure and longer time to survive. The coefficient on the interaction term is not significant. Thus, the influence of specialist CEOs on IPO survival does not differ depending on the magnitude of CEO power. Controlling for the effect of CEO power, the failure risk of IPO firms with specialist CEOs is 22.1% that of firms with generalist CEOs. Moreover, I partition my sample based on the degree of CEO power to investigate whether the impact of CEOs' specialist experience on IPO survival varies across firms with CEOs of different power levels. Re-estimating the Cox proportional hazard model (Equation 4.3) on the two sub-samples of IPO firms with and without powerful CEOs provides us with similar results to the main finding. Specialist CEOs significantly reduce the probability of failure and increase the time to survive. Among IPO firms whose CEOs have more decision making power, those with specialist

CEOs have the failure risk of 34.8% the failure risk of those with generalist CEOs. This figure is only 7.3% among firms whose CEOs do not have much power over the board.

4.6.3. Controlling for endogeneity

First of all, I check if the influence of specialist CEOs on IPO survival is driven by CEO characteristics other than their past work experience. Thus, in addition to the control variables in the main hazard analysis, I include additional variables controlling for several observable executive characteristics based on prior literature. Previous empirical evidence suggests that strategic decision making may be influenced by CEO age, tenure, and education (Boeker 1997; Fondas and Wiersema 1997). Age and tenure may also determine the risk attitudes of CEOs. As CEOs become older, their corporate risk-taking behaviours decrease, which, in turn, significantly influences firm performance (Serfling 2014). Moreover, CEOs who have worked for the firm for a longer time have lower incentives to establish a reputation and hence tend to be more risk-averse (Graham 2013). There is also evidence for the association between ownership and compensation and strategic decision-making (for example, Sanders and Hambrick (2007), Goodstein and Boeker (1991); Sanders and Hambrick (2007)). Additionally, prior literature suggests the link between outsider CEOs and firm performance (Huson et al. 2001; Parrino 1997). Thus, I control for those CEO characteristics and include the following variables in the baseline Cox proportional hazard model (Equation 4.3): *CEO age, CEO tenure, Internal hire, CEO ownership, Log(total compensation), MBA, Ph.D., Ivy League alumnus.* The results demonstrate that specialist CEOs still significantly reduce failure risks after controlling for the impact of observable characteristics of CEOs.

Moreover, it should be noted that a CEO may be selected due to the fit of the individual with the job requirements. A firm with particular characteristics may prefer to appoint a CEO with managerial characteristics that suit the firm's organisational context. Thus, my results may be biased due to this selection problem. To address the endogenous matching between CEOs and firms, I employ the propensity score matching procedure. Using this method, I compare the occurrence of delisting within five years after the offering of an IPO firm with a specialist CEO with that of the same firm if it had appointed a generalist CEO. Initially, I measure the propensity score, which is the conditional probability of receiving the treatment (having a specialist CEO) given the firm's pre-treatment characteristics, for all of the IPO firms by estimating a probit regression for the probability of firms appointing a specialist CEO based on various observable CEO, firm,

and industry characteristics. Based on the propensity score, I match each observation in the treated group with the control group and estimate the average effect of the treatment on the treated (ATET) to evaluate the effect of specialist CEOs on the occurrence of delisting. Table 4.11 presents the results for the ATET on the occurrence of delisting for IPO firms with specialist CEOs and those with generalist CEOs. The matching variables include *Log(firm age), Log(sales), Top-tier underwriter, ROA, R&D, Advertising, Capital expenditure, Diversification, CEO-Founder, CEO-Chairman, High-tech industry, and Year dummies*. The ATET is negative and strongly significant at the 1% level, indicating that IPO firms with specialist CEOs are less likely to be delisted in subsequent periods. This finding is consistent with the results presented in the main analysis.

4.6.4. Other robustness checks

In the main analysis, I define failed firms as those that are delisted due to negative reasons. For robustness, I check if my results are sensitive to the inclusion of acquired firms in the failure category by re-estimating the Cox model (Equation 4.3) in which failed firms include IPO firms that are delisted from the stock exchanges due to both negative reasons and acquisitions. I include acquired firms in the category of failed firms because earlier studies suggest that these firms appear to experience financial distress (Jain and Kini 2000; Welbourne and Andrews 1996). In addition, I also check the robustness of the results on the sample of IPO firms that do not have CEO turnovers within five years after the offering. The results are reported in Table 4.12 and consistent with the earlier findings that the management of specialist CEOs improves the survival profiles of IPO issuers.

4.7. Conclusion

In this study, I examine whether past work experience of CEOs is associated with the probability of IPO failure and survivability in post-issue periods. Analysing detailed biographical information of CEOs, I generate a general ability index as the first factor of applying the principal component analysis to five proxies of managerial general ability including the number of positions which the CEO has held, the number of firms by which the CEO has been employed, the number of industry sectors in which the CEO has worked, whether the CEO has experience as a CEO in other firms, and whether the CEO used to work in a conglomerate firm. Based on the general ability index, I categorise IPO

firms' CEOs into specialist CEOs and generalist CEOs. Consistent with the prediction of upper echelons theory that past managerial experience can influence corporate outcomes, I find that CEOs who have specialist managerial skills tend to contribute positively to the survival profiles of IPO issuers. I show that IPO firms with specialist CEOs have a lower probability of failure and survive for a longer time than firms with generalist CEOs. The influence of CEOs' specialist experience on IPO survival remains strong after controlling for the effects of high-tech industries, crisis periods, CEO power, the inclusion of acquired firms in the failed firm category, and the exclusion of IPO firms which have CEO turnovers within five years after the offering. I also mitigate the concern that my results are biased by the endogeneity of CEO selection by applying the propensity score matching approach.

Overall, the findings suggest that specialist experience of CEOs is an important dimension of CEO characteristics and can exert a positive influence on the survivability of IPO firms. From this perspective, my study not only contributes to the finance literature that explores the effect of managerial characteristics on corporate outcomes but also extends the upper echelon theory by establishing how organisational outcomes are linked with career backgrounds of CEOs. My focus on this paper is to investigate which type of managerial experience, i.e. generalist managerial skills or specialist managerial skills, improves the survivability of IPO firms. To better understand how specialist CEOs can affect IPO survival, it is plausible for future research to further examine channels through which specialist CEOs can influence their firms' survival profiles. In my analysis, I suggest that financial leverage is one of the possible channels. The level of financial leverage is significantly higher among IPOs with generalist CEOs than firms with specialist CEOs, and financial leverage is associated with an increased probability of failure and shorter time to survive. Therefore, it is very likely that generalist CEOs with their greater risk attitudes and better ability to raise external funds will tend to exceedingly use financial leverage, which leads to lower future survivability. In addition, in my research, I specify specialist CEOs and generalist CEOs based mainly on their external job mobility, future researchers may also want to refine the measure of prior managerial experience, for example, to include as well internal experience, functional experience, or qualitative data based on in-depth interviews or surveys to produce more detailed analyses of prior experience of CEOs. Last but not least, although my emphasis has been on CEOs, there may be an opportunity to explore the implications of prior work experience for top management team members as a whole.

Table 4. 1 Variable definition

Panel A: CEO characteristics	
Variable	**Definition**
CEO age	Age of CEO in years (*BoardEx*).
CEO gender	Dummy variable that equals to one if CEO is female, and zero otherwise (*BoardEx*).
CEO tenure	Number of years working as CEO in the firm until the IPO (*BoardEx*).
CEO-Chairman	Dummy variable that equals to one if CEO is also chairman of the board, and zero otherwise (*BoardEx*).
CEO-Founder	Dummy variable that equals to one if CEO is also founder of the firm, and zero otherwise (*BoardEx*).
CEO ownership	Percentage of shares owned by CEO in the issue year (*SEC's EDGAR*).
MBA	Dummy variable that equals to one if CEO has an MBA degree, and zero otherwise (*BoardEx*).
PhD	Dummy variable that equals to one if CEO has a PhD degree, and zero otherwise (*BoardEx*).
Ivy League alumnus	Dummy variable that equals to one if CEO is an alumnus of an Ivy League institution, and zero otherwise (*BoardEx*).
Internal hire	Dummy variable that equals to one if CEO is hired internally, and zero otherwise (*BoardEx*).
Cash compensation	Salary and bonus (in thousands of dollars) of CEO in the issue year (*SEC's EDGAR*).
Equity compensation	Equity incentives and value of options granted (in thousands of dollars) of CEO in the issue year (*SEC's EDGAR*).
Total compensation	Total compensation of CEO which consists of salary, bonus, equity incentives, non-equity incentives, options, and other compensation in the issue year (*SEC's EDGAR*).
General ability index	First factor of applying principal component analysis to five proxies of general managerial ability: *Number of roles*, *Number of firms*, *Number of industries*, *CEO experience dummy*, *Conglomerate experience dummy*.
Specialist CEO	Dummy variable that equals to one if CEO is a specialist, and zero otherwise. CEO is classified as a specialist if CEO's general ability index is below the median of the IPO sample.
Number of roles	Number of roles in which CEO has worked before becoming CEO in the IPO firm (*BoardEx*).
Number of firms	Number of firms for which CEO has worked before becoming CEO in the IPO firm (*BoardEx*).
Number of industries	Number of industries (based on four-digit SIC codes) in which CEO has worked before becoming CEO in the IPO firm (*BoardEx*).
CEO experience dummy	Dummy variable that equals to one if CEO worked as a CEO in another firm before becoming CEO in the IPO firm, and zero otherwise (*BoardEx*).
Conglomerate experience dummy	Dummy variable that equals to one if CEO worked in a multi-segment firm before becoming CEO in the IPO firm, and zero otherwise (*BoardEx*).

Powerful CEO	Dummy variable that equals to one if CEO is powerful, and zero otherwise. CEO is classified as being powerful if CEO's power index is above the median of the IPO sample. CEO power index is the first factor of applying principal components analysis on five proxies of CEO power: *CEO-Chairman, CEO-Founder, CEO ownership, CEO tenure,* and *Ivy League alumnus.*

Panel B: Firm and offering characteristics

Variable	**Definition**
Firm age	Firm age in years measured as the difference between the firm's IPO year and its founding year. Company founding years are collected from the Field-Ritter dataset.[18]
Sales	Total sales in the issue year (*Compustat* SALE)
Profitability	Ratio of EBITDA to total assets in the issue year (*Compustat* EBITDA/AT).
Leverage	Ratio of total debt to total assets in the issue year (*Compustat* (DLC + DLTT)/AT).
R&D	Ratio of research and development expenses to book value of total assets in the issue year (*Compustat* XRD/AT).
Advertising	Ratio of advertising expenses to total assets in the issue year (*Compustat* XAD/AT).
Capital expenditure	Ratio of capital expenditure to total assets in the issue year (*Compustat* CAPX/AT).
Diversification	Number of business segments in which the IPO firm operates (*Compustat*).
Proceeds	Total proceeds of the IPO (*SDC*).
Big4 auditor	Dummy variable that equals to one if the firm is audited by a big four audit firm, and zero otherwise. Big four audit firms include Ernst & Young, Deloitte & Touche, KPMG, and PricewaterhouseCoopers (*Compustat* AU).
Venture capitalist	Dummy variable that equals to one if the IPO firm is venture backed, and zero otherwise (*SDC*).
Top-tier investment bank	Dummy variable that equals to one if the IPO firm is underwritten by most reputable underwriters, zero otherwise (*SDC*). Most reputable underwriters are those with a ranking score of 9.0 or above based on Jay Ritter's underwriter rankings.[19]
Market-to-book	Market-to-book ratio in the issue year (*Compustat* (PRCC_F*CSHO)/ (AT-LT)).
High-tech industry	Dummy variable that equals to one if the IPO firm is in an industry with a SIC code of 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3577, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812 4813 (telephone equipment), 4899 (communications services), 7371 – 7375, 7378, or 7379 (software), and zero otherwise (*SDC*).
Initial returns	Stock returns on the first day of trading (*CRSP*).
Delist	Dummy variable that equals to one if the IPO firm is delisted within 5 years after the offering, and zero otherwise (*CRSP*).

[18] The Field-Ritter dataset is available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/FoundingDates.htm.
[19] IPO underwriter reputation rankings are available on Jay Ritter's webpage: http://bear.warrington.ufl.edu/ritter/ipodata.htm.

Survived firms	Firms that are still trading. Their CRSP delist code is 100 (*CRSP*).
Acquired firms	Firms that are acquired in mergers. Their CRSP delist code is from 200 to 299 (*CRSP*).
Failed firms	Firms that are delisted due to negative reasons. Their CRSP delist code is greater than or equal to 300 (*CRSP*).

Table 4. 2 Distribution by issue year and industry of three IPO groups – Failed, Acquired, and Survived

The table presents the distribution of three groups of IPOs categorised based on CRSP delist codes: Failed, Acquired, and Survived. Survived firms are those that are still trading (delist code of 100). Acquired firms are those that are delisted due to acquisitions (delist code from 200 to 299). Failed firms are those that are delisted for negative reasons (delist code greater than or equal to 300). *N* denotes the number of observations.

Panel A: Distribution of IPOs from 1999-2009

	From IPO date to December 2014		From IPO date to five years after IPO	
	N	*%*	*N*	*%*
Failed	83	11.50	54	7.48
Acquired	342	47.37	206	28.53
Survived	297	41.13	462	63.99
Total	722	100.00	722	100.00

Panel B: Distribution by issue year of three groups of IPOs – Failed, Acquired, and Survived

Year	All IPOs	Failed		Acquired		Survived	
	N	*N*	*%*	*N*	*%*	*N*	*%*
1999	107	16	14.95	41	38.32	50	46.73
2000	125	7	5.60	30	24.00	88	70.40
2001	30	2	6.67	9	30.00	19	63.33
2002	30	2	6.67	10	33.33	18	60.00
2003	39	4	10.26	14	35.90	21	53.85
2004	95	3	3.16	30	31.58	62	65.26
2005	71	3	4.23	16	22.54	52	73.24
2006	83	7	8.43	19	22.89	57	68.67
2007	98	7	7.14	27	27.55	64	65.31
2008	14	2	14.29	2	14.29	10	71.43
2009	30	1	3.33	8	26.67	21	70.00
Total	722	54		206		462	

Note: Delisting is tracked for five years after the IPO.

Panel C: Distribution by industry of three groups of IPOs – Failed, Acquired, and Survived

Industry (two-digit SIC codes)	All IPOs	Failed		Acquired		Survived	
	N	*N*	*%*	*N*	*%*	*N*	*%*
Oil and gas (13)	22	1	4.55	2	9.09	19	86.36
Food products (20)	5	1	20.00	1	20.00	3	60.00
Chemical products (28)	107	9	8.41	32	29.91	66	61.68
Manufacturing (30 - 34)	17	4	23.53	3	17.65	10	58.82
Computer equipment & services (35, 73)	229	18	7.86	85	37.12	126	55.02
Electronic equipment (36)	70	3	4.29	23	32.86	44	62.86
Scientific instruments (38)	60	5	8.33	19	31.67	36	60.00
Transportation & public utilities (41, 42, 44 - 49)	56	4	7.14	10	17.86	42	75.00
Wholesale & retail trade (50 - 59)	54	3	5.56	12	22.22	39	72.22
Entertainment services (70, 78, 79)	13	1	7.69	0	0.00	12	92.31
Health services (80)	19	1	5.26	5	26.32	13	68.42
All others (01, 12, 15, 17, 22-27, 29, 37, 39, 72, 75, 82, 87, 96)	70	4	5.71	14	20.00	52	74.29
Total	722	54		206		462	

Note: Delisting is tracked for five years after the IPO.

Table 4. 3 Survival distribution of IPO firms with specialist and those with generalist CEOs by year of issue and industry

The table presents the comparison of the distribution and cumulative failure rates by issue year and industry between two groups of IPO firms: those with specialist CEOs, and those with generalist CEOs. The cumulative failure rates are examined for five years after the IPO. *N* denotes the number of observations.

Panel A: Survival distribution of IPO firms with specialist and generalist CEOs by year of issue

Year	CEO work experience	IPO sample		Cumulative number and percentage of firms that failed after the IPO									
				Within 1 year		Within 2 years		Within 3 years		Within 4 years		Within 5 years	
		N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
1999	Specialist	52	48.60	0	0.00	3	5.77	4	7.69	5	9.62	6	11.54
	Generalist	55	51.40	0	0.00	3	5.45	8	14.55	9	16.36	10	18.18
2000	Specialist	46	36.80	0	0.00	1	2.17	2	4.35	2	4.35	2	4.35
	Generalist	79	63.20	0	0.00	3	3.80	3	3.80	5	6.33	5	6.33
2001	Specialist	8	26.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	22	73.33	0	0.00	0	0.00	1	4.55	1	4.55	2	9.09
2002	Specialist	7	23.33	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	23	76.67	0	0.00	0	0.00	1	4.35	1	4.35	2	8.70
2003	Specialist	22	56.41	0	0.00	2	9.09	2	9.09	2	9.09	2	9.09
	Generalist	17	43.59	1	5.88	1	5.88	1	5.88	1	5.88	2	11.76
2004	Specialist	58	61.05	0	0.00	2	3.45	2	3.45	2	3.45	2	3.45
	Generalist	37	38.95	0	0.00	0	0.00	0	0.00	0	0.00	1	2.70
2005	Specialist	37	52.11	0	0.00	1	2.70	1	2.70	1	2.70	2	5.41
	Generalist	34	47.89	0	0.00	0	0.00	0	0.00	1	2.94	1	2.94
2006	Specialist	53	63.86	0	0.00	1	1.89	2	3.77	4	7.55	4	7.55
	Generalist	30	36.14	0	0.00	2	6.67	3	10.00	3	10.00	3	10.00
2007	Specialist	56	57.14	0	0.00	0	0.00	0	0.00	1	1.79	1	1.79
	Generalist	42	42.86	0	0.00	2	4.76	3	7.14	6	14.29	6	14.29
2008	Specialist	8	57.14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	6	42.86	0	0.00	2	33.33	2	33.33	2	33.33	2	33.33
2009	Specialist	13	43.33	0	0.00	0	0.00	0	0.00	1	7.69	1	7.69
	Generalist	17	56.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1999-2009	Specialist	360	49.79	0	0.00	10	2.78	13	3.61	18	5.00	20	5.56
	Generalist	362	50.21	1	0.28	13	3.58	22	6.06	29	7.99	34	9.37

Panel B: Survival distribution of IPO firms with specialist and generalist CEOs by industry

Industry (two-digit SIC codes)	CEO work experience	IPO sample		Cumulative number and percentage of firms that failed after the IPO									
				Within 1 year		Within 2 years		Within 3 years		Within 4 years		Within 5 years	
		N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Oil and gas (13)	Specialist	8	36.36	0	0.00	0	0.00	0	0.00	1	12.50	1	12.50
	Generalist	14	63.64	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Food products (20)	Specialist	1	20.00	0	0.00	1	100.00	1	100.00	1	100.00	1	100.00
	Generalist	4	80.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Chemical products (28)	Specialist	61	57.01	0	0.00	0	0.00	0	0.00	1	1.64	1	1.64
	Generalist	46	42.99	1	2.17	1	2.17	2	4.35	6	13.04	8	17.39
Manufacturing (30-34)	Specialist	10	58.82	0	0.00	2	20.00	3	30.00	3	30.00	3	30.00
	Generalist	7	41.18	0	0.00	0	0.00	1	14.29	1	14.29	1	14.29
Computer equipment & services (35, 73)	Specialist	115	50.22	0	0.00	5	4.35	6	5.22	7	6.09	9	7.83
	Generalist	114	49.78	0	0.00	1	0.88	6	5.26	8	7.02	9	7.89
Electronic equipment (36)	Specialist	37	52.86	0	0.00	0	0.00	0	0.00	1	2.70	1	2.70
	Generalist	33	47.14	0	0.00	1	3.03	1	3.03	2	6.06	2	6.06
Scientific instruments (38)	Specialist	27	45.00	0	0.00	1	3.70	1	3.70	2	7.41	2	7.41
	Generalist	33	55.00	0	0.00	1	3.03	2	6.06	2	6.06	3	9.09
Transportation & public utilities (41, 42, 44-49)	Specialist	23	41.07	0	0.00	0	0.00	1	4.35	1	4.35	1	4.35
	Generalist	33	58.93	0	0.00	2	6.06	3	9.09	3	9.09	3	9.09
Wholesale & retail trade (50-59)	Specialist	29	53.70	0	0.00	1	3.45	1	3.45	1	3.45	1	3.45
	Generalist	25	46.30	0	0.00	1	4.00	1	4.00	1	4.00	2	8.00
Entertainment services (70, 78, 79)	Specialist	6	46.15	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	7	53.85	0	0.00	1	14.29	1	14.29	1	14.29	1	14.29
Health services (80)	Specialist	8	42.11	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	11	57.89	0	0.00	1	9.09	1	9.09	1	9.09	1	9.09
All others (01, 12, 15, 17, 22-27, 29, 37, 39, 72, 75, 82, 87, 96)	Specialist	35	49.30	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	35	50.70	0	0.00	4	11.43	4	11.43	4	11.43	4	11.43

Table 4. 4 Descriptive statistics

The table presents descriptive statistics of the sample of US IPOs over the period from 1999 to 2009. CEO work experience, CEO characteristics, firm and offering characteristics are illustrated in Panel A, Panel B, and Panel C, respectively. All variables are defined in Table 4.1. Tests of difference in means between two samples of IPO firms with specialist and generalist CEOs are based on t-tests. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. *N* denotes the number of observations.

Panel A: CEO work experience

	All IPOs						IPOs with specialist CEOs	IPOs with generalist CEOs
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean
General ability index	722	-0.00	-1.13	-0.28	0.84	1.51	-1.15	1.15
Number of roles	722	5.07	3.00	5.00	7.00	2.82	3.46	6.66
Number of firms	722	5.13	3.00	4.00	6.00	3.31	3.10	7.13
Number of industries	722	1.47	1.00	1.00	2.00	0.93	1.00	1.94
CEO experience dummy	722	0.52	0.00	1.00	1.00	0.50	0.33	0.70
Conglomerate dummy	722	0.37	0.00	0.00	1.00	0.48	0.13	0.61

Panel B: CEO characteristics

	All IPOs						IPOs with specialist CEOs	IPOs with generalist CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean	*p-value*
CEO age	722	49.18	43.00	49.00	55.00	8.07	47.96	50.57	0.000
CEO gender	722	0.03	0.00	0.00	0.00	0.18	0.03	0.04	0.228
CEO tenure	722	4.40	1.00	3.00	6.00	4.42	4.96	3.83	0.002
Internal hire	722	0.27	0.00	0.00	1.00	0.44	0.29	0.24	0.040
CEO-Chairman	722	0.37	0.00	0.00	1.00	0.48	0.39	0.34	0.070
CEO-Founder	722	0.27	0.00	0.00	1.00	0.45	0.35	0.20	0.000
CEO ownership	722	12.63	2.10	4.30	13.88	18.66	13.76	11.48	0.055
Cash compensation	722	658.11	292.16	409.76	641.15	1494.21	603.80	713.37	0.168
Equity compensation	722	690.08	0.00	149.83	605.38	1938.34	553.47	829.49	0.031
Total compensation	722	1666.07	444.42	805.94	1561.21	3071.64	1468.40	1866.62	0.044
MBA	722	0.26	0.00	0.00	1.00	0.44	0.23	0.30	0.013
PhD	722	0.10	0.00	0.00	0.00	0.31	0.13	0.08	0.031
Ivy League alumnus	722	0.17	0.00	0.00	0.00	0.38	0.14	0.21	0.006

Panel C: Firm and offering characteristics

	All IPOs						IPOs with specialist CEOs	IPOs with generalist CEOs	Difference
	N	Mean	*p25*	*p50*	*p75*	*sd*	Mean	Mean	*p-value*
Firm age	722	17.33	5.00	9.00	18.00	23.67	16.02	18.62	0.070
Sales	722	401.63	25.19	82.80	288.15	1168.94	276.70	525.86	0.002
Profitability	722	-0.03	-0.16	0.06	0.14	0.40	-0.01	-0.05	0.024
Leverage	722	0.14	0.00	0.01	0.22	0.23	0.13	0.16	0.024
R&D	722	0.10	0.00	0.04	0.13	0.18	0.10	0.09	0.349
Advertising	722	0.02	0.00	0.00	0.01	0.07	0.02	0.02	0.457
Capital expenditure	722	0.06	0.02	0.03	0.07	0.08	0.06	0.06	0.268
Diversification	722	1.38	1.00	1.00	1.00	0.96	1.24	1.52	0.000
Proceeds	722	144.68	50.00	80.50	140.00	203.36	118.92	170.30	0.000
Initial returns	722	0.28	0.00	0.11	0.31	0.52	0.24	0.32	0.034
Top-tier underwriter	722	0.51	0.00	1.00	1.00	0.50	0.49	0.54	0.064
Venture capitalist	722	0.57	0.00	1.00	1.00	0.50	0.58	0.56	0.233
Big4 auditor	722	0.92	1.00	1.00	1.00	0.28	0.91	0.93	0.133
Market-to-book	722	4.12	1.13	2.27	4.20	7.33	4.09	4.14	0.463
High-tech industry	722	0.45	0.00	0.00	1.00	0.50	0.45	0.45	0.473
Delist	722	0.07	0.00	0.00	0.00	0.26	0.06	0.09	0.025

Table 4. 5 Correlation matrix

	Specialist CEO	Log(firm age)	Log(sales)	Top-tier underwriter	Big4 auditor	Venture capitalist	Profitability	Leverage	Market-to-book	R&D	Advertising	Capital expenditure	Diversification	Log(proceeds)	Initial returns	CEO-Chairman	CEO-Founder
Specialist CEO	1.000																
Log(firm age)	0.024	1.000															
Log(sales)	-0.044	0.558	1.000														
Top-tier underwriter	-0.057	0.067	0.209	1.000													
Big4 auditor	-0.041	-0.013	0.034	0.179	1.000												
Venture capitalist	0.027	-0.479	-0.491	0.000	0.174	1.000											
Profitability	0.074	0.433	0.684	0.097	0.019	-0.392	1.000										
Leverage	-0.074	0.358	0.407	0.187	0.013	-0.369	0.237	1.000									
Market-to-book	-0.004	-0.240	-0.218	-0.012	0.002	0.174	-0.159	-0.210	1.000								
R&D	0.015	-0.199	-0.456	-0.090	-0.012	0.309	-0.540	-0.148	0.085	1.000							
Advertising	-0.004	-0.072	0.035	-0.001	0.031	0.020	-0.174	-0.045	-0.020	-0.037	1.000						
Capital expenditure	-0.023	0.020	0.145	0.052	-0.016	-0.126	0.027	0.200	-0.068	-0.124	0.125	1.000					
Diversification	-0.146	0.326	0.365	0.087	-0.027	-0.308	0.180	0.284	-0.115	-0.163	-0.061	0.079	1.000				
Log(proceeds)	-0.141	0.321	0.630	0.327	0.107	-0.317	0.411	0.434	-0.129	-0.309	-0.035	0.112	0.305	1.000			
Initial returns	-0.060	-0.264	-0.088	0.035	0.055	0.182	-0.081	-0.153	0.504	-0.042	0.007	-0.027	-0.091	-0.006	1.000		
CEO-Chairman	0.055	0.018	0.080	-0.022	-0.074	-0.032	0.108	0.059	-0.006	-0.103	-0.046	0.004	0.040	0.053	0.001	1.000	
CEO-Founder	0.173	-0.224	-0.170	-0.021	0.004	0.218	-0.094	-0.159	0.091	0.104	-0.029	-0.035	-0.131	-0.209	0.093	0.207	1.000

Figure 4. 1 Nelson-Aalen cumulative hazard estimates

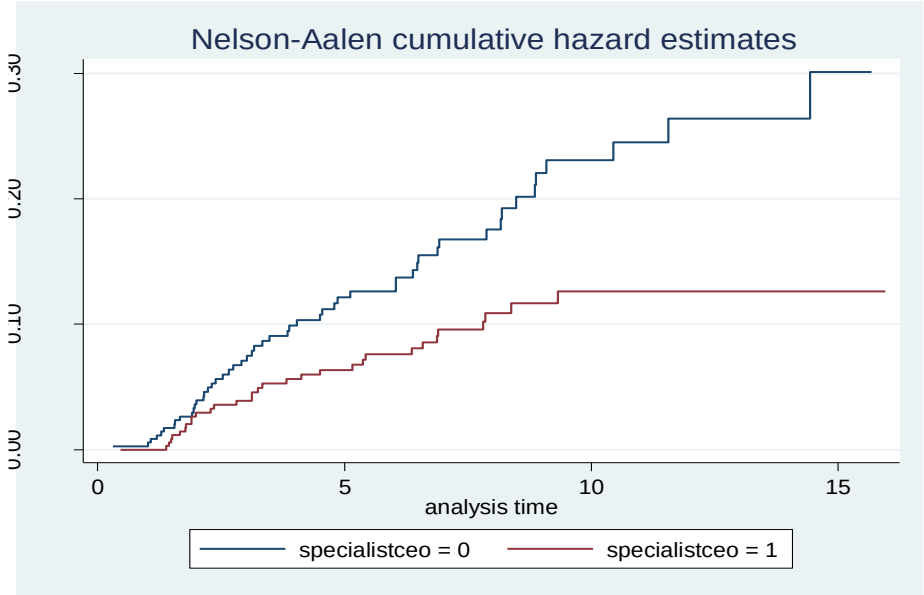
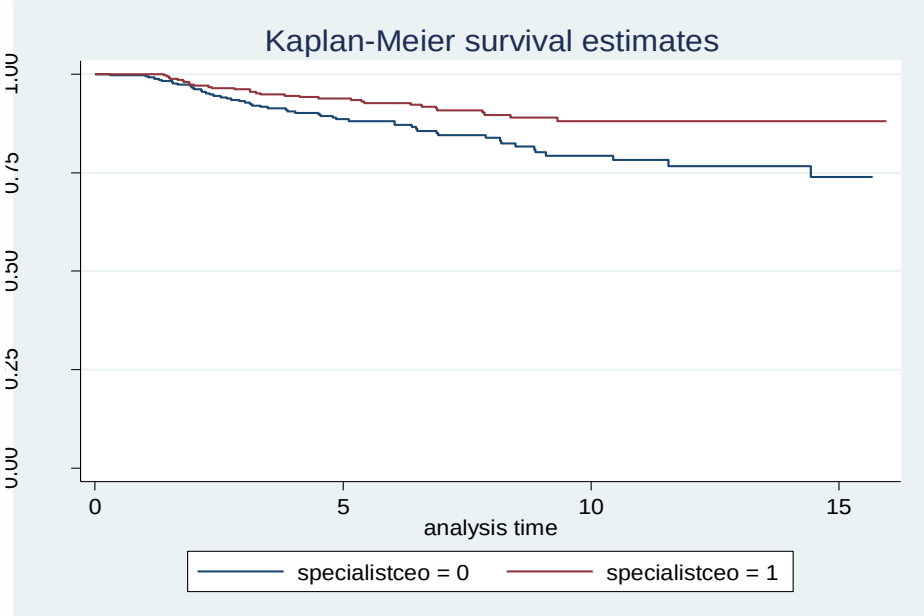


Figure 4. 2 Kaplan-Meier survival estimates



Log-rank test for equality of survival functions

Chi-square = 8.02

Chi-square test probability = 0.005

List of survival functions

Time after IPO	IPOs with generalist CEOs		IPOs with specialist CEOs	
	Number of IPOs	Survivor function	Number of IPOs	Survivor function
1 year	354	0.997	358	1.000
2 year	306	0.961	328	0.971
3 year	264	0.931	301	0.962
4 year	237	0.906	278	0.945
5 year	214	0.886	248	0.938
6 year	179	0.876	220	0.927
7 year	156	0.845	194	0.909
8 year	125	0.839	143	0.897
9 year	101	0.802	112	0.890
10 year	78	0.793	86	0.881
11 year	60	0.782	56	0.881
12 year	51	0.767	43	0.881
13 year	42	0.767	37	0.881
14 year	32	0.767	31	0.881
15 year	12	0.739	13	0.881

Table 4. 6 Estimation of Cox proportional hazard model of probability of failure and time-to failure

The table illustrates the estimation of the Cox proportional hazard model of probability of failure and time-to failure for the sample of US IPOs over the period 1999-2009. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Table 4.1. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. The test statistics are shown in parentheses below coefficient estimates.

	(1)		(2)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-1.048***	0.351		
	(-3.89)			
General ability index			0.366***	1.443
			(4.26)	
Log(firm age)	-0.593	0.553	-0.494	0.610
	(-1.27)		(-1.06)	
Log(sales)	-0.688**	0.503	-0.690**	0.501
	(-2.28)		(-2.32)	
Top-tier underwriter	-0.487*	0.615	-0.509*	0.601
	(-1.68)		(-1.75)	
Big4 auditor	-0.417	0.659	-0.328	0.720
	(-0.88)		(-0.70)	
Venture capitalist	0.007	1.007	-0.014	0.986
	(0.02)		(-0.04)	
Profitability	-2.119***	0.120	-2.267***	0.104
	(-3.51)		(-3.84)	
Leverage	2.569***	13.058	2.655***	14.231
	(3.93)		(4.17)	
Market-to-book	-0.106***	0.899	-0.107***	0.899
	(-2.81)		(-2.85)	
R&D	-0.403	0.668	-0.464	0.629
	(-0.61)		(-0.71)	
Advertising	2.497*	12.143	2.166*	8.723
	(1.95)		(1.72)	
Capital expenditure	-0.434	0.648	-0.144	0.866
	(-0.30)		(-0.10)	
Diversification	-0.192	0.826	-0.256	0.774
	(-1.05)		(-1.38)	
Log(proceeds)	-1.013*	0.363	-1.030**	0.357
	(-1.92)		(-1.97)	
Initial returns	0.430*	1.537	0.496**	1.641
	(1.91)		(2.29)	
CEO-Chairman	-0.455	0.635	-0.492*	0.612
	(-1.58)		(-1.70)	
CEO-Founder	-0.225	0.798	-0.104	0.901
	(-0.73)		(-0.34)	
Chi-square	203.78		204.88	
Chi-square test probability	0.000		0.000	
Number of observations	722		722	

	(3)		(4)		(5)		(6)		(7)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Number of roles	0.197***	1.217								
	(3.96)									
Number of firms			0.146***	1.157						
			(4.31)							
Number of industries					0.273*	1.314				
					(1.80)					
CEO experience dummy							0.540**	1.717		
							(2.07)			
Conglomerate experience									0.491*	1.634
									(1.74)	
Log(firm age)	-0.529	0.589	-0.490	0.613	-0.453	0.636	-0.518	0.596	-0.433	0.648
	(-1.11)		(-1.06)		(-0.96)		(-1.07)		(-0.92)	
Log(sales)	-0.731**	0.482	-0.718**	0.488	-0.663**	0.515	-0.612**	0.542	-0.689**	0.502
	(-2.43)		(-2.36)		(-2.23)		(-2.02)		(-2.28)	
Top-tier underwriter	-0.494*	0.610	-0.415	0.661	-0.494*	0.610	-0.397	0.673	-0.486*	0.615
	(-1.71)		(-1.42)		(-1.70)		(-1.35)		(-1.68)	
Big4 auditor	-0.293	0.746	-0.256	0.774	-0.398	0.672	-0.348	0.706	-0.434	0.648
	(-0.62)		(-0.55)		(-0.85)		(-0.72)		(-0.91)	
Venture capitalist	-0.095	0.909	-0.011	0.989	-0.012	0.988	0.048	1.049	0.007	1.007
	(-0.29)		(-0.03)		(-0.04)		(0.14)		(0.02)	
Profitability	-2.395***	0.091	-2.231***	0.107	-2.109***	0.121	-2.199***	0.111	-2.273***	0.103
	(-4.07)		(-3.74)		(-3.53)		(-3.65)		(-3.79)	
Leverage	2.347***	10.456	2.566***	13.018	2.534***	12.609	2.479***	11.923	2.556***	12.880
	(3.72)		(4.20)		(4.10)		(4.00)		(4.03)	

Market-to-book	-0.130***	0.878	-0.107***	0.899	-0.103***	0.902	-0.100***	0.905	-0.110***	0.896
	(-3.26)		(-2.84)		(-2.75)		(-2.62)		(-2.94)	
R&D	-0.474	0.622	-0.306	0.737	-0.258	0.773	-0.393	0.675	-0.348	0.706
	(-0.72)		(-0.46)		(-0.40)		(-0.59)		(-0.53)	
Advertising	1.793	6.007	2.187*	8.905	2.314*	10.114	2.400**	11.025	2.171*	8.765
	(1.46)		(1.85)		(1.90)		(1.96)		(1.79)	
Capital expenditure	-0.453	0.636	0.134	1.144	-0.401	0.669	-0.840	0.432	-0.454	0.635
	(-0.31)		(0.09)		(-0.27)		(-0.55)		(-0.31)	
Diversification	-0.195	0.823	-0.200	0.819	-0.131	0.877	-0.163	0.850	-0.206	0.814
	(-1.09)		(-1.11)		(-0.75)		(-0.91)		(-1.12)	
Log(proceeds)	-1.035**	0.355	-0.967*	0.380	-0.821	0.440	-0.779	0.459	-0.799	0.450
	(-1.96)		(-1.88)		(-1.58)		(-1.48)		(-1.53)	
Initial returns	0.524**	1.689	0.462**	1.587	0.457**	1.579	0.432*	1.540	0.452**	1.572
	(2.50)		(2.08)		(2.17)		(1.95)		(2.13)	
CEO-Chairman	-0.434	0.648	-0.426	0.653	-0.350	0.705	-0.452	0.637	-0.387	0.679
	(-1.50)		(-1.48)		(-1.24)		(-1.54)		(-1.35)	
CEO-Founder	-0.037	0.963	-0.205	0.814	-0.245	0.783	-0.218	0.804	-0.207	0.813
	(-0.12)		(-0.67)		(-0.81)		(-0.71)		(-0.68)	
Chi-square	203.29		203.54		190.89		192.23		190.83	
Chi-square test probability	0.000		0.000		0.000		0.000		0.000	
Number of observations	722		722		722		722		722	

Table 4. 7 Estimation of Cox proportional hazard model of probability of failure and time-to failure

The table illustrates the estimation of the Cox proportional hazard model of probability of failure and time-to failure controlling for high-tech industries for the sample of US IPOs over the period 1999-2009. Specification (1) includes a dummy variable *High-tech industry* and an interaction term between *Specialist CEO* and *High-tech industry*. Specification (2) is conducted on the sub-sample of IPO firms in high-tech industries. Specification (3) is conducted on the sub-sample of IPO firms not in the high-tech industries. All regressions include year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 4.1.

	Overall IPO sample (1)		IPOs in high-tech industries (2)		IPOs not in high-tech industries (3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.622**	0.537	-0.751*	0.472	-0.584*	0.558
	(-1.98)		(-1.69)		(-1.76)	
High-tech industry	0.282	1.325				
	(0.88)					
Specialist CEO * High-tech industry	-0.212	0.809				
	(-0.43)					
Log(firm age)	-0.601	0.548	-1.110	0.329	0.229	1.257
	(-1.48)		(-1.38)		(0.41)	
Log(sales)	-0.495**	0.610	-1.297***	0.273	-0.669**	0.512
	(-2.13)		(-2.94)		(-2.36)	
Top-tier underwriter	-0.336	0.715	-0.204	0.815	-0.452	0.636
	(-1.24)		(-0.47)		(-1.19)	
Big4 auditor	-0.232	0.793	1.119	3.063	-0.563	0.569
	(-0.54)		(0.91)		(-1.10)	
Venture capitalist	-0.369	0.691	-0.655	0.519	-0.671	0.511
	(-1.32)		(-1.37)		(-1.38)	
Profitability	-2.404***	0.090	-1.999**	0.135	-2.972***	0.051
	(-4.85)		(-2.35)		(-4.68)	
Leverage	2.356***	10.549	1.784*	5.953	2.151***	8.595
	(4.66)		(1.68)		(3.05)	
Market-to-book	-0.099***	0.906	-0.064	0.938	-0.309***	0.734
	(-2.76)		(-1.38)		(-3.54)	
R&D	-2.559**	0.077	-3.722	0.024	-0.333	0.717
	(-2.25)		(-1.59)		(-0.51)	
Advertising	2.472	11.851	8.491**	4871.218	1.320	3.744
	(1.56)		(2.18)		(1.01)	
Capital expenditure	0.354	1.425	-1.519	0.219	1.632	5.113
	(0.28)		(-0.52)		(1.12)	
Diversification	-0.161	0.852	-0.059	0.943	-0.226	0.798
	(-0.99)		(-0.18)		(-1.16)	
Log(proceeds)	-0.684*	0.505	-0.021	0.979	-0.901*	0.406
	(-1.66)		(-0.02)		(-1.69)	
Initial returns	0.355*	1.426	0.364	1.439	0.745**	2.107
	(1.82)		(1.17)		(2.19)	
CEO-Chairman	-0.426	0.653	-0.303	0.739	-0.321	0.725
	(-1.62)		(-0.72)		(-0.85)	
CEO-Founder	-0.164	0.849	0.287	1.332	-0.135	0.873
	(-0.59)		(0.61)		(-0.33)	
Chi-square	144.19		78.14		104.33	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		324		398	

Table 4. 8 Estimation of Cox proportional hazard model of probability of failure and time-to-failure

The table illustrates the estimation of the Cox proportional hazard model of probability of failure and time-to failure controlling for crisis periods for the sample of US IPOs over the period 1999-2009. Crisis periods include the collapse of the dotcom bubble in 2000-2001 and the financial crisis 2007-2008. Specification (1) includes a dummy variable *Crisis period* and an interaction term between *Specialist CEO* and *Crisis period*. Specification (2) is conducted on the sub-sample of IPO firms in the crisis periods. Specification (3) is conducted on the sub-sample of IPO firms not in the crisis periods. All models include industry dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 4.1.

	Overall IPO sample (1)		IPOs in crisis periods (2)		IPOs not in crisis periods (3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.699**	0.497	-2.450***	0.086	-0.985***	0.373
	(-2.18)		(-3.59)		(-2.76)	
Crisis period	-0.057	0.945				
	(-0.17)					
Specialist CEO * Crisis period	-0.768	0.464				
	(-1.35)					
Log(firm age)	-0.586	0.557	-1.795*	0.166	-0.024	0.976
	(-1.33)		(-1.84)		(-0.04)	
Log(sales)	-0.868***	0.420	-1.457**	0.233	-0.779**	0.459
	(-2.98)		(-2.08)		(-2.05)	
Top-tier underwriter	-0.507*	0.602	-1.796***	0.166	-0.094	0.910
	(-1.77)		(-2.67)		(-0.23)	
Big4 auditor	-0.564	0.569	2.749	15.620	-0.529	0.589
	(-1.30)		(1.47)		(-0.93)	
Venture capitalist	-0.132	0.877	-0.273	0.761	0.161	1.174
	(-0.41)		(-0.31)		(0.39)	
Profitability	-2.004***	0.135	-4.891***	0.008	-3.057***	0.047
	(-3.40)		(-2.93)		(-3.93)	
Leverage	2.654***	14.206	3.791*	44.319	2.841***	17.140
	(4.37)		(1.90)		(3.48)	
Market-to-book	-0.103***	0.902	-0.433***	0.649	-0.075*	0.928
	(-2.67)		(-2.70)		(-1.85)	
R&D	0.162	1.176	3.251	25.818	-5.781***	0.003
	(0.25)		(1.50)		(-2.85)	
Advertising	2.655**	14.219	3.923*	50.568	3.303	27.205
	(2.11)		(1.80)		(1.28)	
Capital expenditure	-0.646	0.524	-10.702***	0.000	1.076	2.934
	(-0.46)		(-2.61)		(0.56)	
Diversification	-0.187	0.829	1.212***	3.360	-0.557*	0.573
	(-1.07)		(2.63)		(-1.94)	
Log(proceeds)	-0.520	0.594	-2.129**	0.119	-0.489	0.613
	(-1.07)		(-2.04)		(-0.77)	
Initial returns	0.356	1.428	0.684	1.982	0.596*	1.814
	(1.59)		(1.55)		(1.86)	
CEO-Chairman	-0.496*	0.609	-1.873***	0.154	-0.501	0.606
	(-1.78)		(-2.60)		(-1.37)	
CEO-Founder	-0.161	0.852	0.866	2.378	-0.092	0.912
	(-0.54)		(1.31)		(-0.24)	
Chi-square	192.57		134.61		139.42	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		267		455	

Table 4. 9 Estimation of Cox proportional hazard model of probability of failure and time-to-failure

The table illustrates the estimation of the Cox proportional hazard model of probability of failure and time-to failure controlling for CEO power for the sample of US IPOs over the period 1999-2009. CEO power index is the first factor of applying principal component analysis on the five proxies for CEO power: *CEO-Chairman, CEO-Founder, CEO ownership, CEO tenure,* and *Ivy League alumnus*. Powerful CEOs are those whose power index is greater than the sample median. Specification (1) includes a dummy variable *Powerful CEO* and an interaction term between *Specialist CEO* and *Powerful CEO*. Specification (2) is conducted on the sub-sample of IPO firms with powerful CEOs. Specification (3) is conducted on the sub-sample of IPO firms without powerful CEOs. All models include industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 4.1.

	Overall IPO sample (1)		IPOs with powerful CEOs (2)		IPOs without powerful CEOs (3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-1.509***	0.221	-1.056*	0.348	-2.611***	0.073
	(-2.98)		(-1.89)		(-3.40)	
Powerful CEO	-0.409	0.664				
	(-0.92)					
Specialist CEO * Powerful CEO	0.444	1.560				
	(0.61)					
Log(firm age)	-0.735	0.480	0.038	1.039	-2.331*	0.097
	(-1.10)		(0.04)		(-1.81)	
Log(sales)	-1.049**	0.350	-2.441***	0.087	-1.716*	0.180
	(-2.51)		(-3.20)		(-1.77)	
Top-tier underwriter	-0.561	0.570	0.336	1.399	-0.057	0.944
	(-1.51)		(0.50)		(-0.07)	
Big4 auditor	-0.360	0.698	-1.725	0.178	1.278	3.590
	(-0.58)		(-1.55)		(0.96)	
Venture capitalist	-0.187	0.829	-0.859	0.423	-0.279	0.757
	(-0.45)		(-1.45)		(-0.29)	
Profitability	-2.677***	0.069	1.120	3.066	-5.102***	0.006
	(-3.21)		(0.87)		(-2.91)	
Leverage	3.937***	51.246	4.060**	57.961	0.280	1.324
	(3.67)		(2.01)		(0.12)	
Market-to-book	-0.133**	0.875	-0.094	0.910	-0.533***	0.587
	(-2.46)		(-1.59)		(-2.68)	
R&D	-3.977**	0.019	1.909	6.745	-3.396	0.033
	(-2.21)		(1.38)		(-1.48)	
Advertising	3.062	21.369	-1.126	0.324	3.161	23.593
	(1.20)		(-0.21)		(0.56)	
Capital expenditure	-3.033	0.048	1.438	4.214	-5.982	0.003
	(-1.22)		(0.36)		(-1.04)	
Diversification	-0.443	0.642	0.308	1.360	-0.741	0.476
	(-1.64)		(0.63)		(-1.28)	
Log(proceeds)	-0.328	0.720	0.652	1.920	-1.951	0.142
	(-0.50)		(0.57)		(-1.23)	
Initial returns	0.373	1.452	0.815**	2.259	0.541	1.718
	(1.30)		(2.12)		(0.57)	
Chi-square	158.05		89.31		135.26	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		361		256	

Table 4. 10 Estimation of Cox proportional hazard model of probability of failure and time-to-failure

The table illustrates the estimation of Cox proportional hazard model of probability of failure and time-to failure controlling for CEO characteristics for the sample of US IPOs over the period 1999-2009. CEO characteristics included in the model are: *CEO age, CEO tenure, Internal hire, CEO ownership, Total compensation, MBA, PhD, Ivy League alumnus*. All models include industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 4.1.

	Coefficient	Hazard ratio
Specialist CEO	-1.340***	0.262
	(-3.00)	
Log(firm age)	-0.935	0.393
	(-1.16)	
Log(sales)	-1.079*	0.340
	(-1.85)	
Top-tier underwriter	-0.646	0.524
	(-1.38)	
Big4 auditor	-1.125	0.325
	(-1.63)	
Venture capitalist	-0.258	0.772
	(-0.48)	
Profitability	-3.025***	0.049
	(-2.75)	
Leverage	5.547***	256.550
	(4.36)	
Market-to-book	-0.152**	0.859
	(-2.21)	
R&D	-0.742	0.476
	(-0.90)	
Advertising	2.337	10.349
	(0.76)	
Capital expenditure	-7.356*	0.001
	(-1.76)	
Diversification	-0.211	0.809
	(-0.67)	
Log(proceeds)	-0.102	0.903
	(-0.14)	
Initial returns	0.574	1.776
	(1.43)	
CEO-Chairman	-0.322	0.724
	(-0.65)	
CEO-Founder	-0.257	0.773
	(-0.56)	
CEO age	0.059*	1.061
	(1.82)	
CEO tenure	-0.014	0.987
	(-0.24)	
Internal hire	-0.004	0.996
	(-0.01)	
CEO ownership	0.004	1.004
	(0.24)	
Log(total compensation)	0.369	1.447
	(0.56)	
MBA	0.411	1.509
	(0.91)	
PhD	0.848	2.336
	(1.41)	
Ivy League alumnus	0.670	1.955
	(1.38)	
Chi-square	153.51	
Chi-square test probability	0.000	
Number of observations	438	

Table 4. 11 Endogeneity control – Propensity score matching

The table illustrates the analysis of the effect of specialist CEOs on the occurrence of delisting in the five year period subsequent to the offering for the sample of US IPOs over the period 1999-2009, controlling for the endogeneity of CEO selection using propensity score matching. The variables used for matching include: *Log(firm age), Log(sales), Top-tier underwriter, ROA, R&D, Advertising, Capital expenditure, Diversification, CEO-Founder, CEO-Chairman, High-tech industry, Year dummies.* All variables are defined in Table 4.1. The test statistic is shown in parentheses below the coefficient estimate. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively.

	Delist
ATET (Specialist CEOs vs. Generalist CEOs)	-0.078*** (-2.80)
Number of observations	722

Table 4. 12 Other robustness checks

The table illustrates the estimation of the Cox proportional hazard model of probability of failure and time-to failure for the sample of US IPOs over the period 1999-2009. Specification (1) is the estimation in which failed firms include those delisted from the stock exchanges due to both negative reasons and acquisitions. Specification (2) is the estimation for the sample of IPO firms excluding those that have CEO turnovers within 5 years after the offering. All models include industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels, respectively. All variables are defined in Table 4.1.

	Failed firms include those delisted from the stock exchanges for both negative reasons and acquisitions (1)		IPO sample excludes firms that have CEO turnover within 5 years after the offering (2)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.500***	0.606	-0.938***	0.391
	(-4.57)		(-2.98)	
Log(firm age)	-0.353*	0.702	-1.005*	0.366
	(-1.89)		(-1.91)	
Log(sales)	-0.047	0.954	-0.510	0.601
	(-0.36)		(-1.42)	
Top-tier underwriter	0.091	1.095	-0.609*	0.544
	(0.81)		(-1.84)	
Big4 auditor	-0.305	0.737	-0.472	0.624
	(-1.36)		(-0.72)	
Venture capitalist	0.079	1.082	0.284	1.329
	(0.57)		(0.75)	
Profitability	-1.169***	0.311	-2.269***	0.103
	(-3.74)		(-3.17)	
Leverage	1.024***	2.784	2.356***	10.547
	(3.30)		(2.90)	

Market-to-book	-0.027***	0.973	-0.097**	0.907
	(-2.90)		(-2.22)	
R&D	-0.549	0.577	-3.741**	0.024
	(-1.10)		(-2.00)	
Advertising	1.273	3.570	2.996**	20.003
	(1.53)		(2.24)	
Capital expenditure	-1.666**	0.189	0.066	1.068
	(-2.06)		(0.04)	
Diversification	-0.405***	0.667	-0.173	0.841
	(-4.62)		(-0.83)	
Log(proceeds)	-0.257	0.774	-0.732	0.481
	(-1.22)		(-1.20)	
Initial returns	0.192**	1.212	0.290	1.336
	(2.10)		(1.13)	
CEO-Chairman	-0.551***	0.576	-0.768**	0.464
	(-4.67)		(-2.28)	
CEO-Founder	0.084	1.087	-0.029	0.971
	(0.70)		(-0.09)	
Chi-square	254.96		169.29	
Chi-square test probability	0.000		0.000	
Number of observations	722		592	

Chapter 5 – Conclusion

In this thesis, I examine the effects of credit ratings and a CEO's work experience on EM and post-issue performance of US IPOs. First of all, I study the impact of credit ratings on EM around IPOs. I find that firms going public with a credit rating are less likely to engage in both accrual-based and real EM in the offering year. I also do an additional test concerning the credit rating level but do not find a significant association between the rating level and EM in the issue year. This suggests that it is the presence of a CRA that matters, not the rating per se. In addition, analysing the interaction effect between CRAs and other financial intermediaries involving in the IPO process such as venture capitalists, investment banks, and auditing firms, I further document that CRAs further constrains the EM of IPO firms that are venture backed, underwritten by reputable investment banks, and audited by large accounting firms. Overall, the findings support my argument that CRAs play a significant role in restraining managers of IPO firms from EM activities. I also investigate the managerial intent in undertaking EM and find that while managers of unrated firms tend to opportunistically manage earnings upward to influence short-term stock prices, managers of rated firms use their accounting and operating discretion to better inform investors about the firm's prospects. This is consistent with my conjecture that the lower information uncertainty among rated IPOs due to the provision of a credit rating facilitates the positive responses from investors to the firm's signalling; therefore, managers of rated IPO firms have more incentives to use financial reporting as a channel to convey private information to the less informed investors to signal the firm's value. Since rated firms tend to use accounting discretion for informative purposes, the EM in the offering year does not explain the post-issue long-run stock performance. However, for unrated firms, the income-increasing EM undertaken in the issue year can predict the IPO firm's underperformance in subsequent periods.

Secondly, I provide novel empirical evidence on the association between financial expert CEOs and EM around IPOs. I document that financial expert CEOs are not only less likely to manipulate earnings in the offering year but also tend to provide investors with more informative reported earnings. Additionally, financial expert CEOs with more decision making power over the board tend to have a stronger influence on lowering the level of EM in the issue year. I also check the results with alternative measures of CEOs'

financial experience such as CFO experience, CPA certification, and financial experience variety. For all of the measures, I still find consistent results which suggest the significance of financial expert CEOs in providing higher quality in terms of lower EM and more informative financial reporting.

Thirdly, I examine the influence of specialist CEOs on the survival profiles of IPO firms and find that specialist managerial experience of CEOs is an important aspect determining the future survivability of IPO firms. Particularly, I find that specialist CEOs are associated with a lower probability of failure and higher survival rates in subsequent periods following the offering. The failure risk of IPO firms with specialist CEOs is approximately a third of the failure risk of firms with generalist CEOs. The results remain consistent after controlling for the effects of high-tech industries, crisis periods and CEO power, as well as endogenous CEO selection.

As with other research, my study has its own limitations, which open the opportunities for future research. First of all, my analysis is focused on the US IPO market. I believe that my findings can provide useful insights for both the US and international IPO markets such as the European market because the recent trends indicate some convergence between the US and European IPO markets (Jain and Kini 2008; Ritter 2003). However, further research on international IPO markets may be useful in strengthening the understanding of the influence of credit ratings and CEOs' work experience on EM and post-issue performance in a different institutional and regulatory context. Another issue is regarding the managerial discretion over financial reporting. In this study, I apply an EM methodology using accrual expectation models that have been widely used in prior literature. However, I acknowledge the rising concerns over the explanatory power of this methodology. Therefore, I suggest future research to conduct a detailed investigation of actual cases of firms that have been charged with earnings manipulation in order to more deeply understand the pervasiveness of financial reporting misbehaviours as well as the context in which they occur, and to provide the validation of the accrual expectation models. Last but not least, with regard to my analysis of the influence of specialist CEOs on IPO survival, it will be useful for future research to explore channels through which specialist CEOs can enhance the survivability of IPO firms. Moreover, analysis using qualitative data from in-depth surveys or interviews will provide additional comprehensive analysis on how prior work experience of CEOs contributes to the post-performance of IPO issuing firms.

References

Adams, R. B., H. Almeida, and D. Ferreira. 2005. Powerful CEOs and Their Impact on Corporate Performance. *The Review of Financial Studies* 18 (4):1403-1432.

Aharony, J., C. Lin, and L. Loeb. 1993. Initial Public Offerings, accounting choices, and earnings management. *Contemporary Accounting Research* 10 (1):61-81.

Ahmad, W., and R. Jelic. 2014. Lockup Agreements and Survival of UK IPOs. *Journal of Business Finance & Accounting* 41 (5-6):717-742.

Alhadab, M., I. Clacher, and K. Keasey. 2014. Real and accrual earnings management and IPO failure risk. *Accounting and Business Research* 45 (1):55-92.

Ali, A., and W. Zhang. 2015. CEO tenure and earnings management. *Journal of Accounting and Economics* 59 (1):60-79.

Alissa, W., S. B. Bonsall Iv, K. Koharki, and M. W. Penn Jr. 2013. Firms' use of accounting discretion to influence their credit ratings. *Journal of Accounting and Economics* 55 (2–3):129-147.

Allison, P. D. 2000. Survival Analysis Using the SAS System: A Practical Guide: SAS Institute Publishing.

An, H., and K. Chan. 2008. Credit ratings and IPO pricing *Journal of Corporate Finance* 14 (5):584-595.

Arnoud, W. A. B., T. T. Milbourn, and A. Schmeits. 2006. Credit Ratings as Coordination Mechanisms. *The Review of Financial Studies* 19 (1):81-118.

Balatbat, M. C. A. 2006. Discussion of Explaining the Short- and Long-Term IPO Anomalies in the US by R&D. *Journal of Business Finance & Accounting* 33 (3-4):580-586.

Baldenius, T., N. Melumad, and X. Meng. 2014. Board composition and CEO power. *Journal of Financial Economics* 112 (1):53-68.

Ball, R., and L. Shivakumar. 2008. Earnings quality at initial public offerings. *Journal of Accounting and Economics* 45:324–349.

Balsam, S. 1998. Discretionary Accounting Choices and CEO Compensation*. *Contemporary Accounting Research* 15 (3):229-252.

Bamber, L. S., J. John, and W. Isabel Yanyan. 2010. What's My Style? The Influence of Top Managers on Voluntary Corporate Financial Disclosure. *Accounting Review* 85 (4):1131-1162.

Bannier, C. E., and C. W. Hirsch. 2010. The economic function of credit rating agencies – What does the watchlist tell us? *Journal of Banking & Finance* 34 (12):3037-3049.

Barber, B. M., and J. D. Lyon. 1996. Detecting abnormal operating performance: The empirical power and specification of test statistics. *Journal of Financial Economics* 41 (3):359-399.

Barton, J., and P. J. Simko. 2002. The Balance Sheet as an Earnings Management Constraint. *The Accounting Review* 77:1-27.

Barzel, Y., M. Habib, and B. Johnsen. 2006. Prevention is better than cure: Precluding information acquisition in IPOs. *Journal of Business* 79:2911–2923.

Becker, C., M. Defond, J. Jiambalvo, and J. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research,* 15 (1):1-24.

Bergstresser, D., and T. Philippon. 2006. CEO incentives and earnings management. *Journal of Financial Economics* 80:511–529.

Bertrand, M., and A. Schoar. 2003. Managing with style: The effect of managers on corporate policy. *The Quarterly Journal of Economics* 118:1169-1208.

Boeker, W. 1997. Strategic Change: The Influence of Managerial Characteristics and Organizational Growth. *The Academy of Management Journal* 40 (1):152-170.

Bonsall, S., K. Koharki, and M. Neamtiu. 2015. The Effectiveness of Credit Rating Agency Monitoring: Evidence from Asset Securitizations. *Accounting Review* 90 (5):1779-1810.

Boudreau, J. W., W. R. Boswell, T. A. Judge, and R. D. Bretz. 2001. Personality and cognitive ability as predictors of job search among employed managers *Personnel Psychology* 54 (1):25-50.

Bowen, R. M., S. Rajgopal, and M. Venkatachalam. 2008. Accounting Discretion, Corporate Governance, and Firm Performance*. *Contemporary Accounting Research* 25 (2):351-405.

Brau, J. C., and S. E. Fawcett. 2006. Initial Public Offerings: An Analysis of Theory and Practice. *The Journal of Finance* 61 (1):399-436.

Bunderson, J. S., and K. M. Sutcliffe. 2002. Comparing Alternative Conceptualizations of Functional Diversity in Management Teams: Process and Performance Effects. *The Academy of Management Journal* 45 (5):875-893.

Burgstahler, D., and I. Dichev. 1997. Earnings management to avoid earnings decreases and losses. *Journal of Accounting and Economics* 24:99-126.

Cain, M. D., and S. B. McKeon. 2016. CEO Personal Risk-Taking and Corporate Policies. *Journal of Financial and Quantitative Analysis*:1-26.

Campion, M. A., L. Cheraskin, and M. J. Stevens. 1994. Career-Related Antecedents and Outcomes of Job Rotation. *The Academy of Management Journal* 37 (6):1518-1542.

Cannella, A. A., J.-H. Park, and H.-U. Lee. 2008. Top Management Team Functional Background Diversity and Firm Performance: Examining the Roles of Team Member Colocation and Environmental Uncertainty. *The Academy of Management Journal* 51 (4):768-784.

Cantillo, M., and J. Wright. 2000. How do firms choose their lenders? An empirical investigation. (13):155–189.

Carhart, M. 1997. On persistence in mutual fund performance. *Journal of Finance* 52 (1):57-82.

Carpentier, C., and J.-M. Suret. 2011. The survival and success of Canadian penny stock IPOs. *Small Business Economics* 36.

Chan, K., and Y. Lo. 2011. Credit ratings and long-term IPO performance. *Journal of Economics & Finance* 35 (4):473-483.

Charitou, A., C. Louca, and N. Vafeas. 2007. Boards, ownership structure, and involuntary delisting from the New York Stock Exchange. *Journal of Accounting and Public Policy* 26 (2):249-262.

Chen, S.-S., W.-C. Lin, S.-C. Chang, and C.-Y. Lin. 2013. Information Uncertainty, Earnings Management, and Long-run Stock Performance Following Initial Public Offerings. *Journal of Business Finance & Accounting* 40 (9-10):1126-1154.

Cheng, M., and M. Neamtiu. 2009. An empirical analysis of changes in credit rating properties: Timeliness, accuracy and volatility. *Journal of Accounting and Economics* 47 (1–2):108-130.

Cheung, C. S., and I. Krinsky. 1994. Information asymmetry and the underpricing of initial public offerings: further empirical evidence. *Journal of Business Finance & Accounting* 21 (5):739-747.

Chikh, S., and J.-Y. Filbien. 2011. Acquisitions and CEO power: Evidence from French networks. *Journal of Corporate Finance* 17 (5):1221-1236.

Coffee, J. C. 2006. *Gatekeepers: The Professions and Corporate Governance*: Oxford, Oxford University Press.

Cohen, D. A., A. Dey, and T. Z. Lys. 2008. Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods. *Accounting Review* 83 (3):757-787.

Cohen, D. A., and P. Zarowin. 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting and Economics* 50 (1):2-19.

Crossland, C., Z. Jinyong, N. J. Hiller, and D. C. Hambrick. 2014. CEO career variety: Effects on firm-level strategic and social novelty. *Academy of Management Journal* 57 (3):652-674.

Custódio, C., M. A. Ferreira, and P. Matos. 2013. Generalists versus specialists: Lifetime work experience and chief executive officer pay. *Journal of Financial Economics* 108 (2):471-492.

Custódio, C., and D. Metzger. 2013. How Do CEOs Matter? The Effect of Industry Expertise on Acquisition Returns. *Review of Financial Studies* 26 (8):2008-2047.

———. 2014. Financial expert CEOs: CEO′s work experience and firm′s financial policies. *Journal of Financial Economics* 114 (1):125-154.

Daily, C. M., and J. L. Johnson. 1997. Sources of CEO Power and Firm Financial Performance: A Longitudinal Assessment. *Journal of Management* 23 (2):97.

Darrough, M., and S. Rangan. 2005. Do Insiders manipulate earnings When They Sell Their Shares in an Initial Public Offering? *Journal of Accounting Research* 43 (1):1-33.

Dasgupta, S., and F. Ding. 2010. Search intermediaries, internal labormarkets, and CEO pay. *Unpublished working paper, Hong Kong University of Science and Technology*.

DeAngelo, E., H. DeAngelo, and D. Skinner. 1994. Accounting choices of troubled companies. *Journal of Accounting and Economics* 17:113−143.

Dechow, P. 1994. Accounting earnings and cash flows as measures of firm performance: The role of accounting accruals. *Journal of Accounting and Economics* 18 (1):3-42.

Dechow, P., W. Ge, and C. Schrand. 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting & Economics* 50:344-401.

Dechow, P., R. Sloan, and A. Sweeney. 1995. Detecting earnings management. *The Accounting Review* 70 (2):193-225.

Dechow, P. M., and I. D. Dichev. 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors. *The Accounting Review* 77:35-59.

Dechow, P. M., S. P. Kothari, and R. L. Watts. 1998. The relation between earnings and cash flows. *Journal of Accounting and Economics* 25 (2):133-168.

DeFond, M. L., and J. Jiambalvo. 1994. Debt convenant violation and manipulation of accruals. *Journal of Accounting & Economics* 17:145-176.

Degeorge, F., J. Patel, and R. Zeckhauser. 1999. Earnings management to exceed thresholds. *Journal of Business* 72:1−33.

Demerjian, P. R., B. Lev, M. F. Lewis, and S. E. McVay. 2013. Managerial Ability and Earnings Quality. *Accounting Review* 88 (2):463-498.

Demers, E., and P. Joos. 2007. IPO Failure Risk. *Journal of Accounting Research* 45 (2):333-371.

Dempsey, S. J., H. G. Hunt, and N. W. Schroeder. 1993. Earnings management and corporate ownership structure: An examination of extraordinary item reporting. *Journal of Business Finance & Accounting* 20:479−500.

Denis, D. J., and V. T. Mihov. 2003. The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings. *Journal of Financial Economics* 70 (1):3-28.

Dichev, I. D., and J. D. Piotroski. 2001. The Long-Run Stock Returns following Bond Ratings Changes. *The Journal of Finance* 56 (1):173-203.

Doukakis, L. C. 2014. The effect of mandatory IFRS adoption on real and accrual-based earnings management activities. *Journal of Accounting and Public Policy* 33 (6):551-572.

Dragoni, L., I.-S. Oh, P. Vankatwyk, and P. E. Tesluk. 2011. Developing executive leaders: The relative contribution of cognitive ability, personality, and the accumulation of work experience in predicting strategic thinking compentency *Personnel Psychology* 64 (4):829-864.

DuCharme, L., L., P.H. Malatesta, and S.E. Sefcik. 2001. Earnings management: IPO valuation and subsequent performance. *Journal of Accounting, Auditing and Finance* 16:369-396.

DuCharme, L., P. Malatesta, and S. Sefcik. 2004. Earnings management, stock issues, and shareholder lawsuits. *Journal of Financial Economics* 71 (1):27-49.

Dutta, S., and B. Trueman. 2002. The Interpretation of Information and Corporate Disclosure Strategies. *Review of Accounting Studies* 7 (1):75-96.

Dye, R. A. 1988. Earnings Management in an Overlapping Generations Model. *Journal of Accounting Research* 26 (2):195-235.

Dyreng, S. D., M. Hanlon, and E. L. Maydew. 2010. The Effects of Executives on Corporate Tax Avoidance. *Accounting Review* 85 (4):1163-1189.

Espenlaub, S., A. Khurshed, and A. Mohamed. 2012. IPO Survival in a Reputational Market. *Journal of Business Finance & Accounting* 39 (3-4):427-463.

Fama, E. 1998. Market efficiency, long term returns and behavioral finance. *Journal of Financial Economics* 49:283-306.
Fama, E., and K. French. 1993. Common risk factors in the returns on bonds and stocks. *Journal of Financial Economics* 33:3-56.
Fama, E., and K. French. 2004. New lists: Fundamentals and survival rates. *Journal of Financial Economics* 73 (2):229-269.
Fan, J. P. H., and T. J. Wong. 2002. Corporate ownership structure and the informativeness of accounting earnings in East Asia. *Journal of Accounting and Economics* 33 (3):401-425.
Fan, Q. 2007. Earnings Management and Ownership Retention for Initial Public Offering Firms: Theory and Evidence *Accounting Review* 82 (1).
Faulkender, M., and M. Petersen. 2006. Does the source of capital affect capital structure? *Review of Financial Studies* 19:45–79.
Feng, M., W. Ge, S. Luo, and T. Shevlin. 2011. Why do CFOs become involved in material accounting manipulations? *Journal of Accounting and Economics* 51 (1–2):21-36.
Fields, T. D., T. Z. Lys, and L. Vincent. 2001. Empirical research on accounting choice. *Journal of Accounting and Economics* 31 (1–3):255-307.
Finkelstein, S. 1992. Power in Top Management Teams: Dimensions, Measurement, and Validation. *The Academy of Management Journal* 35 (3):505-538.
Fishman, M. J., and K. M. Hagerty. 2003. Mandatory Versus Voluntary Disclosure in Markets with Informed and Uninformed Customers. *Journal of Law, Economics, and Organization* 19 (1):45-63.
Fondas, N., and M. Wiersema. 1997. Changing of the Guard: the Influence of CEO Socialization on Strategic Change. *Journal of Management Studies* 34 (4):561-584.
Francis, J., A. H. Huang, S. Rajgopal, and A. Y. Zang. 2008. CEO Reputation and Earnings Quality*. *Contemporary Accounting Research* 25 (1):109-147.
Francis, J., R. LaFond, P. Olsson, and K. Schipper. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics* 39 (2):295-327.
Franz, D., H. HassabElnaby, and G. Lobo. 2014. Impact of proximity to debt covenant violation on earnings management. *Review of Accounting Studies* 19 (1):473-505.
Friedlan, J. 1994. Accounting choices of issuers of initial public offerings. *Contemporary Accounting Research* 11:1-31.
Frydman, C., and D. Jenter. 2010. CEO Compensation. *Annual Review of Financial Economics* 2 (1):75-102.
Garicano, L., and E. Rossi-Hansberg. 2006. Organization and Inequality in a Knowledge Economy. *The Quarterly Journal of Economics* 121 (4):1383-1435.
Ge, W., D. Matsumoto, and J. L. Zhang. 2011. Do CFOs Have Style? An Empirical Investigation of the Effect of Individual CFOs on Accounting Practices*. *Contemporary Accounting Research* 28 (4):1141-1179.
Gerakos, J., M. Lang, and M. Maffett. 2013. Post-listing performance and private sector regulation: The experience of London's Alternative Investment Market. *Journal of Accounting and Economics* 56 (2–3, Supplement 1):189-215.
Giannetti, M. 2011. Serial CEO incentives and the structure of managerial contracts. *Journal of Financial Intermediation* 20 (4):633-662.
Goodstein, J., and W. Boeker. 1991. Turbulence at the Top: A New Perspective on Governance Structure Changes and Strategic Change. *The Academy of Management Journal* 34 (2):306-330.
Graham, J., C. Harvey, and S. Rajgopal. 2005. The economic implications of corporate financial reporting. *Journal of Accounting and Economics* 40:3–73.
Graham, J. R., C. R. Harvey, and M. Puri. 2013. Managerial attitudes and corporate actions. *Journal of Financial Economics* 109 (1):103-121.
Gramlich, J., and O. Sorensen. 2004. Voluntary management earning forecasts and discretionary accruals: Evidence from Danish IPOs. *European Accounting Review* 13 (2):235-259.
Guay, W. R., S. Kothari, and R. L. Watts. 1996. A market based evalaution of discretionary accruals model. *Journal of Accounting Research* 34:183-105.

Guidry, F., A. Leone, and S. Rock. 1999. Earnings-based bonus plans and earnings management business unit managers. *Journal of Accounting and Economics* 26:113−142.

Gul, F. A., S. Y. K. Fung, and B. Jaggi. 2009. Earnings quality: Some evidence on the role of auditor tenure and auditors' industry expertise. *Journal of Accounting and Economics* 47 (3):265-287.

Gunny, K. A. 2010. The Relation Between Earnings Management Using Real Activities Manipulation and Future Performance: Evidence from Meeting Earnings Benchmarks*. *Contemporary Accounting Research* 27 (3):855-888.

Hambrick, D. C. 2007. Upper Echelons Theory: An Update. *The Academy of Management Review* 32 (2):334-343.

Hambrick, D. C., and S. Finkelstein. 1987. Managerial discretion: A bridge between polar views of organizational outcomes. *Research in Organizational Behavior* 9:369-406.

Hambrick, D. C., S. Finkelstein, and A. C. Mooney. 2005. Executive Job Demands: New Insights for Explaining Strategic Decisions and Leader Behaviors. *The Academy of Management Review* 30 (3):472-491.

Hambrick, D. C., M. A. Geletkanycz, and J. W. Fredrickson. 1993. Top Executive Commitment to the Status Quo: Some Tests of Its Determinants. *Strategic Management Journal* 14 (6):401-418.

Hambrick, D. C., and P. A. Mason. 1984. Upper Echelons: The Organization as a Reflection of Its Top Managers. *The Academy of Management Review* 9 (2):193-206.

Han, S., V. K. Nanda, and S. Silveri. 2016. CEO Power and Firm Performance under Pressure. *Financial Management*.

Hand, J., R. Holthausen, and R. Leftwich. 1992. The effect of bond rating agency announcements on bond and stock prices. . *Journal of Finance* 57:733-752.

Hayward, M. L. A., V. P. Rindova, and T. G. Pollock. 2004. Believing one's own press: the causes and consequences of CEO celebrity. *Strategic Management Journal* 25 (7):637-653.

Healy, P. M. 1985. The effect of bonus schemes on accounting decisions. *Journal of Accounting & Economics* 7 (85-112).

Healy, P. M., and K. G. Palepu. 1993. The effect of firms financial disclosure strategies on stock prices. *Accounting Horizons* 7:1-11.

Heckman, J. 1979. Sample selection bias as a specification error. *Econometrica* 47:153-161.

Hensler, D. A., R. C. Rutherford, and T. M. Springer. 1997. The survival of initial public offerings in the aftermarket. *Journal of Financial Research* 20 (1):93.

Herbohn, K., I. Tutticci, and P. S. Khor. 2010. Changes in Unrecognised Deferred Tax Accruals from Carry-Forward Losses: Earnings Management or Signalling? *Journal of Business Finance & Accounting* 37 (7-8):763-791.

Hitt, M. A., and B. B. Tyler. 1991. Strategic Decision Models: Integrating Different Perspectives. *Strategic Management Journal* 12 (5):327-351.

Hochberg, Y. V. 2012. Venture Capital and Corporate Governance in the Newly Public Firm. *Review of Finance* 16 (2):429-480.

Holthausen, R., D. Larker, and R. Sloan. 1995. Annual bonus schemes and the manipulation of earnings. *Journal of Accounting and Economics* 19:29−74.

Holthausen, R. W., and R. W. Leftwich. 1986. The effect of bond rating changes on common stock prices. *Journal of Financial Economics* 17 (1):57-89.

Hribar, P., and D. W. Collins. 2002. Errors in Estimating Accruals: Implications for Empirical Research. *Journal of Accounting Research* 40 (1):105-134.

Hu, C., and Y.-J. Liu. 2015. Valuing diversity: CEOs' career experiences and corporate investment. *Journal of Corporate Finance* 30 (0):11-31.

Huang, H. H., W. Wang, and J. Zhou. 2013. Shareholder Rights, Insider Ownership and Earnings Management. *Abacus* 49 (1):46-73.

Huang, R., K. J. K. Tan, and R. W. Faff. 2016. CEO overconfidence and corporate debt maturity. *Journal of Corporate Finance* 36:93-110.

Huang, S. 2014. Managerial expertise, corporate decisions and firm value: Evidence from corporate refocusing. *Journal of Financial Intermediation* 23 (3):348-375.

Hubbard, R. G., and D. Palia. 1995. Executive pay and performance Evidence from the U.S. banking industry. *Journal of Financial Economics* 39 (1):105-130.
Huson, M. R., R. Parrino, and L. T. Starks. 2001. Internal Monitoring Mechanisms and CEO Turnover: A Long-Term Perspective. *The Journal of Finance* 56 (6):2265-2297.
Jain, B., and O. Kini. 2000. Does the presence of venture capitalists Improve the survival profile of IPO Firms? In *Journal of Business Finance & Accounting*, 1139-1183.
Jain, B. A., and O. Kini. 2008. The Impact of Strategic Investment Choices on Post-Issue Operating Performance and Survival of US IPO Firms. *Journal of Business Finance & Accounting* 35 (3-4):459-490.
Jain, B. A., and C. L. Martin, Jr. 2005. The Association Between Audit Quality and Post-IPO Performance: A Survival Analysis Approach. *Review of Accounting & Finance* 4 (4):50-75.
Jenkinson, T., and A. Ljungqvist. 2001. *Going Public-The Theory and Evidence on how Companies Raise Equity Finance*. edited by n. Edition. Oxford: Oxford University Press.
Jensen, M. C., and W. H. Meckling. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* 3 (4):305-360.
Jiang, F., B. Zhu, and J. Huang. 2013. CEO's financial experience and earnings management. *Journal of Multinational Financial Management* 23 (3):134-145.
Jiraporn, P., Y. Liu, and Y. S. Kim. 2014. How Do Powerful CEOs Affect Analyst Coverage? *European Financial Management* 20 (3):652-676.
Jo, H., Y. Kim, and M. S. Park. 2007. Underwriter choice and earnings management: evidence from seasoned equity offerings *Review of Accounting Studies* 12 (1):23-59.
Johnson, S. A. 1997. An Empirical Analysis of the Determinants of Corporate Debt Ownership Structure. *The Journal of Financial and Quantitative Analysis* 32 (1):47-69.
Jones, J. J. 1991. Earnings management during import relief investigations. *Journal of Accounting Research* 37:55-81.
Jorion, P., Z. Liu, and C. Shi. 2005. Informational effects of regulation FD: evidence from rating agencies. *Journal of Financial Economics* 76 (2):309-330.
Jorion, P., C. Shi, and S. Zhang. 2009. Tightening credit standards: the role of accounting quality. *Review of Accounting Studies* 14 (1):123-160.
Kallunki, J.-P., and M. Martikainen. 2003. Earnings management as a predictor of future profitability of Finnish firms. *European Accounting Review* 12 (2):311-325.
Kaplan, S. N., M. M. Klebanov, and M. Sorensen. 2012. Which CEO Characteristics and Abilities Matter? *The Journal of Finance* 67 (3):973-1007.
Kaplan, S. N., and B. A. Minton. 2012. How Has CEO Turnover Changed? *International Review of Finance* 12 (1):57-87.
Karampatsas, N., D. Petmezas, and N. G. Travlos. 2014. Credit ratings and the choice of payment method in mergers and acquisitions. *Journal of Corporate Finance* 25 (0):474-493.
Kasznik, R. 1999. On the association between corporate voluntary disclosure and earnings management. *Journal of Accounting Research* 37:58-81.
Khurana, R. 2002. *Searching for a Corporate Savior: The Irrational Quest for Charismatic CEOs*. Princeton, NJ: Princeton University Press.
Kim, J.-B., and C. H. Yi. 2006. Ownership Structure, Business Group Affiliation, Listing Status, and Earnings Management: Evidence from Korea*. *Contemporary Accounting Research* 23 (2):427-464.
King, T., A. Srivastav, and J. Williams. 2016. What's in an education? Implications of CEO education for bank performance. *Journal of Corporate Finance* 37:287-308.
Klein, A. 2002. Audit committee, board of director characteristics, and earnings management. In *Journal of Accounting and Economics*, 375-400.
Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting and Economics* 39 (1):163-197.
Krishnan, G. V. 2003. Does big 6 auditor industry expertise constrain earnings management? *Accounting Horizons (Suppl.)*:1–16.

Kuang, Y. F., B. Qin, and J. L. Wielhouwer. 2014. CEO Origin and Accrual-Based Earnings Management. *Accounting Horizons* 28 (3):605-626.
LeClere, M. J. 2000. The Occurrence and Timing of Events: Survival Analysis Applied to a Study of Financial Distress. *Journal of Accounting Literature* 19:158-189.
Lee, G., and R. W. Masulis. 2011. Do more reputable financial institutions reduce earnings management by IPO issuers? *Journal of Corporate Finance* 17 (4):982-1000.
Liu, Y., and P. Jiraporn. 2010. The effect of CEO power on bond ratings and yields. *Journal of Empirical Finance* 17 (4):744-762.
Lo, K. 2008. Earnings management and earnings quality. *Journal of Accounting and Economics* 45 (2-3):350-357.
Lobo, G. J., and J. Zhou. 2006. Did Conservatism in Financial Reporting Increase after the Sarbanes-Oxley Act? Initial Evidence. *Accounting Horizons* 20 (1):57-73.
Loughran, T., J. R. Ritter, and K. Rydqvist. 1994. Initial public offerings: International insights. *Pacific-Basin Finance Journal* 2 (2–3):165-199.
Louis, H., and D. Robinson. 2005. Do managers credibly use accruals to signal private information? Evidence from the pricing of discretionary accruals around stock splits. *Journal of Accounting and Economics* 39 (2):361-380.
Mackey, A. 2008. The effect of CEOs on firm performance. *Strategic Management Journal* 29 (12):1357-1367.
Malmendier, U., and G. Tate. 2005. CEO Overconfidence and Corporate Investment. *The Journal of Finance* 60 (6):2661-2700.
———. 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics* 89 (1):20-43.
———. 2009. Superstar CEOs. *The Quarterly Journal of Economics* 124 (4):1593-1638.
Malmendier, U., G. Tate, and J. Yan. 2011. Overconfidence and Early-Life Experiences: The Effect of Managerial Traits on Corporate Financial Policies. *Journal of Finance* 66 (5):1687-1733.
Marquardt, C. A., and C. I. Wiedman. 2004. How Are Earnings Managed? An Examination of Specific Accruals*. *Contemporary Accounting Research* 21 (2):461-491.
McNichols, M. F. 2002. The Quality of Accruals and Earnings: The Role of Accrual Estimation Errors: Discussion. *The Accounting Review* 77:61-69.
Mishra, D. R. 2014. The dark side of CEO ability: CEO general managerial skills and cost of equity capital. *Journal of Corporate Finance* 29 (0):390-409.
Morsfield, S. G., and C. E. L. Tan. 2006. Do Venture Capitalists Influence the Decision to Manage Earnings in Initial Public Offerings? *Accounting Review* 81 (5):1119-1150.
Murphy, K. J., xe, bojn, xed, and J. k. 2004. CEO Pay and Appointments: A Market-Based Explanation for Recent Trends. *The American Economic Review* 94 (2):192-196.
Nicholson, N., E. Soane, M. Fenton-O'Creevy, and P. Willman. 2005. Personality and domain-specific risk taking. *Journal of Risk Research* 8 (2):157-176.
Orens, R., and A.-M. Reheul. 2013. Do CEO demographics explain cash holdings in SMEs? *European Management Journal* 31 (6):549-563.
Parrino, R. 1997. CEO turnover and outside succession A cross-sectional analysis. *Journal of Financial Economics* 46 (2):165-197.
Quigley, T. J., and D. C. Hambrick. 2015. Has the "CEO effect" increased in recent decades? A new explanation for the great rise in America's attention to corporate leaders. *Strategic Management Journal* 36 (6):821-830.
Ritter, J. 2003. Differences between European and American IPO Markets. *European Financial Management* 9 (4):421-434.
Ritter, J., and I. Welch. 2002. A review of IPO activities, pricing and allocation. *Journal of Finance* 57 (4):1795-1828.
Ritter, J. R. 1991. The Long-Run Performance of Initial Public Offerings. *Journal of Finance* 46 (1):3-27.
Roosenbloom, P., and T. Van De Goot. 2003. Takeover Defences and IPO Firm Value in the Netherlands. *European Financial Management* 9 (4):484-511.

Roosenboom, P., T. van der Goot, and G. Mertens. 2003. Earnings management and initial public offerings: Evidence from the Netherlands. *International Journal of Accounting* 38 (3):243-266.

Roychowdhury, S. 2006. Earnings management through real activities manipulation. *Journal of Accounting and Economics* 42 (3):335-370.

Sanders, W. G., and D. C. Hambrick. 2007. Swinging for the Fences: The Effects of CEO Stock Options on Company Risk Taking and Performance. *The Academy of Management Journal* 50 (5):1055-1078.

Schultz, P. 1993. Unit initial public offerings: A form of staged financing. *Journal of Financial Economics* 34 (2):199-229.

Serfling, M. A. 2014. CEO age and the riskiness of corporate policies. *Journal of Corporate Finance* 25 (0):251-273.

Shumway, T. 2001. Forecasting bankruptcy more accurately: A simple hazard model. *Journal of Business* 74 (1):101-124.

Srinidhi, B. I. N., F. A. Gul, and J. Tsui. 2011. Female Directors and Earnings Quality*. *Contemporary Accounting Research* 28 (5):1610-1644.

Subramanyam, K. 1996. The pricing of discretionary accruals. *Journal of Accounting and Economics* 22:249-281.

Suijs, J. 2007. Voluntary disclosure of information when firms are uncertain of investor response. *Journal of Accounting and Economics* 43 (2-3):391-410.

Teoh, S., I. Welch, and T. Wong. 1998a. Earnings management and the long-run market performance of initial public offerings. *Journal of Finance* 53:1935–1974.

Teoh, S. H., T. J. Wong, and G. R. Rao. 1998b. Are accruals during initial public offerings opportunistic? *Review of Accounting Studies* 3:175–208.

Tesluk, P. E., and R. R. Jacobs. 1998. Toward an integrated model of work experience *Personnel Psychology* 51 (2):321-355.

Trueman, B., and S. Titman. 1988. An Explanation for Accounting Income Smoothing. *Journal of Accounting Research* 26:127-139.

Vafeas, N. 1999. Board meeting frequency and firm performance. *Journal of Financial Economics* 53 (1):113-142.

Vardaman, J. M., D. G. Allen, R. W. Renn, and K. R. Moffitt. 2008. Should I stay or should I go? The role of risk in employee turnover decisions. *Human Relations* 61 (11):1531-1563.

Venkataraman, R., J. P. Weber, and M. Willenborg. 2008. Litigation Risk,Audit Quality, and Audit Fees: Evidence from Initial Public Offerings. *Accounting Review* 83 (5):1315-1345.

Veprauskaitė, E., and M. Adams. 2013. Do powerful chief executives influence the financial performance of UK firms? *The British Accounting Review* 45 (3):229-241.

Watts, R. L., and J. L. Zimmerman. 1978. Towards a Positive Theory of the Determination of Accounting Standards. *Accounting Review* 53 (1):112.

Weber, J., and M. Willenborg. 2003. Do Expert Informational Intermediaries Add Value? Evidence from Auditors in Microcap IPOs. *Journal of Accounting Research* 41 (4):681-720.

Welbourne, T. M., and A. O. Andrews. 1996. Predicting the Performance of Initial Public Offerings: Should Human Resource Management Be in the Equation? *The Academy of Management Journal* 39 (4):891-919.

Willenborg, M., and J. C. McKeown. 2000. Going-concern initial public offerings. *Journal of Accounting and Economics* 30 (3):279-313.

Wongsunwai, W. 2013. The Effect of External Monitoring on Accrual-Based and Real Earnings Management: Evidence from Venture-Backed Initial Public Offerings*. *Contemporary Accounting Research* 30 (1):296-324.

Xie, B., I. Davidson, Wallace N., and P. J. DaDalt. 2003. Earnings management and corporate governance: the role of the board and the audit committee. *Journal of Corporate Finance* 9 (3):295-316.

Xuan, Y. 2009. Empire-Building or Bridge-Building? Evidence from New CEOs' Internal Capital Allocation Decisions. *The Review of Financial Studies* 22 (12):4919-4948.

Ye, K. 2014. Independent director cash compensation and earnings management. *Journal of Accounting and Public Policy* 33 (4):391-400.

Yeo, G. H. H., P. M. S. Tan, K. W. Ho, and S. S. Chen. 2002. Corporate Ownership Structure and the Informativeness of Earnings. *Journal of Business Finance & Accounting* 29 (7-8):1023-1046.

Zang, A. Y. 2012. Evidence on the Trade-Off between Real Activities Manipulation and Accrual-Based Earnings Management. *Accounting Review* 87 (2):675-703.

Zimmerman, R. D. 2008. Understanding the impact of personality traits on individuals' turnover decisions: A meta-analytic path model *Personnel Psychology* 61 (2):309-348.