# EARNINGS MANAGEMENT AROUND IPO LOCKUP EXPIRATION AND THE ROLE OF AUDITORS

by

Lizhong Hao

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This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. Mark Kohlbeck, School of Accounting, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the College of Business and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

SUPERVISORY COMMITTEE:

Mark Kohlbeck, Ph.D.
Dissertation Advisor

Jian Cao, Ph.D.

Maya Thevenot, Ph.D.

Luis Garcia-Feijoo, Ph.D.

Kimberly Dunn, Ph.D.
Director, School of Accounting

Somnath Bhattacharya, Ph.D.
Interim Dean, College of Business

Barry T. Rosson, Ph.D.
Dean, Graduate College

July 10, 2013
Date

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ABSTRACT

Author: Lizhong Hao

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I examine the presence of earnings management at pre-IPO and lockup periods. Motivated by significant post-lockup insider sales documented in prior research, I investigate whether insiders (managers and venture capitalists) inflate earnings around the lockup period in order to increase share price and maximize personal wealth from selling shares at lockup expiration. I also compare levels of earnings management in the pre-IPO and lockup periods with those in the post-lockup period. Prior research also documents that auditor quality mitigates earnings management behavior. I explore the impact of auditor quality in the unique setting of IPO lockups.

I test my hypotheses based on a sample of 744 IPO firms that went public over the period 1996-2010. I find evidence that IPO firms engage in income-increasing earnings management in the pre-IPO and lockup periods, mainly through current accruals manipulation. Cross-sectional analysis reveals that my sample IPO firms also utilize real-

activities manipulation, but only in the early pre-IPO period. The results are robust with respect to alternative abnormal accruals and real-activities measures. I also find that IPO firms that hire prestigious auditors experience less earnings management in the lockup period than firms with lower-quality auditors, after controlling for the monitoring role of venture capitalist and underwriter reputation.

# DEDICATION

I dedicate my dissertation to my parents, Qingtang and Aimei, and my wife, Yaxian.

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# CHAPTER 1 INTRODUCTION

*Stocks almost always fall when an initial public offering lockup expires. When an IPO hits the markets, many of the initial investors – especially company insiders – are prohibited from selling for a period of time, usually six months. When that lockup period expires, insiders are allowed to sell, and they usually do* (Lambert 2001, page 37).

Almost all initial public offerings (IPOs) have a share lockup provision. A lockup provision is an agreement between an issuing firm and its underwriter, prohibiting insiders and other pre-IPO shareholders from selling shares for a specified period, usually six months after the offer. Lockup information is disclosed in the IPO prospectus, under a heading such as "Shares Eligible for Future Sale."[1] This section typically specifies the number of shares subject to lockup and the expiration date of the lockup period. IPO lockups are not required by law in the US. However, investment banks underwriting IPOs always require issuers to have the lockup agreement to prevent insider selling right after IPOs.

One major motivation for setting the lockup is that underwriters want to see the true market value of the newly traded firm, whereas significant insider selling immediately after the issue may obscure the price. When firms go public through IPOs, the number of shares offered is only a relatively small portion of the overall ownership. A

[1] More specifically, lockup information is disclosed in the SEC Form S-1 or Part 1 of Form 424A.

substantial portion of shares is held by company insiders. If insiders are allowed to sell right after the IPO, this may flood the market and adversely affect the market price of the stock, and subsequently impair the firm's ability to raise additional equity capital.

A second purpose of lockups is to send the market a bonding signal. By restricting insider sales for an extended period of time, the underwriters intend to ensure that insiders will maintain a significant economic interest in the firm after the IPOs. The lockup provision communicates to investors that key insiders will remain with the firm for a period of time and that they are not seeking to cash out in advance of imminent bad news (Field and Hanka 2001; Brav and Gompers 2003). It is believed that when insiders retain large ownership holdings, their incentives are aligned with outsiders' incentives (Ibbotson and Ritter 1995).

The lockup expiration day represents the first opportunity for a firm's founders and other initial investors to cash out their ownership stake in the firm. As soon as the lockup period expires, insiders are suddenly allowed to sell.[2] Prior research has already documented that insiders, especially venture capitalists, do use this opportunity to cash out their shares and lock their personal wealth. For example, Field and Hanka (2001), Bradley et al. (2001), and Ofek and Richardson (2000) document significantly negative abnormal returns and positive abnormal trading volume around the IPO unlock date. They conclude that the price decline is due to insider sales, and that significant insider selling creates an overwhelming supply of shares to the market, which depresses the market prices.

[2] They are still subject to more general insider trading regulations such as Rule 10b-5, Rule 144 and Rule 701, which place additional restrictions on insider trading.

I investigate whether insiders manage earnings to increase share price during the IPO lockup period. One primary reason to select the lockup period is the significant insider sales at lockup expiration. Compared to the number of shares offered at IPOs, significantly more shares are held by company insiders and these shares are restricted from selling until the lockup ends. Hence insiders who hold large shares and plan to cash out after IPOs may have a high incentive to manage earnings upward before selling. And the reversal nature of accrual accounting prevents insiders from managing earnings via accruals across a different accounting period when they can only cash out their ownership after the lockup expires.

Another motivation to investigate earnings management around the lockup period is that a large number of prior studies have focused on earnings management in the pre-IPO and the IPO years and the results are mixed. For example, Friedlan (1994) and Teoh et al. (1998c) document strong evidence of earnings management before the initial offerings; however, Ball and Shivakumar (2008) argue that substantial earnings management is less likely for IPO firms because it would attract enhanced scrutiny and increase litigation risk. When firms go public through IPOs, they are required to report higher quality financials by their auditors, underwriters and boards, and are under greater regulatory scrutiny.

Furthermore, prior research argues that firms have both the opportunity and incentive to manipulate earnings during the time of new equity offerings. At IPOs, public information available to investors is rather limited. The issuer's prospectus is the primary source of public information. On the other hand, corporate insiders are considered to have superior information about the true value of the firm. This information asymmetry

provides insiders an opportunity to manage earnings upward to influence firm value. The fact that increased share price of the firm enhances insiders' personal wealth provides a strong incentive to exercise accounting discretion.

I focus on two prominent types of insiders: managers and venture capitalists (hereafter referred to as insiders). I use discretionary current accruals (DCA), discretionary total accruals (DTA) and two metrics of real activity management as proxies for earnings management. I predict that IPO firms experience abnormal levels of earnings management during the lockup period. I also compare levels of earnings management surrounding the pre-IPO and lockup periods with those in the post-lockup period. I define lockup period as the quarters between IPO and lockup expiration; the pre-IPO period is defined as four quarters prior to IPO and the post-lockup period as four quarters after the Lockup Expiration.

In addition, I explore the role of auditor quality around IPO lockup expiration. Specifically, I examine whether IPO firms that hire prestigious auditors experience less earnings management in the pre-IPO and lockup periods than firms with lower-quality auditors. I use auditor size as a proxy for auditor quality and partition the sample into Big-Four and Non-Big-Four groups. I predict firms that hire Big-Four auditors will experience less earnings management.

Beginning with a sample of 7,500 firm-quarter observations representing 744 unique IPO firms, I examine my earnings management estimates during the pre-IPO and IPO lockup periods. Consistent with my hypotheses, I find evidence that IPO firms engage in income-increasing earnings management in the pre-IPO and lockup periods, mainly through current accruals manipulation. The time-series distribution analyses

reveal that my sample IPO firms also utilize real-activities management, but only in the early pre-IPO period. I also find that IPO firms that hire prestigious auditors experience less earnings management in the lockup period than firms with lower-quality auditors, after controlling for the monitoring role of venture capitalist and underwriter reputation.

Finally, I investigate the relationship between earnings management at lockups and insider sales post lockup expiration. I use percentage of insider ownership to measure insider selling incentive and predict a positive association between earnings management and insider selling incentive. The results of cross-sectional analyses, however, do not support my hypothesis of insider selling incentive. These results may be affected by using insider ownership percentage as a proxy of insider selling incentive. Insiders with high ownership may not necessarily have high incentive to sell after IPO.

This study contributes to the IPO, earnings management and audit quality literature in several important aspects. First, extant studies on earnings management at IPO only focus on the earnings management behavior prior to IPO or during the IPO year (Friedlan 1994; Teoh et al. 1998c). My study contributes to the literature by investigating earnings management post-IPO surrounding the lockup period. Thus the results of my study will answer the empirical question of whether insiders manage earnings strategically before the lockup expiration.

Second, my study contributes to an ongoing discussion on whether insider trading provides a motive for earnings management. Prior research has offered a number of motives for earnings management: to raise external financing at low cost (Teoh et al. 1998c), earning-based compensation and bonus plan (e.g. Watts and Zimmerman 1990; Dechow and Sloan 1991), to avoid loss and debt covenant violation or to meet or beat

analyst forecasts (e.g. Dechow and Skinner 2000; Burgstahler and Eames 2006). However, prior studies report mixed results as to whether insider trading motivates earnings management (Seyhun 1986; Park and Park 2004; Sawicki and Shrestha 2008; Dechow et al. 1996). The significant insider selling activities at lockup expiration provide a unique setting to test this issue. I predict that earnings management surrounding IPO lockup is associated with subsequent insider sales and that subsequent insider sales provide an incentive for earnings management. Therefore, my study will shed light on whether insider sales motivate earnings management in the IPO setting.

Third, prior studies on earnings management mainly use annual data. However, using annual data may underestimate the magnitude of earnings management around IPOs, because earnings inflation and subsequent accrual reversal may occur in the same fiscal year. I use quarterly data to examine earnings management behavior during the IPO lockup period**.** Using quarterly data may provide a sharper estimate of earnings management behavior and thus increase the likelihood of detecting earnings manipulation (Jeter and Shivakumar 1999). Furthermore, since financial information for interim quarters is not audited, managers have greater discretion over interim financial reporting than annual reporting. The lockup agreements typically specify a lockup period of 180 days, therefore, two quarterly earnings announcements are released in the lockup period.

Fourth, I also explore whether earnings management behaviors follow a time pattern in the context of IPO. This study shows whether and when insiders strategically manage earnings during the IPO process by comparing earnings management during the Pre-IPO and lockup periods to earnings management in the post-lockup period.

In addition, this paper also contributes to the auditing literature by examining whether auditor reputation plays a monitoring role in the IPO lockup setting. A healthy and efficient capital market is vital to all market participants. Yet one of the characteristics of IPO firms is the information asymmetry between insiders and outsider investors. Information asymmetry may lead to market inefficiencies and high cost of capital. Therefore, the monitoring role of third-party specialists and their ability to reduce information asymmetry has attracted much interest from IPO firms, investors and regulators, as well as academic researchers. Going public through an IPO is an important event for the issuer. The IPOs may enable the issuer to raise additional capital to fund potential profitable projects and to borrow money on more favorable terms in a more liquid market relative to debt financing.

Overall, investors and regulators are concerned with earnings management in the new equity market. The IPO process provides both opportunity and incentives for earnings management due to limited public information being available to external investors. Earnings management is costly to investors as it allows for opportunistic behavior by management in order to maximize their personal wealth at the expense of external investors. Following prior research on underwriter and venture capitalists, I investigate whether high quality auditors mitigate earnings management in the IPO lockup context. Furthermore, I investigate whether financial statements that are audited exhibit less earnings management than those that are simply reviewed.

The rest of my dissertation is organized as follows. Chapter 2 reviews prior research on IPO and IPO lockups. Chapter 3 describes my motivation, theory and hypotheses development. Chapter 4 describes the research design. Chapter 5 introduces

the data source, sample selection process and data description. I present the empirical results and robustness tests in Chapter 6 and provide summary, conclusion and limitations of my research in Chapter 7.

# CHAPTER 2 LITERATURE REVIEW

IPO lockups have received great attention in the popular press and finance literature. Since my study relates to IPO lockups, earnings management and auditor quality, in this section I review previous studies on the role of IPO lockups, market reactions to the event of lockup expiration, earnings management in the context of IPO and the monitoring function of venture capitalists, underwriters, and auditors during the IPO process.

## 2.1 The role of lockups

The IPO Lockup provision is not required by law, but negotiated between the IPO issuer and its underwriter. One stream of prior studies explores motivations of IPO firms creating the lockup provision and the roles that a lockup provision can serve. They conclude that the lockup provision has two competing roles: a commitment solution to control the moral hazard problem and a signaling device to reduce adverse selection. The commitment hypothesis predicts a bonding solution where firms of *low quality* usually offer longer lockups. The signaling hypothesis predicts that only *high-quality* firms offer longer lockups.

Brav and Gompers (2003) employ a sample of 2,871 IPOs over the period of 1988 – 1996 and find evidence supporting the commitment solution but not the signaling hypothesis: firms that are unprofitable and not venture capital-backed, with low book-to-market ratio and lower-quality underwriters, have significantly longer lockup period.

Their results suggest that insiders of firms associated with greater potential moral hazard lock their shares for a longer period of time. Likewise, Chong and Ho (2007) examine IPOs in Singapore and find that firms with greater information asymmetry and moral hazard problems feature longer lockup periods.

Prior research examining the signaling hypothesis assumes that firm quality is not directly observable to external investors; hence, high-quality firms provide signals to communicate their high quality. For example, Brau et al. (2005) challenge the findings of Brav and Gompers (2003) and argue for the signaling hypothesis. They develop a model predicting that lockups will be shorter for firms with higher idiosyncratic risk. Their empirical results are consistent with the signaling theory.

In general, the signaling hypothesis argues that signaling is costly and only high-quality firma are willing to bear the costs. A lockup agreement can serve as a signal of high firm quality because holding undiversified portfolios is risky and imposes costs to insiders. If firms use lockups to signal, then only higher-quality firms would agree to longer lockups. Insiders of low-quality firms would be unwilling to bear the cost and risk of long lockups. Arthurs et al. (2009) investigate whether a longer lockup period is used as a *signal* of high quality to reduce investors' uncertainty and information asymmetries between potential investors and insiders. Using a sample of 640 IPO firms, they find a negative relationship between lockup period and venture capital backing and prestigious underwriting, indicating that a longer lockup period acts as a substitute signal to venture capital and prestigious underwriter backing. Likewise, Leland and Pyle (1977) develop a model in which entrepreneurs signal the value of their ventures by the percentage of

ownership retained. Entrepreneurs retaining higher ownership after IPO provide a signal that their ventures have higher value and less risk.

### 2.2 IPO underpricing and lockup provision

Recent studies also explore the relation between IPO underpricing and the lockup provision. Aggarwall et al. (2002) develop a model in which managers strategically underprice IPOs to enhance personal wealth from selling shares at lockup expiration. By underpricing the issue, the large run-up in stock price on the first day attracts interests of research analysts and the media. Analysts provide more recommendations and research reports for the hottest IPOs. This enhanced coverage attracts the attention of more investors, shifting upward the demand curve for the stock. Managers then exploit this additional demand and high stock price when they sell shares at lockup expiration. Using a sample of 618 IPOs from 1994 to 1999, they find that managerial ownership is positively correlated with first-day underpricing, underpricing is positively correlated with research coverage, and research coverage is positively correlated with stock returns and insider selling at the lockup expiration. Boulton et al. (2011) investigate whether earnings quality influence underpricing across a sample of 10,783 IPOs from 37 countries, they find that IPOs are underpriced less in countries where public firms produce higher quality earnings information.

### 2.3 Market reaction to IPO lockups

Prior research in finance and financial press focuses on the day of IPO lockup expiration as an important event with respect to stock price changes and investor trading behavior. An extensive body of research has documented significant price decline and

trading volume increase around the date of lockup expiration (i.e., Ofek and Richardson 2000; Field and Hanka 2001; Bradley et al. 2001; Brau et al. 2004). For example, Ofek and Richardson (2000) report a permanent price drop in the range of 1.15-3.29 percent and a corresponding 38 percent increase in trading volume. Based on a sample of 1,948 IPO lockup agreements from 1988 to 1997, Field and Hanka (2001) find that lockup expiration is associated with a significant three-day abnormal return of -1.5 percent and a permanent 40 percent increase in average trading volume. Bradley et al. (2001) use standard event study methods and report an average abnormal return of -0.74 percent on the lockup expiration day and a five-day cumulative abnormal return of -1.61 percent. Overall, empirical research provide evidence indicating that there is always price decline due to substantial insider sales and that the cumulative loss is not a transitory effect, but a permanent loss of firm value.

The terms in lockup agreements, the number of shares locked and the unlock date are disclosed in the IPO prospectus. Hence, they are public information and available to all investors. The efficient market hypothesis argues that stock market only responds to unexpected information. As such, investors should not respond to the lockup expiration and no abnormal returns should be observed around the unlock date. However, the significant market reactions documented in prior research are somewhat surprising. In a sense, the markets are not rationally reacting to anticipated information. The fact that stock market responds to a totally anticipated event documented in previous studies adds to the list of market anomalies.[3]

[3] Ritter (1998) conducts a review for issues related to IPO and lists three market anomalies: the new issue underpricing, "hot issue" markets, and the long-run underperformance. IPO underpricing refers to the large

Previous research also investigates whether certain firm-specific characteristics are related to the significant price and trading reactions at the IPO unlock day. Bradley et al. (2001) partition their sample into venture-capital-backed and non-venture-capital-backed firms and find that the negative returns are concentrated in firms with venture capital backing. For the venture-capital-backed group, the largest losses occur for high-tech firms and firms with the greatest post-IPO stock price increases. Similarly, Field and Hanka (2001) find that venture capitalists sell more aggressively than executives and other shareholders after lockup expires.

Tolia and Yip (2003) examine whether stock price reaction around IPO lockup expiration day is different for 'Hot' and 'Cold' IPOs.[4] They hypothesize that stock prices of Hot IPOs are less affected by the unlocking event, while for Cold IPOs, venture capitalists have a tendency to dispose of their shares in order to preempt further decline in their wealth. Contrary to what they expected, results indicate statistically significant decline in returns for hot IPOs.

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run-ups in share price on the first day of offerings. Underpricing IPO is costly to the issuer as it represents money "left on the table" and foregone wealth for the newly public firm. The "hot issue" markets refer to the periods of high average initial returns and rising volume. Post-issue underperformance refers to the poor long-run stock performance of issuing firms relative to non-issuing firms.

[4] Tolia and Yip (2003) define the IPO categories based on first day returns, which computed using the offer price and the first day closing price. 'Cold' IPOs are referred to those with first day returns of 0 percent or less, whereas IPOs with first day returns greater than 10 percent are defined as 'Hot' IPOs.

### 2.4 Monitoring role of venture capitalists, underwriters, and auditors

Numerous studies have examined the monitoring role of venture capitalists and underwriters in the IPO process. IPO firms are relatively unknown in the capital market and they are characterized by asymmetric information. Therefore, the monitoring role of third-party specialists and their ability to certify the value of securities have attracted much academic interest. Megginson and Weiss (1991) compare venture capital backed IPOs with a control sample of non-venture capital backed IPOs from 1983 through 1987 (matched by closest offering size in the same industry) and find that venture capital backing results in significantly lower underpricing and underwriting spreads. They conclude that venture capitalists play a certification role by reducing information asymmetries between insiders and public investors in IPO. Morsfield and Tan (2006) demonstrate that venture-backed IPOs are associated with lower IPO-year abnormal accruals (indicating less earnings management).

Another related body of work examines how underwriters resolve the asymmetric information inherent in the IPO process (DeAngelo 1981a; Beatty and Ritter 1986; Titman and Trueman 1986; Carter and Manaster 1990). For instance, Carter and Manaster (1990) provide evidence that prestigious underwriters are associated with lower risk offerings and less underpricing. Brav and Gompers (2003) report that stock price reactions at lockup expiration are lower for firms with high quality underwriter. Yip et al. (2009) find that short-term price momentum and long-term price reversal pattern is most pronounced for IPOs that are underwritten by leading investment banks and backed by venture capitalists.

Chang et al. (2010) investigate whether underwriter reputation *moderates* the relationship between earnings management and long-term performance of IPO firms. They argue that prestigious underwriters protect their reputation by carefully monitoring and certifying financial information of IPO firm, thereby limiting any potential earnings manipulation. Therefore, IPO firms associated with more prestigious underwriters will be associated with less earnings management. Consistent with the hypothesis, they find a significantly negative relationship between earnings management and post-offer stock performance only for those firms associated with less-prestigious underwriters, but not for those underwritten by more prestigious underwriters. Their findings suggest that prestigious underwriters restrict the extent of earnings manipulation, monitoring the quality of financial information. Similarly, Carter and Manaster (1990) find evidence indicating that the desire to protect their reputation leads higher-quality underwriters to market only low-risk IPOs.

### 2.5 Earnings management around IPOs

My study is closely related to previous research on earnings management around security offerings. This stream of research argues that strong information asymmetry around IPOs provides opportunity for earnings management and the fact that increased share price enhances insiders wealth provides incentive to exercise accounting discretion. Early studies primarily investigate whether firms manage earnings in the pre-IPO years or during the IPO year. Abnormal accruals are mainly used as a proxy for earnings management. Unusually high positive discretionary accruals are considered evidence of income-increasing earnings management.

However, the results of research on earnings managements in pre-IPO periods are somewhat mixed. For example, Aharony et al. (1993) use a sample of 229 industrial IPOs between 1985 and 1987 and examine whether entrepreneurs manipulate earnings in the periods prior to IPOs (one year and two years prior to IPOs). They find only weak support for the earnings management hypothesis prior to IPOs. In contrast to Aharony et al. (1993), Friedlan (1994) documents strong evidence of earnings management before the initial offering (one year prior to IPOs). He also finds that firms providing interim financial statements for a period after the most current annual statement make income-increasing discretionary accruals in the interim statements but not in the annual financial statements.

Teoh et al. (1998c) report evidence consistent with their hypothesis of opportunistic accruals management. IPO firms select abnormal accruals aggressively to report high earnings during the IPO year. Additionally, they examine IPO firms' individual accounting items and find that IPO firms use more income-increasing depreciation methods and report significantly less for uncollectible accounts receivable compared to a matched sample of non-issuing industry peers with similar performance. Taken together, the evidence is consistent with firms inflating earnings when going public by opportunistically managing earnings.

On the contrary, Beneish (2001) argues that, although equity offerings create situations in which managers have strong incentives to manipulate earnings, it may be premature to conclude intentional earnings management based on changes in discretionary accruals. Ball and Shivakumar (2008) further question the hypothesis of artificial earnings inflation as means of influencing IPO prices. They examine a sample of

UK IPOs and compare their financials prepared when the firms were private with financials subsequently restated for inclusion in public prospectuses. Contrary to popular belief and empirical evidence from previous studies, their empirical results indicate high earnings quality (more conservative) for financials in IPO prospectuses than those prepared initially in private status. They attribute this to the higher quality reporting demand of public firms by financial statement users, auditors, boards, analysts, and greater regulatory scrutiny. They conclude that substantial earnings management by IPO firms is less likely because it would attract enhanced scrutiny and increase litigation risk. Moreover, IPO firms are typical firms with high growth. The increase in discretionary accruals surrounding IPO could be due to appropriate changes in working capital and exogenous influences on business operation from IPO proceeds. IPO firms use IPO proceeds to invest in working capital items, which reduces operating cash flow relative to earnings and thus causes positive accruals. Therefore, the discretionary accrual estimates are biased in the IPO setting.

### 2.6 Post-IPO underperformance and earnings management

The post-IPO underperformance has been well-documented in the finance literature. Ritter (1991) first documents that IPO firms' stock returns are significantly less than those of a matched sample of non-IPO firms over the three-year period after the offerings. Loughran and Ritter (1995) further report that companies issuing seasoned equity offering also underperform relative to non-issuing firms for five years after the issues. Jain and Kini (1994) find a significant decline in operating performance subsequent to the IPO relative to their pre-IPO levels. Regarding the long-term underperformance of IPO firms, prior studies have offered a number of explanations. For

example, Ang et al. (2007) examine the Peso effect and predict that IPO underperformance may result from selecting a sample including too few star performers ex post than were expected ex ante. However, they find that IPO underperformance is unlikely to the result of the statistical Peso effect.

Early research also investigates the association between the long-run underperformance of IPO firms and earnings management. Researchers find that high abnormal accruals at the IPO year are followed by subsequent poor long-term stock performance. They argue that the opportunistic earnings management before IPO contributes to the post-IPO underperformance since earnings management using aggressive accrual cause subsequent poor firm performance due to accrual reversal. For example, Teoh et al. (1998a) examine whether earnings management explains the cross-sectional variation in post-IPO stock return underperformance. They find that issuers with higher discretionary accruals have poorer stock return performance in the subsequent three years. IPO firms in the most "aggressive" quartile of discretionary current accruals earn a cumulative abnormal return of approximately 20 to 30 percent less than the cumulative abnormal return of IPO firms ranked in the most "conservative" quartile. IPO firms make accounting adjustment (accruals) to boost their earnings relative to actual cash flow. When accruals are abnormally high, stock on average subsequently experience poor return performance. Greater earnings management in IPOs is associated with more optimistic errors in analyst earnings forecasts, and with more adverse subsequent long-run abnormal stock returns. Likewise, Teoh et al. (1998b) find a significant association between discretionary current accruals and underperformance for seasoned equity offerings (SEO).

Moreover, DuCharme et al. (2001) examine a sample of 171 IPOs from 1982 to 1987 and find that abnormal accruals during the offer year (and the preceding year) are negatively related to subsequent stock returns. In examining the interaction between earnings management and ownership retention, Fan (2007) reports that discretionary accruals are the highest in the IPO year and have strong predictive power per IPO firms' subsequent decline in operating performance, consistent with the hypothesis that IPO issuers manage earnings. Cotton (2008) compares the performance-matched discretionary accruals and the long-run abnormal stock performance of firms issuing only primary shares with those of firms issuing only secondary shares or a combination of primary and secondary shares. He also finds evidence supporting the hypothesis that earnings management contributes to the long-run underperformance of IPOs.

My study is also related to a recent study by Huang and Lin (2007), who investigate the relation between post-IPO earnings management (EM) and lockups based on a sample of Taiwanese firms. They measure the magnitude of EM using the performance-matching discretionary accruals (DAs) model developed by Kothari et al. (2005). They find positive DAs in the lockup periods and DAs are positively associated with subsequent insider selling activity.

My study differs from the Huang and Lin (2007) in at least three aspects. First, the study of Huang and Lin (2007) is based on a sample of Taiwanese firms, whose lockup provision is mandatory, all IPO firms are subject to the same length of lockup period since 1998, and Taiwanese insiders are constrained to two-stage lockups (four quarters in the first stage and eight quarters in the second stage). My paper uses a different sample of IPO firms in the US, where selecting a share lockup agreement is

completely voluntary, and share lockup is usually for 6 months. Second, I extend prior research to compare earnings management measures in the periods of pre-IPO and lockup with that at post lockup period. Third, my study examines the role of auditors in reducing earnings management in IPO lockup period.

### 2.7 Summary

Collectively, it has been well documented by prior research that the IPO process is characterized by information asymmetry inherent between insiders and outside investors, which provides opportunity for opportunistic earnings management. Hence, the role of third-party specialists who monitor and reduce information asymmetry has attracted much academic interest. Prior research has provided evidence that venture capitalists and prestigious underwriters are associated with lower risk offering, lower IPO underpricing, and less earnings management. Even though prior research suggests that there are both opportunities and incentives for earnings management around IPOs, empirical studies on earnings management in the pre-IPO periods report mixed results. In addition, prior research also documents significant stock price decline due to large insider sales at IPO lockup expiration. Following these notions, I argue that the insider selling at lockup expiration may provide a strong incentive for insiders to conduct income-increasing earnings management in the lockup period.

# CHAPTER 3 THEORIES AND HYPOTHESES

Going public through an IPO is an important event for the issuing company. Most companies start by raising capital from a small number of private investors. Often companies have to compensate investors for the lack of liquidity. At some point, private companies may find it more desirable to go public by selling stock to public investors. Once the stock is publicly traded on the market, the enhanced liquidity will improve the financial structure and enable the company to raise capital on more favorable terms at lower cost (Aharony et al. 1993; Ritter 1998).

Research shows that an IPO process is particularly vulnerable to earnings management, which allows for opportunistic behavior by managers to maximize their own utility at the expense of the external shareholders. Too much earnings management may distort the information content of earnings in a way that is costly to investors. If investors are guided by earnings that are manipulated but are unaware of that, they could pay an unrealistic price for their investment. Therefore, research on earnings management in the context of IPO is vital for a healthy and efficient capital market.

In the following section, I discuss the theories that I apply to support my hypotheses – theories that relate to information asymmetry, insider sales, and agency theory. I conclude this section by linking the theories to my hypotheses.

### 3.1 Information asymmetry and insider sales

I apply two theories to develop my hypotheses of earnings management at IPO lockup: information asymmetry and insider selling incentive. Information asymmetry with IPO firms is partly due to the scarcity of public information available in the market. For investors, there is relatively little public information available except the firm's prospectus, and little news or coverage by analysts about the firms released at IPO (Rao 1989). On the other hand, corporate insiders have superior information about the operating performance and true value of their firm. Even when analysts start issuing forecasts, they (and the issuers) are under pressure to make the most favorable earnings forecasts in order to meet financial analysts' forecasts and keep the newly issued share price from declining (Teoh et al. 1998a).

Information asymmetry at IPOs is common and has been well documented in prior research (Leland and Pyle1977; Hughes 1986; Titman and Trueman 1986; Brau et al. 2005). Managers have private information about the firm's current and future earnings trend that external shareholders do not have, hence they may take advantage of their private information to report earnings that result in maximum personal benefits. Richardson (2000) argues that shareholders do not have sufficient information to "see through" the managed earnings when information asymmetry is high.

The IPO lockup period is particularly vulnerable to earnings management. First, the typical information asymmetry between insiders and potential investors provides opportunities for earnings management. Brau et al. (2004) argue that the information asymmetry at the time of lockup expiration is even stronger than that at the IPO date because, at the lockup expiration date, the actual number of shares to be sold by insiders

is unknown to the market, whereas at the IPO date the number of secondary shares for sale must be disclosed in the prospectus. Therefore, insiders may take advantage of the opportunities to exercise discretion when preparing financial information and conceal adverse information because doing so will allow them to sell securities at a higher price.

Second, insider managers have incentives to report high earnings in the lockup period to influence market price favorably when they plan to sell their ownership shares at lockup expiration. When firms go public, the number of shares offered in the IPOs is a relatively small portion of the overall ownership. The majority of shares are pre-owned by the company's initial investors such as the founders, venture capitalists and management. Insiders are prohibited from selling immediately after the IPO due to the share lockup provision. On the day of lockup expiration, insiders are suddenly allowed to sell.

Prior studies have well documented that insiders, particularly venture capitalists, sell their shares at lockup expiration. Rajan and Servaes (1997) and Ofek and Richardson (2000) provide evidence that the negative abnormal returns at lockup expiration are driven by aggressive insider sales. And the aggressive insider sales create an excessive supply of shares which depresses share prices. Bradley et al. (2001) further explain that venture capitalists sell aggressively because they are not long-term, buy-and-hold investors, that the share price decrease at lockup expiration and the most noticeable spike in trading volume is the result of venture capitalists simply liquidating their positions and substantially increasing the supply of shares.

The lockup expiration day represents the first opportunity for firm founders and other initial investors to cash out their ownership stake in the firm. Insiders planning or

considering the sale of personal shares at lockup expiration have incentives to choose income-increasing earnings management and withhold negative information strategically to maximize personal wealth (Brau et al. 2004).

Third, accrual accounting provides managers an effective vehicle to engage in earnings management in the lockup period. Accrual accounting allows managers discretion over timing and amount when recognizing revenues and expenses. According to U.S. generally accepted accounting principles (GAAP), public firms are required to prepare their financial statements using accrual basis accounting instead of cash basis accounting, and accruals provide management discretions in recognizing revenues and expenses. Moreover, investors may not fully understand accrual accounting, therefore high reported earnings are directly valued into offering price. Above all, there is no market price to refer to at the time of an IPO when investors are estimating IPO firm value.

In general, high reported earnings increase share price, and the greater the share price, the greater will be the insiders' cash proceeds from cashing out shares (Aharony et al. 1993). The fact that increased share price enhances personal wealth provides insiders the incentive to manage earnings through accounting discretion. There is a rich literature on information content showing that financial statement information affects firm value and that accounting information is an input in the pricing of IPOs (Ball and Brown 1968; Hughes 1986; Titman and Trueman 1986).

### 3.2 Agency theory

The self-interest maximizing behavior of insider managers is explained in agency theory, which predicts that the principal and agent are motivated by their self-interests.

With the separation of ownership and control in the modern corporate environment, the principal cannot directly observe the agent's effort. So the principal writes the compensation contract to motivate the agent to work. The agent's compensation is tied to certain financials. A rational agent has economic incentives to manage earnings and engage in moral hazard, because doing so would increase his/her cash benefit and maximize personal wealth in the short run. The higher the reported earnings, the higher will be the agent's payout. The agent has an information advantage because he/she controls the firm's accounting system.

### 3.3 Hypotheses of EM in lockup and pre-IPO periods

I investigate whether insiders engage in earnings management during the lockup period. The SEC defines corporate insiders as the company's officers, directors and any beneficial owners of more than ten percent of a class of the company's equity securities. I focus on two categories of insiders: managers and venture capitalists (Darrough and Rangan 2005; Healy 2002). I assume that managers have an ownership stake in the firm and that venture capitalists can also influence the firm's decision making. Venture capitalists are active investors in the companies they finance. They usually sit on the boards of directors, provide advice, and hire key managers, etc. (Gompers and Lerner 1998). In return for their services, they receive contractually agreed-upon compensation. Therefore, venture capitalists also play an active role in the decision-making process of start-up firms (Gompers and Lerner 1996), so they could influence firms' financial reporting and disclosure choices around the time of IPO.

Empirical evidence indicates that significant insider sales always occur when lockup ends, which motivates me to predict that insiders may manage earnings upward to

keep their stock price high before they cash out at lockup expiration. Specifically, insiders may increase current accruals by advancing recognition of revenues with credit sales and/or by delaying recognition of expenses, and/or they may take real economic actions (e.g., reduce research and development expenditures or other capital investments) to achieve high reported earnings.

While prior studies argue that the IPO process provides both opportunities and incentives for earnings management, people may also argue that effective regulatory controls and monitoring procedures have been put in place so that substantial earnings management is less likely during the IPO process. One such regulatory control is the requirement that financial statements be audited. The financial statements reported in an IPO firm's prospectus are required to be audited by an independent auditor to certify the compliance with GAAP. Moreover, since 1989 with Statement of Auditing Standards 53, auditors are required to take steps to detect financial statement fraud. Second, compared with private firms, public firms are subject to a higher level of external monitoring and regulatory scrutiny. For fear of lawsuits and reputational damage, auditors and underwriters will exercise their due diligence and constrain the issuing firm from aggressive earnings management. Third, the reputational concerns of venture capitalists and entrepreneurs may also put an additional constraint on earnings management.

Ball and Shivakumar (2008) document more conservative financial reporting for IPO firms relative to those financials prepared when the firms were private because their auditors, underwriters, board, and analysts demand higher reporting quality and the enhanced scrutiny from regulators when firms go public. Venkataraman et al. (2008) examined the relation between audit risks, audit quality and audit fee in the IPO setting.

They found that pre-IPO accruals are negative and less than post-IPO accruals, indicating that issuers do not engage in opportunistic earnings management. Above all, many regulations and procedures have been introduced to control management opportunistic behavior, particularly in the IPO process.

On the other hand, since lockup provision and unlock date are public information and insiders will always sell and prices will always decline after lockup expires, why would investors buy at the end of the lockup period? In other words, who is hurt if earnings are inflated during the IPO lockup period? Prior research shows that investors tend to be optimistic when they pick up an IPO to invest in. Many would think this firm is going to be the next Microsoft or EBay. Many end up paying an unrealistic price and hence suffer great capital losses. I believe that those who get hurt by the earnings management are outside investors who do not have inside information and underestimate their investment risk; they purchase the firm's stocks between IPO and lockup expiration when the firm's value is overpriced by inflated earnings.

Furthermore, investors tend to buy when the price drops, not when the price is increasing. I argue that there are investors in the market who still buy at lockup expiration. When the firm's share price drops to a certain point at the end of the lockup period, some investors (whether informed or not) may believe that the firm's value is underpriced and thus it is a good time to take the long position. Nevertheless, the demands for shares may be less than supplies at the lockup expiration. Ofek and Richardson (2000) and Bradley et al. (2001) propose that the share price decline at lockup expiration is caused by a downward sloping demand curve and aggressive sales

by insiders such as venture capitalists. When insiders sell their shares, the public is asked to hold a greater number of shares (Field and Hanka 2001).

Therefore, I argue that the incentive from insider sales is stronger so insider managers are willing to take the risks and engage in earnings management. I predict that insiders planning or considering the sale of personal shares at lockup expiration have incentives to manage earnings upward during the lockup period. Hence, my first hypothesis states as follows:

**H1: IPO firms make income-increasing earnings management around the lockup period.**

Even though some prior studies argue that significant earnings management is less likely prior to IPO due to high reporting demand, a large body of research reports evidence of earnings management in the pre-IPO and IPO years. For example, Teoh et al. (1998a) document significant income-increasing discretionary accruals prior to IPO. They further argue that the incentives to manage earnings are likely to persist in the months immediately after the offering as insiders usually cannot dispose of their personal shares until after the lockup expires. Rangan (1998) also finds positive discretionary accruals before IPOs as IPO firms make great efforts to increase the offering price. Since previous studies on earnings management pre-IPO have yielded mixed results, whether insiders manage earnings prior to IPO, and to what extent, remains an empirical question and deserves further investigation.

Therefore, I explore whether insiders start inflating earnings in the pre-IPO period and continue managing earnings in the IPO lockup period. I divide the time around IPO

lockup into three phases: pre-IPO, lockup and post-lockup periods (see Figure 1). I define the fiscal quarter in which the IPO occurs as IPO Quarter (t=0) and the fiscal quarter in which lockup expires as Lockup Expiration Quarter (t=+2…+12). My lockup period begins with the IPO Quarter and ends with the Lockup Expiration Quarter.[5] The pre-IPO period is composed of four quarters prior to the IPO Quarter and the post-lockup period comprises four quarters after the Lockup Expiration Quarter.

If insiders plan to cash out their ownership at lockup expiration and the positive association between insider trading and earnings management documented in prior research also applies to the IPO setting, then the question comes to when insiders start opportunistic earnings management. I argue that insiders who plan to sell their ownership shares engage in income-increasing earnings management starting prior to IPO and continue to maintain inflated earnings during the lockup period in order to maximize personal wealth from selling shares at lockup expiration. I compare earnings management measures in the pre-IPO and lockup periods with those in the post-lockup period. Hence, my second hypothesis states as follows:

**H2: Firms exhibit higher levels of earnings management in the pre-IPO than in the post-lockup period.**

### 3.4 Hypotheses of auditor quality and EM in lockups

My next hypothesis relates to auditor quality and earnings management during the IPO lockup period. Assuming opportunistic earnings management does exist in the IPO

[5] Figure 1 indicates a two-quarter IPO lockup period, which is based on the typical 180 lockup days documented in prior research (Ofek and Richardson 2000; Field and Hanka 2001; Bradley et al. 2001). In my actual sample, this period varies from two to twelve quarters for different firms.

lockup period and earnings management is costly to investors, then an important question arises: are there any control processes that have been put in place to effectively mitigate such behavior? Prior studies have documented the role of underwriters and venture capitalists in reducing information asymmetry and earnings management (Megginson and Weiss 1991; Morsfield and Tan 2006; Titman and Trueman 1986; Chang et al. 2010). I further investigate in this study the incremental effect of prestigious auditors on mitigating earnings management behavior beyond the monitoring role of underwriters and venture capitalists, that is, whether auditor quality helps reduce earnings management in the IPO context. The IPO lockup period provides a unique setting to examine the role of auditor quality after controlling for prestigious underwriters and venture capitalists.[6]

An entrepreneur who decides to go public must hire an auditor to examine his/her firm's financial statements. Financial statements in the IPO firm's prospectus have to be audited. The demand for audit service arises from the agency problem between owner and management (Jensen and Meckling 1976; Watts and Zimmerman 1990). Management has the incentive to inflate earnings to maximize their personal wealth. Such information asymmetries create an adverse selection problem in that rational investors will only offer a low average price for the securities unless they can be credibly assured that the securities have higher than average quality. This adverse selection as described by Akerlof (1970) can lead to market inefficiency, and even market failure. One means of reducing the agency problem is to hire an independent auditor to monitor

[6] I control for underwriter reputation and venture capitalist-backing as prior research has documented evidence of significant monitoring role of underwriters and venture capitalists.

and credibly attest management assertions contained in the financial statements (Kinney 1988).

Firms use auditors with high reputations to signal their high quality. Prior studies report that firms switch auditors before going public. For example, Titman and Trueman (1986) develop a model to demonstrate that an entrepreneur with favorable information about his firm's value chooses a higher-quality auditor and investment banker than an entrepreneur with less favorable information. Carpenter and Strawser (1971) document that a significant number of firms switch from regional to "nationally known" auditors when they go public.

From the perspective of auditors, they have the incentive to investigate and report deviations since their reputation capital is reduced by ex post misstatements. High-quality auditors have more invested in reputation capital; they will have more to lose if they fail to detect material misrepresentations (DeAngelo 1981b). Aharony et al. (1993) examine whether the choice of auditors **(**and underwriters**)** is related to the extent of earnings management. They predict that managers of IPOs using prestigious auditors (underwriters) have less opportunity to manipulate income than managers of IPOs using less prestigious auditors (underwriters). They found weak evidence that earnings management was related to the quality of auditors (underwriters).

Beatty (1989) examines the relationship between auditor reputation and initial returns to investors of IPO firms. His study, which was based on a sample of 2,215 IPOs from 1975-1984, shows that IPO firms that hire more reputable CPA firms exhibit lower initial returns (less underpricing) than firms with less reputable auditors. Michaely and Shaw (1995) examine the relationship between auditor quality and characteristics of IPO

(risk, underpricing, and the long-term performance). They found that prestigious auditors are associated with significantly less risk and lower underpricing. They also found weak evidence that IPOs associated with the more prestigious auditors experience better long-run performance.

Overall, this suggests that high-quality auditors are more likely to curb earnings management in the IPO lockup period than low-quality auditors, when the earnings reports are audited. The IPO process is associated with high business and litigation risk. The Securities Act of 1933 mandates that auditors are liable for any false or misleading information about the prospectus of the issuer. Therefore, I predict that high-quality auditors are more conservative with their client's accounting choices and estimates. High-quality CPA firms have more invested in their reputational capital, therefore have more to lose if they fail to reveal material misrepresentations (DeAngelo 1981b). Any earnings management behavior is more likely detected by high quality auditors.

However, it is difficult for auditors to identify opportunistic real earnings management (REM) from normal operation adjustments based on optimal business decisions. Even when they suspect an opportunistic REM, it is not their direct responsibility to detect and report this kind of activity (Sohn 2011). Therefore, I only examine the relation between auditor quality and accrual-based earnings management and predict that prestigious auditors mitigate accrual earnings management around lockups, as follows:

**H3: IPO firms that hire higher-quality auditors are associated with less accrual-based earnings management in the pre-IPO and lockup periods than firms that hire lower-quality auditors.**

The quarters that fall in the IPO lockup period may be either the fiscal year end or the interim quarters. Financial reports for the fiscal year end quarter are audited, whereas interim financial reports are not required to be audited, but to be reviewed. Interim reviews are distinguished from annual audits in scope. An audit usually consists of physical inspection, confirmation from external parties or examination of documents, whereas a review consists of inquiries, analytical procedures and discussion. As of March 2000, the SEC requires all registrants to have their quarterly financial statements reviewed before those reports are filed with the SEC (SEC 1999). Before the SEC adopted the rule, firms could delay the review of their interim financial reports until the end of the fiscal year.

Extant research compares timely and retrospective interim reviews in the US. Ettredge et al. (2000) find that firms with timely reviews report a higher proportion of non-routine adjustments during the first three quarters than firms with retrospective reviews. Manry et al. (2003) show that timely reviews increase the relevance and reliability of reported earnings more than retrospective reviews; more specifically, quarterly earnings better reflect the economic information impounded in stock returns when the auditor reviews those earnings on a timely basis than earnings that are reviewed retrospectively.

Interim reviews generally offer a lower degree of assurance compared to an audit. For example, Kinney et al. (2004) estimate auditor quality using both interim and annual restatements. However, when analyzing data they exclude interim review of Form 10-Q and argue that annual audits are more intensive and carry more legal and regulatory responsibilities than do interim reviews. Alves and Dos Santos (2008) examine the

incremental information content of a sample of first and third quarter unaudited reports issued in Portugal in the period from 1994 to 2004. They find that, although the first and third quarter reports convey enough new information to spur price and trading reaction, the audited annual reports spur more significant price reactions than the unaudited quarterly reports. Krishnan and Zhang (2005) show that auditors' review reports are generally not attached in the 10-Q filings since the costs of disclosing audit review outweigh the benefits.

More recent studies focus on earnings management in firms' interim financial reports. Generally, management has more discretion in the preparation of *interim* reports than for annual reports. Mendenhall and Nichols (1988) document that management has more opportunity to manipulate interim earnings when the earnings reports are unaudited. The involvement of an auditor in interim reporting may enhance the effectiveness of the auditor's monitoring function and increase the quality of interim reports. Prior literature also indicates that timely auditor review and more auditor involvement in firms' financial reporting lead to fewer annual audit adjustments and less audit risk (Ettredge et al. 2000). Bédard and Courteau (2010) investigate the costs of interim review and its impact on the quality of interim financial statements (measured by quarterly unexpected accruals). Using a sample of 800 firms in the years 2004-2005 in Canada, they document that interim reviews are significantly associated with lower levels of absolute unexpected accruals in the fourth quarter but found no significant effect on the quality of financial statements in the first three quarters.

Based on prior studies, I predict that IPO firms whose quarterly financial statements in the lockup period are audited present less earnings management than when their financials are just reviewed. Hence my fourth hypothesis is stated as follows:

**H4: IPO firms whose financial statements in the lockup period have been audited are associated with less earnings management than firms whose lockup period financial statements have been reviewed**.

### 3.5 Hypothesis of insider selling incentives

Next, I predict that earnings management during IPO lockup is associated with subsequent insider sales. When a firm goes public through IPO, the owners typically sell only 15-20 percent of the company. The remaining 80-85 percent of shares is owned by the company's founders and other pre-IPO owners (Ofek and Richardson 2000). These insiders are prohibited from selling during the lockup period. Upon the expiration of the lockup period, they are free to sell their shares.

Prior studies have documented that insiders such as venture capitalists do sell at lockup expiration to diversify their portfolio and lock personal wealth. For example, Field and Hanka (2001) indicate that venture capitalists sell their shares more aggressively than do other pre-IPO investors. Bradley et al. (2001) suggest that venture-capitalist firms sell significantly more than non-venture-capitalist firms at lockup expiration. They conclude that venture capitalists are not long-term, buy-and-hold investors; they usually liquidate their positions immediately after lockup expiration.

Venture capitalists first raise money from investors and form a limited partnership, with the venture capitalist serving as general partner and the investors as limited partners. They usually make equity investments in young, high-risk, high-growth

companies. The most successful venture-capital-backed companies usually go public through IPO, merger or acquisition. Eventually venture capitalists will liquidate their position, either by selling shares on the open market and then paying those proceeds to investors (limited partners) in cash, or make distributions of shares to their limited partners.

More frequently venture capitalists distribute shares to their investors rather than cash out (Gompers and Lerner 1998). There are a number of reasons for the preference of share distributions over cash sales: to bypass insider sales restriction under SEC rules, tax motivations, to avoid negative effect on prices from selling shares, and compensation consideration, to mention just a few. Whether venture capitalists cash out or distribute shares should not influence the results of my study, as the incentive for earnings management remains when venture capitalists decide to distribute shares. They still want the price to be high as they calculate returns to their limited partners based on market price.

Extant research also examines the relationship between managers' insider transactions and earnings management; however, the results are mixed. For example, Dechow et al. (1996) use a sample of firms subject to accounting enforcement actions to investigate the motivations for earnings management. They find that managers do not appear to manipulate earnings in order to sell their holdings at inflated prices. In contrast, Bar-Gill and Bebchuk (2003) develop a model and argue that the incentive to misreport increases when managers intend to sell some of their stock holdings in the short-term. Trueman (1990) also argues that managers have the incentive to manipulate earnings when they plan to sell their ownership in the subsequent period. Park and Park (2004)

document evidence that current discretionary accruals are higher for firms whose managers sell their ownership in the subsequent period than for other firms, indicating that managers manipulate earnings before selling their ownership. Collectively, these studies suggest that accounting decisions are associated with insider trading and insider trading provides incentives for earnings management.

A competing argument in prior research, however, focuses on the monitoring role of venture capitalists. Venture capitalists hold a vast majority of their original investment for at least the duration of the lockup period. Morsfield and Tan (2006) conclude that venture capitalists play a monitoring role in lowering earnings management. Warfield et al. (1995) argue that managers with higher ownership are more likely to act in the interests of shareholders.

Furthermore, Rule 144 places additional restrictions on insider trading. Under Rule 144, a person who has beneficially owned restricted shares of common stock can sell the restricted securities only if the following five conditions are met: 1) the prescribed holding period must be met (at least one year); 2) there is adequate information available to the public regarding the historical performance of the security; 3) the amount to be sold is less than 1% of the shares outstanding and accounts for less than 1% of the average of the previous four weeks' trading volume; 4) all of the normal trading conditions that apply to any trade have been met; and 5) if wishing to sell more than 500 shares or an amount worth more than $10,000, the seller must file a form with the SEC before the sale (http://www.sec.gov/investor/pubs/rule144.htm). Due to Rule 144, insiders such as venture capitalists may not be eligible to sell even after the lockup expires. Gompers and Lerner (2002) observe that, on average, venture capitalists hold a majority of their shares for two

years after the initial offering. They typically distribute shares to their investors (limited partners) rather than cash out.

It is also possible for insiders to sell shares prior to the lockup expiration after receiving permission from the underwriters. The lockup agreement is not mandated by the SEC but an agreement between the lead underwriter and the IPO firm. Field and Hanka (2001) show that approximately one percent of firms in their sample allow early release and that early release is rare in their sample period. Ofek and Richardson (2000) also document that, although underwriters do allow early sales of shares by locked-up shareholders, the percentage of sales that are unlocked prior to expiration is generally small. They conclude that majority of shareholders sell after the lockup period to diversify their asset risk.[7]

I argue that insiders who plan to sell their ownership shares at lockup expiration have the incentive to manage earnings during the lockup period. I predict a positive association between insider selling incentives and earnings management during the IPO lockup period, as follows:

**H5: Earnings management in the lockup period is positively associated with insider selling incentives.**

[7] I examine a random sample of 100 IPOs in my sample and found a similar proportion for early release. I conclude that my analysis will not be affected by firms with early lockup expiration.

### 3.6 Summary

In summary, insider sales at lockup expiration provide incentives to inflate earnings in the lockup period. The information asymmetry and scarcity of public information during the IPO process make earnings management possible and outside investors may not see through the managed earnings. I also apply agency theory to explain the self-interest maximizing behavior of managers in the lockup period. I predict that insider managers who plan to sell personal shares at lockup expiration manage earnings upward during the lockup period. Based on prior research, it is possible that IPO firms start managing earnings in the pre-IPO period; therefore, I hypothesize that earnings management in the pre-IPO and lockup periods is significantly higher than in the post-lockup period. To examine the insider selling incentive hypothesis, I predict that earnings management is positively associated with subsequent insider selling incentive. Finally, I investigate whether high auditor quality reduces earnings management in the IPO context and predict that prestigious auditors mitigate earnings management around lockups.

# CHAPTER 4 RESEARCH DESIGN

In this chapter, I develop my research design to assess whether earnings have been inflated by insider managers during the IPO lockup period and whether auditor quality effectively mitigates earnings management. I first discuss measures of earnings management. I use discretionary current accruals (DCA), discretionary total accruals, and two proxies of real activities management to measure earnings inflation around lockup expiration. I conclude this chapter with empirical models to test my hypotheses.

## 4.1 Measures of earnings management

Since earnings management behavior is not directly observable, whether or not managers deliberately manipulate earnings has been debatable. Nevertheless, prior research has developed a number of proxies to measure earnings management. In general, earnings management measures are classified into two broad categories: accrual-based accounting measures and real-activity measures. Accrual-based accounting measures include accounting accruals, earnings smoothness, timely loss recognition, meet-or-beat earnings targets, and earnings persistence (Dechow et al. 2010). Real-activity measures refer to those actions managers take to adjust operating cash flows. Examples of real earnings management include discretionary spending on R&D, advertising, and maintenance, timing of asset sales, and so on.

In this study, I adopt three approaches to better capture insiders' accounting choice and financial reporting behavior during the IPO process. First, since prior studies

indicate no single measure of earnings management that is superior to others, I include discretionary current accruals, discretionary total accruals, and two proxies of real activities to estimate earnings management around IPO lockup expiration. Second, I use quarterly data instead of annual data to improve measurement quality. Prior research mainly uses annual data in examining earnings management. However, earnings inflation and subsequent accrual reversal may occur in the same fiscal year. As a result, using annual data may not capture the dynamic nature of earnings management. Third, I examine earnings management simultaneously in the pre-IPO and post-IPO lockup periods. Due to the lockup provision, insiders are not allowed to sell their shares until the lockup ends. However, it is not clear when insiders start managing earnings: prior to IPO or post-IPO. I partition the IPO process into three periods: pre-IPO, lockup, and post-lockup (where post-lockup is treated as a control period).

A firm's reported earnings consist of cash flows and accounting accruals. Given that managers have discretion in accounting of accruals, such accruals may be subject to earnings management. Following prior studies, I use discretionary current accruals (DCA) and discretionary total accruals (DTA) as my primary measures of earnings management. In addition to discretionary accruals, recent studies document that firms may manage earnings through adjusting real operating activities (e.g. Roychowdhury 2006; Cohen et al. 2008; Cohen and Zarowin 2010). I use abnormal cash flow from operations and discretionary expenses to examine real earnings management during the IPO lockup period.

### 4.1.1 Accrual-based earnings management

Prior studies on earnings management around IPOs primarily rely on accrual-based measures to estimate earnings management (AEM). For example, Friedlan (1994) uses discretionary accruals developed by DeAngelo (1986) with accruals in an earlier period as a benchmark and adjustment for growth. He also uses non-IPO firms (in the same industry and year) as control samples. Chang et al. (2010) measure earnings management using DCA and performance-adjusted DCA (Kothari et al. 2005). Fan (2007) uses discretionary accruals estimated from cash flow statements and adjusted for a performance-matched firm's discretionary accruals suggested by Kothari et al. (2005).

To calculate DCA, prior studies first decompose total accruals into current and non-current components. Current accrual adjustments involve only current assets and liabilities, while non-current accrual adjustments involve long-term assets and liabilities. However, positive accrual adjustments are not necessarily evidence of earnings management. Kaplan (1985) reports that accruals vary with the firm's economic condition. Given the economic condition of an individual firm, some accrual adjustments are appropriate and better predict the firm's future cash flow while others are not (Teoh et al. 1998a). Therefore, it is necessary to decompose accruals into nondiscretionary (normal) accruals, which are determined by the economic condition, and discretionary (abnormal) accruals, which is an indication of earnings management.

In order to obtain a benchmark for expected accruals and identify the discretionary component of accruals, extant studies have developed various models using either cross-sectional or time series data. The Jones (1991) model uses a time-series approach by regressing total accruals on variables expected to explain the

nondiscretionary accruals. The modified Jones model by Dechow et al. (1995) uses cross-sectional data and obtains a benchmark for normal accruals from a matched sample of a non-issuing firm. The performance-adjusted accrual model by Kothari et al. (2005) requires both time series and cross-sectional data. They obtain a benchmark for expected accruals from a matched sample of non-IPO matched firms with industry, year and closest ROA.

Following Teoh et al. (1998a), I use DCA as my primary proxy for magnitude of earnings management. DCA has been frequently used as a proxy for earnings management because managers have more discretion over short-term than long-term accruals (Guenther 1994). Managers can increase current accruals through accelerating recognition of revenues or deferring recognition of expenses.

Current accruals (CA) are defined as the change in noncash current assets minus the change in current liabilities. The nondiscretionary component of current accruals is the expected accruals, which is calculated using the modified Jones (1991) model by estimating a cross-sectional regression. I use the cross-sectional approach to estimate the benchmark for expected accruals because a time series approach is infeasible for IPO settings. For each IPO firm, I select a matched sample of all non-issuing firms (firms not issuing IPOs or SEOs in the testing period) in the same industry (based on a two-digit SIC code), year and quarter. I regress CA on the change in sales using the matched non-issuing sample. Thus, I run the following cross-sectional regression to calculate expected CA for firm i in period t; all variables are scaled by lagged total assets:

$$\frac{\mathrm{CA_{j,t}}}{\mathrm{AT_{j,t-1}}} = \mathrm{a_0}\left(\frac{1}{\mathrm{AT_{j,t-1}}}\right) + \mathrm{a_1}\left(\frac{\Delta \mathrm{S_{j,t}}}{\mathrm{AT_{j,t-1}}}\right) + \varepsilon_{j,t} \quad (1)$$

where,

$CA_{j,t}$ = Δ[accounts receivables + inventory + other current assets] - Δ[accounts payable + tax payable + other current liabilities];

$AT_{j,t-1}$ = Total assets for the estimation sample j at period t-1; and

$\Delta S_{j,t}$ = Change in sales from period t-1 to t.

Then, NDCA is calculated using the estimated coefficients in the above model after subtracting the change in the trading receivables from the change in sales revenues:

$$NDCA_{i,t} = \hat{\alpha}_0 \left(\frac{1}{AT_{i,t-1}}\right) + \hat{a}_1 \left(\frac{\Delta S_{i,t} - \Delta AR_{i,t}}{AT_{i,t-1}}\right) + \varepsilon_{i,t} \quad (2)$$

where,

$NDCA_{i,t}$ = Nondiscretionary current accruals for firm i at period t; and

$\Delta AR_{i,t}$ = Change in account receivable for firm i in period t.

All other variables have been previously defined. Hence, $\hat{a}_0$ and $\hat{a}_1$ are the estimated intercept and slope coefficient respectively. Following Teoh et al. (1998a), I subtract the change in trade receivables from change in sales to allow for the possibility of credit sales manipulation. Finally, the difference between CA and NDCA is considered DCA, which is used as a proxy for earnings management in this study.

$$DCA_{i,t} = \frac{CA_{i,t}}{AT_{i,t-1}} - NDCA_{i,t} \quad (3)$$

Following prior research in earnings management, I also use DTA as a measure of earnings management (Teoh et al. 1998c; Cohen et al. 2008; Cohen and Zarowin 2010). I use the Dechow et al. (1995) cross-sectional modified Jones model to estimate expected total accruals. I also add return on assets (ROA) to the model as suggested by Kothari et al. (2005) to control for extreme operating performance. Total accounting accruals are defined as the difference between reported net income and operating cash flows. The

modified Jones model is estimated for each industry (based on two-digit SIC code), year and quarter as follows:

$$\frac{\mathrm{TA_{j,t}}}{\mathrm{AT_{j,t-1}}} = \beta_0 \left(\frac{1}{\mathrm{AT_{j,t-1}}}\right) + \beta_1 \left(\frac{\Delta \mathrm{S_{j,t}}}{\mathrm{AT_{j,t-1}}}\right) + \beta_2 \left(\frac{\mathrm{PPE_{j,t}}}{\mathrm{AT_{j,t-1}}}\right) + \beta_3 ROA_{j,t} + \varepsilon_{j,t} \qquad (4)$$

where,

$\mathrm{TA_{j,t}}$ = Total accruals measured as net income minus cash flow from operation;

$\mathrm{PPE_{j,t}}$ = The gross property, plant and equipment; and

$\mathrm{ROA_{j,t}}$ = Return on assets, measured as net income divided by total assets.

Using the coefficients obtained from equation (4), I calculate the normal level of total accruals, and non-discretionary total accruals (NDTA) in each industry, year and quarter as follows:

$$\mathrm{NDTA} = \hat{\beta}_0 \left(\frac{1}{\mathrm{AT_{i,t-1}}}\right) + \hat{\beta}_1 \left(\frac{\Delta \mathrm{S_{i,t}} - \Delta \mathrm{AR_{i,t}}}{\mathrm{AT_{i,t-1}}}\right) + \hat{\beta}_2 \left(\frac{\mathrm{PPE_{i,t}}}{\mathrm{AT_{i,t-1}}}\right) + \hat{\beta}_3 \mathrm{ROA_{i,t}} + \varepsilon_{i,t} \qquad (5)$$

Then DTA is the difference between total accruals and the NDTA ("normal" total accruals) from the fitted model.

$$\mathrm{DTA_{i,t}} = \frac{\mathrm{TA_{i,t}}}{\mathrm{AT_{i,t-1}}} - \mathrm{NDTA_{i,t}} \qquad (6)$$

In the section for sensitivity tests, I use the performance-matched DCA advanced in Kothari et al. (2005) to test the robustness of my accrual-based earnings management measures.

### 4.1.2 Real earnings management

In addition to earnings management through accounting accruals, managers may have incentives to manage real activities to meet certain earnings targets or to avoid debt covenant violation. Graham et al. (2005) provide evidence suggesting that managers

prefer real earnings management (REM) activities compared to AEM. Zang (2012) studies the tradeoff between accrual management and real manipulation and find that managers determine real manipulation before accrual management. Cohen et al. (2008) show that managers switched from accrual-based to REM after the Sarbanes-Oxley Act (SOX). Cohen and Zarowin (2010) argue that firms tend to utilize more real activity adjustments as real earnings management is less likely to be scrutinized by auditors and regulators.

Compared to accrual-based earnings management, real activity adjustments affect a firm's cash flow; therefore, the consequences of such activities can be economically significant to the firm. Gunny (2010) examines the consequences of real earnings management and find evidence that it has a significantly negative impact on future operating performance.

Cohen and Zarowin (2010) identify at least two reasons for managers to manage earnings through real activities rather than through accruals. First, real activities are less likely to draw auditor attention or regulatory scrutiny than accounting accruals. Second, relying on accrual management alone is risky. If all accrual-based strategies are used and reported income still falls below the target, managers would be left with no choice as they cannot adjust real activities at the end of the fiscal period.

Prior studies on real earnings management focus on the opportunistic reduction of R&D expenses. Other methods of real activities management include reduction in selling, general, and administrative (SG&A) expenditure, the timing of asset sales to report a gain, boost sales by offering deep discount or more lenient credit terms, and overproduction to decrease COGS. For example, Dechow and Sloan (1991) find evidence

that CEOs decrease R&D spending toward the end of their tenure to increase short-term earnings. Darrough and Rangan (2005) examine whether insiders conduct real earnings management (influence R&D expenditures) when they sell their shares after IPOs. Using a sample of 243 IPOs from 1986 to 1990, they document that change in R&D spending in the year of the IPO is negatively related to managerial selling. Their evidence is consistent with managers' reduction in R&D spending to increase current earnings before they sell their ownership after IPO. Bartov (1993) provides evidence consistent with managers timing their asset sales so that gains from these sales smooth negative earnings change and mitigate debt covenant violation. Roychowdhury (2006) find evidence that firms try to avoid reporting losses by offering price discounts to increase sales, overproducing to lower cost of goods sold, and/or reducing discretionary expenditures. Cohen and Zarowin (2010) find that SEO firms engage in real activities manipulation, and the decline in post-SEO performance due to the real activities management is more severe than that due to accrual management.

Despite the increasing interest in real earnings management, there is little research to date on real earnings management around new equity offerings. I investigate whether insiders engage in real activities management during the IPO lockup period. Following prior research on real earnings management and models developed by Dechow et al. (1998) and applied by Roychowdhury (2006), Cohen and Zarowin (2010) and Zang

(2012), I use two metrics to examine the level of real earnings management activities: abnormal cash flow from operation (ACFO) and discretionary expenses (ADisEx).[8]

CFO represents cash flow from operation as reported in the statement of cash flows. Managers may attempt to temporarily increase sales by offering price discounts or more lenient credit terms. The additional sales will increase current period earnings, assuming the margins are positive. However, the price discount and more lenient credit terms will results in lower cash flows in the current period.

Discretionary expenses include R&D expenses, selling, general and administrative (SG&A) expenses and advertising expenses. Reducing such expenses results in higher current period earnings, assuming such expenditures do not generate immediate revenue and income.

I first calculate the normal level of CFO and discretionary expenses using the model developed by Dechow et al. (1998) and implemented in Roychowdhury (2006) and Cohen and Zarowin (2010). Recent studies by Gunny (2010) and Zang (2012) also provide evidence on the validity of these proxies.[9] Consistent with prior studies, I express

[8] I do not include production cost proxy in my analysis of real earnings management as this is a method that can only be fully utilized by manufacturing companies (Roychowdhury 2006; Alhadab et al. 2013) and manufacturing companies make up only 24% of my sample.

[9] Dechow et al. (1998) develop a model that relates a firm's earnings to its cash flows and accruals based on some assumptions: sales follow a random walk, accounts receivables at the end of the period are a constant fraction of current period sales (i.e. $AR_t = \alpha S_t$). They also assume that all expenses vary with sales, so expense for period t is $(1-\pi) S_t$, where $\pi$ is the net profit margin on sales. Hence, earnings can be expressed as: $E_t = \pi S_t$. Following the assumption that target inventory is a constant fraction of the next period's forecasted cost of sales, working capital (accounts receivable + inventory – accounts payable) is

normal CFO as a linear function of sales and change in sales. To estimate normal CFO, I run the following model for each industry and year:

$$\frac{CFO_{j,t}}{AT_{j,t-1}} = \alpha_0 \left(\frac{1}{AT_{j,t-1}}\right) + \beta_1 \left(\frac{S_{j,t}}{AT_{j,t-1}}\right) + \beta_2 \left(\frac{\Delta S_{j,t}}{AT_{j,t-1}}\right) + \varepsilon_{j,t} \quad (7)$$

where,

$CFO_{j,t}$ = Normal (expected) cash flow from operation for sample j at quarter t.

$TA_{j,t-1}$ = Total assets at quarter t-1.

$S_{j,t}$ = Sales for quarter t; and

$\Delta S_{j,t-1}$ = Change in sales from quarter t-1 to t.

All other variables have been previously defined. Abnormal CFO is the actual CFO minus the normal CFO calculated for each industry and year using the estimated coefficients from equation (7).

Based on the assumptions of Dechow et al. (1998), normal discretionary expenses (DisEx) are also expressed as a linear function of sales (all expenses vary with sales). However, when one considers the situation where firms manage sales upward to increase reported earnings, running the model would result in significantly lower residuals. To address this issue, I model normal discretionary expenses as a function of lagged sales instead of current sales:

$$\frac{DisEx_{j,t}}{AT_{j,t-1}} = a_0 \left(\frac{1}{AT_{j,t-1}}\right) + \beta_1 \left(\frac{S_{j,t-1}}{AT_{j,t-1}}\right) + \varepsilon_{j,t} \quad (8)$$

The abnormal DisEx is calculated as the difference between the actual values and the respective normal values estimated from equation (8). I use these two variables as proxies

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simply expressed as change in sales ($WC_t = S_t - S_{t-1}$). Hence, cash flow from operation is expressed as: $CFO_t = E_t - WC_t = \pi S_t - \delta(S_t - S_{t-1})$.

for real earnings management. Significantly low levels of cash flow from operations and low discretionary expenses are indicators of real earnings management.[10]

### 4.2 Using quarterly data instead of annual data

Prior studies mainly use annual data in examining earnings management around IPOs. However, earnings inflation and subsequent accrual reversal may occur in the same fiscal year. As a result, using annual data may underestimate the magnitude of earnings management around IPOs. Friedlan (1994) finds firms that provide interim financial statements after the most current annual statements make income-increasing discretionary accruals in the interim statements but not in the annual statements.

The information content and value relevance of quarterly earnings information has been well documented in prior research.[11] Recent studies use quarterly data to detect

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[10] Following Bartov (1993), Gunny (2010), and Zang (2012), I use gain/loss on asset sales (GLS) as an alternative measure to test the robustness of REM measures (see later discussion). First, I estimate the normal level of gain on asset sales using the following model:

$$\frac{GLS_{j,t}}{AT_{j,t-1}} = \alpha_0\left(\frac{1}{AT_{j,t-1}}\right) + \beta_1\left(\frac{PPES_{j,t}}{AT_{j,t-1}}\right) + \beta_2\left(\frac{IS_{j,t}}{AT_{j,t-1}}\right) + \beta_3\left(\frac{\Delta S_{j,t}}{AT_{j,t-1}}\right) + \varepsilon_{j,t}$$

where, $GLA_{j,t}$ is gain/loss from sale of fixed assets for sample j at quarter t, $PPES_{j,t}$ is sales of property, plant and equipment, $IS_{j,t}$ is sales of investment, and $\Delta S_{j,t}$ is the change in sales from period t-1 to t-1. I estimate this model for each industry and year. Abnormal level of GLS (AGLS) is measured as the residual from the estimation model.

[11] Kiger (1972) first documents significant price changes and trading volume during the three days surrounding quarterly earnings announcements, indicating that interim reports are used by investors. Morse (1981) shows that the most significant price changes and excess trading volume occur the day prior to the announcement. In addition, Buchheit and Kohlbeck (2002) find an increase in informativeness of

potential earnings management and the results are mixed. For example, Das et al. (2009) report that potential earnings management is more likely to occur in the fourth quarter relative to the interim quarters, indicating that managers have greater incentives to manage annual rather than quarterly results. Likewise, Thomas and Zhang (2002) find unusual patterns of COGS scaled by sales in the fourth fiscal quarter as evidence of earnings management. Barton and Simko (2002) use quarterly data and provide evidence consistent with the hypothesis that managers' ability to optimistically bias earnings decreases with the extent to which net asset values are already overstated on the balance sheet. In addition to the main test using annual data, Zang (2012) provides validity tests of the four real earnings management proxies using quarterly data.

Prior studies have also examined whether audit reviews of interim reports are value relevant to investors. By comparing the earnings response coefficients (ERC) and the stock price reaction to the 10-Q filing, Krishnan and Zhang (2005) show that ERC is positively associated with the disclosure of the audit review report and significant cumulative abnormal returns around 10-Q filing, indicating that the review report adds to the information content of earnings announcements.

My study focuses on earnings management behavior during the IPO lockup period using quarterly data**.** By using quarterly data, I expect to make a more precise estimate of earnings quality. The lockup agreements typically specify a lockup period of 180 days. During this period of time, two quarterly earnings announcements are released. For the purpose of examining the time of earnings management around IPOs, I define

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quarterly earnings announcements over the past 23-year period from 1975 through 1997; however, they also find that this increasing price reaction to earnings is driven only by larger firms.

three phases around the IPO date: the pre-IPO period, the lockup period, and the post-lockup period (See Section 4.3.2 and Figure 1).

### 4.3 Empirical models to test the hypotheses

I investigate whether insiders manage earnings upward before they cash out their ownership at IPO lockup expiration and whether auditor quality mitigates opportunistic earnings management behavior in the IPO lockup context. In this section, I develop my empirical models to test my hypotheses.

#### 4.3.1 The basic model

I start with the following model from Morsfield and Tan (2006) and Chang et al. (2010):

$$EM_{i,t} = a_0 + \beta_1 UW_i + \beta_2 VC_i + \beta_3 Big4_i + \beta_4 SEO_i + \beta_5 Hi\text{-}Tech_i + \beta_6 Age_i + \beta_7 \Delta CapEx_{i,t} + \beta_8 \Delta S_{i,t} + \beta_9 Proceeds_i + \beta_{10} Underprice + \beta_{11} ROA_{i,t} + \beta_{12} Loss_{i,t} + \beta_{13} CFO_{i,t} + \beta_{14} LnAT_{i,t} + \beta_{15} LEV_{i,t} + \beta_{16} OpCycle_{i,t} + \beta_{17} CapInt_{i,t} + IND + Year + \varepsilon_{i,t} \quad (9)$$

where,

$EM_{i,t}$ = Levels of earnings management for firm i at quarter t, measured by DCA, DTA, ACFO, and ADisEx;

$UW_i$ = Underwriter ranking with the value 0-9 from the Ritter website at http://bear.warrington.ufl.edu/ritter/ipodata.htm;

$VC_i$ = Dummy variable equals one if the IPO firm is venture capitalist-backed, and zero otherwise;

$Big4_i$ = Dummy variable equals one if the auditor is one of the Big Four auditors, and zero otherwise;

$SEO_i$ = Dummy variable equals one if the firm subsequently conducted a seasoned equity offering, and zero otherwise;

$Hi\text{-}Tech_i$ = Indicator variable that equals 1 if the IPO firm is in the high-tech industry (data obtained from SDC), and 0 otherwise;

$Age_i$ = The IPO firm age measured as the natural logarithm of one plus the firm's age [ln(1+age)], where firm age is calculated as the difference between the IPO issue-year and the founding year;

$\Delta CapEx_{i,t}$ = Change in capital expenditure from quarter t-1 to quarter t, scaled by total assets in quarter t-1;

$\Delta S_{i,t}$ = Firm growth measured as change in sales from quarter t-1 to quarter t for firm i, scaled by the sales in quarter t-1;

$Proceeds_i$ = Offer price multiplied by total number of primary shares issued for firm i;

$Underprice_i$ = Measured as the ratio between the offer price and the first-day closing price minus the offer price [(closing price – offer price)/ offer price];

$ROA_{i,t}$ = Return on assets calculated as the ratio of net income to total assets;

$Loss_{i,t}$ = Dummy variable for firms that report a loss in quarter t;

$CFO_{i,t}$ = Cash flow from operations;

$LnAT_{i,t}$ = Firm size measured by the natural logarithm of total assets at quarter t;

$LEV_{i,t}$ = Financial leverage calculated as the ratio of total liabilities to total assets;

$OpCycle_{i,t}$ = Operating cycle, calculated as $\frac{(AR_t + AR_{t-1})/2}{(\frac{Sales}{360})} + \frac{(INV_T + INV_{T-1})/2}{(\frac{COSG}{360})}$;

$CapInt_{i,t}$ = Capital intensity calculated as the ratio of gross PPE to total assets at quarter t;

IND = Industry dummy; and

Year = Year dummy

I first include a set of variables to control for the monitoring role of underwriter reputation, venture capital backing, and auditor quality. Prior studies have demonstrated that prestigious underwriters and venture capitalists play a monitoring role by reducing information asymmetry and/or earnings management (Titman and Trueman 1986; Carter and Manaster 1990; Brav and Gompers 2003; Morsfield and Tan 2006; Fan 2007). For example, Morsfield and Tan (2006) demonstrate that venture-backed IPOs are associated with lower IPO-year abnormal accruals (indicating less earnings management). Therefore, I include underwriter (UW) ranking and venture capitalist-backing (VC) as control variables in the model. I measure underwriter quality following Loughran and Ritter (2004) with updated underwriter ranking data from the Ritter website (http://bear.warrington.ufl.edu/ritter/ipodata.htm), where underwriter reputation is ranked on a scale of 0-9, where 9 is the most prestigious underwriter and 0 is the least prestigious. I expect the coefficients on both variables to be negative. I also include an indicator variable Big4 to control for audit quality. Beatty (1989) and Michaely and Shaw (1995) provide evidence that prestigious auditors are associated with significantly less risk and lower underpricing. Becker et al. (1998) and Krishnan (2003) find evidence that higher-quality auditors play a significant monitoring role in detecting and mitigating accrual-based earnings management. I expect the coefficient on Big4 to be negative.

The second set of variables is included to control for the opportunities and incentives for earnings management. Healy and Wahlen (1999) review and list three major incentives for firms engaging in earnings management: capital market motives (i.e., to meet or beat analyst earnings forecast, to influence new equity offering),

contracting motives (i.e., to maximize executive compensation, to avoid debt covenant violation), and regulatory motives (i.e., to meet industry requirements or anti-trust regulations). Accordingly, I include a set of variables to control for various incentives and opportunities for earnings management. In order to control for regulatory motives, I delete sample firms in the financial and utility industries.

Teoh et al. (1998b) document that subsequently issuing seasoned equity offerings (SEOs) provides incentives for earnings management. Hence, I include an indicator variable SEO and predict the coefficient on SEO to be positive. Hi-Tech, Age, ΔS and ΔCapEx measure growth opportunities. Hi-Tech is a dummy variable that equals to one if the IPO firm is in the high-tech industry. Age is calculated as the natural logarithm of one plus the age of the firm before going public, where age is the difference between the founding year and the IPO year. ΔSales measures change in sales from quarter t-1 to quarter t for firm i, scaled by the sales in quarter t-1. ΔCapEx is the change in capital expenditure from quarter t-1 to quarter t scaled by total assets at quarter t-1 (Rangan 1998; Teoh et al. 1998a; Cohen and Zarowin 2010).Younger and high-growth firms build a substantial part of firm value from highly uncertain growth opportunities, making it easier for management of these firms to manage earnings. Hence, high growth firms are more likely to experience high discretionary accruals due to increased sales revenue and have more uncertainty regarding the firm valuation. Therefore, I expect the coefficients on changes in sales (ΔS) and capital expenditure (ΔCapEx) growth to be positively, and Hi-Tech and firm age (Age) to be negatively associated with earnings management.

Following prior research, I also control for IPO underpricing (Underprice) and IPO proceeds (Proceeds) (Chang et al. 2010). IPO proceeds are calculated as the offer

price multiplied by total number of primary shares issued. Underprice is measured as the ratio between offer price and first-day closing price minus offer price. Prior studies have found evidence that the first-day IPO underpricing is positively associated with post-IPO stock returns and insider selling (Aggarwall et al. 2002) and negatively associated with earnings information quality (Boulton et al. 2011). Similarly, prior research has found that IPOs with larger proceeds have more incentive to inflate earnings (DuCharm et al. 2004; Teoh et al. 1998d). Therefore, I expect the coefficients on Underprice and Proceeds to be positive.

Kothari et al. (2005) show that operating performance is associated with the magnitude of discretionary accruals, thus I include three variables to control for operating performance and profitability: return on asset (ROA), cash flow from operation (CFO), and Loss (Gunny 2010; Chang et al. 2010). Firms with high operating performance have less incentive to conduct earnings management. Roychowdhury (2006) finds evidence that firms reporting loss are more likely to manage earnings. I expect the coefficient on Loss to be positive and the coefficients on ROA and CFO to be negative.

Leverage (LEV) captures financial structure. I use the ratio of total liabilities to total equity to measure LEV. Aharony et al. (1993) provide evidence that earnings management is more pronounced among firms with large financial leverage. Morsfield and Tan (2006) argue that highly leveraged firms have high incentives to manipulate earnings upwards in order to avoid covenant violation, but these firms may also face greater monitoring debt holders. Thus, I do not have a specific prediction for the coefficient on LEV.

I include the natural logarithm of total assets (LnAT) to measure firm size. Prior studies suggest firm size is positively associated with accrual quality (Brau et al. 2004). Larger firms are expected to have greater information available to markets and are more closely followed by analysts, which reduces the opportunity for earnings management. Therefore, I expect the coefficient on LnAT to be negative.

Prior anecdotal and empirical evidence indicates a reversal in the pattern of quarterly earnings changes. A firm performing poorly in the interim quarterly may attempt to increase earnings of the fourth quarter, whereas a firm performing well in interim quarters may attempt to decrease earnings of the fourth quarter to build a reserve for the future (Das et al. 2009). Accordingly, I include in my model operating cycle (OpCycle) and capital intensity (CapInt) to control for quarterly fixed effect. Finally, I include controls for industry (IND) and year (Year) fixed effect.

### 4.3.2 Test on earnings management at IPO lockup and pre-IPO periods

My first hypothesis H1 predicts income-increasing earnings management by IPO firms during the lockup period. Hypothesis H2 predicts that IPO firms engage in income-increasing earnings management in the pre-IPO period relative to the post-lockup period. To test these two hypotheses, I add two dummy variables, Pre-IPO and Lockup, into the basic model developed in the previous section. I divide my sample into three periods: pre-IPO, lockup and post-lockup periods. Figure 1 illustrates my time line. I define the pre-IPO, lockup, and post-lockup periods based on the actual firm-specific IPO offer date and lockup expiration date reported from SDC (see Section 3.3). The post-lockup period is my estimation period or control period. To better capture the normal level of firm

accounting choice, I define my post-lockup period to include four-quarterly data after lockup expiration. Hence I test H1 and H2 using the following regression model:

$$EM_{i,t} = a_0 + \mathbf{\beta_1 Pre\text{-}IPO_{i,t}} + \mathbf{\beta_2 Lockup_{i,t}} + \beta_3 UW_i + \beta_4 VC_i + \beta_5\, Big4_i + \beta_6 SEO_i + \beta_7 Hi\text{-}tech_i + \beta_8 Age_i + \beta_9 \Delta CapEx_{i,t} + \beta_{10} \Delta S_{i,t} + \beta_{11} Proceeds_i + \beta_{12} Underprice + \beta_{13} ROA_{i,t} + \beta_{14} Loss_{i,t} + \beta_{15} CFO_{i,t} + \beta_{16} LnAT_{i,t} + \beta_{17} LEV_{i,t} + \beta_{18} OpCycle_{i,t} + \beta_{19} CapInt_{i,t} + IND + Year + \varepsilon_{i,t} \quad (10)$$

where,

$Pre\text{-}IPO_{i,t}$ = Dummy variable that equals one if the firm-quarter observation is in the pre-IPO period, and zero otherwise.

$Lockup_{i,t}$ = Dummy variable that equals one if observation is in the lockup quarters, and zero otherwise.

All other variables have been previously defined. I compare earnings management measures in the pre-IPO and lockup periods with those in the post-lockup period. In this analysis, the post-lockup period is used as a control base. I believe that the post-lockup period serves as an appropriate control because these sample firms are homogenous to the firms in the pre-IPO and lockup periods, the only difference being that in the post-lockup period the insider selling incentive does not exist or at least becomes less influential. A significant positive coefficient on Pre-IPO and Lockup will be consistent with H1 and H2, indicating the existence of earnings management at both the pre-IPO and lockup periods relative to the post-lockup period

### 4.3.3 Test on the impact of auditor quality

My second set of analyses examines whether auditor quality mitigates the opportunistic earnings management behavior in the pre-IPO and IPO lockup periods.

Following prior research, I use auditor size (Big4) as a proxy for auditor quality, which is the two-tier classification scheme of Big-Four versus non-Big-Four auditors. I use the following regression to test H3:

$$EM_{i,t} = a_0 + \beta_1 \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \mathbf{\beta_3\ Pre\text{-}IPO_{i,t} \times Big4_{i,t}} + \mathbf{\beta_4 Lockup_{i,t} \times Big4_{i,t}} + \beta_5 UW_i + \beta_6 VC_i + \beta_7\ \text{Big4}_i + \beta_8 SEO_i + \beta_9 \text{Hi-Tech}_i + \beta_{10} Age_i + \beta_{11} \Delta CapEx_{i,t} + \beta_{12} \Delta S_{i,t} + \beta_{13} Proceeds_i + \beta_{14} Underprice + \beta_{15} ROA_{i,t} + \beta_{16} Loss_{i,t} + \beta_{17} CFO_{i,t} + \beta_{18} LnAT_{i,t} + \beta_{19} LEV_{i,t} + \beta_{20} OpCycle_{i,t} + \beta_{21} CapInt_{i,t} + IND + Year + \varepsilon_{i,t} \quad (11)$$

All variables have been previously defined. My variables of interest are the two interaction terms. I predict that the coefficients on the two interaction terms will be negative.

### 4.3.4 Test on annual audit versus interim review

Hypothesis H4 predicts IPO firms present lower levels of earnings management in the pre-IPO and lockup periods when the quarterly financial statements are audited than when their financials are just reviewed. I use the following regression model to test H4:

$$EM_{i,t} = a_0 + \beta_1\ \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \mathbf{\beta_3\ Pre\text{-}IPO_{i,t} \times Audit_{i,t}} + \mathbf{\beta_4 Lockup_{i,t} \times Audit_{i,t}} + \beta_5 UW_i + \beta_6 VC_i + \beta_7\ \text{Big4}_i + \beta_8 SEO_i + \beta_9 \text{Hi-Tech}_i + \beta_{10} Age_i + \beta_{11} \Delta CapEx_{i,t} + \beta_{12} \Delta S_{i,t} + \beta_{13} Proceeds_i + \beta_{14} Underprice + \beta_{15} ROA_{i,t} + \beta_{16} Loss_{i,t} + \beta_{17} CFO_{i,t} + \beta_{18} LnAT_{i,t} + \beta_{19} LEV_{i,t} + \beta_{20} OpCycle_{i,t} + \beta_{21} CapInt_{i,t} + \beta_{22} Audit_{i,t} + + IND + Year + \varepsilon_{i,t} \quad (12)$$

where,

$Audit_{i,t}$ = Dummy variable that equals one if the sample firm i is audited at quarter t, and zero otherwise.

All other variables have been previously defined. My variables of interest are the two interaction terms. I predict that the coefficients on the two interaction terms will be negative.

### 4.3.5 Test on earnings management and insider sales

Hypothesis H5 predicts that earnings management around IPO lockup is associated with insiders' incentives to sell. I predict that insiders with higher ownership are more likely to sell after lockup expiration to diversify their portfolio and lock up their personal health, and insiders who plan to sell tend to engage in income-increasing earnings management to increase stock price and hence their investment returns. I use insider ownership as a proxy for insider selling incentive.

I argue that high managerial ownership may lead managers to focus on short-term stock prices, thereby leading to incentives for earnings management. Cheng and Warfield (2005) document evidence that managers with high equity incentives are more likely to sell in the subsequent period. Dechow and Sloan (1991) demonstrate that CEOs spend less on R&D expenditures to improve short-term earnings performance during their final years in office. Brav and Gompers (1999) and Field and Hanka (2001) find that firms with a greater percentage of shares locked up suffer larger declines in value surrounding lockup expiration, indicating a positive association between insider ownership and insider sales. Fan (2007) finds evidence that ownership retention is associated with earnings management during the IPO.

I predict that the higher ownership shares insiders hold, the more likely they will sell to diversify their portfolio and reduce risk, and the higher incentive to manage earnings upward in order to maximize personal wealth and potential benefit from

earnings management. Following Fan (2007), I use pre-IPO ownership as a proxy for insider selling incentive, which is measured as number of shares owned by pre-IPO owners divided by numbers of shares outstanding immediately after IPO. To test hypothesis H5, I estimate the following cross-sectional regression:

$$EM_{i,t} = a_0 + \beta_1 \text{Pre-IPO}_{i,t} + \beta_2 \text{Lockup}_{i,t} + \mathbf{\beta_3\ Pre\text{-}IPO_{i,t} \times Owner_{i,t}} + \mathbf{\beta_4 Lockup_{i,t}} \times \mathbf{Owner_{i,t}} + \beta_5 UW_i + \beta_6 VC_i + \beta_7\ \text{Big4}_i + \beta_8 SEO_i + \beta_9 \text{Hi-Tech}_i + \beta_{10} Age_i + \beta_{11} \Delta CapEx_{i,t} + \beta_{12} \Delta S_{i,t} + \beta_{13} Proceeds_i + \beta_{14} Underprice + \beta_{15} ROA_{i,t} + \beta_{16} Loss_{i,t} + \beta_{17} CFO_{i,t} + \beta_{18} LnAT_{i,t} + \beta_{19} LEV_{i,t} + \beta_{20} OpCycle_{i,t} + \beta_{21} CapInt_{i,t} + \beta_{22} Owner_{i,t} + IND + Year + \varepsilon_{i,t} \quad (13)$$

where

$Owner_{i,t}$ = Number of shares owned by pre-IPO owners divided by numbers of shares outstanding immediately after IPO.

All other variables have been previously defined. My variable of interest is Owner. A significantly positive coefficient on Owner will be consistent with H5.

I acknowledge the limitation of using insider ownership to estimate insider selling as not all insiders with high ownership are motivated to sell. In fact, one stream of research documents a bonding role of ownership – the higher managerial ownership, the more likely the manager's economic interest is in line with that of the firm. For example, Warfield et al. (1995) argue that managers with higher ownership are more likely to act in the interests of shareholders. They demonstrate that firms with higher managerial ownership have lower magnitudes of discretionary accruals. Consistent with the bonding role of managerial ownership, Brau et al. (2004) find that percentage of management ownership after IPO is positively related to cumulative abnormal return surrounding the

lockup expiration, indicating that managers with higher ownership are less likely to sell their shares at lockup expiration. For future research, I will use actual insider sales data to directly test the relationship between earnings management in lockup period and insider sales post-lockup expiration.

### 4.4 Summary

In this chapter, I describe measures of earnings management and the empirical models used to test my hypotheses. I use both accounting accruals and real activities measures to estimate earnings management around the IPO lockup period. Because IPO firms are rather new, a time series approach is infeasible in this setting, I use a cross-sectional approach to estimate benchmarks for both expected accruals and normal levels of real earnings management (CFO and discretionary expenses) based on a sample of non-IPO firms, matched by industry (based on two-digit SIC code) and year. Then I develop my empirical models following Morsfield and Tan (2006) and Chang et al. (2010). I include in the model a set of control variables that may influence earnings management measures.

# CHAPTER 5 SAMPLE SELECTION AND DATA DESCRIPTION

In this section, I report the procedures used to derive my sample, discuss my sample characteristics and descriptive statistics, and present estimations of AEM and REM measures. Finally, I provide and discuss a time-series distribution of the AEM and REM measures.

## 5.1 Sample selection

I collect IPO data from the Securities Data Company (SDC) and financial data from Compustat Quarterly. The initial full sample consists of 4,312 US IPOs between 1996 and 2010 from the Global New Issues database of the SDC. Table 1 presents my sample selection process. Consistent with prior studies on IPOs and earnings management, I exclude offerings consisting of close-end funds, real estate investment trusts (REITs), reverse leveraged buyouts, any spinoffs, limited partnership, shares of beneficial interest (SBI), foreign corporations, American depository receipts (ADRs), unit issues.[12] These restrictions result in a sample of 3,147 offers (1,165 offers are eliminated). I further require offer prices to be greater than $1 and with IPO lockup

[12] I use both SDC flag and CRSP share code to identify and remove certain offerings. For example, to delete close-end funds, I use SDC flag and CRSP share code 14; to delete REITs, I use the SDC REIT type code and CRSP share code 18.

information and underwriter data available. This procedure eliminates 896 offers, leaving a sample of 2,251 US common stock offerings from the SDC.

I also require firms to have sufficient financial data from Compustat Quarterly to calculate accrual-based and real earnings management measures. I further require each sample firm to have at least nine quarterly observations (four-quarterly data in the pre-IPO period, one-quarterly data in lockup period, and four-quarterly data in the post-lockup period). Furthermore, for inclusion in the sample, an offering firm must have at least eight non-IPO peers in the same industry (based on two-digit SIC) and quarter to facilitate the estimation of expected accruals and REM measures. I also require necessary data to calculate all control variables included in the models. Finally, I exclude firms in the financial (SIC 60-69) and utility (SIC 49) industries as they are highly regulated industries with different accounting rules. These restrictions further eliminate 1,507 IPOs, leaving a final sample of 744 unique firms with 7,500 firm-quarter observations. This selection procedure likely introduces a survivorship bias into the sample, resulting in a sample consisting of larger, more successful firms, as noted by Cohen et al. (2008), Cohen and Zarowin (2010), and Alhadab et al. (2013). However, I expect that this bias will reduce the variation in my earnings management metric, resulting in a more conservative test of earnings management.

To test the insider selling incentive hypothesis, I use data from SDC, which provides number of shares outstanding before IPO, shares outstanding after IPO, and market value before IPO for a limited number of firms. I use number of shares outstanding before IPO divided by number of shares immediately after IPO to calculate insider ownership percentage prior to IPO (Owner). Merging the full sample with the

insider ownership data from SDC results in a smaller sample consisting of 485 IPO firms and 4,900 firm-quarter observations for the period from 1996 to 2010.

## 5.2 Data description

### 5.2.1 Sample characteristics

Table 2 presents the sample characteristics and descriptive statistics. Panel A provides the distribution of IPO firms by year for the full sample. Consistent with prior IPO research, there is some clustering in time. Approximately 71 percent of sample IPO firms are concentrated in four years from 1996 to 1999. This is not surprising, as the stock market boomed during this period due to the dot-com IPO bubble. The lowest numbers of IPOs in my sample are in 2001, when the dot-com bubble crashed, and in 2008 as the result of the recent financial crisis. Panel B presents the distribution of IPO firms by industry using two-digit SIC codes. My sample represents a wide selection of 55 different industries. At the same time, there is also a concentration of IPOs in computer, electronic, chemical products, and high-technology industries (SIC codes 28, 35, 36, 38, 73).They make up about 54.3 percent of the total sample. Overall, my sample exhibits similar characteristics to samples used in prior IPO research (Teoh et al. 1998a; Morsfield and Tan 2006; Chang et al. 2010), indicating that IPOs clustered both in time and by industry.

Panel C of Table 2 reports the post-IPO firm characteristics and descriptive statistics for the full sample. Panel D of Table 2 presents descriptive statistics for the insider ownership sample. The mean market value immediately after IPO is about $400 million, but the median is only $170 million, both about four to five times the post-issue

book values ($317 million in mean and $125 million in median for the insider ownership sample). The mean (median) book-to-market ratio (BTM) is 28 (25) percent. The mean of total assets (AT) is $209 million and the mean of sales is $49 million ($139 million and $34 million, respectively, for the insider ownership sample). The significantly high mean and low medians in these values suggest skewness in both samples. To address this issue, I take the natural logarithm of total assets as a control variable for firm size in my cross-sectional analyses. Using log transformation should be able to mitigate the skewness problem.

My sample IPO firms report a mean loss of -0.65 million in the post-IPO period and a return on assets (ROA) of -2 percent (one percent in median). Before going public, my sample firms have existed for a mean (median) of 15 (8) years. In general, IPO firms are young firms. The offer prices average about $12.08 per share (median $12 per share), IPO firms raise average proceeds of $77.7 million (median $40 million), underpriced by 19 percent (median 10 percent), and with an average lockup period of 215 days (median 180 days). The mean value of Owner indicates that, on average, the number of shares owned by pre-IPO owners make up 72 percent of shares outstanding after IPO, consistent with prior research that the majority of ownership is retained by pre-IPO owners. The mean underwriter reputation ranking (UW) in my IPO sample is 6.98 (median 8.00) on a scale of 0-9; about 41 percent of the IPOs in my sample are venture-backed, the majority of IPOs (90 percent) are audited by the Big-Four auditors, and 53 percent of IPOs belong to the high-tech industries. The insider ownership sample exhibits similar firm characteristics to the full sample in terms of IPO age, net income, ROA, offer price,

proceeds, etc. Overall, these firm characteristics are consistent with prior research and suggest that both my samples are representative of IPOs in the sample period.

### 5.2.2 Estimation of AEM and REM

Table 3 presents descriptive statistics for variables used to estimate "normal" levels of current accruals (CA), total accruals (TA), cash flow from operation (CFO), and discretionary expenses (DisEx), using a matched sample of all non-IPO firms in the same industry (based on two-digit SIC code), the same year and quarter for each IPO firm. The estimation also requires at least eight observations in each industry and quarter. Consistent with prior research, all variables are scaled by total assets of prior period and all continuous independent variables are winsorized at 1 percent and 99 percent to minimize the influence of potential outliers. The estimations in Table 3 are based on a matched non-IPO sample of 294, 321 firm-quarter observations. The mean (median) of "normal" level of CA is -0.1484 (-0.0001) and mean (median) of TA is -0.3560 (-0.0331) across all industries and during the sample period between 1996 and 2010. They are consistent with prior research in magnitude and direction (e.g., Jeter and Shivakumar 1999). The mean and median of CA and TA are negative, and the mean is smaller than the median. Similarly, the mean (median) level of CFO is -0.1946 (0.0249) and the mean (median) level of DisEx is 0.1319 (0.046).

Table 4 reports the regression coefficients used to estimate nondiscretionary ("normal" level) CA, TA, CFO and DisEx (see Section 4.1). I estimate these models using a matched sample of non-IPOs with 294,321 firm-quarter observations. Industry-quarters with less than eight observations are excluded from the estimation. The table

reports the mean coefficients across industry-quarter. T-statistics are computed using the standard errors of the mean coefficients across industry-quarters.

The coefficients of variables in the four regressions are all significantly different from zero. All coefficients are consistent with prior research in terms of magnitude and signs (Dechow et al. 1998; Roychowdhury 2006; Zang 2012).[13] The mean adjusted $R^2$ of the four regressions ranges from 3.13% to 28.69%, which is comparable to the explanatory powers in prior research.

### 5.2.3 Time-series distribution of AEM and REM measures

Table 5 reports the time-series distribution for the four measures of earnings management: DCA, DTA, ACFO, and ADisEx, all scaled by prior period total assets, from quarter -4 to quarter +6 relative to the IPO quarter.[14] The mean DCA change over time from significantly negative at quarter -4 (-0.162, significant at 1% level) to significantly positive at quarter -1 up to quarter +3 (0.021, significant at 1%), then become negative again, though insignificant, at quarters + 4 and + 6. A similar time-series pattern is also observed with the mean DTA. Consistent with my hypothesis of

[13] There is one exception with the coefficient of $\Delta S_t$ in the CFO model. My estimated coefficient on $\Delta S_t$ is negative and significant (-0.0313, t=9.25), which is consistent with Dechow et al. (1998) but not consistent with that of Roychowdhury (2006). The coefficient on $\Delta S_t$ in Roychowdhury (2006) is significantly positive. Roychowdhury (2006) explains that this is due to difference in assumptions; Dechow et al. (1998) assume that net income is determined by contemporaneous sales and is independent of prior-period revenues, which is unlikely to be "descriptive of real data" in Roychowdhury (2006).

[14] The majority of firms in my sample have a lockup period from quarter 0 to quarter +2. Among the 744 sample IPO firms, 640 firms (86%) have a lockup period of two quarters; the rest of the firms (104 firms, about 14% of sample) have a lockup period ranging from three to twelve quarters.

income-increasing earnings management around the IPO lockup period, I find significant positive abnormal current accruals and total accruals.

Interestingly however, I find negative and significant abnormal accruals in the pre-IPO period, indicating that managers do not inflate earnings before IPO. These results are consistent with Ball and Shivakumar (2008), who document more conservative reporting in IPO prospectuses as the result of higher reporting standard and greater regulatory scrutiny for public firms. The finding of negative accruals in pre-IPO period is also consistent with Venkataraman et al. (2008) and Aharony et al. (1993), who also document negative accruals in the pre-IPO period. The negative abnormal accruals prior to IPO could be the result of firms taking a big bath strategy to enable them to meet positive earnings target in the lockup period.

The time-series distribution of the two real earnings management proxies also shows some interesting results. Prior research finds evidence that firms may inflate earnings through sales discount and/or reducing discretionary expenses. Thus, lower than normal levels of cash flow from operation and discretionary expenses are indications of real-activity earnings management. Table 5 reports negative and significant abnormal cash flow from operation (ACFO) in the early pre-IPO period from quarter -4 to quarter -3 and significant negative abnormal discretionary expenses for all the four quarters in the pre-IPO period. Consistent with my prediction, my sample IPO firms exhibit earnings-enhancing real-activities in the pre-IPO period. However, both real-activities measures become either significantly positive or remain negative but insignificant for the rest of the quarters in the lockup period and post-lockup period. This is not surprising as prior research also reports positive abnormal discretionary expenses in the period immediately

following new equity offerings (Cohen and Zarowin 2010). These abnormal real-activities measures in the periods following IPO, with the opposite direction to what occurs prior to IPO, suggest that managers do not engage in real earnings management simultaneously with accruals-based earnings management during lockup period. Similarly, Cohen and Zarowin (2010) argue that managers may adjust expenditures and cash flow in response to new offerings so that abnormal real behavior is minimized in the long run.

Table 6 presents the Pearson (upper-triangle) and Spearman (lower-triangle) correlation coefficients between selected continuous variables in my earnings management models for the full sample of 7,500 firm-quarter observations. The main variables of interest are DCA, DTA, ACFO, and ADisEx. In the Pearson correlation, DCA is significantly and positively correlated with DTA (0.987), which is not surprising as both DCA and DTA are measuring the discretionary component of reported earnings. The two proxies of accrual-based earnings management (DCA and DTA) are not correlated with the two real-activities measures (ACFO and ADisEx), suggesting that firms engaging in accrual-based earnings management do not conduct real activities manipulation at the same time. Consistent with prior studies, the correlation coefficient between ACFO and ADisEx is significantly negative (-0.025). This implies that some manipulation strategies, for example sales discount that decreases cash flow, have a negative effect on discretionary expenses (Cohen and Zarowin 2010). Total asset (LnAT) is positively correlated with underwriter reputation (0.561) and proceeds (0.585), indicating that large firms usually have their IPOs underwritten by more prestigious underwriters and tend to have larger size offerings. All significant correlations between

the other variables are relatively low and less than 0.5, suggesting that multicollinearity is less likely. The results in the Spearman measure are very similar to those in the Pearson measure.

# CHAPTER 6 EMPIRICAL RESULTS

In this chapter, I discuss the empirical results for my hypotheses of earnings management around IPO lockup expiration, and the role of auditors and insider selling incentives, followed by sensitivity analyses to evaluate the robustness of my main findings.

## 6.1 Earnings management around IPO lockup expiration

H1 predicts income-increasing earnings management around IPO lockups and H2 further predicts earnings management in the pre-IPO period in connection with the post-lockup period. I use two accrual-based earnings management (DCA and DTA) and two real-activities earnings management (ACFO and ADisEx) proxies to estimate earnings manipulation. My primary variables of interest are the two indicator variables: Lockup and Pre-IPO. I use the four earnings management measures separately as my dependent variable and regress on Lockup and Pre-IPO plus a set of control variables.

Table 7 presents the results of four regression analyses for my hypotheses H1 and H2. The mean adjusted explanatory powers for the four models range from approximately 3.2 percent to 33.2 percent, which are comparable to prior literature. In the DCA column, the coefficients on control variables are generally consistent with prior studies. Results show that Big4, ΔCapEx, Proceeds, Underprice, ROA, Loss, CFO, OpCycle, and CapInt are important factors in explaining discretionary current accruals. The coefficient on Big4 is

negative and significant (t = -1.71), suggesting that auditors with a higher reputation are more likely to mitigate earnings management. Consistent with my prediction of monitoring function, the coefficients on UW and VC are negative but insignificant. ΔCapEx and ΔS are included to control for firm growth. Consistent with my prediction, the coefficient on ΔCapEx is positive and significant (t=2.33), indicating that managers of firms with high growth opportunities and uncertainty are more likely to mislead investors through earnings management. The coefficient on ΔS, though positive, is insignificant. Similar results are observed for control variables in the DTA, ACFO and ADisEx models.

When DCA is used as a dependent variable, the coefficient on Lockup is positive and significant (0.027, t=3.29) after controlling for other variables, indicating that IPO firms engage in income-increasing earnings management during the lockup period. Consistent with hypothesis H2, the coefficient on pre-IPO is positive and marginally significant (0.021, t=1.77). Therefore, H2 is supported. My sample firms exhibit income-increasing earnings management in the lockup and pre-IPO periods in connection with the post-lockup period.

In the DTA column, however, the coefficient on Pre-IPO remains positive but not statistically significant, while the coefficient on Lockup becomes negative but insignificant. Therefore, I do not find evidence of earnings management through total accrual adjustment.[15] This is not surprising as prior studies have documented that

[15] In the subsequent analyses on auditor quality, annual audit and insider selling incentives, I find similar and insignificant results when using DTA, ACFO and ADisEx. Therefore, I mainly report results from using DCA to estimate earnings management for all subsequent tests.

managers have more discretion over short-term than long-term accruals (Guenther 1994; Teoh et al. 1998a). I also acknowledge that my quarterly data with a sample period of about ten quarters may not be able to capture long-term accrual adjustment by management.

Consistent with my hypothesis that managers may increase current-period earnings through sales discount (resulting in lower CFO) and/or reducing expenditures, all the coefficients on Pre-IPO and Lockup under the ACFO model and ADisEx model are negative (with the exception of coefficient on Lockup under the ADisEx model), however, these estimated coefficients are not statistically significant. Therefore, I do not find evidence that my sample firms engage in real-activities management during the pre-IPO and lockup periods. This may be due to my sample period (from 1996 to 2010) that includes the financial crisis incurred around 2008, which may have significantly impacted firms' operating activities. Since my sample period is different from prior studies, a direct comparison of the results may not be appropriate.[16]

### 6.2 Auditor quality and annual audit around lockups

My third hypothesis predicts that high-quality auditors constrain accrual-based earnings management in the pre-IPO and lockup periods.[17] Consistent with prior

[16] For example, Roychowdhury (2006) use a sample of firms between 1987 and 2001; Cohen and Zarowin (2010) select a sample over the 1987 to 2006 period; and Gunny (2010) uses a sample covering the years from 1988 to 2002.

[17] I drop the DTA, ACFO, and ADisEx measures for the audit quality analysis and all subsequent tests as my results from using these three measures are insignificant. Prior studies also indicate that managers have more discretion over short-term than long-term accruals (Guenther 1994). The prior regression results of

research, I use an indicator variable Big4 to measure auditor quality. The Big4 column of Table 8 provides results to test H3. The estimated coefficients on Pre-IPO and Lockup remain positive and significant, indicating the presence of earnings management in the pre-IPO and lockup periods. All control variables are consistent with prediction in sign. The results also show that variables such as ΔCapEx, Proceeds, Underprice, ROA, CFO, OpCycle, and CapInt are significant factors in explaining the variation in DCA. My variables of interest are the two interaction terms: Pre_IPO*Big4 and Lockup*Big4. The coefficient on the interaction term of Lockup*Big4 is negative and highly significant (-0.1592, t=-4.60). The coefficient on Pre-IPO*Big4, though negative, is not statistically significant. Hypothesis H3 is supported. These results suggest that sample firms audited by big-four auditors exhibit significantly less accrual earnings management around IPO lockup expiration after controlling for other factors.

Hypothesis H4 predicts that IPO firms experience lower levels of earnings management during the fiscal year-end quarters, when the financial statements are audited, than in the interim quarters, when the financial data are just reviewed. Regression results are presented in the Audit column of Table 8. My variables of interest are the two interaction terms: Pre-IPO*Audit and Lockup*Audit. Consistent with hypothesis H4, the coefficient on the interaction term Lockup*Audit is negative and significant (-0.0426, t=-2.44). The estimated coefficient on Pre-IPO*Audit is negative; however, the negative coefficient is not statistically significant. Overall, I find that IPO firms experience lower levels of earnings management in the lockup periods when their

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my earnings management indicate that managers are less likely to engage in earnings manipulated through long-term discretion.

financial statements are audited than in the interim quarters when their financials are just reviewed.

### 6.3 Insider selling and earnings management around IPO lockup expiration

My last hypothesis, H5, examines whether earnings management around the IPO lockup period is motivated by insider sales documented in prior research. I use pre-IPO insider ownership (Owner) as a proxy for insider selling incentive, measured as a ratio of number of shares owned by pre-IPO insiders to total number of shares outstanding immediately after IPO. My dependent variable is DCA, a proxy for earnings management. My variables of interest are the two interaction terms: Pre-IPO*Owner and Lockup*Owner. To test my hypothesis H5, I estimate the regression equation (13) over the insider sample of 485 IPO firms with 4,900 firm-quarter observations.

Results are presented in Table 9. The estimated coefficients on Pre-IPO and Lockup remain positive and significant, indicating income-increasing earnings management in the pre-IPO and lockup periods. All control variables are consistent with prediction in sign. The results also show that variables such as UW, Underprice, LnAT, CFO, OpCycle, and CapInt are significant factors in explaining the variation in DCA. The coefficients on the interaction term of Lockup*Owner and Pre-IPO*Owner, though positive as predicted, are not statistically significant, therefore, I do not find evidence to support H5. I acknowledge the limitation of using pre-IPO insider ownership to proxy insider selling incentive, as not all insiders with high ownership are more motivated to sell. For future research, I will use other proxies such as net insider sales to directly test the relationship between earnings management at IPO lockups and subsequent insider sales.

### 6.4 Sensitivity tests

In this section, I conduct additional analyses to test the robustness of my findings. I start with the performance-adjusted discretionary current accruals measure and then use gain/loss on asset sales (GLS) as alternative measures of accrual-based and real-activities earnings management. I separate VC-backed firms from non-VC-backed firms to test whether venture capitalists (as insiders) are different from managers. Furthermore, I conduct a two-stage analysis to address the issue of endogeneity in auditor choice. Finally, I consider sample firms that report negative book values.

In order to test whether my findings hold for different measures of accrual-based earnings management, I follow Kothari et al. (2005) and employ the performance-adjusted discretionary current accrual (ADCA) approach. Specifically, I match each IPO firm with one non-IPO firm in the same two-digit industry and quarter with the closest ROA. Then I estimate discretionary accruals as the difference between discretionary accrual from using the cross-sectional modified Jones model and the corresponding discretionary accruals for the performance-matched firm. The matching process results in a sample of 5,709 firm-quarter observations. I re-estimate equation (10) with the new measure of ADCA as my dependent variable. Results (untabulated) are similar to the main findings reported in Table 7 using DCA. The estimated coefficients for all control variables are consistent with my prediction. Adjusted $R^2$ remains approximately 3.0 percent. The coefficient on Pre-IPO is positive yet insignificant. The estimated coefficient on Lockup is positive and significant (0.0351, t=2.45), indicating that sample IPO firms inflate earnings during the lockup period. Thus the primary results hold with the alternative measure of earnings management.

Second, I use gain/loss on asset sales (GLS) as an alternative measure to test the robustness of my REM measures (see footnote #10 for details of how to calculate abnormal level of GLS, or AGLS). This estimation process results in a sample of 6,561 firm-quarter observations. I re-estimate equation (10) with the new measure AGLS. Results (untabulated) are similar to the findings represented in Table 7 using ACFO and ADisEx. The coefficients on both Pre-IPO and Lockup are negative but not statistically significant. The primary results of no real earnings management in pre-IPO and lockup periods also hold for the alternative measure.

Third, venture capitalists as insiders may have incentives and abilities to manage earnings that are different from management. When venture capitalists decide to exit their position from a company, their incentive may no longer be aligned with other insiders or company shareholders. Instead, they focus more on short-run profit; they switch their interest to maximize their investment returns and are less interested in the reputation of the firm. Therefore, I partition my sample into 304 VC-backed firms (with 3,046 observations) and 435 non-VC-backed firms (with 4,454 observations). I re-estimate equation (10) separately for the two subsample groups. Results (untabulated) show that coefficients on Lockup for both groups are positive and significant; the coefficient on Lockup for the VC-backed groups is greater in magnitude and significance. Consistent with prior studies, I find that venture capitalists are generally aligned with management in inflating earnings during the lockup period.

Fourth, I consider potential self-selection bias of firms in choosing their auditors. IPO firms are not randomly assigned to audit firms; it is probable that they self-select their auditors, either Big Four or non-Big Four, based on factors other than auditor

quality (i.e., firm size, private information, and underwriter recommendation, etc.). For example, Titman and Trueman (1986) find that entrepreneurs with favorable information about their firm's value choose higher-quality auditors. To address this potential self-selection bias, I follow Chaney et al. (2004) and use the Heckman (1979) approach to estimate the self-selection model.[18] Results (untabulated) show that the coefficient on the interaction term Lockup*Big4 is still negative and significant (-0.037, t=-5.33). After controlling for self-selection bias, I obtain similar results compared with the primary analysis presented in Table 7. These results indicate that self-selection is not an issue in my study.

Finally, I consider the influence of sample firms with negative book values. Descriptive statistics in Panel C of Table 2 indicate a negative minimum book value for the full sample. To address the potential influence of negative book values on earnings management behavior in this study, I exclude all observations with negative book values (495 observations were deleted) and re-estimate equation (10) based on the new sample of 7,005 observations with DCA as the dependent variable. Results (untabulated) are similar to the primary findings reported in Table 7. The estimated coefficients on Lockup (0.114, t=3.35) and Pre-IPO (0.033, t=1.95) are positive and significant, indicating

[18] In the first stage, I use a probit model regressing the indicator variable Big4 on a set of variables that are related to the choice of auditors including asset size, asset turnover, debt-asset ratio, current ratio, quick ratio, return on assets, and the interaction of return on assets and loss to compute the inverse Mills ratios (IMR). In the second stage, I include the inverse Mills ratio in my primary model as an additional explanatory variable.

income-increasing earnings management during the lockup and Pre-IPO periods. Thus the primary results hold after excluding sample observations with negative book values.

# CHAPTER 7 CONCLUSIONS

Motivated by significant insider sales documented by prior research, I investigate whether insiders engage in income-increasing earnings management around the lockup period. I also compare levels of earnings management in the pre-IPO and lockup periods with those in the post-lockup period. It has been well documented in prior research that auditors with superior reputation are more likely to mitigate earnings management behavior because they have more to lose if they fail to detect material misstatements. I explore the impact of auditor quality on earnings management and annual audit in the unique setting of IPO lockups.

I find evidence that IPO firms inflate earnings in the pre-IPO and lockup periods, mainly through current accruals manipulation. Time series analysis reveals that the sample IPO firms also utilize real-activities manipulation, but more so in the early pre-IPO period rather than in the lockup period. The results are robust with respect to alternative abnormal accruals and real-activities measures. I also find that IPO firms that hire prestigious auditors experience less earnings management in the lockup period after controlling for the monitoring role of venture capitalist and underwriter reputation. Cross-sectional analysis also reveals that IPO firms are less likely to engage in earnings management in the fiscal yearend quarters than in the interim quarters, as firms' financial

statement for fourth quarters are audited while those for interim quarters are simply reviewed.

My study extends prior research on earnings management in several aspects. First, to my knowledge, this study is the first to examine earnings management during the IPO lockup period and I employ both accruals-based and real-activities measures. Second, I use quarterly data, which provides a sharper focus on the event and thus may increase the likelihood of detecting earnings manipulation (Jeter and Shivakumar 1999). In addition, financial information for interim quarters is not audited, which may allow managers greater discretion compared to the fiscal yearend quarter. Third, I explore the dynamic time pattern of earnings management around the IPO and lockup periods by comparing earnings management measures in the pre-IPO and lockup periods to that in post-lockup period. Finally, I examine the role of audit quality in mitigating earnings management in the lockup period and explore the differential impact of annual audit versus interim review on earnings management behavior.

In summary, my study contributes to the earnings management literature by documenting accrual and real-activities earnings manipulation during the pre-IPO and lockup periods, and this income-increasing earnings management could be motivated by insider sales at lockup expiration. My results are robust to controlling for a number of issues including alternative AEM and REM measures, separate VC-backed firms from non-VC-backed firms, and self-selection bias when choosing auditors.

The results of this study should be of interest to IPO investors, issuers and intermediaries such as underwriters and auditors. I assume in this study that the initial offering markets and insider sales at lockup ends provide incentives for earnings

management and that investors cannot detect all earnings management. Prior research shows that opportunistic earnings management behavior has long-term consequences, including the long-run underperformance of IPO firms, reputation damage for management, underwriters, and auditors. A firm's reputation for credible reporting information disclosures would be negatively affected by the opportunistic accounting choices, which in turn may negatively affect the firm's equity valuation on the capital market.

The primary limitations of my study are the construct validity of earnings management, auditor quality, and insider sales measures, the breakdown of the pre-IPO, lockup, and post-lockup periods, and possibility of factors influencing IPO firms' financial reporting decisions around other than insider sales. For example, because earnings management behavior is not directly observable, any proxies are subject to measurement error. Although I provide alternative measures to test robustness of these proxies as discussed above, I cannot rule out the possibility that the noise in the earnings management measures may bias my results. In addition, I define auditor quality based on auditor firm size; I acknowledge that not all small auditor firms provide low-quality audit, and vice versa. With these limitations in consideration, I performed a number of additional sensitivity tests to minimize the effect of these limitations. These procedures generally support my findings in the main analyses.

APPENDIX A VARIABLE DESCRIPTIONS

| | |
|---|---|
| CA | Current accruals = change in accounts receivable (data#37) + change in inventory (data#38) + change in other current assets (data#39) - change in accounts payable (data#46) - change in tax payable (data#47) - change in other current liabilities (data#48);[a] |
| AT | Total assets (data#44); |
| S | Sales (data#2); |
| ΔS | Change in sales from quarter t-1 to t; |
| AR | Accounts receivable (data#37); |
| ΔAR | Change in accounts receivable from quarter t-1 to t; |
| NDCA | Nondiscretionary current accruals, calculated from equation (2); |
| DCA | Discretionary current accruals, measured as the difference between CA and NDCA in equation (3); |
| CFO | Cash flow from operation (data#108); |
| TA | Total accruals = net income (data#69) - CFO; |
| PPE | Gross property, plant and equipment (data#118); |
| ROA | Return on assets = net income/total assets; |
| NDTA | Nondiscretionary total accruals, calculated from equation (5); |
| DTA | Discretionary total accruals, measured as the difference between TA and NDTA; |
| DisEx | Discretionary expenses = R&D expenses (data#4) + selling, general and administrative expenses (data# 1); |
| ACFO | Abnormal CFO, measured as the difference between actual CFO and the predicted value of normal CFO from equation (7); |
| ADisEx | Abnormal DISEX, measured as the difference between actual DISEX and the predicted value of normal DISEX from equation (8); |
| EM | Earnings management, measured using DCA, DTA, ACFO, and ADisEx; |
| UW | Underwriter reputation using the ranking of 0-9 from the Ritter website at http://bear.warrington.ufl.edu/ritter/ipodata.htm ; |
| VC | Venture capital, a dummy variable equals one if IPO firm is venture-capitalist-backed, and zero otherwise; |

| | |
|---|---|
| Big4 | Big Five/Four auditor, a dummy variable equals one if the IPO firm is audited by one of the Big Five/Four auditors, and zero otherwise; |
| SEO | Seasoned equity offering, a dummy variable equals one if the IPO firm subsequently conducted a seasoned equity offering, and zero otherwise; |
| Hi-tech | High-tech industry, a dummy variable that equals one if the IPO firm is in the high-tech industry, and zero otherwise; |
| Age | IPO age = [ln(1+age)], where age is calculated as the difference between the IPO issue year and the founding year; |
| Proceeds | IPO proceeds = offer price*total number of primary shares issued; |
| ΔCapEx | Change in capital expenditure from quarter t-1 to t, scaled by total assets in quarter t-1; |
| Loss | A dummy variable that equals one if the firm reports a loss in the quarter, and zero otherwise; |
| LnAT | Firm size measured as the natural logarithm of total assets; |
| LEV | financial leverage = total liabilities (data# 54)/total assets; |
| OpCycle | Operating cycle = $\frac{(AR_t + AR_{t-1})/2}{(\frac{Sales}{360})} + \frac{(INV_T + INV_{T-1})/2}{(\frac{COSG}{360})}$; |
| CapInt | Capital intensity = gross PPE/total assets; |
| IND | Industry dummy; |
| YEAR | Year dummy; |
| Pre-IPO | A dummy variable that equals one if the firm-quarter observation is in the pre-IPO quarters, and zero otherwise; |
| Lockup | A dummy variable that equals one if the firm-quarter observation is in the lockup quarters, and zero otherwise; |
| OWN | Ownership retention = # of shares owned by pre-IPO owners/# of shares outstanding after IPO; |
| Audit | A dummy variables that equals one if the firm-quarter financials are audited, and zero otherwise; |
| GLS | Gain/Loss from sale of PPE and investment (data# 102); |
| PPES | Sale of PPE (data# 83); |
| IS | Sale of Investments (data# 85); |
| Aturn | Asset turnover = sales/total assets; |
| DAR | Debt-asset ratio = Long-term debt (data# 51)/total assets; |
| Curr | Current ratio = current assets (data# 40)/total assets; |
| Quick | Quick ratio = (current assets - inventory)/total assets; |

[a] The data item number provided in parenthesis is based on Compustat Quarterly Data Industrial item numbers at http://www.crsp.chicagobooth.edu/documentation/product/ccm/cross/quarterly_data.html

**FIGURE 1 TIME LINE**

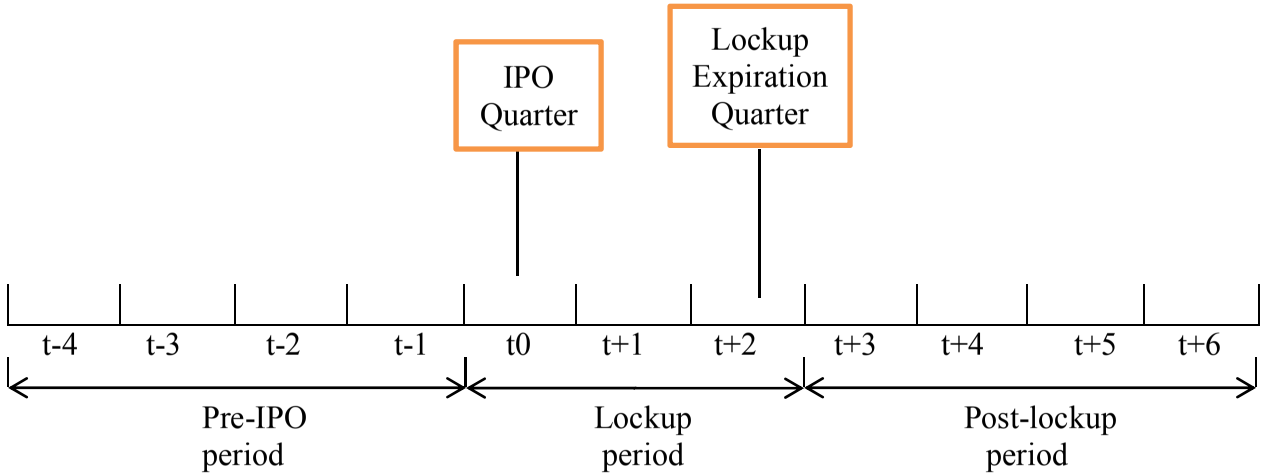

Table 1 Sample selection process

| Selection item | Sub-total | Total |
|---|---|---|
| Total number of IPOs in 1996-2010 | | 4,312 |
| Less: REITs and close-end funds, | (751) | |
| Less: Reversed leverage buyouts and spinoffs | (259) | |
| Less: Limited partnership, unit offerings, ADRs, foreign corporation, shares of beneficial interest (SBI) | (155) | 3,147 |
| Less: Firms whose offer price < $1 | (31) | |
| Less: Firms with no lockup agreement or no underwriter data available | (865) | |
| Sample IPOs available | | 2,251 |
| Less: Firms without sufficient financial data in COMPUSTAT Quarterly | (994) | |
| Less: Firms with less than nine quarterly observations | (64) | |
| Less: Firms missing data included in the regression analyses | (46) | |
| Less: Firms in the utilities (SIC 49) and financial (SIC 60-69) industries | (403) | |
| Final sample | | 744 |

Table 2 Sample Characteristics

Panel A: Time distribution of IPO sample during 1996-2010

| Year | Freq. | Percent | Cum. Percent |
|---|---|---|---|
| 1996 | 234 | 31.45 | 31.45 |
| 1997 | 155 | 20.83 | 52.28 |
| 1998 | 76 | 10.22 | 62.50 |
| 1999 | 61 | 8.20 | 70.70 |
| 2000 | 21 | 2.82 | 73.52 |
| 2001 | 4 | 0.54 | 74.06 |
| 2002 | 8 | 1.08 | 75.13 |
| 2003 | 10 | 1.34 | 76.48 |
| 2004 | 31 | 4.17 | 80.65 |
| 2005 | 29 | 3.90 | 84.54 |
| 2006 | 48 | 6.45 | 90.99 |
| 2007 | 38 | 5.11 | 96.10 |
| 2008 | 4 | 0.54 | 96.64 |
| 2009 | 7 | 0.94 | 97.58 |
| 2010 | 18 | 2.42 | 100.00 |
| Total | 744 | 100 | |

Table 2 continued

Panel B: Industry distribution of IPO sample during 1996-2010

| Industry | Two-digit SIC Codes | Freq. | Percent |
|---|---|---|---|
| Oil and Gas | 13 | 27 | 3.63 |
| Food products | 20 | 9 | 1.21 |
| Paper, paper products and printing | 24-27 | 10 | 1.34 |
| Chemical Products | 28 | 49 | 6.59 |
| Manufacturing | 30-34 | 19 | 2.55 |
| Computer Hardware & Software | 35 | 47 | 6.32 |
| Electronic Equipment | 36 | 54 | 7.26 |
| Transportation | 37,39,40-42,44,45 | 41 | 5.51 |
| Scientific Instruments | 38 | 44 | 5.91 |
| Communications | 48 | 31 | 4.17 |
| Durable Goods | 50 | 20 | 2.69 |
| Retail | 53,54,56,57,59 | 36 | 4.84 |
| Eating and Drinking Establishments | 58 | 13 | 1.75 |
| Business Services | 73 | 210 | 28.23 |
| Entertainment Services | 70,78,79 | 16 | 2.15 |
| Health | 80 | 18 | 2.42 |
| Engineering and management services | 87 | 29 | 3.90 |
| All others | 1, 2, 10, 12, 14, 15, 16, 17, 21, 22, 23, 29, 46, 47, 51, 55, 72, 75, 76, 81, 82, 83, 86, 99 | 71 | 9.54 |
| Total | | 744 | 100.00 |

Table 2 continued

Panel C: Post-offer firm characteristics for the full sample

| Variables | Mean | Median | S.D. | Minimum | Maximum |
|---|---|---|---|---|---|
| MV (US$ millions) | 399.18 | 170.32 | 991.16 | 1.89 | 16,999.73 |
| BV (US$ millions) | 76.64 | 35.83 | 183.36 | -632.90 | 2,534.56 |
| BTM | 0.28 | 0.25 | 0.23 | -0.99 | 2.11 |
| S (US$ millions) | 49.02 | 11.81 | 139.95 | 0.00 | 1,990.58 |
| NI (US$ millions) | -0.65 | 0.21 | 11.69 | -130.82 | 69.26 |
| AT (US$ millions) | 208.61 | 54.18 | 804.39 | 0.84 | 18,677.40 |
| ROA | -0.02 | 0.01 | 0.11 | -1.14 | 0.64 |
| CFO (US$ millions) | 10.69 | 0.19 | 100.81 | -56.97 | 2,614.57 |
| LEV | 0.40 | 0.29 | 0.46 | 0.02 | 6.68 |
| CapEx | 26.76 | 1.43 | 429.05 | 0.00 | 11,644.84 |
| Offer Price (US$) | 12.08 | 12.00 | 5.06 | 3.50 | 65.00 |
| Proceeds (US$ millions) | 77.71 | 40.00 | 133.93 | 3.75 | 1,432.17 |
| Age (years) | 14.98 | 8.00 | 20.02 | 0.00 | 158.00 |
| Underpricing | 0.19 | 0.10 | 0.38 | -0.96 | 6.06 |
| Lockup (days) | 214.91 | 180.00 | 113.06 | 90.00 | 1,095.00 |
| Owner (%) | 0.72 | 0.71 | 0.46 | 0.01 | 8.78 |
| UW | 6.98 | 8.00 | 2.25 | 1.00 | 9.00 |
| VC | 0.41 | 0.00 | 0.49 | 0.00 | 1.00 |
| Big4 | 0.90 | 1.00 | 0.29 | 0.00 | 1.00 |
| Hi-Tech | 0.53 | 1.00 | 0.50 | 0.00 | 1.00 |

Table 2 continued

Panel D: Post-offer firm characteristics for the subsample of insider ownership

| Variables | Mean | Median | S.D. | Minimum | Maximum |
|---|---|---|---|---|---|
| MV (US$ millions) | 316.82 | 124.77 | 917.83 | 1.89 | 16999.73 |
| BV (US$ millions) | 54.85 | 31.02 | 131.88 | -632.90 | 1,316.00 |
| BTM | 0.28 | 0.25 | 0.22 | -0.99 | 1.07 |
| S (US$ millions) | 34.38 | 9.65 | 99.96 | 0.00 | 1,529.04 |
| NI (US$ millions) | -0.76 | 0.27 | 10.49 | -130.82 | 69.26 |
| AT (US$ millions) | 139.36 | 46.29 | 368.21 | 0.84 | 4,107.02 |
| ROA | -0.02 | 0.01 | 0.11 | -0.83 | 0.64 |
| CFO (US$ millions) | 5.37 | 0.00 | 30.68 | -56.97 | 373.37 |
| LEV | 0.40 | 0.28 | 0.42 | 0.01 | 5.47 |
| CapEx | 8.44 | 1.17 | 31.47 | 0.00 | 465.75 |
| Offer Price (US$) | 11.55 | 11.00 | 5.18 | 3.50 | 65.00 |
| Proceeds (US$ millions) | 59.69 | 33.53 | 106.71 | 3.75 | 1,432.17 |
| Age (years) | 14.41 | 8.00 | 18.65 | 0.00 | 158.00 |
| Underpricing | 0.19 | 0.11 | 0.40 | -0.96 | 6.06 |
| Lockup (days) | 225.30 | 180.00 | 131.13 | 90.00 | 1,095.00 |
| Owner (%) | 0.72 | 0.71 | 0.46 | 0.01 | 8.78 |
| UW | 6.79 | 8.00 | 2.34 | 1.00 | 9.00 |
| VC | 0.41 | 0.00 | 0.49 | 0.00 | 1.00 |
| Big4 | 0.90 | 1.00 | 0.30 | 0.00 | 1.00 |
| Hi-Tech | 0.25 | 1.00 | 0.50 | 0.00 | 1.00 |

The full sample consists of 744 domestic IPO firms going public in the period from 1996-2010 with an offering price of at least $1. The sample firm must also have at least four quarters pre-IPO and four quarters post-lockup financial data from COMPUSTAT to calculate accruals. The time distribution of the sample is reported in Panel A by IPO fiscal year and the industry distribution of the sample is reported in Panel B by two-digit SIC code. Panel C reports IPO firm characteristics. Panel D is based on a subsample of 485 firms for insider ownership analysis.
See Appendix A for variable descriptions.

Table 3 Descriptive statistics of variables for estimating AEM and REM

| Variables | N | Mean | Median | S.D. | 25th Percentile | 75th Percentile |
|---|---|---|---|---|---|---|
| $CA_t$ / $AT_{t-1}$ | 294,321 | -0.1484 | -0.0001 | 23.2449 | -0.0276 | 0.0244 |
| 1/ $AT_{t-1}$ | 294,321 | 0.2880 | 0.0053 | 9.1535 | 0.0007 | 0.0351 |
| $\Delta S_t$ / $AT_{t-1}$ | 294,321 | 0.0312 | 0.0030 | 5.8972 | -0.0203 | 0.0292 |
| $TA_t$ / $AT_{t-1}$ | 294,321 | -0.3560 | -0.0331 | 30.6226 | -0.0947 | 0.0111 |
| $PPE_t$ / $AT_{t-1}$ | 294,321 | 0.6592 | 0.4520 | 8.8542 | 0.1848 | 0.8501 |
| $ROA_t$ | 294,321 | -0.1751 | 0.0059 | 43.1338 | -0.0225 | 0.0198 |
| $CFO_t$ / $AT_{t-1}$ | 294,321 | -0.1946 | 0.0249 | 8.9100 | -0.0404 | 0.0807 |
| 1 / $AT_{t-1}$ | 294,321 | 0.2827 | 0.0053 | 9.0935 | 0.0007 | 0.0351 |
| $S_t$ / $AT_{t-1}$ | 294,321 | 0.3940 | 0.2220 | 11.1795 | 0.0957 | 0.3760 |
| $\Delta S_t$ / $AT_{t-1}$ | 294,321 | 0.0299 | 0.0030 | 5.8861 | -0.0203 | 0.0292 |
| $DisEx_t$ / $AT_{t-1}$ | 294,321 | 0.1319 | 0.0460 | 3.7076 | 0.0096 | 0.1128 |
| $S_{t-1}$ / $AT_{t-1}$ | 294,321 | 0.3398 | 0.2169 | 9.0412 | 0.0935 | 0.3640 |

This table reports descriptive statistics of regression variables used to estimate normal level of current accruals (CA), total accruals (TA) and real operating activities (CFO, DisEx). The regression is based on a sample of non-IPO firms in the same industry (using two-digit SIC code) and same fiscal quarter. The estimation requires at least 8 observations for each industry-quarter. As the result, the matched sample consists of 294, 321 firm-quarter observations. All explanatory variables are winsorized at the 1 percent and 99 percent levels to minimize extreme observations.
See Appendix A for variable descriptions.

Table 4 Estimation of normal level of CA, TA, CFO, and DisEx

| Variables | CA | | TA | | CFO | | DisEX | |
|---|---|---|---|---|---|---|---|---|
| | Pred. sign | Estimated coefficient | Pred. sign | Estimated coefficient | Pred. sign | Estimated coefficient | Pred. sign | Estimated coefficient |
| Intercept | - | -0.16005<br>(-3.79)*** | - | -0.36207<br>(-6.54)*** | ? | -0.14939<br>(-9.27)*** | ? | 0.03942<br>(7.655)*** |
| $1/AT_{t-1}$ | - | -0.03598<br>(-7.66)*** | - | -0.15359<br>(-24.37)*** | - | -0.20631<br>(-105.42)*** | + | 0.2165<br>(122.24)*** |
| $\Delta S_t/AT_{t-1}$ | + | 0.70664<br>(96.93)*** | + | 0.0476<br>(4.77)*** | + | -0.03132<br>(-9.25)*** | | |
| $PPE_t/AT_{t-1}$ | | | - | -0.1168<br>(-17.27)*** | | | | |
| $ROA_t$ | | | + | 0.14411<br>(112.62)*** | | | | |
| $S_t/AT_{t-1}$ | | | | | + | 0.03561<br>(18.46)*** | | |
| $S_{t-1}/AT_{t-1}$ | | | | | | | + | 0.2485<br>(115.40)*** |
| Mean adj. $R^2$ (%) | | 3.13 | | 4.38 | | 3.94 | | 26.69 |
| No. of observations | | 294,321 | | 294,321 | | 294,321 | | 294,321 |
| No. of industry-quarters | | 3,773 | | 3,773 | | 3,772 | | 3,772 |

Table 4 Continued

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
This table reports estimation of normal level of current accruals, total accruals and real operating activities. The regression is based on a sample of non-IPO firms in the same industry (using two-digit SIC code) and quarter. The estimation requires at least 8 observations for each industry-quarter for calculating normal current accruals, total accruals, cash flow from operations, discretionary expenses. The table reports the mean coefficients and the corresponding t-statistics.
See Appendix A for variable descriptions.

Table 5 Time-Series Distribution of Accruals and real earnings management

| Proxies for EM | -4 | -3 | -2 | -1 | 0 | +1 | +2 | +3 | +4 | +5 | +6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DCA | | | | | | | | | | | |
| Mean | -0.162 | -0.199 | -0.084 | **0.025** | **0.049** | **0.027** | **0.023** | **0.021** | -0.789 | 0.002 | -0.009 |
| T-stat | (-8.0)*** | (-8.2)*** | (-4.2)*** | (1.6)* | (2.6)*** | (2.5)** | (3.1)*** | (3.2)*** | (-1.0) | (0.5) | (-1.1) |
| N | 185[a] | 172 | 404 | 636 | 694 | 712 | 713 | 714 | 722 | 713 | 696 |
| DTA | | | | | | | | | | | |
| Mean | -0.314 | -0.357 | -0.190 | -0.028 | -0.176 | 0.002 | **0.027** | 0.021 | -0.908 | 0.010 | 0.022 |
| T-stat | (-11.6)*** | (-8.4)*** | (-8.6)*** | (-1.2) | (-1.1) | (0.2) | (3.2)*** | (1.4) | (-1.0) | (1.4) | (-1.8)* |
| N | 185 | 172 | 404 | 636 | 694 | 712 | 713 | 714 | 722 | 713 | 696 |
| ACFO | | | | | | | | | | | |
| Mean | **-8.134** | **-6.068** | 0.457 | 5.632 | 11.345 | 6.067 | 7.814 | 7.877 | 13.774 | 7.373 | 7.986 |
| T-stat | (-3.3)*** | (-1.8)* | (0.20) | (4.0)*** | (2.9)*** | (5.0)*** | (5.0)*** | (5.4)*** | (3.0)*** | (4.8)*** | (4.5)*** |
| N | 185 | 172 | 404 | 636 | 694 | 712 | 713 | 714 | 722 | 713 | 696 |
| ADisEx | | | | | | | | | | | |
| Mean | **-23.862** | **-23.293** | **-13.149** | **-3.045** | -1.382 | -0.811 | -0.338 | -0.056 | -0.755 | 0.143 | -0.139 |
| T-stat | (-8.3)*** | (-7.8)*** | (-6.5)*** | (-2.2)** | (-1.6) | (1.0) | (0.5) | (-0.1) | (-0.7) | (0.2) | (-0.2) |
| N | 180 | 169 | 398 | 625 | 681 | 699 | 700 | 702 | 710 | 701 | 684 |

Table 5 Continued

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
Panel A reports time-series statistics on DCA, DTA, ACFO, and ADisEx in percentage of lagged total assets. DCA is extracted from current accruals by a within two-digit SIC industry cross-sectional modified Jones (1991) model. Expected accruals are estimated each quarter from a cross-sectional regression of current accruals on the change in sales using all non-issuing firms in the same two-digit SIC code as the IPO firm. Expected accruals are the predicted accruals from the regression after subtracting change in accounts receivables from change in sales. DCA is current accruals minus expected current accruals. All accrual variables are scaled by lagged total assets and are reported as a percentage of lagged total assets. DTA, ACFO, and ADisEx are estimated in the similar process. P-values for the Wilcoxon signed-rank tests are two-tailed, based on t distribution for means. See Appendix A for variable descriptions.

[a] The number of observations goes down dramatically in the pre-IPO quarters because there are only a limited number of firms report interim quarter financial information prior to IPO

Table 6 Correlation matrix of earnings management variables

Panel A Correlation matrix columns 1-10

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| DCA | | 0.987* | 0.003 | 0.000 | 0.018 | 0.023* | 0.006 | 0.026* | 0.003 | 0.031* |
| DTA | 0.477* | | 0.001 | 0.001 | 0.015 | 0.007 | 0.002 | 0.017 | 0.001 | 0.014 |
| ACFO | 0.064* | 0.445* | | -0.025* | 0.103* | 0.158* | 0.432* | -0.067* | 0.006 | 0.066* |
| ADisEx | 0.043* | 0.118* | -0.072* | | -0.015 | -0.038* | -0.093* | 0.012 | -0.002 | -0.004 |
| UW | -0.045* | -0.108* | 0.143* | 0.139* | | 0.135* | 0.335* | 0.080* | -0.042* | 0.077* |
| LnAge | 0.054* | -0.105* | 0.288* | -0.106* | 0.097* | | 0.203* | -0.098* | -0.044* | 0.139* |
| Proceeds | -0.062* | -0.195* | 0.288* | -0.106* | 0.097* | 0.185 | | 0.011 | -0.020 | 0.066* |
| Underprice | -0.011 | -0.065* | -0.015 | 0.094* | 0.112* | -0.061* | 0.168* | | 0.004 | 0.012 |
| ΔCapExp | 0.035* | 0.066* | 0.090* | 0.057* | 0.022 | -0.001 | 0.030* | 0.028* | | 0.000 |
| ROA | 0.135* | -0.177* | 0.485* | -0.151* | 0.073* | 0.345* | 0.147* | 0.078* | 0.063* | |
| ΔS | 0.079* | 0.101* | 0.023 | 0.219* | 0.021 | -0.094* | 0.005 | 0.060* | 0.217* | 0.091* |
| LnAT | 0.025* | -0.125* | 0.388* | 0.104* | 0.572* | 0.248* | 0.789* | 0.088* | 0.106* | 0.225* |
| LEV | -0.107* | -0.161* | 0.126* | -0.145* | 0.026* | 0.180* | 0.097* | -0.162* | -0.093* | 0.005 |
| OpCycle | 0.193* | 0.265* | -0.096* | 0.219* | -0.104* | 0.079* | -0.149* | 0.019 | 0.020 | -0.060* |
| CapInt | -0.043* | -0.129* | 0.259* | -0.111* | 0.047* | 0.161* | 0.130* | -0.121* | 0.012 | 0.089* |
| Owner | 0.007 | -0.055* | 0.108* | 0.026 | 0.082* | 0.065* | 0.122* | 0.025 | 0.008 | 0.121* |

Table 6 continued

Panel B Correlation matrix columns 11-16

| Variables | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|
| DCA | 0.001 | 0.025* | -0.037* | 0.005 | 0.006 | 0.033* |
| DTA | 0.001 | 0.019 | -0.038* | 0.006 | -0.045* | 0.012 |
| ACFO | -0.009 | 0.303* | 0.050* | 0.013 | 0.153* | 0.030 |
| ADisEx | 0.003 | -0.045* | -0.015 | 0.006 | -0.018 | 0.019 |
| UW | -0.022 | 0.561* | -0.050* | -0.059* | 0.069* | 0.003 |
| LnAge | -0.031* | 0.285* | 0.119* | 0.005 | 0.098* | 0.091* |
| Proceeds | -0.002 | 0.585* | 0.130* | -0.044* | 0.125* | 0.024 |
| Underprice | -0.006 | 0.040* | 0.1230* | -0.044* | 0.125* | 0.024 |
| ΔCapExp | 0.017 | -0.021 | -0.026* | -0.012 | 0.062* | 0.008 |
| ROA | -0.009 | 0.221* | -0.295* | -0.009 | 0.046* | 0.075* |
| ΔS | | -0.003 | -0.011 | -0.003 | 0.011 | -0.010 |
| LnAT | 0.061* | | -0.061* | -0.077* | 0.192* | 0.038* |
| LEV | -0.076* | 0.097* | | -0.034* | 0.159* | 0.018 |
| OpCycle | -0.072* | -0.068* | -0.142* | | -0.107* | 0.023 |
| CapInt | -0.013 | 0.159* | 0.340* | -0.245* | | -0.040* |
| Owner | -0.006 | 0.165* | 0.078* | 0.117* | 0.023 | |

* represents significance at the 5 percent level.
This table reports the Pearson (upper triangle) and Spearman (lower triangle) correlations of variables in the earnings management analyses for the full sample of 7,500 firm-quarter observations over the period 1996-2010.
See Appendix A for variable descriptions.

Table 7 Regression results of earnings management around IPO lockups

| | Pred. | Model 1 (DCA) | | Model 2 (DTA) | | Model 3 (ACFO) | | Model 4 (ADisEx) | |
|---|---|---|---|---|---|---|---|---|---|
| Variables | sign | Coeff. | T-Statistic | Coeff. | T-Statistic | Coeff. | T-Statistic | Coeff. | T-Statistic |
| Intercept | | 0.035 | (0.40) | 0.507 | (1.24) | -35.611 | (-2.23)** | 11.808 | (1.37) |
| Pre-IPO | H2: + | **0.021** | (1.77)* | 0.067 | (1.12) | -1.225 | (-0.53) | -1.152 | (-0.95) |
| Lockup | H1: + | **0.027** | (3.29)*** | -0.050 | (-1.20) | -1.698 | (-1.04) | 0.883 | (1.03) |
| UW | - | -0.001 | (0.59) | 0.015 | (1.42) | -2.775 | (-6.58)*** | 0.673 | (3.05)*** |
| VC | - | -0.006 | (0.73) | 0.015 | (0.37) | -1.414 | (-0.89) | 4.157 | (5.06)*** |
| BIG4 | - | -0.023 | (-1.71)* | -0.159 | (-2.39)** | 0.379 | (-0.14) | -0.148 | (-0.11) |
| SEO | + | 0.012 | (1.03) | 0.081 | (1.36) | 2.963 | (1.26) | 1.790 | (1.46) |
| Hi-tech | - | -0.008 | (-0.85) | -0.267 | (-5.44)*** | -2.679 | (-1.39) | 7.121 | (7.10) |
| Age | - | -0.002 | (-0.42) | 0.048 | (2.27)** | 3.022 | (3.63)*** | -1.636 | (-3.75)*** |
| ΔCapEx | + | 0.002 | (2.33)** | 0.008 | (1.70)* | 0.100 | (0.56) | 0.015 | (0.16) |
| ΔS | + | 0.000 | (0.16) | -0.001 | (-0.24) | 0.191 | (-1.44) | 0.024 | (0.35) |
| Proceeds | + | 6.832 | (1.77)* | -5.348 | (-0.24) | 2.093 | (29.35)*** | -7.299 | (-1.79)* |
| Underprice | + | 0.019 | (2.09)** | -0.245 | (-5.28)*** | -6.325 | (-3.47)*** | 4.205 | (4.45)*** |
| ROA | - | -0.051 | (-3.53)*** | -0.666 | (-9.27)*** | -0.678 | (-0.24) | 0.946 | (0.65) |
| Loss | + | 0.013 | (1.70)* | -0.042 | (-1.09) | -7.503 | (4.94)*** | 1.061 | (1.33) |
| CFO | - | 0.000 | ( -2.16)** | 0.000 | (-0.48) | | | -0.071 | (-6.77)*** |
| LnAT | - | -0.006 | (-1.32) | -0.022 | (-1.04) | 3.343 | (4.04)*** | 0.667 | (1.54) |
| LEV | +/- | 0.012 | (1.14) | 0.123 | (2.42)** | -1.516 | (-0.76) | 2.175 | (2.10)** |
| OpCycle | + | 0.000 | (1.69)* | 0.000 | (-1.62) | 0.002 | (4.39)*** | 0.000 | (1.50) |
| CapInt | - | -0.044 | (4.28)*** | -1.650 | (-31.90)*** | 9.525 | (4.69)*** | 0.131 | (0.12) |
| IND, Year | | Yes | | Yes | | Yes | | Yes | |
| # of obs. | | 7,500 | | 7,500 | | 7,500 | | 6,550[a] | |
| Adj. $R^2$ (%) | | 3.22 | | 15.72 | | 33.21 | | 13.65 | |

Table 7 continued

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
This table reports the estimation results of equation (10) based on the pooled ordinary least squared method with industry fixed effect and year indicators. The dependent variables are discretionary current accruals (DCA), discretionary total accruals (DTA), abnormal cash flow from operation (ACFO), and abnormal discretionary expenses (ADisEx). See Appendix A for variable descriptions.

[a] The number of observations drops in the ADisEx model because the data for R&D expenses and SG&A expenses are missing for some firms; consequently, ADisEx cannot be calculated for those firms with missing R&D and SG&A expenses, resulting in fewer firm-quarter observations.

Table 8 Regression results of auditor quality and annual audit

| | | Model 1 (Big4) | | Model 2 (Audit) | |
|---|---|---|---|---|---|
| Variables | Predicted Sign | Coeff. | T-Statistic | Coeff. | T-Statistic |
| Intercept | | 0.009 | (0.11) | 0.0338 | (0.42) |
| Pre-IPO | + | 0.1665 | (4.93)*** | 0.0127 | (1.37) |
| Lockup | + | 0.0484 | (2.15)** | 0.0374 | (3.92)*** |
| BIG4 | - | -0.0049 | (-0.29) | -0.0234 | (1.76)* |
| Pre_IPO*BIG4 | H3: - | -0.0223 | (-0.93) | | |
| Lockup*BIG4 | H3: - | -0.1592 | (-4.60)*** | | |
| Audit | - | | | -0.0158 | (1.63)* |
| Pre_IPO*Audit | H4: - | | | -0.0039 | (0.13) |
| Lockup*Audit | H4: - | | | -0.0426 | (-2.44)** |
| UW | - | -0.0013 | (-0.60) | -0.0014 | (-0.67) |
| VC | - | -0.0061 | (-0.76) | -0.0064 | (-0.79) |
| SEO | + | 0.0126 | (1.05) | 0.0094 | (0.78) |
| Hi-tech | - | -0.0090 | (-0.91) | -0.0082 | (-0.84) |
| Age | - | -0.0019 | (-0.45) | -0.0016 | (-0.38) |
| ΔCapEx | + | 0.0022 | (2.37)** | 0.0021 | (2.34)** |
| ΔS | + | 0.0001 | (0.17) | 0.0001 | (0.17) |
| Proceeds | + | 6.8689 | (1.78)* | 6.7053 | (1.74)* |
| Underprice | + | 0.0199 | (2.15)** | 0.0187 | (2.02)** |
| ROA | - | -0.0505 | (-3.52)*** | -0.0487 | (-3.39)*** |
| Loss | + | 0.0119 | (1.54) | 0.0118 | (-2.02)** |
| CFO | - | -0.0001 | (-2.16)** | -0.0001 | (-1.91)* |
| LnAT | - | -0.0057 | (-1.34) | -0.0049 | (-1.17) |
| LEV | +/- | 0.0108 | (1.07) | 0.0106 | (1.05) |
| OpCycle | + | 0.0000 | (1.75)* | 0.0000 | (1.73) |
| CapInt | - | -1.0447 | (-4.27)*** | -0.0435 | (-4.21)*** |
| IND | | Yes | | Yes | |
| YEAR | | Yes | | Yes | |
| # of observations | | 6674 | | 6674 | |
| Adjusted $R^2$ (%) | | 3.53 | | 3.50 | |

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.

This table reports the estimation results of equations (11) and (12) based on the pooled ordinary least squared method with industry fixed effect and year indicators. The dependent variable is discretionary current accruals (DCA). See Appendix A for variable descriptions.

Table 9 Regression results of insider selling incentives

| Variables | Pred. Sign | Coeff. | T-Statistic |
|---|---|---|---|
| Intercept | | -0.1462 | (-1.17) |
| Pre-IPO | + | 0.0202 | (2.16)** |
| Lockup | + | 0.0286 | (2.22)** |
| Owner | - | -0.0093 | (-0.82) |
| Pre_IPO*Owner | H5: + | 0.0236 | (0.87) |
| Lockup*Owner | H5: + | 0.0124 | (0.61) |
| UW | - | -0.0050 | (-2.00)** |
| VC | - | -0.0049 | (-0.53) |
| BIG4 | - | -0.0188 | (-1.26) |
| SEO | + | 0.0052 | (0.36) |
| Hi-tech | - | -0.0180 | (-1.62) |
| Age | - | 0.0071 | (1.38) |
| ΔCapEx | + | 0.0001 | (0.01) |
| ΔS | + | 0.0004 | (0.34) |
| Proceeds | + | 6.8167 | (1.13) |
| Underprice | + | 0.0355 | (3.57)*** |
| ROA | - | -0.0382 | (-1.62) |
| Loss | + | 0.0141 | (1.54) |
| CFO | - | -0.0003 | (-1.94) |
| LnAT | - | -0.0093 | (-1.85)* |
| LEV | +/- | -0.0099 | (-0.87) |
| OpCycle | + | 0.0000 | (2.37)** |
| CapInt | - | -0.1361 | (-11.21)*** |
| IND | | Yes | |
| YEAR | | Yes | |
| # of observations | | 4,900 | |
| Adjusted $R^2$ (%) | | 7.06 | |

*, **, *** Indicate 0.10, 0.05, and 0.01 significance levels, respectively, for a two-tailed test.
This table reports the estimation results of equation (13) based on a sample of 4,900 firm-quarter observations and the pooled ordinary least squared method with industry fixed effect and year indicators. The dependent variable is discretionary current accruals (DCA). See Appendix A for variable descriptions.

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