MONITORING OR MORAL HAZARD? EVIDENCE FROM REAL ACTIVITIES
MANIPULATION BY VENTURE-BACKED COMPANIES

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Prior literature suggests two competing theories regarding the role of venture capitalists (VCs) in their portfolio companies. The VC monitoring hypothesis argues that VCs effectively resolve the managerial agency problem through close monitoring and restraining managers' earnings management behavior. The VC moral hazard hypothesis argues that VCs aggravate the private benefits agency problem by exerting influence over managers to artificially inflate exit stock price through earnings management.

Using a sample of IPO firms between 1987 and 2002, after controlling for the magnitude of accruals manipulation (AM), I compare the magnitude of real activities manipulation (RM) between venture-backed and non-venture-backed companies. I find that relative to non-venture-backed companies, venture-backed companies show significantly less RM in the first post-IPO fiscal year. The results are robust after controlling for the VC selection endogeneity. The finding supports the VC monitoring hypothesis that VCs restrain managers' RM behavior. Furthermore, I document that venture-backed companies exhibit a significant difference from non-venture-backed companies only in the first post-IPO fiscal year. The difference between the two groups in either the IPO year or the second post-IPO fiscal year is not significant, or at best, is weak. This finding is consistent with the argument that VCs tighten their control during the lockup expiration period when insiders such as managers or founders have strong incentives to inflate earnings. By the end of the second post-IPO fiscal year when VCs exit the portfolio companies, their impact on portfolio companies' RM decreases dramatically which makes the difference between the two groups less significant. In addition, using a sample of venture-backed IPOs from

1987 to 2002, I find that companies backed by high-reputation VCs show significantly less RM than those backed by low-reputation VCs in the first post-IPO fiscal year. The results are robust to alternative VC reputation proxies. This finding is consistent with the argument that high-reputation VCs have more incentives to preserve reputation and better ability to monitor managers than low-reputation VCs.

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CHAPTER 1

INTRODUCTION

Venture capitalists (VC firms or VCs) are significant capital market players in the U.S.¹ They are believed to be extensively involved in the companies they finance (i.e., portfolio companies) by closely monitoring their activities and providing valuable support and governance (Lerner 1995; Gompers and Lerner 2002; Hellman and Puri 2002; Hochberg 2003). This belief is consistent with the argument that VCs preserve shareholder value. However, criticisms of the VC industry abound. These criticisms relate to conflicts of interests with other pre-initial public offering (IPO) or post-IPO stakeholders, accounting irregularities, or excessive tax benefits (Stross 2000; Healy 2002; Tunick 2003). For example, VC firms allegedly exerted influence over management to artificially inflate IPO firm stock prices during the Internet bubble period in the late 1990s (Buckman 2001; Mills 2001). Proponents of the monitoring argument suggest that VCs may have a positive influence over financial reporting, whereas proponents of the opportunistic argument claim that VCs may have a negative influence over financial reporting. The purpose of this study is to empirically test how VCs' alleged opportunistic behavior, combined with their tighter monitoring tendencies and their reputational considerations, impact earnings management through real activities manipulations (RM).

I analyze the impact of VCs on portfolio companies' financial reporting practices under the theoretical framework of agency theory. Gilson and Gordon (2003) categorize agency problems to be (1) the managerial agency problem that arises from the separation of ownership

¹ Over the past 20 years, more than one-third of all IPOs in the U.S. have been venture-backed (Morsfield and Tan 2006). Well-known venture-backed companies include Digital Equipment Corporation, Apple, Federal Express, Compaq, Sun Microsystems, Cisco, Intel, Microsoft, eBay, Google, and Genentech (Source: National Venture Capital Association website, <http://www.nvca.org>, accessed January 22, 2009.)

and control and (2) the private benefits agency problem that arises from the existence of a controlling shareholder. The existence of a large shareholder, who is willing to incur the cost of monitoring, effectively reduces managerial agency costs but increases private benefits agency costs. Thus, the existence of a large shareholder such as VCs involves a tradeoff between these two types of agency problems. The VC monitoring hypothesis suggests that VCs effectively reduce the managerial agency problem by restraining managers' earnings management. The VC moral hazard hypothesis suggests that VCs may exert influence over managers and encourage managers to engage in earnings management in pursuit of private benefits. Anecdotal and empirical evidence is in support of both hypotheses. Gilson and Gordon (2003) also assert that non-controlling shareholders will prefer the presence of a controlling shareholder so long as the benefits from reduction in managerial agency costs are greater than the costs of private benefits of control. This study may provide inference whether the benefits of reduction in managerial agency costs outweigh the private benefits agency costs in the case of VC by evaluating companies' accounting practices. In particular, I tend to differentiate between the VC monitoring hypothesis and the moral hazard hypothesis in their roles of affecting RM of portfolio companies. In this study, I investigate the following research questions:

- 1) Do venture-backed companies have more or less RM than non-venture-backed companies?
- 2) Does VCs' influence on portfolio companies' RM change after VCs exit?
- 3) Is the reputation of VC firms associated with the magnitude of RM in the portfolio companies?

Overall, I find that VC presence has a positive impact on financial reporting choices in the portfolio companies. The strength of this positive impact is associated with VC firms' reputation. Using a sample of IPO firms between 1987 and 2002, I compare the magnitude of

RM of venture-backed and non-venture-backed companies subsequent to IPO, after controlling for the magnitude of AM. I find that venture-backed companies show significantly less RM than non-venture-backed companies in the first post-IPO year. The findings are robust after controlling for VC selection endogeneity. The results are consistent with the VC monitoring hypothesis. Furthermore, I examine how the difference in RM between venture-backed and non-venture-backed companies changes over time, within a three-year post-IPO period. I find that venture-backed companies exhibit a significant difference in RM from non-venture-backed companies only in the first post-IPO year. The difference between the two groups in either the IPO year or the second post-IPO fiscal year is not significant, or at best, is weak. This finding is consistent with the argument that VCs tighten their control during the lockup expiration period when insiders have strong incentives to inflate earnings.² By the end of the second post-IPO fiscal year, the impact of VCs on portfolio companies' RM decreased dramatically, which makes the difference between the two groups insignificant or weakly significant. In addition, I examine whether the proxies for VC reputation (i.e. the number of investment rounds in which a VC firm has participated, the total number of portfolio companies in which a VC firm has invested, and the total amount of capital a VC firm has invested in all portfolio companies) are associated with the level of RM. I document that companies backed by high-reputation VCs show significantly less RM than those backed by low-reputation VCs in the first post-IPO year. The results are robust using alternative VC reputation measures. This is consistent with the argument that high-reputation VCs have more incentives to preserve their reputation, and they are better at monitoring managers than low-reputation VCs.

² Insiders are restricted to sell their shares during the lockup agreement period (usually 180 days from the IPO day). Starting from the lockup expiration day, insiders such as managers, founders and VCs are allowed to liquidate their shares.

This study is important for three reasons. First, examining only one earnings management technique at a time cannot explain the overall effect of earnings management activities (Fields, Lys, and Vincent 2001). Though prior researchers have investigated discretionary accruals manipulation (Morsfield and Tan 2006), it is still necessary to examine real activities manipulation. In a survey study, Graham, Harvey, and Rajgopal (2005) find that managers are more willing to engage in real activities manipulation (RM) than in discretionary accruals manipulation (AM); 80% would decrease discretionary spending; 55% would delay a project; only 28% would draw down reserves; and just 8% would change accounting assumptions. In order to assess whether VCs positively or negatively influence financial reporting, researchers need to evaluate both earnings management methods. Prior literature reports that VCs restrain portfolio companies' upward discretionary accruals manipulation in the IPO year (Morsfield and Tan 2006).³ It remains a question whether VCs restrain RM or whether they prefer engaging in a mix of lower AM and higher RM. In addition, prior research (Zang 2007; Cohen, Dey, and Lys 2008) find that managers treat AM and RM as substitutes in the presence of an exogenous shock such as a regulatory change or a lawsuit. Their finding implies that AM and RM are correlated variables; examining either type of manipulation in isolation cannot lead to definitive conclusions. Thus, the present study avoids the problem by examining VCs' influence over RM after controlling for AM.

Second, VCs are unique and important capital market players. Their incentives and behavior deserve further academic attention. Prior findings regarding their impact on portfolio companies' financial reporting are mixed. Some studies attribute better financial reporting

³ Following Teoh et al. (1998a), Morsfield and Tan (2006) define IPO year as the fiscal year when the IPO happened. Their earnings management measures are calculated using the financial statement data disclosed in the first annual report subsequent to the IPO date.

quality to their monitoring role in the portfolio companies (Hochberg 2003; Morsfield and Tan 2006; Agrawal and Cooper 2008; Wongsunwai 2008). Other studies report evidence that VCs' presence in the portfolio companies impairs financial reporting quality (Darrough and Rangan 2005; Cohen and Langberg 2006; Ertimur, Sletten, and Sunder 2007; Lee and Masulis 2008). Consequently, the present study sheds light on the debate between the two streams of literature by examining a new aspect of financial reporting—RM.

Third, IPOs provide a powerful setting to investigate RM. Due to intense public attention and scrutiny toward IPOs, companies are less willing to engage in AM (Ball and Shivakumar 2008).⁴ As RM is harder to detect, companies may choose to focus on RM, given the same level of capital market incentives to meet earnings targets (Graham et al. 2005). Thus, RM may be more likely to occur in an IPO setting than in other settings.

This study contributes to accounting literature in the following ways: First, I expand the growing stream of literature that examines the influence of ownership structure on financial reporting practices. Prior research reports that family ownership (Wang 2006; Ali, Chen, and Radhakrishnan 2007; Chen, Chen, and Cheng 2007), private equity sponsor ownership (Katz 2009), and public shares ownership (Givoly, Hayn, and Katz 2008) affect earnings quality and voluntary disclosure. This study is the first to provide evidence on VCs' impact on earnings management through RM. Second, complement to Morsfield and Tan (2006) that examine the impact of VC presence and AM, this study provides large sample empirical evidence on the relationship between VC ownership and RM. Different from Morsfield and Tan (2006), I

⁴ Ball and Shivakumar (2008) observe that IPO firms report negative current accruals and more conditional conservatism compared to the control groups (private firms and post-IPO public firms) in the same year. They attribute the conservative reporting at IPO to the closer monitoring of auditors, boards, analysts, rating agencies, press, and litigants, and to the greater regulatory scrutiny.

consider an expanded research window (three post-IPO years) to examine how VCs' exit impacts RM. By examining a three-year window, I provide complete time series evidence including the lockup expiration period and VC exit period. Third, this study contributes to literature investigating the heterogeneity in VC reputation and its impact on financial reporting (Wongsunwai 2008). It provides evidence that VC reputation, a factor determining the strength of governance, is negatively associated with the magnitude of RM in the portfolio companies. This finding further strengthens the conclusion that VCs have a positive impact on financial reporting through their monitoring of managers.

The rest of the paper is organized as follows. Chapter 2 describes the institutional background and reviews prior literature. Chapter 3 develops the hypotheses. Chapter 4 describes the empirical models and measures. Chapter 5 reports the empirical results, and Chapter 6 concludes the study.

CHAPTER 2

INSTITUTIONAL BACKGROUND AND LITERATURE REVIEW

2.1 Institutional Background of the Venture Capital Industry

2.1.1 The Business Structure of a VC Firm

Venture capitalists (VCs) are financial intermediaries who aggregate money from several sources and invest in young companies. Usually, these young companies are developing innovative technologies or have business models that project fast growth (Fenn, Liang, and Prowse 1997). Companies receiving venture capital financing are known as portfolio companies. A VC firm operates a few funds that contain capital raised primarily from institutional investors, such as insurance companies, university endowments, and pension funds. Each VC fund may select and invest in a few portfolio companies that match the specified goals of the fund. VC funds are structured legally in the form of limited partnership with the institutional investors being the limited partners and the VC firm being the general partner. Each venture capital fund has a limited ten-year life with a possible extension of three years; after which, the fund is dissolved completely, and the original capital plus any contractual returns on the investments are returned to the limited partners (Gompers and Lerner 2002). General partners charge 2 to 4 percent of the capital as annual management fees and 20 percent of the profits as bonus (Sahlman 1990). Figure 1 illustrates the functioning of a VC firm.

2.1.2 VC Reputation and Long-term Success

At any given time, a VC firm may manage several funds. Its long-term success depends on its maintained ability to raise new investment funds from the limited partners (Morsfield and Tan 2006). The success of these fundraising efforts rests on the VC firm's reputation for returning profits that are higher than what could have been earned in the open market (Gompers

and Lerner 2002). VC firms are therefore highly motivated to be associated with successful portfolio companies, since the success of these companies, as evidenced by their successful and credible initial public offerings (IPOs), increases the VC firms' ability to raise future funds. Indeed, successful IPOs, which are the object of scrutiny and public attention, establish clearly to the world of investors that the involved VC firms are good at what they do. This may motivate VC firms to use their proximity to and influence over portfolio companies' management to modify their companies' financial reporting choices (Heesen 2002). VC firms do list the profitable companies they have taken public in the marketing documents distributed to their potential limited partners (Gompers and Lerner 1997). Successfully backed IPOs can increase VC firms' chances of future fundraising and improve their ability to take portfolio companies public in the future (Gompers 1995; Brav and Gompers 1997).

2.1.3 The Value Chain of Venture Capital Industry

The venture capital industry has its own peculiar life cycle: 1) pre-screening business plans and selecting portfolio companies; 2) nurturing and monitoring the investments; and 3) harvesting the investments through either IPOs or mergers and acquisitions (Gompers and Lerner 2002). VC firms are highly specialized to invest in a particular industry or geographical area. A portfolio company usually needs several rounds of venture capital financing before successfully going public. Figure 2 demonstrates the supply of capital to a start-up company.

2.1.4 VC Syndication

VC firms claim that they are active investors who try to “add value through ongoing involvement with continuing business development” (Barry, Muscarella, Peavy, and Vetsuypens 1990, 449). VC firms often invest through syndicates in which one or more VC firms originate the deal and take the lead role in working with the portfolio company (Lerner 1994a). According

to Hochberg, Ljungqvist, and Lu (2007), VC firms syndicate for three reasons. First, they syndicate in the hope of future reciprocation. A VC firm may invite others to co-invest in a promising deal and expect others to do the same in the future (Lerner 1994a). Second, by checking each other's willingness to invest in potentially promising deals, VC firms can better screen the investments and reduce the risks (Sah and Stiglitz 1986). Third, individual VC firms tend to have sector-specific and location-specific investment expertise. Syndications help diffuse information across sector boundaries and allow VC firms to diversify their portfolios (Stuart and Sorensen 2001).

2.1.5 VC Exit

VC firms eventually want to liquidate their ownership position. As VC firms' comparative advantage lies in their ability to oversee young companies, delayed exit incurs opportunity costs (DeAngelo and DeAngelo 1987). Among several different ways to exit, the most frequent exit method is an initial public offering, and the second most frequent method is merger and acquisition (Barry et al. 1990). In addition, almost all (96 percent) of the IPOs, but only slightly more than half (59 percent) of the acquisitions, provide positive returns for VC firms. This suggests that an IPO is usually the most profitable way for VC firms to exit. In this form of exit, VC firms distribute the shares they hold in the IPO companies to their limited partners.⁵ VC firms start to distribute those shares when the lockup agreement between the underwriters and the insiders expires. Each venture capital fund usually distributes all its

⁵ According to Gompers and Lerner (1998), VC firms usually avoid selling their shares in the public market because doing so incurs tax expenses for both VC firms and limited partners. In addition, selling shares in the public market is subject to the SEC's insider trading rule (SEC Rule 144), which restricts the amount of shares VC firms can sell at one time. Rule 144 requires a at least six months holding period on shares to be sold and a trading volume during any three-month period below 1% of outstanding same class shares. The insider trading law prevents VC firms from exiting in a quick manner. However, distribution to the VC firms' limited partners is exempt from the insider-trading rule.

holdings at one time. However, if multiple VC funds have invested in the same portfolio company, these funds may have different distribution dates. According to Gompers and Lerner (1998), the mean (median) holding period is 1.78 (1.02) years from the IPO date. Most of the VC funds exit the portfolio companies within two years after IPO.

2.2 The VC Monitoring Hypothesis

Two theories on the role of VCs compete in the finance literature. The first of these is the VC monitoring hypothesis. Prior literature shows that VC firms, as large and active investors, intensively observe and control the portfolio companies (Gompers 1995; Lerner 1995; Kaplan and Stromberg 2002). This is consistent with the theory that the existence of a large shareholder, who is willing to incur the cost of monitoring, reduces the managerial agency problem (Shleifer and Vishny 1986). Sahlman (1990) points out that VCs resolve the managerial agency problem in one of four ways. VCs (1) structure their investments so they can keep tight control, where staging the infusion of capital is the most important controlling mechanism,⁶ (2) devise compensation schemes that provide managers in portfolio companies with desired incentives, (3) become actively involved in managing the companies in which they invest, or (4) preserve mechanisms to make their investments liquid. The VC monitoring hypothesis suggests that VCs will have strong incentives to monitor managers of the portfolio companies because they tend to protect their investment in highly risky startups and because they try to establish a reputation of success. Indeed, the VC firms are motivated to be associated only with quality and successful portfolio companies (Gompers 1995; Gompers and Lerner 2002; Ivanov, Krishnan, Masulis, and

⁶ Staged financing allows the VC firms to revalue an investment periodically and to abandon it if the expected net present value turns negative (Barry et al. 1990). This action helps solve the agency conflicts between VC firms and the managers, because the managers have a stronger incentive to create value continuously than if all the needed capital was provided at once (Gompers 1995).

Singh 2008). VCs also have a strong ability to monitor managers of the portfolio companies because they possess in-depth industry knowledge and are deeply involved in the operation of these portfolio companies. In addition to playing the information acquisition role of the traditional information intermediaries, such as underwriters, financial analysts, or auditors, VC add value to the businesses by exercising direct control over the management and providing professional business support (Hellman and Puri 2002). This control includes setting up the boards and serving on them, designing human resource policies and stock-based compensation schemes, visiting company offices frequently, meeting with customers and suppliers, replacing and hiring key managers, and providing consulting and active involvement in key strategic decisions (Barry et al. 1990; Lerner 1995; Gompers and Lerner 1996; Hellman and Puri 2002). Kaplan and Stromberg (2003) state that VC firms negotiate complex control rights, including board representation rights, at the time of their investment and utilize sophisticated mechanisms to monitor and advise their portfolio companies. For example, VC firms shape the board of directors at IPOs (Baker and Gompers 2003). Empirical evidence shows that venture-backed companies maintain boards of directors, audit committees, and compensation committees that are more independent from management and that those venture-backed companies are more likely to separate the roles of CEO and chairman than their non-venture-backed counterparts (Hochberg 2003; Morsfield and Tan 2006; Cadman and Sunder 2008). To the extent that VC firms effectively fulfill their monitoring role, venture backing is expected to restrain managers' opportunistic behavior in the portfolio companies.

2.3 The VC Moral Hazard Hypothesis

The second of these competing theories is the VC moral hazard hypothesis. Although the existence of a large shareholder reduces the managerial agency costs, it incurs the private

benefits agency costs at the same time (Gilson and Gordon 2003). This perspective shows that VCs, as controlling owners with a limited holding period, may opportunistically maximize their own interests at the expense of other investors' interests. In contrast to other institutional investors who also own a substantial fraction of firm equity, venture capital funds by law have limited life spans—usually 10 years, which may create a short-term performance focus (Barry et al. 1990; Sahlman 1990; Gompers and Lerner 1999). The VC moral hazard hypothesis suggests that VC firms' short holding period post-IPO may create incentives for them to strategically influence the portfolio companies' stock price upon exit (Lee and Masulis 2008). In fact, the internal rate of return of a venture capital fund is calculated according to the distribution day's share price.⁷ Therefore, VCs may have incentives to influence the stock price through opportunistic financial reporting or disclosure. For example, there is evidence that less seasoned VCs have used inside information to time stock distributions to limited partners, causing substantial negative price reactions to the distribution (Gompers and Lerner 1998). Cadman and Sunder (2008) find that VCs make compensation contracts for CEOs with the horizon of such contract corresponding with the anticipated timing of VC exit. This shows that VCs tend to motivate managers to pursue short-term stock price maximization through compensation contract design. In addition, consistent with the private benefits agency problem, Atanasov, Ivanov, and Litvak (2006) find that the most common allegations in VC-related litigation initiated by founders are the expropriation of company assets via related-party transactions and the freezing out of founders.

⁷ On the day of distribution, VC firms distribute shares they hold in the portfolio companies as returns to their limited partners.

Further, consistent with the VC moral hazard hypothesis, the grandstanding hypothesis argues that young VC firms, lacking a past performance record, prematurely take portfolio companies to IPO in order to signal to potential limited partners about their ability (Gompers 1996).⁸ Evidence shows that portfolio companies backed by younger VC firms go to IPO earlier. Grandstanding incurs costs for existing shareholders by causing larger IPO underpricing and reducing future growth prospects.⁹ To the extent that VC firms have a short-term performance focus, they may influence and encourage managers to manipulate earnings in order to maximize the stock price upon their exit.

2.4 Prior Accounting Literature on Venture Capitalists' Impact on Financial Reporting

Prior findings regarding the impact of VCs on financial reporting are mixed. Consistent with the VC monitoring hypothesis, Hochberg (2003) and Morsfield and Tan (2006) find that venture-backed companies have lower abnormal accruals than non-venture-backed companies in the IPO year. Wongsunwai (2008) reports that companies backed by high quality VC firms (measured as a composite index based on prior deal experience and syndication intensity) have lower abnormal accruals at lockup expiration and a lower probability of income decreasing restatements during a post-IPO period of six years. Agrawal and Cooper (2008) find that VC presence significantly reduces the probability of income decreasing restatements during a post-IPO period of three years. All these studies attribute the higher reporting quality to better governance of venture-backed companies.

⁸ *Webster's Third New International Dictionary* defines the verb "to grandstand" as "to act or conduct oneself with a view to impressing onlookers."

⁹ Underpricing is measured as the first day returns of IPO companies. It represents the loss of wealth for all existing shareholders including VCs themselves.

Consistent with the VC moral hazard hypothesis, Cohen and Langberg (2006) observe that venture-backed companies have lower earnings response coefficients (ERC) than non-venture-backed companies in the IPO year (in both long window and short window tests). The informativeness of the earnings (measured as ERC) is a decreasing function of the VCs' ownership of equity and a decreasing function of the VCs' board representation. This is compatible with the argument that VCs manage the flow of public information to capital markets and preserve short-term interests resulting from finite ownership horizons. Cohen and Langberg (2006) argue that venture backing incurs information risk for investors. Ertimur et al. (2007) find that market reactions to management earnings forecasts made by venture-backed companies are significantly lower than market reactions of non-venture-backed companies after controlling for the magnitude of surprise.¹⁰ This is in agreement with the argument that VCs are perceived as reducing the credibility of management earnings forecasts. Darrough and Rangan (2005) find that annual research and development (R&D) expenses decrease in the IPO year compared to the year prior to the IPO. The magnitude of decrease is significantly associated with the amount of shares VCs sell in the IPO. Their finding is consistent with the argument that the incentive to sell shares motivates VCs to cut R&D expenditures in order to increase earnings at IPO.¹¹ Lee and Masulis (2008) examine the relationship between venture backing and abnormal accruals and find no relationship exists between VC presence and discretionary accruals for IPO companies after controlling for VC selection endogeneity.

¹⁰ The magnitude of surprise is measured as the difference between management forecast and the most recent analyst consensus forecast, scaled by share price prior to the forecast.

¹¹ Darrough and Rangan (2005) test the relationship between VC firms' shares sold in an IPO and portfolio company's changes in R&D investment. They measure changes in R&D investment as the difference between IPO year and the year prior to IPO. However, changes in R&D expenditure could be due to managers anticipating poor future investment prospects. They did not measure the abnormal level of R&D expenses after controlling for the normal level of R&D expenses.

2.5 Real Activities Manipulation

Healy and Wahlen (1999, 368) note that “earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports either to mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers.” Prior literature also discusses the possibility that earnings management occurs not only via accounting estimates and methods but also through operational decisions (Fudenberg and Tirole 1995; Healy and Wahlen 1999; Dechow and Skinner 2000). Following this stream of literature, RM is defined as the actions managers take, while deviating from normal business practices, to meet certain earnings thresholds (Roychowdhury 2006; Cohen and Zarowin 2008). There has been an increased appreciation in recent literature for understanding how companies manage earnings using RM in addition to AM (Gunny 2005; Roychowdhury 2006; Zang 2007).

For example, Roychowdhury (2006) contends that companies use multiple RM tools, such as temporary price discounts, reduction in discretionary expenses, and overproduction, to avoid reporting losses. Specifically, Roychowdhury (2006) points out that the first method of RM is to generate additional sales or accelerate sales from the next fiscal year into the current year by offering “limited-time” price discounts. However, such actions reduce margins. The lower margin causes a lower cash flow per sale and abnormally high production costs relative to sales. Managers may boost sales by offering lenient credit terms such as reducing the interest charges. This leads to lower cash flows over the life of sales. The second method of RM is to cut discretionary expenditures such as R&D, advertising, or selling, general, and administrative (SG&A) expenses. This RM method leads to abnormally low discretionary expenses. The third method documented by Roychowdhury (2006) is to overproduce. By producing more units than

necessary for sale, fixed costs can be spread over a larger number of units, lowering fixed costs per unit. This method lowers the total cost of goods sold (COGS) for the period because part of the incurred fixed overhead costs is absorbed by the ending inventory rather than being expensed. Nevertheless, this method leads to high inventory holding costs and abnormally low level of cash flow relative to sales.

RM is different from AM mainly because RM affects cash flows while AM does not. RM is more costly in that the company takes actions that impair its long-term growth prospects and competitive advantage. Yet Graham et al. (2005) conclude that managers prefer RM to AM because RM can be indistinguishable from optimal business decisions and harder to detect. Zang (2007) find that RM and AM can substitute for each other in the presence of an exogenous shock, such as an accounting-based lawsuit. Companies make tradeoffs between the costs of AM (e.g., attracting additional scrutiny or being caught by the regulators) and the costs of RM (e.g., affecting cash flows or losing long-term growth momentum). For example, managers are more willing to use RM in the post Sarbanes-Oxley era because public and regulatory scrutiny has increased the costs of AM (Cohen et al. 2008). Cohen and Zarowin (2008) find that companies use both AM and RM around seasoned equity offerings (SEO). The choice can be predicted as a function of the companies' abilities to use AM and the costs of AM. The economic costs of RM are significantly higher than the economic costs of AM in the context of a SEO. Mizik and Jacobson (2007) find that companies inflate stock prices around SEOs through both AM and RM methods. They further document that investors overvalue companies that manage earnings at SEOs, and the magnitude of this overvaluation links more closely to RM than to AM. Companies that engage in RM significantly underperform others during the post-SEO period.

2.6 IPOs, Lockup Expiration and Earnings Management

Company insiders have strong incentives to boost stock price around capital market transactions such as IPOs (Teoh, Welch, and Wong 1998a). Pre-IPO shareholders, founders, managers, and VC firms have incentives to sell their shares for liquidity at lockup expiration, which usually occurs 180 days after the IPO.¹² Therefore, they have incentives for opportunistically maximizing the value of the shares they hold through earnings management (Cheng and Warfield 2005). At lockup expiration, both insiders and VCs trade actively to liquidate their holdings (Field and Hanka 2001). In addition, IPOs present a situation where AM is restrained by the external market monitoring forces, auditors, boards, analysts, rating agencies, press, litigants, and by a greater regulatory scrutiny (Ball and Shivakumar 2008). Companies may view AM particularly costly in the IPO setting and become more likely to engage in RM. Furthermore, RM is harder to detect than AM, motivating managers to engage in RM. Thus, RM is likely to occur frequently in an IPO setting.

In order to capture the earnings management behavior of portfolio companies, I focus on examining RM at the lockup expiration. Consistent with Teoh et al. (1998a), I define IPO year as the fiscal year during which the initial public offering is made. The lockup agreement can expire in the IPO year or in the subsequent fiscal year, depending on the relative timing of the IPO date and the company's fiscal year end. Figure 3 illustrates the time-line for the two cases where the lockup expires in the IPO fiscal year or in the subsequent fiscal year following the IPO year (IPO+1). In my final sample, 77% of the IPOs have a lockup period of 180 days. 46% of the IPO

¹² According to Field and Hanka (2001), most IPOs feature share lockup agreements that prohibit insiders and other pre-IPO shareholders from selling any of their shares for a specified period. Lockups serve several purposes. They reassure the market that key employees will continue to exert themselves for at least a few months. They provide a credible signal that insiders are not attempting to cash out in advance of imminent bad news. They also aid the underwriters' price support efforts by temporarily constraining the supply of shares. Insiders can start to sell shares for liquidity after the lockup expires.

companies have their lockup agreements expired in the fiscal year of IPO and 54% of IPO companies have their lockup agreements expired in the first post-IPO fiscal year.

CHAPTER 3

HYPOTHESES DEVELOPMENT

3.1 Do Venture-backed Companies Have Higher RM than Non-venture-backed Companies?

The monitoring hypothesis suggests that venture capitalists (VCs) have the incentives and the ability to restrain managers' opportunistic earnings management, through both accrual manipulation (AM) and real manipulation (RM). VCs, as influential large shareholders, may better police managers than the standard panoply of market-oriented techniques (Gilson and Gordon 2003). Specifically, there are four reasons that venture-backed portfolio companies may engage in less RM than non-venture-backed companies.

First, one type of value that VCs add to the portfolio companies is to help the company establish a better governance structure. Hellman and Puri (2002) find that VCs help a startup company build the board and serve on the board, invite independent directors to serve on the board, set up human resources and compensation policy, and improve the information and technology system, etc. The better governance structure of venture-backed companies reduces the probability of both intentional manipulation and unintentional errors in operational business decisions. Consequently, venture-backed companies may be expected to have lower RM than non-venture-backed companies.

Second, the deep involvement of VCs and their in-depth knowledge of the company's business are additional reasons for VCs to effectively monitor and restrain manager's RM practices. For example, leveraging their information advantage gained through operational control prior to initial public offerings (IPOs), VCs are able to evaluate investments with full sets of information and to detect whether managers opportunistically delay profitable investments or myopically cut necessary expenses.

Third, RM incurs long-term reputational cost for VCs. The long-term success of portfolio companies allows VCs to establish their reputations in the industry. Reputation affects their ability to launch subsequent IPOs and their ability to raise future funds (Gompers 1995; Brav and Gompers 1997; Ivanov et al. 2008). Being a credible financial reporter preserves VCs as IPO certifiers (Barry et al. 1990; Megginson and Weiss 1991).¹³ Reputation affects VCs' bargaining power in pre-money valuation negotiation with entrepreneurs (Hsu 2004).¹⁴ VC firms list successful portfolio companies in their marketing documents used for raising future capital. RM hurts portfolio companies' future economic performance and reduces the probability that VC firms will cite those portfolio companies as successful examples in their marketing documents. Thus, VCs may be expected to restrain managerial opportunism to boost stock price through RM due to their reputational concerns.

Fourth, VCs rely on financial statement measures to evaluate investment performance, which creates the demand for unmanaged earnings. According to Kaplan and Stromberg (2002), 73 percent of venture capital financing agreements contains certain types of contingency features based on observable accounting measures of performance.¹⁵ In addition, Armstrong, Davila, and Foster (2006) find that financial statement information explains a sizable component of the levels and changes in valuation in both pre-IPO and post-IPO venture capital valuation. Earnings

¹³ Substantial prior literature in auditing, investment banking, and venture capital examines the performance implications of reputation of financial intermediaries. Prior to the IPO, information about the company does not exist. Investors cannot evaluate the quality of the IPO companies based on any publicly available information. Rather, they infer the quality of IPO companies based on the reputation of affiliated financial intermediaries such as the VC firms. Thus, association with skilled or reputable VC firms may benefit issuing companies and result in less underpricing.

¹⁴ According to Hsu (2004), entrepreneurs are three times more likely to accept offers from high-reputation VC firms and are willing to accept a 10 to 14 percent discount on the valuation of their business.

¹⁵ Venture capital financing is usually staged so that subsequent periods' funding is contingent upon prior periods' performance. VC firms impose such terms in the financial contract in order to reduce managerial agency costs (Sahlman 1990; Gompers 1995).

achieved through RM distort the underlying economic performance and are less useful to VCs. Thus, in order to obtain objective and truthful performance information, VCs restrain managers' earnings management actions through both AM and RM. Overall, the VC monitoring hypothesis suggests that venture-backed companies demonstrate less RM than non-venture-backed companies.

On the other hand, the VC moral hazard hypothesis suggests that VCs have both the incentives and the ability to influence and encourage managers to engage in earnings management. There are four reasons that venture-backed companies may have more RM than non-venture-backed companies. First, short holding periods following IPO creates an incentive for VCs to engage in RM. VC firms are under pressure to exit the investment following IPO because the venture capital funds have a limited life (i.e., ten years). They regard IPOs as the most profitable channel to exit (Gompers and Lerner 2002). VC firms usually distribute their shares to the limited partners within two years following IPO (Gompers and Lerner 1998). The exit pressure arguably establishes incentives for VCs to engage in myopic behavior that can hurt long-term growth prospects of the portfolio companies. One typical example of this myopic behavior is grandstanding, when young VCs prematurely push portfolio companies to make an IPO, underpricing the companies (Gompers 1996).

Second, VCs experience strong incentives to inflate the stock price upon exit. The internal rate of returns of a venture capital fund is calculated using the stock price on the day when the VC firm distributes its shares to the limited partners. Thus, the VC moral hazard hypothesis suggests that the VC firms have incentives to maximize stock price around distribution days through upward earnings management (Lee and Masulis 2008). Cadman and Sunder (2008) observe that VCs make stock compensation contracts for CEOs using the

incentive horizons aligned with the anticipated timing of the VC exit. This evidence shows that VCs tend to motivate managers to pursue short-term stock price maximization upon VCs' exit. The aligned incentive horizon may cause managers to undertake RM to manage earnings upward upon the exit of VCs.

Third, VCs have incentives for RM, because they may believe that other shareholders bear the cost of destroyed long-term economic value after their exit. Once the VC firms have distributed all their shares to the limited partners, they no longer have any economic ties with the portfolio companies and are unlikely to be affected by any adverse consequences of the RM they engaged during the previous periods. Thus, the cost of RM may be less to VCs than to other shareholders.

Fourth, IPO is a setting where VCs may perceive AM to be more costly than RM. Engaging in RM reduces the likelihood of being detected for aggressive or fraudulent financial reporting, which would cause immediate reputational damage. As IPOs are repeated games for the VC firms, these firms care about their reputation as credible issuers. Evidence shows that being detected as accounting manipulator in IPOs damages a VC firm's reputation concerning future IPOs.¹⁶ On the contrary, RM is harder to detect because it is indistinguishable from optimal operating activities (Graham et al. 2005). Therefore, if VCs perceive the consequence of being caught in fraudulent reporting in the near term to be more costly than the consequence of impairing portfolio companies' future performance, they may prefer RM to AM. Overall, the VC

¹⁶ Luo (2006) observes discretionary accruals-based earnings management to be negatively associated with the number of new IPOs backed by the same lead VC firm in the subsequent two years. There is greater underpricing for the new IPOs backed by the same lead VC firm in the subsequent one year. This evidence shows that the market detects discretionary accruals-based earnings management and this affects VC firms' reputation and their subsequent IPOs' successes.

moral hazard hypothesis suggests that venture-backed companies have more RM than non-venture-backed companies.

Thus, ex ante, it is not clear whether the level of RM of venture-backed companies is higher or lower than that of non-venture-backed companies. The answer lies in which explanation dominates the other in reality. I address this question empirically and test the following non-directional hypothesis:

H1: The magnitude of RM is systematically different between venture-backed and non-venture-backed companies in post-IPO years.

3.2 Does the Difference in RM Between Venture-backed and Non-venture-backed Companies Diminish after VCs' Exit?

VCs' involvement is particularly strong at the early stage of a company's development, and it decreases over time (Hellman and Puri 2002). Once VCs distribute their shares to their limited partners, they usually exit from the board (Gompers and Lerner 2002). Campbell and Frye (2008) find that venture-backed companies utilize governance structures with greater levels of monitoring at the time of IPO compared to non-venture-backed companies, but the difference begins to dissipate over time.¹⁷ In addition, the exit of VCs materially alters the governance structures of portfolio companies. The governance level of venture-backed companies declines a few years subsequent to IPO. By contrast, the governance level of non-venture-backed IPO companies increases gradually due to the benefits of going public. With the influence of VCs declining following their exit, the difference in RM between the two groups of companies may decline. The monitoring hypothesis suggests that VCs may tighten their control after lockup expiration when insiders, such as founders or managers, have strong incentives to behave

¹⁷ Campbell and Frye (2008) measure governance level using board characteristics and G-index.

opportunistically. Thus, I expect the VCs' monitoring effect to be in its strongest form during the post-lockup-expiration period. In addition, the moral hazard hypothesis suggests that VCs themselves may have incentives to manipulate earnings to boost share price when they distribute their shares to their limited partners. Thus, I expect the moral hazard hypothesis to be in its strongest form also after lockup expires. As lockup may expire in either the IPO year or the IPO+1 year, I expect the difference in RM between venture-backed and non-venture-backed companies to be most pronounced in both the IPO year and the IPO+1 year. However, after all VC firms distribute their shares by the end of the IPO+2 year, their impact on the portfolio companies begins to dissipate.¹⁸ As VCs leave the portfolio companies, they also leave the board. This suggests that the effect of direct monitoring by VCs will go immediately after distribution. Nevertheless, the indirect monitoring or governance effect attributed to VCs may remain for some time even after VCs' exit. This is because VCs add value to the portfolio companies by establishing a professional governance mechanism such as a more independent board, more efficient information technology system and internal control system, a better-designed managerial compensation scheme etc. These governance mechanisms continue to function after VCs' exit, which creates a difference between the two groups of companies. The difference in governance mechanisms between venture-backed and non-venture-backed companies may not go away immediately after VCs' exit. Thus, it is an empirical question to what extent the difference in RM diminishes or remains after VCs exit. In general, I expect that the difference between the two groups becomes weaker in the IPO+2 year.

¹⁸ According to Gompers and Lerner (1998), in the post-IPO period, the mean (median) holding period is 1.78 (1.02) years from the IPO day. Most of the VC funds exit the portfolio companies within 2 years following IPO.

In the multivariate test, I compare the difference in RM measures between the two groups of companies over a three-year post-IPO period. I hypothesize that VCs' impact on the portfolio companies' RM decisions is most pronounced in the IPO and the IPO+1 year, relative to IPO+2 year.

H2: The difference in RM between venture-backed companies and non-venture-backed companies is more significant in the IPO and IPO+1 year than in IPO+2 year.

3.3 Does the VC firms' Reputation Affect the Portfolio Companies' RM Decisions?

Prior literature documents cross-sectional variation in the level of monitoring within the VC industry. As of 2002, among the 1,500 active VC firms in the U.S., the top quintile manages about 80 percent of the industry's capital (Boslet 2003). Companies backed by top quality VC firms have significantly less income-increasing AM and less likelihood of income-decreasing restatements than companies backed by other VC firms (Wongsunwai 2008).¹⁹ VC firms build their reputation through extensive deal experience, expertise, and credibility. Highly reputable or seasoned VC firms are less likely to overprice an IPO stock. This is because the cost of reputational damage is higher to the already respectable VC firms than to the less seasoned or less acclaimed VC firms. Furthermore, the VC firm's level of experience influences their ability to monitor. Ivanov et al. (2008) state that reputable VC firms are more actively involved in their portfolio companies after IPO and are associated with better-quality corporate governance. Moreover, since the lockup expiration is the first opportunity for both founders and VC firms to exit their investments, opportunistic VC firms might be tempted, for their own financial gain, to allow a temporary lapse in monitoring to permit their portfolio companies to engage in earnings

¹⁹ Wongsunwai (2008) uses a composite index to measure the quality of VC firms, which includes their deal experience and their syndication size.

management (Wongsunwai 2008). However, this lapse in monitoring is less likely for reputable VC firms because they have incentives to protect their reputations with their limited partners and with the public markets (Wongsunwai 2008). In addition, the grandstanding theory suggests that seasoned VC firms do not need to signal because investors have evaluated their performance over many years and believe in their high abilities (Gompers 1996). Thus, I expect that portfolio companies backed by high reputation VCs exhibit lower RM than those backed by low reputation VCs.

Following prior literature, I use three proxies for VC reputation (*VCR*): (1) the total number of prior rounds of investment in which a VC firm has participated (*VC Rounds*); (2) the total number of portfolio companies in which a VC firm has invested (*VC Companies*); and (3) the total amount of capital invested in all portfolio companies by a VC firm (*VC Investments*).²⁰ The *VC Rounds* variable measures the VC firm's deal experience (Barry et al. 1990). The more deals in which a VC firm has participated, arguably the more experience in monitoring it gains. Similarly, the *VC Companies* variable measures the VC firm's deal experience. The more companies in which a VC firm has invested in, the more monitoring experience it gains. Finally, the *VC Investments* variable captures not only a VC firm's deal experience but also its fundraising success (Wongsunwai 2008). A VC firm is able to deploy a large amount of capital given the fact that it has successfully raised enough capital continuously.

Following Wongsunwai (2008), I restrict the *VCR* measure to the first round of venture financing received by a portfolio company. There are three reasons to focus on the first round. First, VCs face the most uncertainty about a startup's prospects when they make the first-round

²⁰ I purposefully do not separate VC reputation from VC experience or ability because reputation is diligently built upon experience, ability, and past performance and is expected to broadly incorporate facets of each.

investment decision. The originating VC firms that identify the portfolio company invite other VC firms to co-invest. Thus, VC firms participating in the first round usually include the originating VCs who take the lead to work with the portfolio company. Second, the first round is the time when VCs' involvement with the portfolio companies is in the greatest need and thus has the greatest impact.²¹ The VC firms that work with portfolio companies beginning from the first round may play a major role in shaping the portfolio companies. Thus, the effect of *VCR* is better captured by VC firms participating in the first round than by those joining in later rounds. Third, following Ivanov et al. (2008), I measure the VC syndicate reputation at the first round level, by taking the equal-weighted average of the *VCR* measures of all the VC firms that syndicate the first round and use it as the VC reputation score for the portfolio company.²² At earlier rounds, VC firms tend to syndicate investments with peer firms of equivalent reputation, while the less reputable VC firms join the syndicate only in later rounds (Lerner 1994b). Therefore, an equally weighted average makes a reasonable proxy. In addition, prior literature finds that there is a significant difference in the quality of monitoring between the top-quartile VCs and all other VCs (Wongsunwail 2008). Thus, I set the *VCR* variable to be a binary indicator equal to 1 if it is ranked in the top quartile of all IPO firms for a particular IPO year.

I hypothesize that companies backed by high-reputation VCs have less RM than companies backed by low-reputation VCs.

H3: VC reputation is negatively associated with the magnitude of RM of the portfolio companies.

²¹ Hellman and Puri (2002) find that the value-adding influence of VCs is the strongest at the early stage.

²² Barry et al. (1990) use the reputation measure of the lead VC only in their study assuming that the lead VC is the one exerting influence on portfolio companies. They define the lead VC as the VC firm holding the largest equity stake in the portfolio company. However, Gorman and Sahlman (1989) find that the VC firm originating the investment may not end up owning the largest stake at IPO. Measuring the reputation of VC syndicate avoids using noisy proxies for the lead VCs.

CHAPTER 4

MODEL DESCRIPTIONS

4.1 Endogenous VC Selection Bias

Prior literature points out that the provision and receipt of venture funding represents the outcome of an endogenous choice by entrepreneurs and venture capitalists (VCs) (Megginson and Weiss 1991; Lee and Wahal 2004; Sorensen 2007). VCs have stringent selection and evaluation criteria regarding the portfolio companies in which they will invest. The observed earnings management behavior of a portfolio company may be a combined effect of both VC selection and VC intervention. In order to mitigate the possibility that VC firms choose to invest in companies that already have high quality of financial reporting, I use a Heckman (1979) two-stage procedure to correct for this endogenous selection bias. The first stage of the Heckman procedure estimates a probit regression regarding the probability of a company to be selected to receive venture backing. In the second stage, I calculate the inverse Mill's ratio using the coefficient estimates from the probit regression and add it as a control variable to the main regression models. The inverse Mill's ratio controls for the sample selection bias. A coefficient that is significantly different from zero for the inverse Mill's ratio indicates the existence of sample selectivity.

In the first stage Heckman procedure, following Cadman and Sunder (2008), I use three instrumental variables to estimate the probability of a company to be selected to receive venture backing: the age of the company (*AGE*), the headquarter location of the company (*LOCATION*), and the average market-to-book ratio for publicly traded companies in the same two-digit SIC industry during the fiscal year of the firm's IPO (*INDUSTRYMTB*). For the first stage Heckman procedure to be effective, it is important that at least one instrumental variable be exogenous and

have no direct effect on real manipulation (RM) in the portfolio company (Francis and Lennox 2008).²³ All three instrumental variables are free from VC intervention and two instrumental variables (i.e. *AGE* and *LOCATION*) have no theoretical relation with RM. Lerner (1995) finds that VCs tend to invest in companies close to their offices. Headquarter states California and Massachusetts are two geographical regions with high VC firm concentration (Hochberg 2003; Morsfield and Tan 2006). Thus, I use a binary indicator variable *LOCATION* to capture proximity of a company to VC firms. *AGE* measures the life of the firm prior to IPO, based on the assumption that mature companies rely less on VC firms to go IPO, whereas young companies rely more on VC firms' help. I use industry average market-to-book (*INDUSTRYMTB*) ratio as a variable to capture the investment opportunity set of the industry in which the company operates. VC firms may be more likely to invest in companies that operate in industries with greater growth prospects. The probit model follows:

Let $VCB_i = 1$ if $VCB_i^* > 0$, and let $VCB_i = 0$ if $VCB_i^* \leq 0$, then

$$VCB_i = \alpha_{11} + \beta_{11} AGE_i + \beta_{21} LOCATION_i + \beta_{31} INDUSTRYMTB_i + \varepsilon_{i1} \quad (1)$$

Where,

- VCB_i^* = the ability of a company to attract VC financing;
- VCB_i = an indicator variable set to 1 if the company is backed by VC firms, and 0 otherwise;
- AGE_i = log value of the number of years between a company's founding date and its IPO date;
- $LOCATION_i$ = an indicator variable set to 1 if the company's headquarter is located in California or Massachusetts, and 0 otherwise;
- $INDUSTRYMTB_i$ = log value of the average *MTB* ratio for publicly traded companies with the same two-digit SIC code in the fiscal year of IPO.

²³ The instrumental variables should have no theoretical relation with the dependent variable of the second stage regression and thus should be excluded from the second stage regression. Francis and Lennox (2008) survey the use of Heckman procedures in accounting literature and point out that many violate this restriction rule, causing severe multicollinearity.

4.2 Dependent Variables

The dependent variables are measures of RM, evaluated as the deviation from normal levels of business operations for every industry-year. Following Roychowdhury (2006), I estimate RM using the three measures of abnormal cash flows from operations (*ABNCFO*), abnormal production costs (*ABNPROD*), and abnormal discretionary expenses (*ABNDISC*). These measures focus on the following three real earnings manipulation methods: (1) acceleration of the timing of sales through increased price discounts or more lenient credit terms; (2) reporting of lower COGS through increased production; and (3) decreases in discretionary expenses including advertising, R&D, and SG&A expenses. The effect of each RM method affects multiple RM measures simultaneously (Roychowdhury 2006). For example, excessive price discounts lead to abnormally high production costs and abnormally low cash flows from operations (CFO) relative to dollar sales. Overproduction leads to abnormally high inventory-holding costs and abnormally low CFO. Cutting discretionary expenditure leads to abnormally low discretionary expenses relative to sales but abnormally high CFO relative to sales.

Following Roychowdhury (2006), I calculate *ABNCFO* for each firm-year as the residual of the following cross-sectional regression estimated for each two-digit SIC code industry and year with at least 10 firms, excluding the firm. The lower level of *ABNCFO* implies more RM.

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \alpha_{02} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{12} \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{22} \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,2} \quad (2)$$

Where,

$CFO_{i,t}$	=	cash flows from operations, COMPUSTAT data #308;
$Assets_{i,t}$	=	book value of assets, COMPUSTAT data #6;
$Sales_{i,t}$	=	sales, COMPUSTAT data #12;
$\Delta Sales_{i,t}$	=	change in sales from preceding year.

Following Roychowdhury (2006), I calculate *ABNPROD* for each firm-year as the residual of the following cross-sectional regression estimated for each two-digit SIC code industry and year with at least 10 firms, excluding the firm. The higher level of *ABNPROD* implies more RM.

$$\frac{Prod_{i,t}}{Assets_{i,t-1}} = \alpha_{03} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{13} \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{23} \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{33} \left(\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,3} \quad (3)$$

Where,

$$Prod_{i,t} = \text{COGS (COMPUSTAT data \#41) + change in inventory (COMPUSTAT data \#3)}.$$

Following Roychowdhury (2006), I calculate *ABNDISC* for each firm-year as the residual of the following cross-sectional regression estimated for each two-digit SIC code industry and year with at least 10 firms, excluding the firm. The lower level of *ABNDISC* implies more RM.

$$\frac{DiscExp_{i,t}}{Assets_{i,t-1}} = \alpha_{04} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{14} \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,4} \quad (4)$$

Where,

$$DiscExp_{i,t} = \text{R\&D (COMPUSTAT data \#46) + Advertising (data \#45) + Selling, General and Administrative expenses (data \#189). If data for any one of the three variables are available, the other two variables are set to zero if they are missing.}$$

4.3 Experimental Variables

Following Morsfield and Tan (2006), I define the VC Backing (*VCB*) variable to be a binary indicator variable coded 1 if the IPO firm receives any venture capital financing. I measure *VCR* using three alternative proxies, respectively *VC Rounds*, *VC Investments*, and *VC Companies*. I calculate the *VCR* variable for each portfolio company as the equal-weighted average of *VCR* for all VC firms that syndicate the first round of financing. It equals 1 if the

average *VCR* variable is ranked in the top quartile of all VC firms in a particular IPO year, and 0 otherwise.

4.4 Control Variables

In comparing the level of RM across venture-backed and non-venture-backed IPO companies, I control for variables correlated with RM as identified by prior literature. These control variables are listed as follows:

- 1) Leverage (*LEV*). Roychowdhury (2006) finds that companies that have debt are associated with higher levels of RM, because these companies have incentives to avoid violating debt covenants. I measure this variable as the sum of long-term (data #9) and short-term (data #34) debt divided by the market value of equity.
- 2) Market-to-Book ratio (*MTB*). Growth companies are penalized more by the stock market when they miss earnings thresholds (Skinner and Sloan 2002). Thus, companies with higher market-to-book ratio exhibit more incentives to do RM.
- 3) Current liabilities (*CL*). Roychowdhury (2006) finds that companies with current liabilities have higher levels of RM. Stakeholders, such as suppliers, use earnings heuristics to evaluate customer performance and extend customer credit (Graham et al. 2005). Missing earnings targets may cause such companies to lose favorable credit terms. Companies with higher current liabilities have more incentives to meet earnings targets. Thus, companies with high current liabilities as a percentage of total assets are more likely to engage in RM.
- 4) Sum of inventory and receivables (*INVREC*). According to Roychowdhury (2006), excessive production to absorb fixed costs in inventory is easier to accomplish and more likely to escape detection when a company traditionally maintains a high stock of

inventory. Similarly, a company with substantial credit sales to dealers can more easily engage in channel stuffing, or in accelerating the recognition of sales, by shipping goods early to its dealers and booking receivables. Thus, companies with high stock of current assets (in the form of inventory and receivables) are more likely to engage in RM.

- 5) Seasoned equity offering (*SEO*). Prior literature suggests that capital market transactions, such as SEOs, create incentives for companies to manage earnings (Rangan 1998; Teoh, Welch, and Wong 1998b; Shivakumar 2000; DuCharme, Malatesta, and Sefcik 2004). Cohen and Zarowin (2008) find that companies engage in both RM and AM in the year when they issue SEOs. Thus, I control for the influence of SEOs on RM measures in the test. This variable is a binary indicator variable set to 1 if the company issues any SEOs in the fiscal year.
- 6) Number of shares outstanding (*SHARES*). An earnings target is usually a per share number, implying that total actual earnings and number of shares influence companies' distance to their earnings targets. A penny short in earnings per share translates into more dollars of actual earnings for companies with more shares outstanding than for companies with fewer shares outstanding (Zang 2007). Therefore, companies with more shares outstanding have more incentives to do RM. I control for the number of shares outstanding at the end of year in the test.
- 7) Return on assets (*ROA*). Dechow, Sloan, and Sweeny (1995) document that earnings management correlates with firm performance. Zang (2007) shows *ROA* to be positively associated with abnormal R&D expenses but negatively associated with abnormal production costs. I control for *ROA* in the test of RM.

- 8) Annual sales (*SALES*). Dechow et al. (1995) find size to be positively associated with earnings management incentives. Larger companies attract more attention in the capital markets and are subject to greater pressure to meet earnings targets. Zang (2007) finds that size, proxied by the log value of sales, is associated with RM measures. Thus, I measure size as the log value of annual sales.
- 9) Manufacturing industry membership (*MFG*). Roychowdhury (2007) suggests that overproduction, as an earnings management strategy, is only available to firms in the manufacturing industries. Thus, in order to control for the difference in RM between manufacturing firms and other firms, I include a manufacturing dummy variable in the regression. *MFG* is a binary indicator variable, set to be 1 if the company is in industries with a SIC code between 2000 and 3999.
- 10) Discretionary current accruals (*DCA*). Zang (2007) and Cohen et al. (2008) suggest that AM and RM are substitutes in the presence of an exogenous shock. Companies shift from AM to RM after accounting-based lawsuits are filed against them or after the implementation of the Sarbanes Oxley Act (Zang 2007; Cohen et al. 2008). The shift suggests that AM and RM are correlated variables. Thus, I control for the magnitude of AM in the test. I do not predict the sign of the coefficient for AM in the tests. This is because empirical results from Zang (2007) and Cohen et al. (2008) are based on time series evidence, and it is not clear whether AM and RM are substitutes cross-sectionally.²⁴ I measure AM using *DCA* because Teoh et al. (1998a) find that discretionary current accruals have the greatest consistent explanatory power among all

²⁴ It is not clear whether AM and RM are substitutes without the presence of an exogenous shock. Cross-sectionally, it is reasonable to expect that certain companies with stronger earnings management incentives may engage in both higher AM and higher RM than other companies.

the proxies for earnings management examined in an IPO setting. I calculate *DCA* as the residual of the following cross-sectional modified Jones model estimated for each two-digit SIC code industry and year with at least 10 firms, excluding the firm (Teoh et al. 1998a):

$$\frac{CA_{i,t}}{Assets_{i,t-1}} = \alpha_{05} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{15} \left(\frac{\Delta Sales - \Delta TR}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,5} \quad (5)$$

Where,

$$\begin{aligned} CA_{I,t} &= \Delta [\text{accounts receivable (data \#2) + inventory (data \#3) + other current assets (data \#68)}] - \Delta [\text{accounts payable (data \#70) + tax payable (data \#71) + other current liabilities (data \#72)}]; \\ Assets_{I,t} &= \text{book value of assets (data \#6)}; \\ \Delta Sales_{I,t} &= \text{change in data \#12 from the preceding year}; \\ \Delta Sales_{I,t} &= \text{change in trade receivables (data \#151)}. \end{aligned}$$

- 11) Inverse Mill's ratio (*MILLS*). In order to correct for the sample selection bias due to the VC firms' endogenous selection of portfolio companies, I calculate the predicted values of the *VCB* variable using the coefficient estimates from the first stage Heckman (1979) regression model. I calculate the inverse Mill's ratio as the probability density function of standard normal distribution, evaluated at the predicted value of the *VCB* variable, which is then divided by the cumulative density function of standard normal distribution, evaluated at the predicted value of the *VCB* variable.

4.5 Multivariate Regression Models

4.5.1 Venture Backing and Real Manipulation

I use the following model to test the relation between *VCB* and RM during post-IPO years (H1):

$$\begin{aligned} RM_I = & \alpha_{16} + \beta_{16}VCB_I + \beta_{26}CL_I + \beta_{36}DCA_I + \beta_{46}INVREC_I + \beta_{56}LEV_I + \beta_{66}MFG_I + \\ & \beta_{76}MILLS_I + \beta_{86}MTB_I + \beta_{96}ROA_I + \beta_{106}SEO_I + \beta_{116}SALES_I + \beta_{126}SHARES_I \\ & + \varepsilon_{i6} \end{aligned} \quad (6)$$

Where,

RM_i	=	$ABNCFO$, $ABNPROD$, and $ABNDISC$ respectively;
VCB_i	=	an indicator variable set to 1 if the company is backed by any VC firms, and 0 otherwise;
CL_i	=	(current liability (data #5) – short-term debt outstanding (data #34)) / total assets (data #6);
DCA_i	=	discretionary current accruals estimated using the modified Jones model for each industry and year with at least 10 firms, excluding the firm;
$INVREC_i$	=	(inventories (data #3) + receivables (data #2)) / total assets (data #6);
LEV_i	=	(long-term debt (data #9) + short-term debt (data #34)) / (closing price at fiscal year-end (data #199) * number of shares outstanding at fiscal year-end (data #25));
MFG_i	=	an indicator variable set to 1 if the company's SIC code is between 2000 and 3999, and 0 otherwise;
$MILLS_i$	=	$\phi(\hat{Y} \sigma_{\hat{Y}}) / \Phi(\hat{Y} \sigma_{\hat{Y}})$, where $\hat{Y}$ is the predicted value of the VCB variable calculated using coefficient estimates in the first stage Heckman regression. Φ is the cumulative density function of standard normal distribution and ϕ is the probability density function of standard normal distribution.
MTB_i	=	market value of equity (data #25* data #199) / book value of common equity (data #60);
ROA_i	=	income before extraordinary items (data #18) / lagged total assets (data #6);
SEO_i	=	an indicator variable set to 1 if the company issues any SEOs in the fiscal year, and 0 otherwise;
$SALES_i$	=	log value of sales (data #12);
$SHARES_i$	=	log value of the number of shares outstanding at the end of fiscal year (data #25);

H1 is supported if the coefficient of the VCB variable is significantly different from zero in regression model (6).

4.5.2 VC Firms' Influence on Real Manipulation after Their Exit

To test VCs' influence over a three-year post-IPO period (H2), I estimate the above model (2) using financial data reported for the IPO year, the IPO+1 year, and the IPO+2 year respectively. H2 is supported if I observe significant coefficients for the VCB variable in the IPO year and the IPO+1 year, along with less significant or no significant coefficients in IPO+2 year.

4.5.3 VC Reputation and Real Manipulation

I use the following model to test the relation between *VCR* and *RM* (H3):

$$RM_I = \alpha_{17} + \beta_{17}VCR_I + \beta_{27}CL_I + \beta_{37}DCA_I + \beta_{47}INVREC_I + \beta_{57}LEV_I + \beta_{67}MFG_I + \beta_{77}MTB_I + \beta_{87}ROA_I + \beta_{97}SEO_I + \beta_{107}SALES_I + \beta_{117}SHARES_I + \varepsilon_{i7} \quad (7)$$

Where,

- VCR_i = Either *VC Rounds*, *VC Companies*, or *VC Investments*. The *VCR* variable for each portfolio company is calculated as the equal-weighted average of all *VC* firms that syndicate the first round of investment. It equals 1 if the *VCR* variable is ranked in the top quartile of overall sample for a particular IPO year, and 0 otherwise;
- $VC\ Rounds_i$ = the total number of prior rounds of investment a *VC* firm has participated in;
- $VC\ Companies_i$ = the total number of portfolio companies a *VC* firm has invested in;
- $VC\ Investments_i$ = the total amount of capital invested in all portfolio companies by a *VC* firm;
- Other variables' definitions are consistent with the above model (6).

H3 is supported if the coefficients on the three *VCR* proxy variables are significantly different from zero. H3 also predicts that the coefficient estimates of *VCR* have a positive sign in the test of *ABNCFO*, a negative sign in the test of *ABNPROD*, and a negative sign in the test of *ABNDISC*.

CHAPTER 5

EMPIRICAL RESULTS

5.1 Venture Backing and Real Manipulation Analysis

5.1.1 Sample and Data

I obtain all initial public offering (IPO) companies between 1987 and 2002 from the Securities Data Corporation's (SDC) Global New Issues database. The database identifies which IPO companies have venture backing and the names of the venture capitalist (VC) firms. SDC also provides the lockup days data for these companies. The firm age variable is obtained from Jay Ritter's website and the SDC Global New Issues database. If there is any conflict between the Ritter data and the SDC data, I verify the firm age data using Edgar SEC prospectus filing. Annual financial statement information is taken from COMPUSTAT. To be included in the final sample, IPOs must have financial data available in COMPUSTAT for both the year of IPO and the two years prior to IPO to calculate real manipulation (RM) measures. The initial sample of IPO companies downloaded from the SDC database contains 7,526 observations. There are 3,799 companies with the instrumental variables available to estimate the first stage Heckman regression. As COMPUSTAT contains only one year of lagged financial data prior to IPO for most of the companies, the final sample size of the IPO year truncates to 867 firms with RM data available. The final sample of the IPO+1 year has 2,637 firms with RM data available. The final sample of the IPO+2 year has 2,430 firms with RM data available. All continuous variables are Winsorized at the top 1% and bottom 1% to eliminate the effect of extreme values. Table 1 lists the definitions and data sources of all variables.

5.1.2 Descriptive Statistics of the Venture Backing and Real Manipulation Sample

Panels A and B of Table 2 show the distribution of the final sample, by year and by industry, for the IPO+1 year of venture backing and the RM test. There are more IPOs from the late 1990s stock market bubble period than from other years. Venture-backed companies account for approximately 42% of overall IPO sample. The industry distribution of the sample is similar to that reported by Morsfield and Tan (2006). IPOs tend to be concentrated in the computer hardware and software industry (28.7%). In chemical products (63.8%), computer hardware (55.2%), scientific instruments (57.1%) and health (53.2%) industries, the proportion of venture-backed companies is higher than the proportion of non-venture-backed companies.

Panel C of Table 2 presents the descriptive statistics for firm characteristics and the RM measures across the two groups. The mean (median) value of *ABNCFO* of venture-backed companies is 0.07 (0.074) and is significantly higher than that of the non-venture-backed companies (0.031 and 0.033). The mean (median) value of *ABNPROD* of venture-backed companies is -0.074 (-0.070) and is significantly lower than that of the non-venture-backed companies (-0.013 and -0.017). The mean (median) value of *ABNDISC* of venture-backed companies is 0.176 (0.028) and is significantly higher than that of the non-venture-backed companies (-0.007 and -0.046). Overall, the univariate *t*-tests and Wilcoxon rank tests suggest that venture-backed companies have less RM than non-venture-backed companies in the IPO+1 year. Further, venture-backed companies are less leveraged than non-venture-backed companies. This finding is consistent with the argument that venture capital financing substitutes part of the debt financing for venture-backed companies. Venture-backed companies have higher MTB ratio than non-venture-backed companies, which is consistent with the argument that VCs favor high growth companies. Venture-backed companies are more likely to issue seasoned equity offerings

than non-venture-backed companies. This may be explained by the fact that venture-backed companies tend to be high-tech companies, such as biotech that have a large and continuous need for additional cash. The size (proxied by sales) of venture-backed companies is relatively smaller than that of non-venture-backed companies. Consistent with Morsfield and Tan (2006), I find that venture-backed companies have lower levels of *DCA* than non-venture-backed companies in the IPO+1 year. The univariate tests show that all the firm characteristic variables differ significantly across the two groups of companies. Thus, it is necessary to control for them in the tests.

Table 3 presents the Pearson / Spearman correlation matrix for the final sample of the IPO+1 year test. The three RM measures show significant but weak correlations between each other (Pearson correlation coefficients of -0.28, -0.209, and -0.177). They are correlated because a particular RM method affects multiple RM measures simultaneously (Roychowdhury 2007). However, the correlation coefficients are less than 0.3, implying that the three measures are capturing different types of earnings management behavior. Consistent with Roychowdhury (2007), *ABNCFO* and *ABNDISC* are negatively correlated (Pearson correlation of -0.209). This negative correlation may be because cutting discretionary expenses has a negative impact on *ABNDISC* but a positive effect on *ABNCFO* (Roychowdhury 2007). *ABNPROD* shows a negative correlation with *ABNDISC* (Pearson correlation of -0.177). This negative correlation is probably due to managers engaging in activities leading to abnormally high production costs and at the same time reducing discretionary expenses with the common goal being to report higher earnings (Roychowdhury 2007). *ABNCFO* and *ABNPROD* are negatively correlated (Pearson correlation of -0.28) because overproduction or price discounts lead to abnormally high production costs but abnormally low *CFO*. *DCA* is negatively correlated with *ABNCFO* and

ABNDISC but positively correlated with *ABNPROD*. This is consistent with Roychowdhury's (2007) argument that managers engage in both RM and AM at the same time and some manipulation methods, for example overproduction, have a positive effect on *DCA* and a negative effect on *ABNCFO*. Almost all of the control variables show significant correlations with both the RM measures and the *VCB* variable. Thus, it is necessary to include all of them in the regressions. Both Pearson and Spearman correlations show that *VCB* has positive correlations with *ABNCFO* and *ABNDISC* and a negative correlation with *ABNPROD*. This finding is consistent with the VC monitoring hypotheses that venture-backed companies exhibit less RM than non-venture-backed companies. In addition, the correlation coefficients between the test variable *VCB* and all the control variables fall below 35%, indicating multicollinearity is not a potential concern.

5.1.3 Multivariate Regression Results of the Venture Backing and Real Manipulation Analysis

Table 4 presents the results of the two-stage Heckman regressions for testing H1 and H2. Panel A shows that the first stage Heckman regression model successfully predicts the probability of a company receiving venture backing. The coefficient estimates of the three instrumental variables are all significant at the $p\text{-value} < .0001$ level. The signs of these coefficient estimates are as predicted in the hypothesis. The coefficient on *AGE* is significantly negative, indicating that mature companies are less likely to rely on VCs to go public. The coefficient on *LOCATION* is significantly positive, indicating that VCs are more likely to invest in portfolio companies located in California and Massachusetts. The coefficient on *INDUSTRYMTB* is significantly positive, indicating that VCs are more likely to invest in portfolio companies in industries with high future growth prospects. The model exhibits decent predictive power. The Cox-Snell Pseudo R^2 is 11.4% and the McKelvey-Zavoina Pseudo R^2 is

17.7%, which is similar to Cadman and Sunder's (2008) finding. In 70.3% of the cases, the model correctly classifies whether or not a company receives venture backing.

In Table 4, Panel B, I report the OLS regression results of the second stage Heckman model to test H1 and H2.²⁵ I regress the three RM measures respectively on *VCB* and control variables for each of the three post-IPO years. In order to account for non-spherical residuals due to calendar year clustering, I add fixed effects year dummy variables to all the regression models.²⁶ In addition, to adjust for non-spherical residuals due to industry clustering, I compute the Rogers standard errors robust to industry clustering for every regression model. All the nine models are significant at p -value<.0001 level. The adjusted R^2 ranges from 10% to 37%. I find that the coefficients on *VCB* are significant at the 5% two-tailed level consistently across all three RM measures for the IPO+1 year. The coefficient on *VCB* is significantly positive for the *ABNCFO* and *ABNDISC* tests and significantly negative for the *ABNPROD* test. The signs of these coefficients are consistent with the VC monitoring hypothesis. Overall, the finding supports the VC monitoring hypothesis in H1 that VCs restrain portfolio companies' RM following IPO. The coefficient on inverse Mill's ratio is significant in the IPO+1 year tests for *ABNCFO* (one-tailed p -value of 0.035) and *ABNDISC* (one-tailed p -value of 0.005). The coefficient on inverse Mill's ratio in the *ABNPROD* test is marginally significant with a one-tailed p -value of 0.121. These results suggest that VC selection does contribute to the difference

²⁵ The Heckman regressions require the second stage regression to be performed using MLE procedure assuming normally distributed bivariate errors. I perform both the OLS and the MLE procedures for the second stage to obtain the same results. For the ease of reporting, I tabulate the results of OLS in table 4 only.

²⁶ OLS standard errors are unbiased when residuals are independent and identically distributed. When observations cluster by industry, by year, or by firm, OLS produces biased standard errors. For methods to mitigate the problem, please refer to Petersen (2009).

in RM across the two groups of companies. My finding is robust after controlling for the endogenous VC selection effect on RM.

To test H2, I examine how the difference in RM across the two groups of companies changes over the three-year post-IPO period. H2 predicts that venture-backed companies exhibit less RM in both the IPO year and the IPO+1 year than non-venture-backed companies and there is no difference in the IPO+2 year. I observe no significant difference for all three RM measures between venture-backed and non-venture-backed companies in the IPO year. This finding can be explained by the fact that missing data in the IPO year sample bias against detecting significant results. RM measures need two years of lagged financial data to calculate. As COMPUSTAT only contains financial data for the one year prior to IPO for most of the companies, the IPO year sample has a small size and perhaps a biased distribution. Morsfield and Tan (2006) successfully detect that venture-backed companies show significantly lower level of *DCA* than non-venture-backed companies in the IPO year. This is because the calculation of *DCA* only requires one year of lagged financial data.²⁷ Thus, due to missing machine-accessible data, I am unable to address the question of whether or not VCs restrain RM in the IPO year. The regression results for the IPO+1 year show that venture-backed companies have significantly lower level of RM for all three measures than non-venture-backed companies. This finding is consistent with the VC monitoring hypothesis, that when insiders are unlocked to sell shares in the IPO+1 year, VCs tighten their control over insiders to restrain RM. The regression results of the IPO+2 year present the coefficient on *VCB* to be only significant for the *ABNCFO* measure (with a predicted sign consistent with the monitoring hypothesis). This implies that the difference in RM across

²⁷ I replicate the Morsfield and Tan's (2006) test of discretionary current accruals using the IPO year sample and find consistent results.

the two groups of companies diminishes, to a large extent, after VCs exit the portfolio companies. As VCs exit the portfolio companies within two years following IPO, the effect of their direct monitoring disappears. Although there may be some benefits from the heritage VCs left in the company in the form of better governance structure (internal control, HR and compensation policy, and more independent boards, etc.), the monitoring effect by VCs drops significantly after VCs' departure. This finding is consistent with Campbell and Frye (2008) that the level of governance structure of the two groups converges three years following IPO. Accordingly, as the governance effect decreases, the VCs' role in restraining RM decreases. In sum, the finding supports H2 that the difference in RM is strongly significant in the IPO+1 year between the two groups of companies but is weakly significant or not significant in the IPO+2 year.

5.2 VC Reputation and Real Manipulation Analysis

5.2.1 Sample and Data

To test H3, I use a sample of venture-backed IPO companies between 1987 and 2002. I obtain a sample of venture-backed IPO companies between 1987 and 2002 from the SDC Global New Issues database. The data include detailed information on the date and the amount of each round of financing the IPO companies receive. I obtain the *VCR* measures (*VC Rounds*, *VC Companies*, and *VC Investments*) from Thompson Financial VentureXpert database.²⁸ As the RM measure requires two years of the lagged sales variable to calculate, I examine the association between *VCR* and RM in the IPO+1 year, for which COMPUSTAT data are available. The initial

²⁸ VentureXpert updates the value of the VC reputation data by sending out quarterly surveys. They overwrite the value of the data when they receive survey responses. The data used in this study is updated up to date through May 2009. There will be noises in these reputation proxies if any change in VC firm ranking occurs over time. However, the noises do bias against significant results.

venture-backed IPO sample downloaded from the SDC Global New Issues database contains 2,478 observations. There are 1,830 companies with VCR data available. The final sample contains 1,018 companies with both RM and control variable data available. All continuous variables are Winsorized at the top 5% and bottom 5% to eliminate the effect of extreme values.

5.2.2 Descriptive Statistics of the VC Reputation and Real Manipulation Sample

Panels A and B of Table 5 show the distribution of the sample of venture-backed companies, by year and by industry, separately for the high and low *VCR* (proxied by *VC Rounds*) groups. As I define high-reputation to be in the top quartile for a particular IPO year, companies backed by high-reputation VCs account for 26% of the overall sample. High-reputation-VC-backed IPOs exhibit high frequencies for the years 1988, 1990, and 2000. Venture-backed companies are distributed in 50 industries as defined by two-digit SIC code. High-reputation-VC-backed companies tend to be concentrated in food products, chemical products, and retail industries. Panel C presents the descriptive statistics of firm characteristics, separately for the two groups. The mean (median) value of *ABNCFO* of high-reputation-VC-backed companies is 0.103 (0.114) and is significantly higher than that of the low-reputation-VC-backed companies (0.049 and 0.055). The mean (median) value of *ABNPROD* of high-reputation-VC-backed companies is -0.139 (-0.110) and is significantly lower than that of the low-reputation-VC-backed companies (-0.067 and -0.051). The mean (median) value of *ABNDISC* of high-reputation-VC-backed companies is 0.16 (0.088) and is significantly higher than that of the low-reputation-VC-backed companies (-0.067 and -0.008). In sum, the univariate *t*-test and Wilcoxon rank test show that high-reputation-VC-backed companies have less RM than low-reputation-VC-backed companies in the IPO+1 year. Furthermore, compared to the sample descriptive statistics reported in Panel C of Table 2, I observe, as expected, the mean

(median) value of venture-backed companies to be in between that of high-reputation-VC-backed companies and that of low-reputation-VC-backed companies. The mean (median) value of non-venture-backed companies is the lowest among the four groups. High-reputation-VC-backed companies have slightly less leverage than low-reputation-VC-backed companies, which is consistent with the argument that companies backed by high-reputation VCs have more favorable access to venture financing and thus rely less on debts. High-reputation-VC-backed companies demonstrate higher MTB ratio, which is consistent with the argument that companies with greater future growth prospects are more likely to attract financing from high-reputation VCs. High-reputation-VC-backed companies maintain lower inventory and receivables and more shares outstanding.

Table 6 shows the Pearson and Spearman correlation matrix for the sample of 1,018 companies used in the *VCR* and RM analysis. Consistent with Roychowdhury (2007), the three RM measures show significant and negative correlation between each other. Furthermore, there is a significantly high degree of correlation among the three *VCR* measures (Pearson / Spearman correlation coefficients of 0.82, 0.56, and 0.64). These correlation coefficients suggest that the three *VCR* measures do capture the same underlying construct with slight measurement errors. In addition, all the Pearson correlation coefficients are significant between *VCR* and RM measures except for the one between *VC Investments* and *ABNCFO*. The Spearman correlation coefficients are all significant. Thus, I use a ranked dependent variable in the regression of *ABNCFO* and *VC Investments*. *VCR* has a positive correlation with *ABNCFO* and *ABNDISC* but a negative correlation with *ABNPROD*. The signs of these correlation coefficients are consistent with the VC monitoring hypothesis. The correlations between *VCR* and all the control variables fall below 16%, indicating multicollinearity is not a potential concern.

5.2.3 Multivariate Regression Results of the VC Reputation and Real Manipulation Analysis

Table 7 presents the OLS results of regressing RM on three *VCR* measures respectively in the IPO+1 year. In order to adjust for non-spherical residuals, calendar year fixed effects dummy variables and White Heteroskedasticity-consistent standard errors robust to industry clustering are applied. All the nine models are significant at p -value $< .0001$ level. The adjusted R^2 ranges from 19% to 25%. When using *VC Rounds* as the proxy of reputation, I find significant and positive coefficients on *VC Rounds* in both the *ABNCFO* regression (two-tailed p -value of 0.014) and the *ABNDISC* regression (two-tailed p -value of 0.139). I observe a negative coefficient on *VC Round* in the *ABNPROD* regression (two-tailed p -value of 0.000). These results support H3 and suggest that companies backed by high-reputation VCs exhibit less RM than companies backed by low-reputation VCs. Next, when using *VC Companies* as the proxy for reputation, I observe significant and positive coefficients on *VC Companies* in the *ABNCFO* regression (two-tailed p -value of 0.006) and the *ABNDISC* regression (two-tailed p -value of 0.015), and a significant and negative coefficient on *VC Companies* in the *ABNPROD* regression (two-tailed p -value of 0.001). Thus, the results support H3 as well. Further, when using *VC Investments* as the reputation measure, I get similar results except that the coefficient on *VC Investments* is not significant in the *ABNCFO* regression. The other two coefficients are significant and show signs in the direction predicted by H3. In sum, the regression model results show that *VCR* is significantly and negatively associated with portfolio companies' magnitude of RM in the IPO+1 year. The results are robust using different proxies for *VCR*. The finding is consistent with the argument that the variation in the RM of portfolio companies among venture-backed companies is due to VC firms' reputational considerations and their ability to monitor.

CHAPTER 6

CONCLUSION

In this study, I examine the impact of venture capitalist (VC) presence and VC reputation on portfolio companies' real activities manipulation (RM) behavior. The VC monitoring hypothesis states that VC firms effectively resolve the managerial agency problem caused by separation of ownership and control through close monitoring of managers and thus may restrain managers' opportunistic RM behavior. The VC moral hazard hypothesis states that VCs have incentives to inflate opportunistically the exit stock price through RM, aggravating the private benefits agency problem between controlling shareholders and non-controlling shareholders.

Using a sample of IPO companies between 1987 and 2002, I document evidence that VCs restrain portfolio companies' RM behavior in the IPO+1 year, a finding consistent with the VC monitoring hypothesis. The venture-backing (*VCB*) variable is significant across all three RM measures in the IPO+1 year. The results are robust after I control for the endogenous VC selection using two-stage Heckman regression models. In addition, I find that VCs' impact on RM diminishes after VCs exit the portfolio companies. In the IPO+2 year, for all three RM measures, I find *VCB* to be significant only for one measure. This finding is consistent with the argument that VCs' direct monitoring effect decreases dramatically after their departure. Finally, I find that VC reputation (*VCR*) is negatively associated with the magnitude of RM using alternative VC reputation proxies in the first post-IPO fiscal year. This finding is consistent with the argument that relative to low-reputation VCs, high-reputation VCs have more incentive to preserve their reputations by restraining RM and higher ability to monitor managers.

There are two major limitations to this study. First, because RM measures require two years of lagged financial data to calculate and because COMPUSTAT does not contain the data

for most of the companies, my sample for the IPO year test is truncated. This truncated sample size may bias against finding significant results. I thus acknowledge that my study is not able to differentiate between the VC monitoring and the VC moral hazard hypotheses in the IPO year. Second, in the analysis of VC reputation and RM, I do not control for the VC selection endogeneity in the test.²⁹ Thus, I cannot rule out the alternative explanation that high-reputation VCs may choose to invest in high quality companies that exhibit low RM. However, I acknowledge that this study is not intended to draw a causal inference on the relation between VC reputation and RM. Rather, it documents an empirical association between VC reputation and RM.

Overall, I find that VC presence has a positive impact on financial reporting choices in the portfolio companies. The strength of this positive impact is associated with VCs' reputation. This study contributes to accounting literature on the relationship between ownership structure and financial reporting choices, particularly RM. First, it addresses the debate on whether VCs have a positive or a negative impact on financial reporting practices in the portfolio companies. As a complement to Morsfield and Tan (2006), this study presents new evidence that VCs' impact on earnings management is consistent with their monitoring role. This is the first study that examines the relationship between VC ownership and RM. Second, it considers an expanded research window (three post-IPO years) to examine how VCs' exit affects RM. Morsfield and Tan (2006) focus on examining the relationship between VC presence and accruals manipulation in the fiscal year of IPO. They ignore the evidence that the impact of VCs on the portfolio

²⁹ The instrumental variables that explain the probability of receiving venture backing and the probability of receiving high-reputation VC backing are different. The instrumental variables such as AGE, LOCATION and INDUSTRYMTB have decent predictive power explaining venture backing but very low predictive power explaining high-reputation-VC backing. Current knowledge on the instrumental variables that can explain the selection by high-reputation VC is very limited. I am unable to find appropriate instrumental variables to predict the probability of a company receiving backing from a high-reputation VC.

companies continues until VCs exit. By examining a three-year window, I provide more complete time series evidence including the lockup expiration period and VC exit period. Third, this study provides evidence that VC reputation, a factor determining the strength of governance, is negatively associated with the magnitude of RM. The evidence is consistent with the VC monitoring hypothesis. It further strengthens the conclusion that VCs have a positive impact on financial reporting through monitoring.

Figure 1. Time-line of fiscal years for two cases of lockup expiration.

Case 1: Lockup expires within the fiscal year of the IPO

Case 2: Lockup expires after the fiscal year of the IPO

Table 1. Definition of variables.

Variables	Definitions	Sources
Test variables		
<i>VCB</i>	Binary variable, =1 if a company receives VC financing	SDC Global New Issues database
<i>VC Rounds</i>	Binary variable, =1 if the equal-weighted average of VC reputation (<i>VCR</i>) measure for all the VC firms that syndicate the first round, measured as the total number of investment rounds, is ranked in the top quartile in a particular IPO year	SDC VentureXpert database
<i>VC Companies</i>	Binary variable, =1 if the equal-weighted average of VC reputation (<i>VCR</i>) measure for all the VC firms that syndicate the first round, measured as the total number of portfolio companies, is ranked in the top quartile in a particular IPO year	SDC VentureXpert database
<i>VC Investments</i>	Binary variable, =1 if the equal-weighted average of VC reputation (<i>VCR</i>) measure for all the VC firms that syndicate the first round, measured as the total amount of investments, is ranked in the top quartile in a particular IPO year	SDC VentureXpert database
Dependent variables		
<i>ABNCFO</i>	Residuals from the following regression, estimated cross-sectionally for each two-digit SIC code industry year with at least 10 observations: $\frac{CFO_{i,t}}{Assets_{i,t-1}} = \alpha_{02} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{12} \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{22} \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,2}$	COMPUSTAT
<i>ABNPROD</i>	Residuals from the following regression, estimated cross-sectionally for each two-digit SIC code industry year with at least 10 observations: $\frac{Prod_{i,t}}{Assets_{i,t-1}} = \alpha_{03} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{13} \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{23} \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \alpha_{33} \left(\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,3}$	COMPUSTAT
<i>ABNDISC</i>	Residuals from the following regression, estimated cross-sectionally for each two-digit SIC code industry year with at least 10 observations: $\frac{DiscExp_{i,t}}{Assets_{i,t-1}} = \alpha_{04} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{14} \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,4}$	COMPUSTAT

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Table 1 (continued)

Control variables		
<i>CL</i>	Current liability minus short-term debt outstanding, scaled by total assets	COMPUSTAT
<i>DCA</i>	Residuals from the following regression, estimated cross-sectionally for each two-digit SIC code industry year with at least 10 observations: $\frac{DiscExp_{i,t}}{Assets_{i,t-1}} = \alpha_{04} \left(\frac{1}{Assets_{i,t-1}} \right) + \alpha_{14} \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t,4}$	COMPUSTAT
<i>INVREC</i>	Inventories plus receivables, scaled by total assets	COMPUSTAT
<i>LEV</i>	Long-term debt plus short-term debt, scaled by year-end market value of equity	COMPUSTAT
<i>MFG</i>	Binary variable, =1 if the company's SIC code is between 2000 and 3999	COMPUSTAT
<i>MTB</i>	Market value of equity, scaled by book value of common equity	COMPUSTAT
<i>MILLS</i>	Probability density function of standard normal distribution, evaluated at the predicted value of <i>VCB</i> variable, scaled by the cumulative density function of standard normal distribution, evaluated at the predicted value of <i>VCB</i> variable	First stage Heckman regression
<i>ROA</i>	Income before extraordinary items, scaled by lagged total assets	COMPUSTAT
<i>SEO</i>	Binary variable, =1 if the company issues any seasoned equity offerings in the fiscal year	SDC Global New Issues database
<i>SALES</i>	Log value of sales	COMPUSTAT
<i>SHARES</i>	Log value of the number of shares outstanding at the end of fiscal year	COMPUSTAT
Instrumental variables		
<i>AGE</i>	Log value of the number of years between a company's incorporation and IPO	Jay Ritter's website and SDC Global New Issues database
<i>LOCATION</i>	Binary variable=1 if the company's headquarter is located in California or Massachusetts	SDC Global New Issues database
<i>INDUSTRYMTB</i>	Log value of the average market-to-book ratio for each two-digit SIC code industry in the fiscal year of IPO	COMPUSTAT

Table 2. Sample descriptive statistics of the 2637 IPO companies used in the IPO+1 year venture backing and real manipulation analysis.

Panel A: Distribution by year (N=2637).

	Venture-backed	Non-venture-backed	% of venture-backed companies	% out of all IPO companies
1987	42	75	36%	4%
1988	22	36	38%	2%
1989	20	33	38%	2%
1990	21	33	39%	2%
1991	71	73	49%	5%
1992	96	117	45%	8%
1993	121	167	42%	11%
1994	79	125	39%	8%
1995	113	138	45%	10%
1996	144	242	37%	15%
1997	80	179	31%	10%
1998	26	87	23%	4%
1999	117	105	53%	8%
2000	115	71	62%	7%
2001	22	23	49%	2%
2002	15	29	34%	2%
Total	1104	1533	42%	100%

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Table 2 (continued)

Panel B: Distribution by industry (N=2637).

Industry	Two-digit SIC code	Venture-backed	Non-venture-backed	% of venture-backed companies	% out of all IPO companies
Oil and gas	13, 29	10	44	18.5%	2.0%
Food products	20	11	39	22.0%	1.9%
Paper and paper product	24-27	13	52	20.0%	2.5%
Chemical products	28	120	68	63.8%	7.1%
Manufacturing	30-34	16	85	15.8%	3.8%
Computer Hardware and Software	35, 73	418	339	55.2%	28.7%
Electronic Equipment	36	118	119	49.8%	9.0%
Transportation	37, 39, 40, 42, 44, 45	18	96	15.8%	4.3%
Scientific Instruments	38	133	100	57.1%	8.8%
Communications	48	34	62	35.4%	3.6%
Electric and Gas Services	49	13	23	36.1%	1.4%
Durable Goods	50	17	56	23.3%	2.8%
Retail	53, 54, 56, 57, 59	45	107	29.6%	5.8%
Eating and Drinking Establishments	58	13	28	31.7%	1.6%
Financial services	61, 62, 64, 65	4	15	21.1%	0.7%
Entertainment Services	70, 78, 79	5	45	10.0%	1.9%
Health	80	41	36	53.2%	2.9%
All others	1, 2, 10, 12, 14, 15, 16, 17, 21, 22, 23, 46, 47, 51, 52, 55, 60, 63, 67, 72, 75, 76, 82, 83, 87	75	219	25.5%	11.1%
Total		1104	1533	41.9%	100.0%

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Table 2 (continued)

Panel C: Descriptive statistics on firm characteristics, by firm type (N=2637).

The last two columns report the two-tailed p -value for the difference between venture-backed and non-venture-backed companies in means and medians respectively. T-tests (Wilcoxon rank tests) are used to test the difference in means (medians).

	Venture-backed companies (N=1104)					Non-venture-backed companies (N=1533)					P -values of the difference	
	Mean	Std. Dev.	Median	Q1	Q3	Mean	Std. Dev.	Median	Q1	Q3	Mean	Median
<i>ABNCFO</i>	0.070	0.401	0.074	-0.076	0.228	0.031	0.339	0.033	-0.088	0.166	0.0084	<.0001
<i>ABNPROD</i>	-0.074	0.328	-0.070	-0.245	0.085	-0.013	0.307	-0.017	-0.163	0.135	<.0001	<.0001
<i>ABNDISC</i>	0.176	0.920	0.028	-0.175	0.279	-0.007	0.770	-0.046	-0.251	0.111	<.0001	<.0001
<i>VCB</i>	1.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	<.0001	<.0001
<i>LEV</i>	0.170	0.461	0.010	0.000	0.095	0.374	0.654	0.117	0.008	0.423	<.0001	<.0001
<i>MTB</i>	3.674	4.819	2.684	1.530	4.571	3.525	5.363	2.345	1.396	4.087	0.4573	0.0027
<i>CL</i>	0.189	0.122	0.162	0.103	0.243	0.206	0.131	0.179	0.111	0.265	0.0003	0.0004
<i>INVREC</i>	0.245	0.198	0.207	0.078	0.367	0.337	0.226	0.305	0.149	0.501	<.0001	<.0001
<i>SEO</i>	0.210	0.408	0.000	0.000	0.000	0.149	0.357	0.000	0.000	0.000	<.0001	<.0001
<i>SHARES</i>	2.602	0.822	2.521	2.032	3.141	2.521	1.082	2.339	1.736	3.175	0.0309	<.0001
<i>ROA</i>	-0.114	0.334	0.001	-0.280	0.110	-0.019	0.264	0.054	-0.056	0.116	<.0001	<.0001
<i>SALES</i>	3.751	1.551	3.926	2.992	4.693	4.429	1.864	4.514	3.336	5.606	<.0001	<.0001
<i>MFG</i>	0.485	0.500	0.000	0.000	1.000	0.451	0.498	0.000	0.000	1.000	0.0918	0.0918
<i>DCA</i>	0.015	0.214	0.010	-0.058	0.100	0.035	0.215	0.023	-0.041	0.112	0.0171	0.0041
<i>MILLS</i>	0.921	0.305	0.939	0.641	1.179	1.142	0.279	1.181	0.968	1.340	<.0001	<.0001

Table 3. Pearson (above diagonal) / Spearman (below diagonal) correlation Matrix for the sample of IPO companies used in the IPO+1 year venture backing and real manipulation analysis (N=2637).

	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>VCB</i>	<i>LEV</i>	<i>MTB</i>	<i>CL</i>	<i>INVREC</i>	<i>SEO</i>	<i>SHARES</i>	<i>ROA</i>	<i>SALES</i>	<i>MFG</i>	<i>DCA</i>	<i>MILLS</i>
<i>ABNCFO</i>		-0.280	-0.209	0.053	-0.107	0.033	-0.097	-0.185	0.034	0.133	0.300	0.109	-0.088	-0.132	-0.031
<i>ABNPROD</i>	-0.348		-0.177	-0.095	0.116	-0.057	0.044	0.093	-0.030	-0.065	-0.259	-0.078	0.044	0.004*	0.038
<i>ABNDISC</i>	-0.250	-0.374		0.107	-0.057	0.083	0.069	-0.072	-0.009*	-0.012*	-0.225	-0.148	-0.061	-0.169	-0.117
<i>VCB</i>	0.085	-0.113	0.147		-0.171	0.014*	-0.069	-0.207	0.079	0.040	-0.157	-0.189	0.033	-0.046	-0.352
<i>LEV</i>	-0.245	0.225	-0.092	-0.280		-0.153	-0.035	0.065	-0.130	-0.021*	-0.043	0.207	-0.069	-0.005*	0.218
<i>MTB</i>	0.144	-0.160	0.081	0.058	-0.337		0.088	-0.074	0.058	0.146	-0.012*	-0.039	-0.007*	-0.045	-0.087
<i>CL</i>	-0.154	0.012*	0.086	-0.069	0.010*	0.111		0.422	-0.081	-0.097	-0.101	0.176	-0.132	-0.152	0.054
<i>INVREC</i>	-0.240	0.059	-0.029	-0.206	0.157	-0.050	0.520		-0.085	-0.307	0.260	0.258	0.166	0.177	0.233
<i>SEO</i>	0.043	-0.046	-0.009*	0.079	-0.134	0.153	-0.085	-0.090		0.154	0.077	0.139	-0.043	0.051	-0.033
<i>SHARES</i>	0.161	-0.086	-0.012*	0.080	-0.056	0.141	-0.106	-0.317	0.173		-0.051	0.525	-0.034	0.007*	-0.037
<i>ROA</i>	0.298	-0.278	-0.197	-0.135	-0.110	0.197	0.046	0.316	0.160	-0.031		0.437	0.018*	0.113	0.250
<i>SALES</i>	0.068	-0.038	-0.170	-0.192	0.299	-0.001*	0.234	0.280	0.166	0.506	0.441		-0.112	0.062	0.323
<i>MFG</i>	-0.033	0.057	-0.001*	0.033	-0.023*	-0.002*	-0.114	0.186	-0.043	-0.051	0.023*	-0.096		0.008*	-0.015*
<i>DCA</i>	-0.186	0.007	-0.087	-0.056	-0.013	-0.036	-0.115	0.205	0.056	0.006	0.157	0.069	-0.011		-0.006*
<i>MILLS</i>	-0.093	0.062	-0.099	-0.344	0.360	-0.106	0.081	0.252	-0.031	-0.068	0.219	0.343	-0.006*	0.012*	

NOTE: *Represents the coefficients that are NOT significant at 10% level of two-tailed t-test. All variables are as defined in Table 1.

Table 4. Testing the hypothesis: Regression results of real manipulation on venture backing and control variables.
Panel A. First stage Heckman selection model for venture backing.

$$VCB_i = \alpha_{11} + \beta_{11} AGE_i + \beta_{21} LOCATION_i + \beta_{31} INDUSTRYMTB_i + \varepsilon_{i1}$$

The dependent variable *VCB* is a binary indicator variable, coded as 1 if the company receives venture backing. The definitions of the three instrumental variables are summarized as in table 1. The first Heckman regression is performed using a probit procedure. The inverse Mill's ratio is calculated based on the coefficient estimates of the probit model and is added to the 2nd stage regression as a control variable.

	<u>Coeff.</u>	<u>Chi-square</u>	<u>P-value</u>
<i>INTERCEPT</i>	-0.637	96.53	<.0001
<i>AGE</i>	-0.1391	49.03	<.0001
<i>LOCATION</i>	0.7526	255.77	<.0001
<i>INDUSTRYMTB</i>	0.2766	84.11	<.0001
<i>N</i>	3799		
<i>Cox Snell Pseudo R²</i>	0.1142		
<i>McKelvey-Zavoina Pseudo R²</i>	0.1769		
<i>Misclassification rate</i>	0.2972		

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Table 4 (continued)

Panel B. Second stage Heckman regression.

$$RM_i = \alpha_{16} + \beta_{16}VCB_i + \beta_{26}CL_i + \beta_{36}DCA_i + \beta_{46}INVREC_i + \beta_{56}LEV_i + \beta_{66}MFG_i + \beta_{76}MILLS_i + \beta_{86}MTB_i + \beta_{96}ROA_i + \beta_{106}SEO_i + \beta_{116}SALES_i + \beta_{126}SHARES_i + \varepsilon_{i6}$$

The testing variable *VCB* is a binary indicator variable, coded as 1 if the company receives venture backing. The dependent variable, *RM*, is *ABNCFO*, *ABNPROD*, and *ABNDISC* respectively for each regression. All other variables are defined as in table 1. All variables are Winsorized at the top 1% and bottom 1% to reduce the effect of extreme values. The regressions are run separately for the samples of IPO year, IPO+1 year and IPO+2 year using the OLS procedure. For each variable in the regression, the coefficient estimates (the two-tailed *p*-values) are reported in the top (bottom) row. Calendar year fixed effect dummy variables are included in each regression. For the sake of brevity, coefficient estimates of these dummy variables are not reported. All *p*-values are based on White heteroskedasticity-consistent standard errors robust to industry clustering.

	IPO Year			IPO+1 Year			IPO+2 Year		
	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>
<i>INTERCEPT</i>	0.28 (0.333)	-0.21 (0.368)	-0.30 (0.633)	0.28 (0.001)	-0.20 (0.008)	-0.01 (0.901)	0.33 (0.004)	0.02 (0.902)	-0.33 (0.292)
<i>VCB</i>	-0.03 (0.725)	-0.01 (0.852)	0.12 (0.452)	0.03 (0.024)	-0.06 (0.006)	0.11 (0.053)	0.03 (0.086)	-0.03 (0.343)	0.03 (0.629)
<i>CL</i>	0.66 (0.078)	-0.14 (0.633)	0.15 (0.683)	0.05 (0.418)	-0.16 (0.114)	0.04 (0.777)	0.10 (0.214)	-0.25 (0.006)	0.31 (0.019)
<i>DCA</i>	0.38 (0.194)	-0.11 (0.434)	0.19 (0.126)	-0.26 (0.013)	0.01 (0.879)	-0.58 (0.164)	0.50 (0.002)	0.01 (0.671)	0.45 (0.000)
<i>INVREC</i>	-1.17 (0.006)	0.53 (0.031)	0.71 (0.172)	-0.31 (0.000)	0.22 (0.000)	0.24 (0.057)	-0.34 (0.000)	0.11 (0.004)	-0.15 (0.359)
<i>LEV</i>	-0.14 (0.030)	0.17 (0.000)	0.14 (0.268)	-0.04 (0.210)	0.03 (0.001)	-0.07 (0.011)	0.01 (0.266)	0.01 (0.205)	-0.00 (0.955)

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Table 4 Panel B (continued)

	IPO Year			IPO+1 Year			IPO+2 Year		
	<i>ABNCF0</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCF0</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCF0</i>	<i>ABNPROD</i>	<i>ABNDISC</i>
<i>MFG</i>	-0.02 (0.459)	0.13 (0.180)	0.15 (0.264)	-0.04 (0.272)	0.01 (0.612)	-0.14 (0.146)	0.05 (0.183)	0.03 (0.390)	-0.16 (0.164)
<i>MILLS</i>	-0.03 (0.848)	0.13 (0.161)	0.09 (0.696)	-0.04 (0.070)	0.02 (0.242)	-0.14 (0.010)	-0.03 (0.443)	0.02 (0.436)	-0.31 (0.058)
<i>MTB</i>	0.03 (0.024)	-0.02 (0.000)	-0.01 (0.120)	-0.00 (0.852)	-0.00 (0.259)	0.01 (0.004)	0.01 (0.081)	-0.00 (0.051)	0.00 (0.484)
<i>ROA</i>	0.50 (0.000)	-0.28 (0.000)	-0.64 (0.000)	0.54 (0.000)	-0.38 (0.000)	-0.52 (0.000)	0.40 (0.001)	-0.44 (0.000)	-0.42 (0.000)
<i>SEO</i>	0.11 (0.470)	-0.10 (0.185)	-0.00 (0.998)	-0.02 (0.168)	0.03 (0.126)	0.03 (0.265)	-0.04 (0.179)	0.04 (0.025)	-0.05 (0.404)
<i>SALES</i>	0.13 (0.014)	-0.06 (0.098)	-0.24 (0.087)	-0.01 (0.702)	0.01 (0.400)	-0.04 (0.418)	-0.00 (0.884)	0.02 (0.023)	-0.02 (0.559)
<i>SHARES</i>	-0.17 (0.049)	0.09 (0.067)	0.39 (0.070)	0.02 (0.411)	-0.01 (0.453)	0.06 (0.202)	0.00 (0.872)	-0.03 (0.004)	0.05 (0.193)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.37	0.21	0.32	0.22	0.14	0.15	0.37	0.10	0.15
N	867	867	867	2637	2637	2637	2430	2430	2430

Table 5. Sample descriptive statistics of the 1018 venture-backed IPO companies used in the VC reputation and real manipulation analysis.

Panel A: Distribution by year (N=1018).

	High-reputation-VC-backed ^a	Low-reputation-VC-backed ^a	% of high-reputation-VC-backed ^a	% out of all venture-backed
1987	6	35	15%	4%
1988	7	13	35%	2%
1989	5	16	24%	2%
1990	8	14	36%	2%
1991	18	53	25%	7%
1992	25	65	28%	9%
1993	26	75	26%	10%
1994	19	50	28%	7%
1995	25	75	25%	10%
1996	31	98	24%	13%
1997	21	53	28%	7%
1998	9	32	22%	4%
1999	29	76	28%	10%
2000	29	67	30%	9%
2001	6	18	25%	2%
2002	3	11	21%	1%
Total	267	751	26%	100%

a. The high and low reputation VCs are classified using the proxy of *VC Rounds*, i.e. VCs' total number of investment rounds participated.

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Table 5(continued)

Panel B: Distribution by industry (N=1018).

Industry	Two-digit SIC code	High-reputation- VC-backed ^a	Low-reputation- VC-backed ^a	% of high-reputation- VC-backed ^a	% out of all venture- Backed
Oil and gas	13, 29	1	6	14.3%	0.7%
Food products	20	4	9	30.8%	1.3%
Paper and paper product	24-27	2	9	18.2%	1.1%
Chemical products	28	37	77	32.5%	11.2%
Manufacturing	30-34	2	12	14.3%	1.4%
Computer Hardware and Software	35, 73	107	279	27.7%	37.9%
Electronic Equipment	36	30	80	27.3%	10.8%
Transportation	37, 39, 40, 42, 44, 45	2	13	13.3%	1.5%
Scientific Instruments	38	31	92	25.2%	12.1%
Communications	48	8	23	25.8%	3.0%
Electric and Gas Services	49	0	11	0.0%	1.1%
Durable Goods	50	1	13	7.1%	1.4%
Retail	53, 54, 56, 57, 59	15	27	35.7%	4.1%
Eating and Drinking Establishments	58	2	8	20.0%	1.0%
Financial services	61, 62, 64, 65	0	1	0.0%	0.1%
Entertainment Services	70, 78, 79	0	3	0.0%	0.3%
Health	80	12	30	28.6%	4.1%
All others	1, 16, 17, 22, 23, 47, 51, 52, 55, 63, 67, 72, 75, 76, 82, 83, 87	13	58	18.3%	7.0%
Total		267	751	26.2%	100.0%

a. The high and low reputation VCs are classified using the proxy of *VC Rounds*, i.e. VCs' total number of investment rounds participated.

To be continued on next page

Table 5 Panel C (continued)

Panel C: Descriptive statistics on firm characteristics, by firm type (N=1018).

The last two columns report the two-tailed p -value for the difference between venture-backed and non-venture-backed companies in means and medians respectively. T-tests (Wilcoxon rank tests) are used to test the difference in means (medians).

	High-reputation-VC-backed ^a (N=267)					Low-reputation-VC-backed ^a (N=751)					P -values of the difference	
	Mean	Std. Dev.	Median	Q1	Q3	Mean	Std. Dev.	Median	Q1	Q3	Mean	Median
<i>ABNCFO</i>	0.103	0.288	0.114	-0.022	0.266	0.049	0.309	0.055	-0.099	0.217	0.0131	0.0018
<i>ABNPROD</i>	-0.139	0.254	-0.110	-0.299	0.030	-0.067	0.264	-0.051	-0.236	0.100	0.0001	0.0003
<i>ABNDISC</i>	0.160	0.491	0.088	-0.141	0.361	0.067	0.453	0.008	-0.203	0.245	0.0070	0.0080
<i>VCR</i>	1.000	0.000	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	<.0001	<.0001
<i>LEV</i>	0.088	0.205	0.009	0.000	0.074	0.146	0.283	0.010	0.000	0.121	0.0004	0.1936
<i>MTB</i>	4.254	3.460	2.970	1.787	5.610	3.475	2.917	2.624	1.496	4.469	0.0011	0.0017
<i>CL</i>	0.186	0.101	0.172	0.104	0.246	0.177	0.102	0.153	0.100	0.234	0.2419	0.1757
<i>INVREC</i>	0.211	0.162	0.184	0.076	0.307	0.243	0.189	0.212	0.074	0.373	0.0081	0.0478
<i>SEO</i>	0.210	0.408	0.000	0.000	0.000	0.213	0.410	0.000	0.000	0.000	0.9096	0.9097
<i>SHARES</i>	2.719	0.767	2.670	2.113	3.277	2.562	0.756	2.484	2.026	3.067	0.0039	0.0033
<i>ROA</i>	-0.119	0.292	-0.046	-0.338	0.119	-0.089	0.261	0.005	-0.253	0.110	0.1379	0.3889
<i>SALES</i>	3.827	1.355	3.982	3.135	4.682	3.710	1.427	3.921	2.894	4.690	0.2418	0.3146
<i>MFG</i>	0.494	0.501	0.000	0.000	1.000	0.485	0.500	0.000	0.000	1.000	0.7857	0.7857
<i>DCA</i>	0.003	0.135	-0.005	-0.061	0.067	0.010	0.146	0.009	-0.066	0.103	0.5063	0.3944

a. The high and low reputation VCs are classified using the proxy of *VC Rounds*, i.e. VCs' total number of investment rounds participated.

Table 6. Pearson (above diagonal) / Spearman (below diagonal) correlation matrix for the sample of venture backed IPO companies used in the VC reputation and real manipulation analysis (N=1018).

	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>VC Rounds</i>	<i>VC Companies</i>	<i>VC Investments</i>	<i>LEV</i>	<i>MTB</i>	<i>CL</i>	<i>INVREC</i>	<i>SEO</i>	<i>SHARES</i>	<i>ROA</i>	<i>SALES</i>	<i>MFG</i>	<i>DCA</i>
<i>ABNCFO</i>		-0.29	-0.18	0.08	0.05	0.03*	-0.14	0.05	-0.08	-0.16	-0.04*	0.08	0.27	0.06	-0.01*	-0.04*
<i>ABNPROD</i>	-0.32		-0.28	-0.12	-0.11	-0.10	0.17	-0.20	-0.09	-0.05	-0.04*	-0.01*	-0.38	-0.22	0.09	-0.02*
<i>ABNDISC</i>	-0.19	-0.34		0.09	0.08	0.06	-0.09	0.09	0.11	-0.04*	0.02*	0.00*	-0.22	-0.09	-0.04*	-0.04*
<i>VC Rounds</i>	0.10	-0.11	0.08		0.82	0.56	-0.10	0.11	0.04*	-0.08	0.00*	0.09	-0.05	0.04*	0.01*	-0.02*
<i>VC Companies</i>	0.08	-0.11	0.07	0.82		0.64	-0.08	0.08	0.03*	-0.06	0.00*	0.11	-0.02*	0.07	0.00*	-0.02*
<i>VC Investments</i>	0.05	-0.10	0.05	0.56	0.64		0.00*	0.04*	0.06	0.01*	0.03*	0.12	0.06	0.16	-0.06	0.02*
<i>LEV</i>	-0.24	0.24	-0.06	-0.04*	-0.05	0.00*		-0.21	-0.03*	0.08	-0.11	-0.02*	-0.05	0.21	-0.12	-0.01*
<i>MTB</i>	0.12	-0.20	0.07	0.10	0.07	0.03*	-0.29		0.17	-0.03*	0.07	0.18	0.08	0.07	-0.05	-0.14
<i>CL</i>	-0.08	-0.13	0.12	0.04*	0.04*	0.07	-0.03*	0.15		0.51	-0.11	-0.09	0.05	0.32	-0.22	-0.18
<i>INVREC</i>	-0.17	-0.13	0.01*	-0.06	-0.04*	0.03*	0.07	0.00*	0.56		-0.07	-0.34	0.38	0.39	0.10	0.18
<i>SEO</i>	-0.04*	-0.04*	0.02*	0.00*	0.00*	0.03*	-0.06	0.14	-0.11	-0.08		0.18	0.05*	0.18	-0.02*	0.04*
<i>SHARES</i>	0.08	-0.01*	-0.02*	0.09	0.11	0.11	-0.03*	0.12	-0.09	-0.33	0.18		-0.23	0.36	-0.13	0.03*
<i>ROA</i>	0.27	-0.39	-0.15	-0.03*	0.00*	0.06	-0.17	0.22	0.15	0.44	0.09	-0.18		0.47	0.00*	0.14
<i>SALES</i>	0.03*	-0.16	-0.11	0.03*	0.07	0.16	0.19	0.07	0.33	0.40	0.21	0.37	0.46		-0.25	0.10
<i>MFG</i>	0.01*	0.09	0.01*	0.01*	0.00*	-0.06	-0.04*	0.02*	-0.21	0.08	-0.02*	-0.13	0.00*	-0.21		0.01*
<i>DCA</i>	-0.15	-0.02*	0.00*	-0.03*	-0.03*	0.01*	-0.04*	-0.09	-0.11	0.20	0.05	0.04*	0.14	0.10	-0.01*	

NOTE: —*—Represents the coefficients that are NOT significant at 10% level of two-tailed t-test. All variables are defined as in Table 1.

Table 7. Testing the hypothesis: Regression results of real manipulation on VC reputation and control variables.

$$RM_i = \alpha_{17} + \beta_{17}VCR_i + \beta_{27}CL_i + \beta_{37}DCA_i + \beta_{47}INVREC_i + \beta_{57}LEV_i + \beta_{67}MFG_i + \beta_{77}MTB_i + \beta_{87}ROA_i + \beta_{97}SEO_i + \beta_{107}SALES_i + \beta_{117}SHARES_i + \varepsilon_{i7}$$

The testing variable *VCR* is a binary indicator variable, coded as 1 for companies that are ranked in the top quartile of the reputation measures in a particular IPO year. I use three measures to proxy for a VC firm's reputation, i.e. the total number of investment rounds (*VC Rounds*), the total number of portfolio companies (*VC Companies*) and the total amount of investments (*VC Investments*). The dependent variable, *RM*, is *ABNCFO*, *ABNPROD*, and *ABNDISC* respectively in each regression. All other variables are defined as in table 1. All variables are Winsorized at the top 5% and bottom 5% of to reduce the effect of extreme values. The regressions are run for the sample of venture-backed companies in the IPO+1 year using the OLS procedure. For each variable in the regression, the coefficient estimates (the two-tailed *p*-values) are reported in the top (bottom) row. Calendar year fixed effect dummy variables are included in each regression. For the sake of brevity, coefficient estimates of these dummy variables are not reported. All *p*-values are based on White heteroskedasticity-consistent standard errors robust to industry clustering.

	<i>VC Rounds</i>			<i>VC Companies</i>			<i>VC Investments</i>		
	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>
<i>INTERCEPT</i>	0.16 (0.188)	-0.07 (0.213)	-0.33 (0.010)	5.62 (0.000)	-0.07 (0.210)	-0.33 (0.009)	0.15 (0.203)	-0.07 (0.210)	-0.33 (0.010)
<i>VC Rounds</i>	0.03 (0.014)	-0.05 (0.000)	0.04 (0.139)						
<i>VC Companies</i>				0.31^a (0.006)	-0.05 (0.001)	0.05 (0.015)			
<i>VC Investments</i>							-0.00 (0.959)	-0.03 (0.101)	0.06 (0.008)
<i>CL</i>	0.07 (0.602)	-0.27 (0.088)	0.51 (0.001)	0.00 (1.000)	-0.27 (0.086)	0.51 (0.000)	0.08 (0.549)	-0.27 (0.092)	0.50 (0.000)
<i>DCA</i>	-0.18 (0.507)	-0.03 (0.747)	0.18 (0.119)	-3.21 (0.158)	-0.03 (0.713)	0.18 (0.121)	-0.17 (0.520)	-0.03 (0.732)	0.17 (0.134)

To be continued on next page

Table 7 (continued)

	<i>VC Rounds</i>			<i>VC Companies</i>			<i>VC Investments</i>		
	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>	<i>ABNCFO</i>	<i>ABNPROD</i>	<i>ABNDISC</i>
<i>INVREC</i>	-0.47 (0.001)	0.28 (0.002)	-0.22 (0.077)	-4.89 (0.000)	0.29 (0.001)	-0.22 (0.081)	-0.49 (0.001)	0.30 (0.001)	-0.22 (0.083)
<i>LEV</i>	-0.10 (0.051)	0.12 (0.018)	-0.21 (0.003)	-1.19 (0.029)	0.13 (0.015)	-0.21 (0.003)	-0.10 (0.039)	0.13 (0.014)	-0.22 (0.002)
<i>MFG</i>	0.01 (0.818)	0.02 (0.559)	-0.03 (0.615)	0.25 (0.438)	0.02 (0.577)	-0.03 (0.614)	0.01 (0.774)	0.02 (0.611)	-0.03 (0.634)
<i>MTB</i>	0.00 (0.829)	-0.01 (0.004)	0.01 (0.001)	0.03 (0.499)	-0.01 (0.003)	0.01 (0.001)	0.00 (0.771)	-0.01 (0.003)	0.01 (0.001)
<i>ROA</i>	0.46 (0.000)	-0.36 (0.000)	-0.56 (0.000)	4.83 (0.000)	-0.35 (0.000)	-0.56 (0.000)	0.45 (0.000)	-0.35 (0.000)	-0.57 (0.000)
<i>SEO</i>	-0.07 (0.006)	0.01 (0.433)	0.00 (0.963)	-0.62 (0.003)	0.01 (0.399)	0.00 (0.947)	-0.07 (0.005)	0.02 (0.309)	0.00 (1.000)
<i>SALES</i>	0.00 (0.850)	-0.02 (0.037)	0.03 (0.299)	0.03 (0.889)	-0.02 (0.030)	0.03 (0.311)	0.01 (0.789)	-0.02 (0.025)	0.03 (0.299)
<i>SHARES</i>	0.03 (0.326)	0.02 (0.418)	-0.00 (0.878)	0.16 (0.468)	0.02 (0.360)	-0.01 (0.827)	0.03 (0.320)	0.02 (0.375)	-0.01 (0.799)
<i>Year fixed effects</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Adjusted R²</i>	0.25	0.25	0.19	0.29	0.24	0.19	0.25	0.24	0.19
<i>N</i>	1018	1018	1018	1018	1018	1018	1018	1018	1018

a. The dependent variable in the regression is ranked into deciles.

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