Do PE and VC Firms Monitor Cash Reserves post-IPO?

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Abstract
The paper examines the impact of PE and VC ownership retention on financially sponsored IPOs' cash reserves. The results show that backed IPOs with higher VC (PE) ownership concentration maintain significantly higher (lower) cash ratios post-flotation, which is driven by fundamentally different growth opportunities of these firms. Post-IPO voluntary ownership retention of PE and VC investors mitigates the agency problems, which allows financially constrained firms to hoard cash. PE and VC syndicate characteristics (bank affiliation and syndicate size) have significant impact on cash reserves. Moreover, the market values positively in the long-run cash held by companies with post-IPO PE investors' equity ownership. Overall, these results suggest that continued involvement of financial sponsors in the post-flotation period is value creating.

Keywords: Private equity; Venture capital; IPOs; Ownership; Financial Constraints; Aftermarket Performance; Cash Reserves.

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1. Introduction

Corporate cash reserves have increased substantially in recent years. Bates *et al* (2009) report that cash holdings of US firms doubled from 1986 to 2006. The *Financial Times* reports that just five companies[2] hold $387 billion of cash, which is equivalent to the United Arab Emirates' gross domestic product in 2013 (Sakoui, 2014). In 2013, Apple held $146.8 billion, while Microsoft $80.7 billion in cash reserves.

However, the extant literature documents a number of drawbacks of high corporate cash holdings. Jensen (1986) argues that entrenched managers are more likely to retain cash than pay dividends. Corporate resources and cash can be tunnelled by managers for their private benefits such as acquisition of perks, empire building, higher wages and investments in unprofitable projects (Shleifer and Vishny, 1989; Fresard and Salva, 2010). As a result of being vulnerable to agency conflicts, cash becomes less valuable to shareholders and they place a smaller value at one dollar of cash (Dittmar and Mahrt-Smith, 2007). Hence, although high cash reserves can be beneficial to finance daily operations and profitable investment opportunities, as well as used as a buffer against sudden cash flow shocks (Keynes, 1936), investors should be aware of negative value implications of excessive cash reserves with low monitoring.

Certain types of investors are able to monitor managers' actions and implement major corporate changes by means of a block equity ownership and representation on the board of directors. Many activist investors, such as Carl Icahn, target firms with high cash holdings and pressure managers to distribute cash to shareholders in the form of dividends, share buybacks or invest in projects, which would result in higher returns than a pile of cash. Several studies (Cronqvist and Fahlenbrach, 2009; Chen *et al*, 2000)

[2] Apple, Microsoft, Google, Verizon Comm., and Samsung Electronics.

find that block holders and institutional investors are active monitors, and have significant impact on US firms' corporate policies and performance. However, previous studies have not focused on the relationship between cash holdings and PE and VC investors in the post-IPO period, even though the extant literature finds that these investors are effective monitoring agents (Krishnan *et al*, 2011; Celikyurt *et al*, 2014).

Research in this area is highly warranted for several reasons. First, private equity and venture capital represent the alternative source of financing available to firms in comparison to more traditional debt financing from investment banks. As a consequence of the recent 2007/2008 financial crisis, many banks are capital-constrained, and hence are unable to lend as much as before the crisis. This topic is especially important in some US states (for example, the commonwealth areas of Pennsylvania), where a great emphasis is put on small businesses. For these firms, venture capitalists could provide financing and access to valuable advice, which would help companies reach the next development/growth stage. Secondly, PE- and VC-backed IPOs are prime drivers of IPO activity in the US. This is especially the case after the recent financial crisis during which these investors could not realize their returns and they still need to make an exit. According to the Ernst and Young report (2014), financially sponsored IPOs represent 62% of US IPOs, 31% of all global IPOs, and there is a robust pipeline of financially sponsored IPOs in the near future.

Third, these investors play a vital role in US economy by fostering entrepreneurial firms and employment: small and medium-sized business establishments represent 63% of new private-sector jobs, 48.5% of employment, and 46% of output (SBA Office, March 2014). Fourth, the asset allocation to non-traditional asset classes such as PE and VC has increased substantially due to the asset class' favourable past performance. Harris *et al* (2014) document PE funds' outperformance

of the S&P 500 net of fees and carried interest throughout the 1980-2010 time period, while VC funds' demonstrated outperformance (underperformance) of public markets during the 1900s (2000s). In 2009, 24.3% of the Yale Endowment portfolio was invested in private equity class, while in 2013 its allocation has increased to 32%, which was motivated by PE/VC asset class' return potential and diversifying power (Yale Endowment Report, 2013). The Yale endowment long-term plan is "…well suited to exploiting illiquid, less efficient markets such as venture capital, leveraged buyouts, oil and gas, timber, and real estate" (Yale Endowment Asset Allocation, 2013). Finally, it's important to consider and examine the effect of PE and VC investors on corporate cash reserves because both type of financing nurture their portfolio companies to the IPO stage. At that point, the wealth of new investors, who buy IPO firms' shares, are impacted by PE and VC investors' monitoring in the post-IPO period.

Given a high proportion of PE and VC investors' unrealized returns at the IPO date[3] and their retained high equity holdings in the post-IPO period, I expect these investors to continue their monitoring activities when their portfolio firm is publicly quoted, particularly in relation to corporate cash reserves, and to affect the IPO long-term performance which previous studies identified as puzzling (Ritter, 1991; Ritter, 2013; Brav and Gompers, 1997; Levis, 2011).

I find that on average VC IPOs maintain a significantly higher cash ratio[4] in all industries than PE-backed IPOs. This is driven by the fact that VC-backed IPOs are young firms with high growth and investment opportunities which require cash to finance their growth. In contrast, PE-backed IPOs are mature, old and large companies with stable free cash flows and low growth opportunities which are prone to agency

[3] Past studies (Barry *et al*, 1990, Cao, 2011) report that VC and PE investors do not exit completely at the IPO date.
[4] Cash ratio as defined as the proportion of assets which is held in cash.

conflicts. I document that IPOs with higher VC (PE) investors' voluntary ownership concentration maintain significantly higher (lower) cash ratios post-flotation than their peers with lower equity holdings. This relationship holds even after accounting for all the control variables. The transaction, precautionary, monitoring and agency theories partly explain corporate cash reserves of financially sponsored IPOs, suggesting that their cash holding is likely to be optimal.

My results indicate that financial constraints in backed IPOs negatively impact the corporate cash reserves. However, I demonstrate that financially constrained backed IPOs which are retained by financial sponsors in the post-flotation period are able to hoard more cash. I document that following a full exit by financial sponsors in the post-flotation period, firms experience a significant increase in financial constraints. I run some robustness tests (e.g. alternative definitions of dependent and independent variables, instrumental variable approach) and find relatively similar results. I also contribute to the existing literature by documenting that PE and VC syndicate characteristics have a significant, long lasting impact on cash reserves: financial sponsors' bank affiliation has a negative effect on backed IPOs' cash holdings, which is in line with Hellmann *et al* (2004), whereas syndicate size has a statistically positive impact.

In line with Ritter (2013), I find support for the market overreaction hypothesis as the short period excess returns are positive, but in the long-run, backed IPOs underperform significantly. I document that retained VC-backed IPOs with high cash ratio significantly outperform peers with low cash ratio, thereby suggesting that VC portfolio firms need high cash reserves to finance growth, which results in long-run superior performance. I also find support for the hypothesis that the market values cash more in companies in which PE investors voluntarily retain equity in the post-flotation

period; this finding does not apply to venture capitalist. This finding implies that the pre-IPO financial sponsors are able to mitigate agency conflicts in firms which are most prone to experience these problems, and they positively contribute to the IPO firm's aftermarket performance. Using an alternative methodology (Faulkender and Wang, 2006) as a robustness test, I find that the marginal value of an extra dollar of cash decreases with the level of cash and leverage in *retained* financially-sponsored IPOs only.

I contribute to the growing literature stream which reports ballooning cash reserves and their declining value to shareholders (Bates *et al*, 2009; Dittmar and Mahrt-Smith, 2007). My findings indicate that financially sponsored IPOs are partially responsible for increasing US corporate cash reserves. I find that during my sample period (1996-2010), the average cash ratio of PE-backed IPOs has doubled from 10% to 20%. Similarly, VC-backed IPOs' cash reserves have experienced an increase from 41% to 60%. This paper also contributes to studies (Cronqvist and Fahlenbrach, 2009; Chen *et al*, 2012) which report that institutional investors are active monitoring agents of US firms who positively affect the firm's performance. I demonstrate that PE and VC investors represent a special type of block holders, whose expertise and pre-IPO involvement results in portfolio companies' superior performance.

This paper is also related to PE and VC literature, which documents financial sponsors' monitoring effectiveness and favorable impact on corporate governance and innovation (Krishnan *et al*, 2011; Celikyurt *et al*, 2014). My findings focus on financial sponsors' effect on corporate cash reserves, which could be easily misused by manages, and demonstrate that PE investors are able to effectively mitigate the agency conflicts. My results suggest that financial sponsors' involvement does not terminate at the IPO

date, and these investors remain active in monitoring and shaping portfolio firms' cash policy in the post-flotation period.

My results can also be related to the debate regarding financial sponsors' ability to extract private benefits by means of their private information, high equity stake and representation on the board of directors. I demonstrate that financial sponsors do not waste corporate cash reserves, but rather reduce agency problems, which proves to create value in the long-run. In sum, my results imply that financial sponsors shape portfolio firms' cash policy in accordance with their growth opportunities, reduce agency conflicts and positively affect firm value, which is beneficial to shareholders in the long-run.

The paper proceeds as follows: Section 2 provides literature review and hypotheses' development. Section 3 describes the sample and methodology. Section 4 presents empirical results, and section 5 describes some additional robustness checks. Section 6 concludes the paper.

2. Literature Review and Hypotheses

2.1 Impact of Cash Reserves on Firm Value

Bates *et al* (2009) document that the average US firms' cash ratio has more than doubled from 1980 to 2004, which is primarily driven by non-dividend paying firms. They attribute this increase to more risky cash flows, higher R&D expenditures, and a reduction in inventories, receivables and capital expenditures. Several studies which examine the relationship between cash holdings and firm value in US (Dittmar and Mahrt-Smith, 2007) or across countries (Pinkowitz *et al*, 2006) conclude that weaker investor protection and corporate governance have significant negative effects on cash

value. Cash is prone to be misused by managers of firms with weak corporate governance on unnecessary capital and acquisition expenditures (Harford *et al*, 2008).

More recently, Chen *et al* (2012) examine the impact of analyst coverage decrease on the value of cash reserves, and find that shareholders value cash less in firms which experience an exogenous analyst coverage decline in anticipation of future agency problems. Their findings suggest that the market considers financial analysts to be important outside monitoring agents, who play a vital role in questioning management's behaviour, actions and mitigating agency problems.

Boubaker *et al* (2014) find that managers of firms which are less subject to shareholders scrutiny, proxied by the distance from financial centre, accumulate significantly more cash, instead of distributing it to their shareholders. This relationship is more pronounced in firms with controlling shareholder having high levels of excess control, suggesting that the cash holding is likely to be used for their own private benefits. In sum, the extant literature concludes that firms are likely to retain cash because of agency conflicts considerations. These arguments motivate the question as to whether PE and VC equity holdings mitigate such conflict.

2.2 PE and VC Investors' Financing and Monitoring Effectiveness

Previous studies (Degeorge and Zeckhouser, 1993; Holthhausen and Larcker, 1996; Cao and Lerner, 2009) report PE-backed IPOs' outperformance relative to non-financially sponsored firms. Levis (2011) concentrates on the UK market and finds PE-backed IPOs to be the best performers followed by VC- and non-backed IPOs, which both demonstrate negative abnormal buy-and-hold returns. In the US, Ritter (2013) reports that PE- and VC-backed IPOs outperformed non-financially sponsored peers

throughout 1980s and 1990s.[5] Several studies (Acharya *et al*, 2010; Cressy *et al*, 2007) conclude that the magnitude of performance improvements and post-buyout performance heavily depend on PE management expertise and industry specialization. However, Cao (2011) finds that shorter restructuring period of portfolio companies by PE investors (or buyout sponsors), which happens during high industry valuations and hot IPO periods, leads to greater deterioration in long-term performance.

The superior aftermarket performance of backed IPOs is attributed to a variety of factors. PE and VC investors exert pressure and conduct intensive restructuring of their portfolio firms, while they are under their private control, by means of a block equity ownership and representation on the board of directors. Katz (2009) finds that firms with majority PE investors' ownership generate better stock price performance. Levis (2011) shows that the relationship between three year stock price performance and PE ownership retained after the IPO is positive, but it is negative for VC holdings.

Jensen (1986, 1989) argues that buyout (or PE) organization form is superior to others as a result of higher levels of debt, management expertise, and board representation, which lead to close monitoring. Cornelli and Karakas (2010) find that PE investors often reduce the size of the board of directors and replace the CEO. Acharya *et al* (2009) conclude that PE-backed public firms' boards are much more collaborative and effective than those of non-backed peers. Cronqvist and Fahlenbrach (2009) document that large block holders (including PE firms) have significant impact on US firms' performance and corporate policies, particularly, investment, financing and executive compensation. Cressy *et al* (2007) find that PE sponsors' industry specialization adds 8.5% to portfolio firm's performance, whereas lower managerial

[5] Ritter (2013) reports that PE- (VC)-backed IPOs demonstrate an average buy-and-hold abnormal return of 5.60% (-12.90%), in contrast to non-backed IPOs' average return of -30.10%.

ownership (Holthhausen and Larcker, 1996) and longer holding periods (Cao and Lerner, 2009) have negative effects on performance of reverse leverage buyouts.

Similarly, following VC financing, firms' boards become more independent (Baker and Gompers, 2003; Hochberg, 2003), with higher VC representation (Lerner, 1995; Celikyurt *et al,* 2012). VC investors discipline and incentivize the management team by incorporating ventures in states with weak anti-takeover laws (Chemmanur, 2010), decentralizing the decision making and linking compensation plans to performance by means of stock options (Baker and Wruck, 1989). To facilitate monitoring, VC investors even ask the firm to relocate to be closer to VC headquarters (Tian, 2011). Krishnan *et al* (2011) argue that the superior VC-backed firms' performance is achieved not only by reputable VC investors selecting higher quality firms, but also by actively shaping corporate governance post-flotation. VCs create product market value by nurturing innovation and financial market value in young, early stage portfolio firms (Tian, 2011). Representation of VC investors on the boards of portfolio firms is associated with increases in innovation, R&D intensity and deal activity (Celikyurt *et al*, 2014).

Previous studies find a number of factors which affect the degree of financial sponsors' monitoring. Bank-affiliated PE and VC funds conduct lower levels of monitoring (than funds with other ownership structures) due to their managers' representation on a higher number of portfolio firms' boards (Caselli *et al,* 2010), which leads to a negative impact on sales growth. Botazzi *et al* (2008) report that general partners (or GPs) with prior business, recruitment and fundraising experience tend to undertake a more active monitoring style.

The extant literature suggests that PE and VC investors are effective monitoring agents. For example, Krishnan *et al* (2011) demonstrate that in post-flotation period VC

investors are actively involved in shaping corporate governance, which ultimately has a positive impact on the aftermarket performance. Similarly, Cao (2011) reports that PE investors' presence post-flotation improves operating performance of reverse leverage buyouts. Also, financial sponsors' involvement and continued presence in firms post-flotation improves corporate governance (Krishnan *et al*, 2011; Cornelli and Karakas, 2012; Hochberg, 2011). Overall, past studies conclude that PE and VC investors improve portfolio companies' performance by monitoring, restructuring and value creation.

2.3 Hypotheses

These findings imply that on top of intense pre-IPO restructuring and value-adding activities, financial sponsors are likely to monitor their sponsored firms, even after the flotation. More specifically, I expect financial sponsors with post-IPO equity ownership to monitor their portfolio companies' cash reserves, oversee its use by managers, and, thereby, mitigate the agency problems associated with cash holdings. This is primarily driven by a high proportion of financial sponsors' unrealized returns at the IPO date, and the need to fully divest at a high stock price in the post-flotation period to maintain their favorable track records and high internal rate of returns (IRR), which prospective investors use in selecting PE and VC funds when they allocate their capital (Fleming, 2010).

Financial sponsors monitor their investments by means of a high block ownership and board representation. PE and VC investors do not sell all of their equity holdings at the IPO (Barry *et al*, 1990; Megginson and Weiss, 1991; Lin and Smith, 1998; Cao, 2011). This post-IPO equity retention is partly explained by the existence of lockup agreements, which oblige pre-IPO investors to retain a certain percentage of

the firm's shares for a specified period of time. However, past studies demonstrate that PE and VC investors choose to retain ownership well after the lockup expiration date.[6] Cao (2011) reports that, on average, buyout sponsors retain 23.95% of the firm's shares and a quarter of the board's seats three years after the flotation. Field and Hanka (2001) find that even after one year post-flotation VC investors hold, on average, approximately 17% of the firm's outstanding shares.

The importance of reputation cannot be overemphasized in the private equity industry. Favorable PE and VC firm's reputation enhances access to stream of deal flows (Hsu, 2004), facilitates the ease of syndication (Hochberg *et al*, 2007), and future fundraising, as well as allows to act as a lead syndicate member in future deals. Since an IPO is the most visible exit route (Krishnan and Masulis, 2010), PE and VC firms are incentivized to induce a high level of monitoring even post-flotation (given that they retain a block ownership) with the goal of maintaining their reputation.

Dittmar and Mahrt-Smith (2007, p. 603) state that "…large shareholders with incentives to monitor management improve the governance of the firm from within, by taking steps to protect their own investments in the face of potential managerial agency conflicts." Hence, PE and VC investors are incentivized to monitor portfolio firms post-flotation and minimize potential managerial expropriation of outside shareholders because of a high proportion of unrealized returns and a great concern for reputation.

However, I expect the relationship to be of opposite signs for PE and VC voluntary ownerships, which is driven by fundamentally different types of firms these investors invest in. PE-backed firms are usually mature, large, publicly quoted companies in non-high-tech industries (Fraser-Sampson, 2010). These firms are usually at the maturity stage of the business cycle, with very limited growth opportunities and

[6] In the US, the average lockup period is 180 days (Brav and Gompers, 2003).

high free cash flows. PE-backed firms are especially prone to agency conflicts as a result of their fundamental firm characteristics, and hence, cash is highly likely to be misused by managers in these firms. Therefore, this leads me to expect PE investors with post-IPO equity ownership to minimize corporate cash reserves, whose misuse by managers would deteriorate PE sponsors' final return.

In contrast to PE houses, VC investors' main objective is to identify ventures with a prospective idea rather than current profitability or entrenched management. Hence, firms which receive VC financing are young, high-tech affiliated companies with high growth opportunities. These firms are usually at the start-up stage of the business cycle, and have not generated profits or previously sold product commercially (Fraser-Sampson, 2010). Since these firms need cash to finance their growth and invest in profitable projects, it is in VC investors' (with post-IPO equity ownership) interest to monitor cash holdings and ensure they are sufficiently high to finance future growth, and unexpected profitable investment opportunities which would contribute to firm value. Overall, the following hypothesis emerges:

*Hypothesis 1: Cash holdings are expected to be **negatively** related to **PE** voluntary ownership but **positively** related to **VC** voluntary ownership.*

In addition, I examine PE and VC investors' monitoring role of cash reserves in the post-flotation period and its impact on the long-run, aftermarket performance. A growing stream of literature examines the contribution of cash holdings to firm value. Pinkowitz *et al* (2006) find the relationship between firm value and cash holdings to be significantly weaker in countries with poor investor protection. In addition, the value of cash holdings differs with firms' corporate governance (Dittmar and Mahrt-Smith,

2007). More recently, Chen *et al* (2012) examine the link between the value of cash reserves and an exogenous analyst coverage reduction. They find that the market values cash less in firms which experience an exogenous analyst's coverage decline in anticipation of future agency problems (i.e. misuse of cash reserves).

In line with previous studies (e.g. Krishnan *et al*, 2009; Cao, 2011), I expect PE and VC investors to remain active monitors and create value in their portfolio firms post-flotation. I hypothesize that financial sponsors are directly interested in monitoring and mitigating agency problems associated with cash reserves even during the post-flotation period because of their high proportion of unrealized returns at the IPO date and concern for reputation. Hence, this leads to the following "Monitoring" hypothesis:

Hypothesis 2: Cash is valued more by the market when financially sponsored IPOs hold more cash ***if*** *PE and VC investors reduce agency conflicts by monitoring cash reserves.*

Overall, this paper combines the following two literature streams. First, I contribute to the set of studies (Bates *et al*, 2009; Dittmar and Mahrt-Smith, 2007) which reports growing cash holdings of US firms and their declining value to shareholders by directly examining whether PE and VC investors contribute to the phenomenon of increasing cash reserves. The second set of studies report the effectiveness of institutional investors in monitoring managers' actions (Cronqvist and Fahlenbrach, 2009; Krishnan *et al*, 2011). I contribute to this literature by assessing whether pre-IPO financial sponsors are active monitoring agents in the post-flotation period, who are able to reduce agency conflicts and thereby improve the firm's long-run performance. In sum, I combine these two literature streams and focus on the effect

of PE and VC ownership on corporate cash policy, and subsequent effect on IPO firms' performance.

3. Data and Methodology

3.1 Sample and Data Sources

The sample includes all non-financial backed IPOs floated on the US stock markets (NYSE and Nasdaq) between 1997 and 2010. Thomson One Banker's ownership coverage begins in 1997, and I consider three year post-flotation long-run performance, thus the need to stop my sample in 2010. To classify financially sponsored IPOs into PE and VC samples, I use the study by Liu and Ritter (2011) and SDC Platinum database. The final sample consists of 446 PE-backed, 900 VC-backed and 576 non-financially sponsored IPOs. I define cash holdings as cash and short-term investments over total assets.[7]

Ownership data of various groups of shareholders around the IPO date is manually collected from individual IPO prospectuses, which are gathered from Perfect Filings. I use Thomson One Banker to collect three years post-IPO ownership data, PE and VC fund and firm reports. I gathered 1727 PE and VC fund detailed reports from Thomson One Banker, which provide coverage of 869 US financially sponsored IPOs. IPO prospectuses are also used to gather the following information: names of PE and VC firms, lockup agreements data, management and institutional ownership around the IPO date, offer price, market of quotation and underwriter name. Post-IPO accounting data is downloaded from COMPUSTAT database, while stock prices and indices are gathered from DataStream.

[7] For robustness checks the following alternative cash ratio definitions are used i) cash and short-term investments over sales ii) cash and short-term investments over net assets.

3.2 Baseline Model Specification

Throughout the multivariate analysis, I differentiate and examine separately the effects of financial sponsors' ownership retention immediately after the lockup expiration date and annual ownership holdings during the three years post-flotation. The two types of ownership retention should be treated separately due to several reasons. PE and VC investors' ownership adjustments immediately after the lockup expiration are influenced by several factors such as the pressing need to make distributions to limited partners, IPO firm characteristics, and the market's reaction. The lockup expiration presents the first opportunity (following the admission) for PE and VC syndicates to realize a substantial part of returns.[8] This decision is purely governed by PE/VC investors' interests and no longer influenced by the investment bank, which on average limits pre-IPO investors' ability to sell shares for 180 days in the US (Brav and Gompers, 2003).

In addition, the market pays particular attention to ownership adjustments made immediately after the lockup expiration. Field and Hanka (2001) find that firms experience significant negative abnormal returns around the unlock day when insiders disclose share sales on that day. This is especially the case for VC-backed firms, which in contrast to other firms exhibit a more aggressive divestment intensity. Moreover, financial sponsors still possess detailed, insider knowledge at the unlock day as a result of a recently conducted restructuring, which was initiated and conducted by PE and VC investors. Financial sponsors can still exert a significant influence on the firm's corporate policies and operations through their block equity holdings and representation on the board of directors. PE sponsors start to significantly reduce their representation

[8] Megginson and Weiss (1991) report that the majority of VC investors do not sell any of the firm's shares at the IPO date. Hence, for some VC syndicates, the unlock day represents the first opportunity to realize returns on investment.

on the board of directors only two years following the quotation (Furth and Rauch, 2014).[9]

In contrast to ownership adjustments at the unlock day, divestments conducted following the lockup expiration are regarded as natural divestment pursued by financial sponsors, who are known to have a limited holding period since funds operate under the fixed 10-year life. After the unlock day, financial sponsors' influence on corporate policies starts to slowly decrease as a result of their reduced ownership concentration, emergence of new block holders and activists, such as Carl Icahn, who are able to significantly influence the board's decisions.

To examine the relationships between financial sponsors' ownership and corporate cash reserves, I follow the model developed by Gao *et al* (2013) and supplement it with the following variables: PE and VC retention dummy, fund characteristics, financial constraints, industry and year fixed effects.

$$Log\ (Cash/Total\ Assets) = \beta_0 + \beta_1 Retention\ Dummy + \beta_2\ Bank\ Affiliated\ Dummy + \beta_3 Large\ Syndicate\ Dummy + \beta_4 Financial\ Constraints + \sum \beta_k\ (Control\ variables_k) + \varepsilon \quad (1)$$

In order to mitigate the outliers' influence and resolve problems associated with skewness, I use the logarithmic transformation of the cash ratio. According to the first hypothesis, I expect β_1 to be significant and negative (positive) for PE- (VC-) backed IPOs, which is driven by different growth opportunities of these firms.

I examine the impact of PE and VC fund characteristics on cash reserves of financially sponsored IPOs. Hellmann *et al* (2004) argue that bank-affiliated funds

[9] Furth and Rauch (2014, p.14) report that "…the buyout funds… hold on to their final board seats until 3.36 years after the IPO."

provide capital to ventures to establish relationships for future lending. Hence, an existing relationship with an investment bank through PE or VC funding alleviates (to an extent) the difficulty and/or costs associated with accessing external funding. On the one hand, this implies that IPOs backed by bank-affiliated funds would hold more cash as a result of a close relationship with a bank, which has previously provided them with additional cash reserves. On the other hand, IPOs backed by bank-affiliated PE/VC funds are likely to maintain a lower cash ratio than IPOs backed by financial sponsors with alternative ownership structures. This is driven by relatively easier access to external funding, and hence smaller incentive and need to hold low return assets (i.e. cash) on their balance sheets. I expect a negative relationship between PE/VC fund's bank affiliation and cash reserves because of PE and VC investors' concern for high returns (i.e. negative β_2 coefficient). In addition, this effect is likely to be more prevalent in PE-backed IPOs than VC ones as they benefit more from an existing relationship with an investment bank as a result of a high debt ratio at the time of IPO.

Another important feature of a PE and VC syndicate is its size. Lasfer and Matanova (2013) report that the median syndicate size is one (two) member(s) in PE- (VC-) backed firms. Tastan *et al* (2013) find that the average (median) syndicate size is 6.83 (6.00) members in VC IPOs floated on the US stock markets. Syndicates are significantly larger in VC deals than in PE ones because of higher risks associated with young, growing and high-tech affiliated firms. Hence, by investing in a venture in larger syndicates, VC investors are able to share and reduce risk (Wright and Lockett, 2003). In addition, past studies find that syndicate members benefit from knowledge sharing (Brandler *et al*, 2002), ability to get access to investments in other geographic markets and second valuations (Lerner, 1994). However, large syndicates have some drawbacks such as the free-riding problem (Chemmanur and Tian, 2011), slow decision making

process and inefficient communication (Wright and Lockett, 2003). Hence, in this paper I use large syndicate dummy as a proxy for the portfolio firm's riskiness, and expect IPOs backed by larger syndicates to hoard more cash in order to avoid experiencing a sudden cash flow shock (i.e. positive β_3 coefficient).

Another important variable which affects corporate cash reserves is financial constraints. In imperfect capital markets, companies face transaction costs associated with raising external funding. Firms may hoard cash in order to minimize these costs and be in position to invest in profitable projects, which may arise in the future. This is especially the case for financially constrained firms, those with volatile cash flows and positive NPV investment opportunities. In contrast, financially *un*constrained firms have a significantly smaller incentive to save cash because of their easier access to external funding and resulting greater ability to invest in profitable projects anytime. Hence, financial constraints could have a positive effect on corporate cash reserves.

On the other hand, financial constraints can negatively affect cash holdings. A large cash pile on the balance sheet attracts negative market's attention because of its low return and the possibility of being misused by managers, which negatively affects firm value. Harford *et al* (2008) report that managers in firms with weak corporate governance are prone to waste cash on unnecessary capital and acquisition expenditures. The firm could be targeted by activists, who are able to significantly influence boards' decisions and corporate policies, such as return cash to shareholders in the form of dividends and/or share repurchases.

However, in contrast to non-backed companies, financially sponsored IPOs have a pre-IPO block holder (i.e. PE/VC syndicate) with significant board representation, whose final return is highly dependent on the firm's share price at their full exit post-flotation. From PE and VC investors' prospective, the emergence of an

activist as the firm's shareholder can be very undesirable since the share price fluctuates greatly during the board's and activists' negotiations. This, in turn, makes it more challenging for PE and VC investors to favourably time (in terms of share price) their full exit after the flotation. Hence, in order to avoid any additional marker scrutiny, I argue that PE and VC can use the existing firm's financial constraints as a disciplinary mechanism for managers. Past studies demonstrate that being financially constrained benefits the firms' innovations (Almeida *et al*, 2013). By minimizing cash reserves in financially constrained firms, financial sponsors force managers to be very selective in the projects they invest in. This is particularly important for VC-backed firms, which in contrast to PE peers have more unstable cash flows, higher uncertainty and information asymmetries as a result of the high-tech nature. These firms' characteristics make it easier for managers to accumulate and misuse cash, whereas financial constraints can force firms to make optimal decisions.

These arguments suggest that financial constraints have negative impact on cash holdings of PE- and VC-backed IPOs (i.e. negative β_4 coefficient). I use the following three measures of financial constraints: Whited and Wu (WW) index, Kaplan and Zingales (KZ) index and dividend payout ratio.[10] Previous studies suggest using a function of various firms' fundamental characteristics as a measure of financial constraints. For example, Kaplan and Zingales (1997) use cash flow, investment opportunities, leverage, cash dividends and cash holdings; while the index developed by Whited and Wu (2006) utilises cash flow, dividends, long term debt, firm size, sales growth and industry sales growth. The indices' specifications and constructions are discussed in more detail in the Appendix. Firms with higher WW and KZ indices'

[10] Farre-Mensa and Ljungqvist (2014) report that widely used measures of financial constraints (including the Whited and Wu and Kaplan and Zingales index) perform poorly in identifying constrained companies. Although the proxy variables are not efficient in light of the new evidence, there is no alternative so far which could capture behaviour of unconstrained and constrained firms.

values are more financially constrained. In addition, I use a firm's payout as an additional measure of financial constraint. Firms which are able to commit to paying dividends in the long-run are most likely to have enough internal funds and be less financially constrained.

In line with Gao *et al* (2013), I use a number of other control variables in Model (1). An important variable of interest is market-to-book ratio, which I use as a proxy for growth opportunities. According to these arguments, I expect firms with higher growth opportunities to hoard more cash. This is particularly the case for VC sample, for which external funding is costly as a result of high information asymmetries between the firm's insiders and outsiders (Myers and Majluf, 1984). Firm size is likely to significantly affect cash reserves. On the one hand, its effect could be positive to reflect the fact that investment opportunities require higher internal funds (Opler *et al*, 1999). On the other hand, larger firms might hold less cash as a result of economics of scale (Miller & Orr, 1966). Cash flow variables is included in the analysis in order to assess whether cash accumulation is a result of higher cash flows. Net working capital represents a cash substitute, which is expected to have a negative coefficient (Kim *et al*, 1998). Antunovich (1996) argues that firms with higher information asymmetries, such as those with high R&D expenses, hold more cash reserves because they are likely to have greater difficulty accessing capital markets.

In line with Harford (1999), I expect capital and acquisition expenditure to have a negative effect on cash reserves. Michaely *et al* (1995) report that dividend omissions announcements are accompanied by an average share price decrease of 7%. Hence, I expect dividend paying backed firms to save cash to protect themselves from a sudden cash shortfall, which could deteriorate the firm's ability to continue paying dividends. Debt repayments are usually done from cash reserves, and hence, I expect leverage to

have an impact on cash reserves. I expect firms with higher sales growth and older firms to hoard less cash, as they could get internal funding from future sales and they are more known and transparent for outsiders. In addition, I include industry and year effects in the model.

In addition, I examine whether post-IPO ownership retention by financial sponsors mitigates agency problems and allows firms, particularly when they are financially constrained, to hoard cash by adding the interaction variable *Financial Constraint*Retention Dummy* (β_5) in the above model. According to the proposed hypotheses, I expect the coefficient β_5 of the interaction term to exhibit a significant positive effect.

In addition, I examine whether the presence of PE and VC investors post-flotation has an impact on financial constraints. More specifically, I expect PE and VC equity ownership to alleviate financial constraints. The extant literature reports that VC investors certify an issue by effectively conveying credible information about the firm. Similarly, Mogilevsky and Murgulov (2012) report that PE-backed IPOs exhibit lower underpricing than non-financially sponsored IPOs. Hellmann *et al* (2004) report that banks provide VC funding in order to develop relationship with firms, which are likely to need debt in the future. These arguments suggest that PE and VC investors' continued post-IPO presence alleviates financial constraints. This could either be achieved by reducing costs associated with accessing external funding[11] or/and the level of information asymmetries. Therefore, this yields the following predictions, which I test my means of a univariate analysis: (i) Backed IPOs with higher PE and VC ownership have significantly lower financial constraints than those with lower PE/VC ownership.

[11] For example, some PE and VC funds are bank affiliated (i.e. the holding company of PE and VC fund/house is a bank). An existing relationship with a bank (through PE or VC funding) could facilitate IPO firm's access to debt financing.

(ii) Backed IPOs experience a significant increase in financial constraints following PE and VC investors' full exit post-flotation.

To investigate the performance drivers of financially sponsored IPOs and shed light on whether the market values cash more in firms where financial sponsors retain ownership, I run the following model:

$$\textit{Three-year Market-Adjusted BHARs} = \beta_0 + \beta_1 \textit{Retention Dummy} + \beta_2 \textit{Industry-Adjusted Cash Ratio} + \beta_3(\textit{Industry-Adjusted Cash Ratio}*\textit{PE/VC Retention Dummy}) + \sum \beta_k (\textit{Control variables}_k) + \varepsilon \quad (2)$$

All accounting independent variables, management and institutional ownership data are taken from the first annual report post-flotation. The above specification allows me to examine the unconditional effect of cash (β_2) on the long-run stock performance of PE- and VC-backed IPOs, whereas β_3 captures the conditional (on financial sponsors' ownership retention) cash effect on the dependent variable. According to the "Monitoring" hypothesis, I expect β_3 to be positive and statistically significant. This effect is likely to be more pronounced in PE-backed IPOs since these firms are more prone to agency conflicts as a result of their fundamental firm characteristics, and post-IPO presence of PE investors is likely to mitigate this conflict. Hence, the market is likely to value cash more in these firms, in comparison to VC sample, which have high growth opportunities and cash is less likely to be misused but rather spent on growth and investment opportunities.

In Model (3), the following control variables are included in line with prior literature: first day return, size, market-to-book, leverage, PE/VC lockup duration,

underwriter reputation, management ownership, institutional block holders' ownership, PE dummy, firm age, industry and year dummies.

4. Empirical Results

Table 1 and Figure 1 report the annual distribution of the cash ratio for financially sponsored and non-backed IPOs. Cash holdings of non-backed and VC IPOs experienced noticeable peaks during the dot-com bubble and in 2009. In 1999, non (VC)-backed IPOs held on average 62% (57%) of their assets in cash, and in 2009 the average cash ratio equaled 46% (73%) respectively. The annual distribution of PE-backed IPOs' cash reserves is more stable with an upward trend which has reached its highest level of 20% in 2010. However, it's important to note that during the sample period the average cash ratio of PE-backed IPOs doubled from 10% to 20%. Within financially sponsored IPOs, VC-backed IPOs on average held a higher proportion of assets in cash compared to PE sample throughout the sample period.

Panel B presents descriptive statistics of cash holdings of US IPOs around the year of quotation. On average, PE-backed IPOs hold the lowest proportion of assets in cash pre-flotation (10%), followed by non-backed (41%) and VC (54%) IPOs (Panel A). This provides a great motivation to investigate the reasons behind such a discrepancy. After the IPO, cash holdings of non-backed firms decrease significantly from 43% to 31%, whereas that of financially sponsored firms remained relatively stable. During the four year time window around the IPO year, the cash ratios of VC and PE samples differ significantly and by the end of the third year post-flotation the VC sample holds 57% of their assets in cash, in contrast to PE IPOs' cash ratio of 15%; the *t* of difference in means is -7.95.

On average, companies in high-tech and healthcare industries hold the highest proportions of assets in cash, while durables and non-durables industries hold the least cash reserves as shown in Panel C. This applies to both non-backed and financially sponsored IPOs. As before, on average PE-backed IPOs maintain the lowest cash reserves followed by non-backed and VC samples, which applies to all industries.[12] I find that VC-backed IPOs maintain significantly higher cash ratios than PE IPOs in all industries (except for the energy sector), suggesting that the significant difference between cash holdings of VC and PE samples are not driven by a single industry. Moreover, this finding provides preliminary insight into the fact that fundamentally different firm characteristics of PE and VC sample are the drivers of corporate cash reserves.

Panel D reports summary statistics for exited and retained backed IPOs. 'Retained' and 'Exited' classification is based on whether PE and VC syndicates have fully exited or retained some shares immediately after the lockup expiration date. This event represents the first opportunity for PE and VC syndicates to choose how much of their equity stake to retain. This decision is purely governed by PE and VC interests and no longer influenced by the investment bank, since the period is above the average of 180 days. I find that retained VC IPOs hold significantly higher cash reserves than their exited peers, whereas cash holdings of PE-backed IPOs are more homogeneous. The differences in means and medians suggest that VC-backed IPOs have significantly higher cash ratios than PE IPOs, regardless of whether backed IPO are retained or exited by financial sponsors. In Appendix, I present the descriptive statistics using alternative definitions of cash ratio.[13] The results remain the same.

[12] Consistent with prior literature, I excluded IPOs which operate in a highly regulated utility industry from the sample.

[13] In the Appendix, I use the following two alternative definitions of the cash ratio: i) cash and short-term investments over sales ii) cash and short-term investments over net assets.

[Insert Table 1 and Figure 1]

Table 2 provides summary statistics of non-backed, PE- and VC-backed IPOs. On average, financially sponsored IPOs differ from the non-backed sample along all the considered IPO firm characteristics (Panel A). I will concentrate on the differences within backed IPOs since it is the focus of the proposed hypotheses. PE-backed IPOs' industry-adjusted cash reserves summary statistics reveal that they maintain relatively similar cash ratio to their public industry peers, whereas the cash ratio of VC-backed IPOs is, on average, 36% higher. PE-backed firms are significantly larger (total assets of $783.86mil versus $69.78mil), and more levered (debt ratio of 71% versus 23%), in line with prior studies (Levis, 2011). They also have higher acquisition expenditures and cash flows than VC-backed IPOs. As expected, VC firms have higher R&D and capital expenditures pre-flotation, more are high-tech and quoted on the Nasdaq market, and they are considerably younger than PE-backed IPOs (6.63 and 28.58 years, respectively), implying that they are much more likely in the start-up stage of their business cycle.

I find that backed IPOs differ significantly in terms of IPO firm ownership structure and syndicate characteristics. Managers of VC-backed IPOs hold significantly a higher proportion of outstanding shares of 33.68% in the pre-flotation period, compared to 27.49% for PE firms. Hence, venture capitalists use managerial equity ownership significantly more than PE investors to align the interests of managers and those of shareholders more closely in young, high-tech and growing firms.

In contrast, institutional pre-IPO investors' ownership of 6.86% in PE IPOs is significantly higher than 4.47% in VC-backed flotations (the *t* of difference in means is

-2.85). A quarter of PE and VC syndicates divest completely after the unlock day,[14] while in 75% of deals financial sponsors retain some shares. The significantly larger syndicate size in VC deals reflects venture capitalists' effort to share and reduce risk associated with supporting young, high-tech and growing ventures. For example, the median syndicate size in VC deals is four members, compared to just two in PE IPOs. Moreover, 7.07% (15.88%) of VC (PE) IPOs are backed by a lead syndicate member which is bank-affiliated.[15] PE-backed IPOs are also more financially constrained than VC IPOs based on the KZ Index (Panel C).

[Insert Table 2]

Table 3 presents the average equity ownership by PE and VC syndicates before and after the flotation. Consistent with previous studies (Levis, 2011; Cao, 2011), PE investors hold significantly higher ownership concentrations in the pre-flotation period of 69.72%, compared to 50.49% for VC syndicate. Block equity holdings allow financial sponsors to make intensive restructuring activities without the scrutiny from the market, and exert significant influence on managers and the board of directors. Financial sponsors pursue a stable divestment strategy by selling around 33-36% of their last period's equity ownership each year. Even three years post-flotation, PE investors still maintain significantly higher holdings than venture capitalists (13.71% versus 7.75%).

[14] It is not viable at the moment to examine PE and VC firms' ownership adjustments made on the exact date of lockup expiration. Thomson One Banker provides ownership data in March, June, September and December. For that reason, the first Thomson One Banker ownership quarter *after* the unlock day is used for the purpose of this analysis. For example, the IPO date of Curon Medical Inc is 9/22/2000. 180 day lockup period expires on 3/21/2001. Hence, the date of the first Thomson One Banker quarter post lockup expiration is 3/31/2001.

[15] I focus on the lead syndicate fund's characteristics. Following the extant literature (Krishnan *et al*, 2011; Lin and Smith, 1998; Hochberg *et al*, 2007), a lead fund is defined as the one which holds the highest percentage of the firm's outstanding shares immediately pre-quotation. In case the lead fund's characteristics are not available, I consider the fund with the second highest equity ownership. Krishnan *et al* (2011) examine lead and non-lead syndicate members, and conclude that lead funds hold significantly more shares and boards seats, which continues in the post-flotation period.

[Insert Table 3]

Table 4 reports the aftermarket performance of PE- and VC-backed IPOs. Panel A shows that the average first day returns of PE-backed IPOs range between -13.64% and 5.09%. One year post-flotation, there is weak evidence that retained cash rich IPOs outperform their exited peers. However the situation dramatically changes thereafter, as the performance of PE-backed IPOs deteriorates. By the end of the third year, the average long-run returns range from -23.97% to 1.69% for various PE sub-samples.

Panel B shows that the average first day return of VC-backed IPOs varies from 14.45% to 52.03%. The significantly higher underpricing of VC, compared to PE IPOs, is consistent with the conventional wisdom that more risky firms (high-tech, young, R&D intensive and Nasdaq quoted) are more underpriced. Within VC cash poor firms, I find a significant variation in first day return: retained IPOs are significantly more underpriced than exited peers. Hence, financial sponsors exit completely soon after the unlock day less risky and IPOs with lower information asymmetries. Overall, Panel B shows that the first day return fluctuates greatly with respect to the level of cash and whether financial sponsors fully divested after the unlock day.

Moreover, IPOs where VC exited significantly outperform their retained peers in the aftermarket in both cash rich and cash poor samples. The last two columns are of particular interest since they are directly related to the proposed hypotheses. More specifically, I find that within retained VC sample, IPOs with higher cash reserves outperform their peers, implying that cash availability allows firms to make positive NPV projects and to generate value. Within the exited VC samples, it's not surprising that I do not find any significant differences (last column) because both samples do not longer have a block equity shareholder who would oversee cash reserves and thereby positively contribute to the long-run performance.

Overall, Table 4 documents two additional trends for PE and VC samples. There is evidence of overreaction in the market since sub-samples with a higher first day return perform worse in the aftermarket. Secondly, the best performers are cash poor IPOs which are fully exited by financial sponsors, which suggest that when there are no monitoring agents such as PE and VC firms, IPO companies are better off minimizing the cash reserves, which could be easily misused by managers.

The VC long-run returns in Table 4 are roughly consistent with Ritter (2013), while PE-backed IPOs' results somewhat differ. This difference could be driven by different sample periods analyzed since it has been widely acknowledged that the underpricing is highly cyclical, and the aftermarket performance is affected by high-volume years (Ritter, 1991). As a robustness check, I present descriptive statistics of long-run stock returns exclusive of 384 VC- and 67 PE-IPOs listed during the bubble period (i.e. January 1999 - December 2000) in Appendix. The results remain similar.

[Insert Table 4]

Table 5 sheds light on the primary drivers of corporate cash reserves. In Panel A, I investigate the individual effects financial sponsors' equity retention, fund characteristics and financial constraints on cash holdings. Within financially sponsored companies, PE-backed firms hold significantly less cash (Model [1] and [2]), which is in line with univariate statistics reported in Table 1. I find that financial sponsors' post-IPO equity ownership has significant explanatory power, which provides support for the proposed hypothesis (Model [3]-[6]). More specifically, I find that continued venture capitalists' involvement in firms has a statistically positive effect on VC firms' cash reserves, while voluntary equity holdings of PE investors have a negative impact on cash reserves. In addition, the positive coefficient of the market-to-book ratio

suggests that VC firms with greater growth/investment opportunities hoard more cash, which is consistent with my expectation.

As predicted, I find that cash reserves of PE-backed IPOs to be negatively affected by PE fund's bank affiliation, in line with Hellmann *et al* (2004), who report that banks provide VC financing to develop new relationships for future loan facilities. As a result of an existing relationship with an investment bank (via PE financing) and easier access to capital markets, IPOs backed by bank affiliated PE funds retain a lower proportion of cash on their balance sheets. Financially sponsored IPOs backed by larger syndicates maintain higher cash reserves post-flotation. Since syndicate members have an incentive to realize the highest possible return on their retained equity stake, their cash reserves are likely to act as a buffer against a sudden cash flow shock in risky portfolio firms. This is in line with the precautionary motive.

The results indicate that while cash flows, R&D, dividend payment and leverage exert positive effect on cash reserves of US floated backed firms, size, net working capital, capital and acquisition expenditure, sales growth and firm age have a negative effect. The cash reserves of backed IPOs are partly explained by the economies of scale ('transaction motive') since the results in Panel A suggest that larger firms hold less cash. In line with Antunovich (1996), I find that more R&D intensive firms hoard more cash because they face higher information asymmetries and are likely to have greater difficulty accessing capital markets.

The agency theory predicts that larger and more established firms (i.e. PE) are more likely to face agency problems of free cash flow, leading, in turn, to an increase in corporate cash reserves. The results in Panel A suggest that this is indeed the case as the coefficients of cash flows are larger and more significant for PE-backed IPOs than for VC peers. Net working capital is also negatively related to cash holdings, implying

that, in line with the substitution effect, firms face less need to hoard cash in case they have high net working capital, which can be easily and quickly transformed into cash. In addition, younger firms maintain higher cash ratios, which could be explained by the markets' limited knowledge of these firms, which could result in more difficulties and higher costs associated with accessing external markets.

As expected and given the fundamental differences between PE and VC-backed IPOs, I find that dividend payment dummy and capital expenditures solely drive PE-backed firms' cash reserves. More specifically, PE portfolio firms with higher capital expenditures hold less cash, whereas dividend paying PE firms hoard more cash. Michaely *et al* (1995) report that dividend omissions announcements are accompanied by an average share price decrease of 7%. Hence, dividend paying PE-sponsored firms save cash to protect themselves from a sudden cash shortfall, which could deteriorate the firm's ability to continue paying dividends. Overall, fundamental PE and VC portfolio firm characteristics have significant impact on the drivers of cash reserves, and lead to VC (PE) post-IPO equity retention to have a positive (negative) effect on VC (PE) firms' cash reserves. Also, cash reserves of PE- and VC-backed IPOs are partly explained by transaction, precautionary and agency theories.

Panel B presents multivariate analysis of corporate cash reserves. I examine whether PE and VC syndicate retention has a significant impact on the relation between financial constraints and cash reserves. Although the financial constraint variable by itself has a statistically negative impact on cash of VC-backed IPOs, the coefficient of the interaction variable (financial constraint index WW*Retention) is statistically positive for VC sample at 1% level. These results suggest that venture capitalists' post-IPO ownership retention allows financially constrained firms to hoard cash.

The results in Panel B confirm that larger and more established firms (i.e. PE-backed IPOs) are more prone to agency problems and hence financial sponsors require low cash levels. In contrast, VC investors ensure that their IPOs have enough cash to finance their future growth and investment opportunities. As a robustness test, I replicate Table 5 (Panel A and B) using the following two alternative measures of the cash ratio in Appendix: i) cash and short-term investments over sales ii) cash and short-term investments over net assets. The results remain unchanged.

In Panel C and D, I examine the extent to which PE and VC voluntary retentions have an impact on cash reserves in financially constrained and unconstrained firms. Financially sponsored IPOs are classified into 'Unconstrained' and 'Constrained' firms every year. Following Lamont *et al* (2001), I rank all firms based on WW (and KZ) index each year. I assign the top 33% of firms as 'constrained', and the bottom 33% as 'unconstrained.' I rank PE and VC samples separately based on the two indices each year. Based on the dividend payout ratio, firms are classified each year as 'unconstrained' if a firm pays dividends, and 'constrained' in the case a firm does not pay dividends.

Panel C indicates that PE investors' *post-IPO annual equity holdings* have a statistically negative impact on cash reserves of both financially constrained and unconstrained firms. In contrast, Panel D shows that for VC sample, the *ownership retention immediately after the unlock day* matters for cash reserves in constrained and unconstrained firms. The statistically significant different proxies for PE and VC continued engagement could be attributed to agency problems. In PE-backed IPOs, which are more prone to such problems, the continuous post-IPO engagement of financial sponsors matters the most. Overall, the results suggest that financial sponsors'

continued involvement in financially constrained and unconstrained portfolio firms mitigates agency problems.

[Insert Table 5]

Table 6 tests whether PE and VC investors play an important role in alleviating financial constraints in portfolio firms. Panel A presents the evolution of financial constraints pre- and in the post-flotation period for backed IPO with high and low financial sponsors' ownership concentrations. Panel A shows that backed firms with higher PE and VC ownership concentrations face significantly lower financial constraints than those with lower PE and VC ownership.[16] Moreover, Panel B reports that PE and VC firms become more financially constrained as more time passes from the IPO year.

Panel C reports the summary statistics of financial constraints' levels around the year of PE and VC syndicates' full exit post-flotation. After financial sponsors' full exit (which takes place one year after IPO), firms experience a significant increase in financial constraints: the average KZ index before the full exit is -1.67, which increases to 0.02 following financial sponsors' full exit. Similarly, 56.28% of firms are financially constrained (based on payout ratio) before the full exit, which significantly increases to 85.06% post full exit. It's interesting to note that financial constraints do not experience a significant increase when PE/VC syndicates exit fully in the 2nd or 3rd year post-flotation, suggesting that the market views financial sponsors' divestment dynamics during the first year of flotation to be the most important. In sum, the results in Table 6 indicate that the post-IPO continued ownership of PE and VC investors alleviates backed IPOs' financial constraints.[17]

[16] Except for WW index results for PE-backed IPOs, which indicate that IPOs with lower PE ownership have lower financial constraints.
[17] In the Appendix, I present median financial constraints statistics.

[Insert Table 6]

I examine the drivers of corporate cash policy in financially sponsored IPOs, and more importantly whether the market values cash more in firms with post-IPO financial sponsors' ownership. It's of a particular interest to examine the impact of cash on the long-run performance of *financially sponsored* IPOs in light of recent papers documenting ballooning cash holdings of US corporations. Backed IPOs represent a distinctive class of companies with lower information asymmetries (Megginson and Weiss, 1991), better corporate governance (Cornelli and Karakas, 2010; Lerner, 1995; Baker and Gompers, 2003), as well as stronger alignment of shareholders' and managers' interests (Baker and Wruck, 1989).

Table 7 provides the multivariate analysis of the long-run performance. Cash reserves have statistically negative impact on the performance of PE-backed IPOs, whereas no significant effect on performance of VC peers. Hence, PE firms are indeed more prone to agency problems, and cash is easily misused by managers in these firms. In contrast, in line with my expectations I find that the cash coefficient is positive, although not significant for the VC sample.

The significant positive coefficient of the interaction variable (i.e. industry-adjusted cash ratio*PE Retention) suggests that the continued equity involvement of PE investors mitigates agency problems associated with cash reserves, and positively affects the firm's long-run performance. Hence, the market values cash more in firms with higher PE investors' post-IPO ownership, which provides support for the monitoring hypothesis. Therefore, PE investors are important monitoring agents in the post-quotation period. In addition, I find that larger PE-backed IPOs perform better, whereas those underwritten by global underwriters perform worse. The long-run performance of VC-backed firms is positively driven by size and firm age.

[Insert Table 7]

As a robustness test, I use a different methodology based on changes in the explanatory variables to confirm that cash is valued more in companies with retained PE investors' involvement. I replicate the model used in the study by Faulkender and Wang (2006) with an addition of PE and VC retention dummy, in which all the accounting values used, except for leverage, are scaled by market capitalization in the previous fiscal year. Panel A presents post-IPO accounting characteristics' summary statistics. Backed IPOs demonstrate negative average industry-adjusted annual excess stock returns three years post-flotation, in line with Ritter (2013). On average, cash holdings of sponsored IPOs increase in the post-IPO period, but VC-backed IPOs continue to hold significantly higher proportion of cash compared to PE-backed IPOs.

In Panel B, I run the model for retained and exited companies separately to compare the drivers of their long-run performance. The marginal value of cash is higher in retained PE-backed than in exited PE IPOs: shareholders of retained PE-backed firms value an extra dollar of cash at $1.70 (statistically significant at 5% level), whereas only at $0.72 (not statistically significant) in exited IPOs. This finding suggests that PE investors can positively contribute to the long-run performance by means of alleviating agency conflicts and continuous support and monitoring of portfolio firms. Interestingly, $\Delta Cash_t$ coefficient in retained PE IPOs is higher than the one reported by Faulkender and Wang (2006) for US public firms. In their study, the authors report (p.1972) "the estimated marginal value of cash for a firm with zero cash and no leverage is $1.47." This provides additional support for the fact that PE investors' post-PO presence is beneficial for other shareholders in creating value. Overall, the results are consistent with Table 7.

The results in Table 8 indicate that the marginal value of cash in retained financially sponsored IPOs is sensitive to lagged firms' cash reserves and leverage. I find that the value of an extra dollar of cash in *retained* IPOs decreases with the level of cash reserves and leverage, as $Cash_{t-1}*\Delta Cash_t$ and $Leverage_t*\Delta Cash_t$ are negative, in line with Faulkender and Wang (2006). However, exited backed peers are not sensitive to these variables. According to the extant literature on contingent claims analysis (Black and Scholes, 1973; Merton, 1973), debt holders hold a very high proportion of firm value in highly levered companies. Hence, an additional dollar of cash in retained backed IPOs primarily go to increasing debt value. As a result, the equity market values less an increase in cash holdings in highly levered firms, since equity holders do not benefit from a larger cash pile. In contrast, *exited* backed peers are likely to converge to their industry peers much quicker that retained companies. For example, Levis (2011) finds that PE-backed IPOs' leverage becomes almost identical to the one of industry peers within the first year of flotation. Hence, I do not find a statistically significant relationship between exited IPOs' firm value and $Leverage_t*\Delta Cash_t$ coeffcient. In conclusion, I contribute to the literature by reporting that the marginal value of cash holdings is sensitive to the level of cash and leverage in retained backed IPOs, while it's insensitive to these factors in backed exited peers.

[Insert Table 8]

5. Additional Robustness Checks

I use instrumental variables approach to address the endogeneity concern to check the robustness of the finding that PE and VC ownership retention alleviates the agency costs in backed IPOs thereby allowing financially constrained firms to hoard cash. I use as instrument PE (VC) retention by PE house age (underpricing), which

presumably affects the financial sponsors' retention post-IPO without depending on the level of cash. Table 9 presents the results of the first stage and the two-stage least-squares estimation. The results of Model [1] and [3] suggest that both instrumental variables have a strongly positive association with the retention variable, which imply that the chosen instruments are appropriate. The results of the two-stage least-squares estimation support earlier results: VC's voluntary presence post-flotation alleviates the agency costs associated with cash reserves, thereby allowing managers to hoard cash in financially constrained firms.

[Insert Table 9]

I use the same methodology to address the endogeneity concern with respect to the finding that post-IPO PE investors' equity guarantees the monitoring of corporate cash reserves, which results in alleviation of agency conflicts and higher market value of cash. I use as instrument PE (VC) retention by low proximity dummy (syndicate size), which presumably affects the financial sponsors' retention post-IPO without depending on the firm's aftermarket performance. The results of the endogeneity test are presented in Table 10. The choice of instrumental variables is judicious since they are both strongly associated with PE/VC post-IPO equity retention (Model [1] and [3]). The two-stage least-squares estimation results provide support for my earlier findings.

[Insert Table 10]

6. Conclusion

A growing stream of literature focuses on ballooning cash holdings of public and private firms (Bates *et al*, 2009; Gao *et al*, 2013), and concludes that corporate governance and investor protection have significant effects on the value of cash reserves (Pinkowitz *et al*, 2006; Dittmar and Mahrt-Smith, 2007). However, there are no studies

to date that examine the impact of PE- and VC-backed IPOs' on cash holding and its impact on firm value.

Private equity and venture capital investors provide capital, certification (Megginson and Weiss, 1991), conduct intensive restructuring (Baker and Wruck, 1989; Acharya *et al*, 2009) and monitoring of their portfolio firms (Jensen, 1986; 1989), which ultimately result in backed firms' improved operating and financial performance. Although financial sponsors make significant adjustments to their ownership at the IPO date (Barry *et al*, 1990; Cao 2011), a large proportion of them remain active investors in the post-flotation period by means of large equity holdings. Hence, these investors are incentivized to continue monitoring and shaping corporate polices in the post-flotation period.

I contribute to the existing literature by analyzing the drivers of backed IPOs' cash reserves. I present evidence that VC-backed IPOs maintain significantly higher cash reserves than PE-backed IPOs in all industries. I examine the impact of financial sponsors' ownership retention, financial constraints and PE/VC fund characteristics on corporate cash holdings of backed IPO. I report that the fundamental firm characteristics of backed firms (especially growth opportunities) are significant drivers of corporate cash reserves. I find that several existing theories (transaction, precautionary and agency) partly explain cash reserves of financially sponsored IPOs. After accounting for all the control variables, I find that VC IPOs with retained venture capitalist' ownership have significantly higher cash reserves than their exited peers, thereby providing support for the proposed hypothesis. In contrast, post-IPO equity ownership by PE investors reduces the firm's corporate cash reserves, which is consistent with the agency theory.

I report that financial sponsors use portfolio firm's existing financial constraint as an additional disciplinary mechanism, which minimizes the cash level, potential misuse of resources, as well as forces managers to be very selective in the investment decisions. PE and VC investors' voluntary post-IPO equity retention allows financially constrained firms to hoard cash for future profitable investment opportunities. I find that PE and VC equity ownership alleviates financial constraints by reporting that following the financial sponsors' full exit post-flotation, firms become significantly more constrained financially.

PE and VC syndicate characteristics (PE/VC fund's bank affiliation and syndicate size) have a material impact on corporate cash reserves of US IPOs. I find that the fund's bank affiliation has significant negative impact of backed firms' cash holdings. In addition, I show that backed IPOs' cash holdings are sensitive to the syndicate size: more risky companies (i.e. those backed by larger syndicates) hold higher cash holdings post-flotation.

I test the monitoring hypothesis which predicts the market to value cash more in backed IPOs with continued financial sponsors' post-IPO ownership. The results indicate that continued PE involvement mitigates agency problems associated with cash holdings, which ultimately positively contributes to the aftermarket performance. Consistent with previous studies (Ritter, 1991; Levis, 2011), I report backed IPOs' long-run underperformance, and find weak evidence of market overreaction. In addition, I find that the marginal value of cash of *retained* backed IPOs is sensitive to the firm's initial cash holdings and leverage, whereas no such statistical effect is found for exited backed IPOs.

Overall, this paper demonstrates that financial sponsors have a significant impact on firms' post-flotation policies and performance. PE and VC investors with

post-IPO equity ownership continue to closely monitor corporate cash reserves, setting it at value maximizing level given the portfolio firm's growth opportunities, thereby mitigating managerial expropriation and leading to better long-run stock returns.

An important implication of the presented results is that the market and outside investors should not be alarmed or penalize financially sponsored IPOs with continued PE and VC ownership for holding more cash. I provide evidence that financial sponsors are able to effectively monitor corporate cash reserves, and ensure it is not misused by managers for their private benefits at the expense of shareholders. Hence, the involvement of activists with the sole purpose of increasing payouts to shareholders in firms with higher than average cash reserves will not be as effective for financially sponsored IPOs. In these firms, PE and VC investors are incentivized to monitor cash because they only lock-in a small part of their returns at the IPO date, whereas their final return is highly dependent on the firm's share price in the aftermarket.

In addition, limited partners should recognize that certain characteristics of PE and VC funding (i.e. fund's bank affiliation and syndicate size) has a significant effect on portfolio firms' corporate policies such as cash, which might not necessarily be in line with their investment principles. In conclusion, this paper contributes to the extant literature on the increasing US corporate cash reserves by documenting that financial sponsors contribute greatly to this phenomenon.

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Table 1. Cash Ratio

The sample consists of 579 non-backed and 1,346 backed IPOs on the US stock markets from 1997 to 2010. Cash Ratio is defined as cash and short-term investments over total assets. "Backed IPO" are IPOs with private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in prospectuses. 't' refers to the IPO year. *Panel A* presents the annual distribution of the cash ratio during the sample period. 'Obs.' refers to the number of available observations. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1%, 5%, and 10% levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between backed and non-backed IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE-backed and VC-backed IPOs ([3]-[4]). *Panel B* shows the means and medians cash ratios for non-backed, PE- and VC-backed IPOs. For years t-1 and t=0, all non-backed and financially sponsored IPOs are considered. For t+1, t+2, t+3, mean and median cash ratios for all non-backed IPOS are presented, whereas for PE and VC IPOs only firms retained by financial sponsors in corresponding year post-flotation are considered in the analysis. *Panel C* shows the distribution of cash ratios by industry. *Panel D* reports the descriptive statistics of cash ratios of backed IPOs. In column [1], [a], [b] and [c], refer to the statistical difference between exited PE and VC IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between retained PE and VC IPOs ([2]-[4]). "Retained IPOs" are IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Annual Distribution of the Cash Ratio

Year	Backed IPOs [1]			Non-Backed IPOs [2]			PE-Backed IPOs [3]			VC-Backed IPOs [4]		
	Obs.	Mean	Median	*Obs.*	Mean	Median	*Obs.*	Mean	Median	*Obs.*	Mean	Median
1996	*94*	0.34[b]	0.15[c]	*86*	0.20	0.10	*21*	0.10[b]	0.03[a]	*73*	0.41	0.31
1997	*165*	0.34	0.27	*128*	0.30	0.16	*45*	0.07[a]	0.03[a]	*120*	0.44	0.40
1998	*330*	0.57	0.40[a]	*194*	0.43	0.21	*65*	0.08[a]	0.02[a]	*265*	0.69	0.48
1999	*456*	0.48	0.47[a]	*234*	0.62	0.28	*88*	0.12[a]	0.04[a]	*368*	0.57	0.59
2000	*424*	0.45[a]	0.40[a]	*213*	0.33	0.22	*96*	0.11[a]	0.05[a]	*328*	0.55	0.52
2001	*346*	0.43	0.40[c]	*135*	0.36	0.30	*99*	0.14[a]	0.08[a]	*247*	0.55	0.56
2002	*293*	0.39	0.37	*101*	0.38	0.31	*101*	0.15[a]	0.09[a]	*192*	0.52	0.54
2003	*275*	0.37	0.33	*75*	0.33	0.29	*114*	0.12[a]	0.06[a]	*161*	0.55	0.61
2004	*266*	0.32	0.20	*70*	0.28	0.17	*141*	0.11[a]	0.06[a]	*125*	0.55	0.60
2005	*329*	0.33[b]	0.18[c]	*84*	0.25	0.15	*177*	0.13[a]	0.07[a]	*152*	0.56	0.60
2006	*383*	0.36[b]	0.24[c]	*123*	0.29	0.14	*185*	0.13[a]	0.07[a]	*198*	0.57	0.60
2007	*346*	0.377[a]	0.32[a]	*118*	0.29	0.14	*160*	0.14[a]	0.07[a]	*186*	0.58	0.64
2008	*283*	0.43	0.24[a]	*105*	0.24	0.12	*140*	0.15[a]	0.08[a]	*143*	0.70	0.51

2009	*277*	0.49	0.30[a]	*103*	0.46	0.13	*122*	0.18[a]	0.09[a]	*155*	0.73	0.48
2010	*183*	0.44[b]	0.36[a]	*128*	0.29	0.16	*72*	0.20[a]	0.11[a]	111	0.60	0.51

Years around the IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
						Panel B. Cash Ratio						
t-1	0.41	0.15	0.10	0.05	0.54	0.45	*2.67****	*[0.00]*	*-1.30*	*[0.00]*	*-8.23****	*[0.00]*
t=0	0.43	0.30	0.16	0.08	0.59	0.67	*4.64****	*[0.00]*	*-3.65****	*[0.00]*	*-9.41****	*[0.00]*
t+1	0.31	0.21	0.14	0.08	0.56	0.59	*7.61****	*[0.00]*	*-12.32****	*[0.00]*	*-24.65****	*[0.00]*
t+2	0.28	0.17	0.15	0.08	0.57	0.54	*6.23****	*[0.00]*	*-6.70****	*[0.00]*	*-8.22****	*[0.00]*
t+3	0.81	0.19	0.15	0.08	0.57	0.53	*1.55*	*[0.00]*	*0.66*	*[0.00]*	*-7.95****	*[0.00]*
						Panel C. Cash Ratio Distribution by Industry						
Non-Durables	0.07	0.05	0.03	0.02	0.22	0.08	*1.72**	*[0.06]*	*-1.72**	*[0.25]*	*-2.42****	*[0.05]*
Durables	0.08	0.05	0.05	0.03	0.25	0.22	*0.62*	*[0.72]*	*-1.76**	*[0.51]*	*-1.98***	*[0.43]*
Manufacturing	0.10	0.04	0.06	0.03	0.43	0.35	*2.07***	*[0.11]*	*-3.56****	*[0.00]*	*-4.56****	*[0.00]*
Energy	0.12	0.06	0.07	0.06	0.11	0.07	*0.94*	*[0.90]*	*0.08*	*[0.41]*	*-0.90*	*[0.46]*
Hi-Tech	0.66	0.27	0.15	0.07	0.53	0.45	*1.20*	*[0.00]*	*0.62*	*[0.00]*	*-3.06****	*[0.00]*
Telecommunications	0.41	0.25	0.09	0.05	0.52	0.35	*2.12***	*[0.00]*	*-0.49*	*[0.41]*	*-1.96***	*[0.00]*
Shops	0.17	0.07	0.10	0.04	0.28	0.18	*1.28*	*[0.20]*	*-1.55*	*[0.03]*	*-3.45****	*[0.00]*
Healthcare	0.49	0.54	0.07	0.04	0.59	0.69	*6.18****	*[0.00]*	*-1.89**	*[0.10]*	*-8.79****	*[0.00]*
Other	0.45	0.09	0.12	0.06	0.61	0.36	*1.32*	*[0.04]*	*-0.46*	*[0.00]*	*-3.06****	*[0.00]*

Panel D. Cash Ratios of Retained and Exited Backed IPOs.

Years around IPO Year	PE-Backed IPOs						VC-Backed IPOs					
	Exited [1]		**Retained** [2]		**Differences** [1]-[2]		**Exited** [3]		**Retained** [4]		**Differences** [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
t-1	0.09[a]	0.04[a]	0.11[a]	0.05[a]	*-0.85*	*[0.09]*	0.40	0.32	0.58	0.48	*-1.93**	*[0.00]*
t=0	0.13[a]	0.06[a]	0.16[a]	0.08[a]	*-1.26*	*[0.11]*	0.67	0.54	0.64	0.70	*0.29*	*[0.00]*
t+1	0.12[a]	0.06[a]	0.14[a]	0.08[a]	*-0.66*	*[0.39]*	0.69	0.44	0.56	0.59	*1.20*	*[0.00]*
t+2	0.11[a]	0.06[a]	0.15[a]	0.09[a]	*-1.42*	*[0.15]*	0.40	0.33	0.57	0.54	*-2.16***	*[0.00]*
t+3	0.12[a]	0.07[a]	0.15[a]	0.08[a]	*-0.97*	*[0.19]*	0.43	0.36	0.57	0.53	*-1.70**	*[0.00]*

Table 2. Descriptive Statistics

The sample consists of non-backed, PE- and VC-backed IPOs floated on the US stock markets between 1997 and 2010. Table 2 presents pre-IPO accounting characteristics. All accounting items are gathered from the last account report pre-IPO. All continuous variables are winsorized at the 1% and 99% levels. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Non-Backed IPOs [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stats	[MW]	t-stats	[MW]	t-stats	[MW]
Panel A. Pre-IPO Accounting Characteristics												
IND. ADJ. CASH RATIO	0.29	0.02	-0.01	-0.03	0.36	0.25	*2.33***	*[0.00]*	*-0.67*	*[0.00]*	*-6.92****	*[0.00]*
CASH RATIO	0.41	0.15	0.10	0.05	0.54	0.45	*2.67****	*[0.00]*	*-1.30*	*[0.00]*	*-8.23****	*[0.00]*
SIZE ($ mil)	301.41	52.33	783.86	305.99	69.78	27.12	*-7.32****	*[0.00]*	*6.91****	*[0.00]*	*12.38****	*[0.00]*
LEVERAGE	0.55	0.26	0.71	0.52	0.23	0.10	*-2.06***	*[0.00]*	*6.18****	*[0.00]*	*10.13****	*[0.00]*
CAPEX/TA	0.10	0.05	0.07	0.04	0.08	0.05	*2.77****	*[0.01]*	*1.84**	*[0.05]*	*-2.42****	*[0.00]*
CF/TA	-0.07	0.02	0.09	0.07	-0.29	-0.16	*-4.36****	*[0.00]*	*5.90****	*[0.00]*	*11.77****	*[0.00]*
R&D/TA	0.13	0.00	0.02	0.00	0.29	0.19	*7.03****	*[0.00]*	*-8.06****	*[0.00]*	*-13.27****	*[0.00]*
NWC/TA	0.58	-0.05	0.06	0.02	-0.10	-0.09	*0.85*	*[0.00]*	*1.48*	*[0.00]*	*1.30*	*[0.00]*
FIRM AGE	14.91	8.00	28.58	18.00	6.63	5.00	*-7.20****	*[0.00]*	*8.13****	*[0.00]*	*20.05****	*[0.00]*
UNDERW. REPUT. (%)	6.73		10.76		16.11		*-2.47****	*[0.01]*	*-5.29****	*[0.00]*	*-2.64****	
NASDAQ QUOTED (%)	55.95		50.45		92.32		*1.36*	*[0.17]*	*-16.33****	*[0.00]*	*-19.98****	
HIGH-TECH (%)	44.91		30.07		87.60		*2.17***	*[0.03]*	*-17.16****	*[0.00]*	*-22.37****	
Panel B. Firm and Syndicate Characteristics												
MGT OWN (%)			27.49	13.85	33.68	26.50					*-3.65****	*[0.00]*
IBH OWN (%)			6.86	0.00	4.47	0.00					*2.85****	*[0.00]*
SYNDICATE SIZE			2.32	2.00	3.84	4.00					*-12.83****	*[0.00]*
BANK AFFILIATED FUND (%)			15.88		7.07						*3.85****	
RETENTION DUMMY (%)			75.78		76.89						*-0.45*	
Panel C. Financial Constraints Characteristics												
WW Index			17.18	1.74	18.67	5.98					*-0.40*	*[0.00]*
KZ Index			-0.20	0.69	-3.49	-2.42					*4.46****	*[0.00]*
Dividend Payout Ratio			1.19	0.00	-0.23	0.00					*1.32*	*[0.00]*

Table 3. PE/VC Syndicate Ownership and Distribution of Cash Holding by PE/VC Ownership.

The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. *Panel A* presents PE/VC syndicate ownership pre-IPO and three years post-flotation. "Pre-IPO" and "Post-IPO" represent PE/VC syndicate's ownership of the firm's share capital immediately prior to and after the flotation. Ownership percentages are manually collected from the "Major Shareholders" section of IPO prospectuses. t refers to the IPO year. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. PE/VC Syndicate Ownership (%) Around the IPO Year.

		PE-Backed IPOs [1]		**VC-Backed IPOs** [2]		**Differences** [1]-[2]	
		Mean	Median	Mean	Median	t-stats	[MW]
[A]	PE/VC Syndicate Ownership$_{pre\text{-}IPO}$	69.72	78.40	50.49	51.44	12.52***	[0.00]
[B]	PE/VC Syndicate Ownership$_{post\text{-}IPO}$	47.23	50.20	39.11	40.14	6.71***	[0.00]
	Difference: [B]-[A]	*-13.14****	*[0.00]*	*-10.63****	*[0.00]*		
[C]	PE/VC Syndicate Ownership$_{t+1}$	27.91	25.50	18.70	15.92	7.82***	[0.00]
[D]	PE/VC Syndicate Ownership$_{t+2}$	21.37	14.29	13.57	8.18	7.10***	[0.00]
[E]	PE/VC Syndicate Ownership$_{t+3}$	13.71	0.43	7.75	0.21	6.50***	[0.00]
	Difference: [E]-[C]	*-9.25****	*[0.00]*	*-15.02****	*[0.00]*		

Table 4. The Aftermarket Performance of PE- and VC-Backed IPOs.

The Table reports the summary statistics of underpricing and post-IPO performance. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets between 1997 and 2010'High cash ratio' includes firms whose cash ratio one year post-IPO is higher than industry-median in a particular year. 'Low Cash Ratio' is defined as those firms whose cash ratio at one year post-IPO is lower than industry-median in a particular year. 'Retained IPOs' are IPOs in which PE/VC syndicates maintained some ownership at first quarter post lockup expiration date, and 'Exited IPOs' are firms in which PE/VC investors sold their entire equity stake at first quarter post lockup expiration date. *Panel A* presents descriptive statistics of PE-Backed IPOs performance measures. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], to indicate statistical significance at the 1%, 5%, and 10% levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between PE high cash ratio retained and exited IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE low cash retained and exited IPOs ([3]-[4]). *Panel B* presents summary statistics for VC-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [5], [a], [b] and [c], refer to the statistical difference between VC high cash ratio retained and exited IPOs ([5]-[6]). In column [7], [a], [b] and [c], refer to the statistical difference between VC low cash retained and exited IPOs ([7]-[8]).

Panel A. Performance of PE-Backed IPOs

	High Cash Ratio		**Low Cash Ratio**		**Differences**	
	Retention	**Exit**	**Retention**	**Exit**	**t-stats**	
	[1]	[2]	[3]	[4]	[1]-[3]	[2]-[4]
Underpricing:						
1st Day	2.66	5.09	1.01[a]	-13.64	*0.33*	*2.09***
Buy-and-hold Returns:						
1 year	6.20[c]	-16.12	-0.96	-0.56	*0.90*	*-1.41*
2 years	-0.91	-22.36	-8.68	-9.55	*0.74*	*-0.69*
3 years	-17.69	-33.91	-23.72[a]	6.25	*0.61*	*-1.44*
Market-Adjusted Buy-and-hold Returns:						
1 year	2.66[c]	-17.45	-3.41	-5.89	*0.81*	*-1.18*
2 years	-6.66	-21.86	-12.57	-20.12	*0.66*	*-0.12*
3 years	-11.83	-23.97	-20.68[c]	1.69	*0.98*	*-1.16*

Panel B. Performance of VC-Backed IPOs

	High Cash Ratio		Low Cash Ratio		Differences	
	Retention	Exit	Retention	Exit	t-stats	
	[5]	[6]	[7]	[8]	[5]-[7]	[6]-[8]
Underpricing:						
1st Day	34.21	28.09	52.03[a]	14.45	*-2.72***	*1.21*
Buy-and-hold Returns:						
1 year	-25.77[a]	-3.78	-42.68[a]	-1.79	*2.58***	*-0.12*
2 years	-51.57[a]	29.33	-69.75[a]	-5.32	*2.17***	*1.16*
3 years	-57.55[a]	-9.26	-76.44[a]	27.83	*2.08***	*-0.80*
Market-Adjusted Buy-and-hold Returns:						
1 year	-25.41[c]	-10.78	-43.24[a]	-8.59	*2.90****	*-0.14*
2 years	-40.22[a]	-0.76	-55.24[a]	-19.75	*2.32***	*0.80*
3 years	-41.43	-33.09	-56.34[a]	14.51	*2.09***	*-1.25*

Table 5. Multivariate Analysis of Backed IPOs' Cash Ratio.

Table 5 presents results of multivariate analysis of backed IPOs' cash ratio. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is the natural logarithm of cash ratio (cash over total assets) one, two and three years post-flotation. In *Panel A*, individual effects of PE/VC ownership retention, fund characteristics and financial constraint are examined. In *Panel B*, the interaction effects on cash holdings of PE- and VC-backed IPOs are analyzed. *Panel C (D)* reports the analysis of cash holdings of financial constrained and unconstrained PE (VC)-backed IPOs. In *Panel D*, PE and VC firms are classified into '*Unconstrained*' and '*Constrained*' firms every year. Following Lamont *et al* (2001), I rank all firms based on KZ index each year, and assign the top 33% of firms as 'constrained', and the bottom 33% as 'unconstrained.' I use the same procedure for the WW index. The ranking of PE and VC firms based on the two indices are done *separately* each year. Based on the dividend payout ratio, firms are classified each year as 'unconstrained' if a firm pays dividends, and 'constrained' in the case a firm does not pay dividends. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Individual Effects	**All Backed IPOs**		**PE-backed IPOs**		**VC-backed IPOs**	
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.12	-0.05	-0.84***	-0.73***	0.18	0.36*
	[0.89]	[-0.36]	[-3.45]	[-2.53]	[1.16]	[1.80]
PE DUMMY	-0.42***	-0.39***				
	[-13.95]	[-10.85]				
RETENTION DUMMY	0.09***		-0.04		0.18***	
	[3.56]		[-0.68]		[6.65]	
VOLANTARY OWN		-0.11*		-0.33***		0.15*
		[-1.76]		[-3.42]		[1.91]
BANK AFFILIATED DUMMY	-0.10***	-0.06	-0.28***	-0.29***	-0.03	-0.01
	[-2.56]	[-1.32]	[-3.41]	[-3.08]	[-0.72]	[-0.11]
LARGE SYND. DUMMY	0.11***	0.13***	0.09**	0.15***	0.09***	0.11***
	[5.11]	[5.52]	[2.06]	[3.01]	[4.53]	[4.42]
FIN. CONSTRAINT INDEX (WW)	0.00	0.00	0.00	0.00	0.00	0.00
	[-0.41]	[-0.29]	[0.97]	[0.66]	[-0.88]	[-0.57]
SIZE	-0.12***	-0.11***	-0.11***	-0.08***	-0.10***	-0.09***
	[-11.68]	[-8.68]	[-5.67]	[-3.46]	[-9.07]	[-6.74]
M/B	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.84]	[-0.95]	[-1.25]	[-1.04]	[3.97]	[2.56]
CF	0.17***	0.15***	1.12***	1.16***	0.09**	0.09*
	[3.51]	[2.67]	[4.71]	[4.29]	[2.17]	[1.82]
NWC	-0.05***	-0.07**	-0.67***	-0.62***	-0.03***	-0.02
	[-3.15]	[-2.08]	[-6.11]	[-4.86]	[-2.85]	[-0.52]
R&D	0.26***	0.31***	2.13***	3.12***	0.20***	0.24***
	[3.50]	[3.72]	[3.44]	[4.33]	[3.30]	[3.35]
CAPEX	-0.33**	-0.25	-0.63**	-0.63*	-0.20	0.00
	[-2.14]	[-1.34]	[-2.13]	[-1.87]	[-1.18]	[-0.02]
ACQ	-0.16***	-0.12***	-0.81***	-0.73***	-0.12***	-0.12***
	[-3.94]	[-2.81]	[-3.86]	[-2.94]	[-3.49]	[-3.03]
DIV DUMMY	0.13***	0.16***	0.14***	0.17***	0.03	0.02
	[3.58]	[3.53]	[2.64]	[2.58]	[0.48]	[0.23]
LEV	0.04*	0.04*	0.02	0.01	0.01	0.02
	[1.66]	[1.77]	[0.47]	[0.27]	[0.39]	[0.54]
SALES G	-0.03***	-0.04***	-0.09	-0.20***	-0.03***	-0.04***
	[-2.42]	[-2.79]	[-1.34]	[-2.69]	[-2.62]	[-2.76]
FIRM AGE	-0.07***	-0.08***	-0.08***	-0.10***	-0.07***	-0.07***
	[-4.98]	[-4.20]	[-3.72]	[-3.73]	[-3.58]	[-2.74]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No of Obs.	2374	1744	854	627	1520	1117
Adjusted R^2	50.25%	49.29%	29.86%	32.43%	33.16%	31.32%

Panel B. Interaction Effects	**All Backed IPOs**		**PE-backed IPOs**		**VC-backed IPOs**	
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.14	-0.05	-0.63***	-0.73***	0.22	0.36*
	[1.06]	[-0.36]	[-2.60]	[-2.53]	[1.37]	[1.83]
PE DUMMY	-0.43***	-0.39***				
	[-14.01]	[-10.84]				
RETENTION DUMMY	0.08***		-0.03		0.15***	
	[2.79]		[-0.54]		[5.34]	
PE/VC VOL OWN		-0.11*		-0.34***		0.20***
		[-1.75]		[-3.37]		[2.38]
FIN. CONSTRAINT INDEX (WW)	-0.01***	0.00	0.00	0.00	-0.01***	0.00
	[-2.57]	[-0.35]	[0.39]	[0.10]	[-3.64]	[0.37]
FIN. CONSTRAINT INDEX (WW)*RETENTION	0.01***		0.00		0.01***	
	[2.54]		[-0.11]		[3.57]	
FIN. CONSTRAINT INDEX (WW)*VOLUNTARY OWN		0.00		0.00		0.00
		[0.19]		[0.18]		[-1.52]
BANK AFFILIATED DUMMY	-0.09***	-0.06	-0.28***	-0.28***	-0.02	0.00
	[-2.38]	[-1.34]	[-3.41]	[-3.06]	[-0.52]	[-0.02]
LARGE SYND. DUMMY	0.11***	0.13***	0.09**	0.14***	0.09***	0.11***
	[5.10]	[5.52]	[2.01]	[3.00]	[4.56]	[4.44]
SIZE	-0.12***	-0.11***	-0.12***	-0.08***	-0.10***	-0.09***
	[-11.73]	[-8.67]	[-5.71]	[-3.44]	[-9.24]	[-6.83]
M/B	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.83]	[-0.94]	[-1.25]	[-1.04]	[4.08]	[2.56]
CF	0.17***	0.15***	1.12***	1.17***	0.09**	0.10*
	[3.49]	[2.66]	[4.72]	[4.28]	[2.18]	[1.89]
NWC	-0.05***	-0.07**	-0.67***	-0.62***	-0.03***	-0.02
	[-3.14]	[-2.08]	[-6.09]	[-4.84]	[-2.88]	[-0.54]
R&D	0.25***	0.31***	2.15***	3.13***	0.20***	0.25***
	[3.46]	[3.71]	[3.48]	[4.33]	[3.17]	[3.42]
CAPEX	-0.33**	-0.25	-0.62**	-0.63*	-0.22	-0.01
	[-2.13]	[-1.34]	[-2.09]	[-1.87]	[-1.29]	[-0.04]
ACQ	-0.16***	-0.12***	-0.83***	-0.73***	-0.13***	-0.11***
	[-4.03]	[-2.81]	[-4.00]	[-2.93]	[-3.58]	[-3.01]
DIV DUMMY	0.13***	0.16***	0.15***	0.17***	0.02	0.02
	[3.55]	[3.53]	[2.70]	[2.58]	[0.27]	[0.26]

LEV	0.04*	0.04*	0.01	0.01	0.02	0.02
	[1.68]	[1.78]	[0.42]	[0.28]	[0.54]	[0.52]
SALES G	-0.04***	-0.04***	-0.09	-0.20***	-0.03***	-0.04***
	[-2.50]	[-2.79]	[-1.37]	[-2.69]	[-2.72]	[-2.76]
FIRM AGE	-0.07***	-0.08***	-0.08***	-0.10***	-0.07***	-0.07***
	[-5.09]	[-4.20]	[-3.70]	[-3.73]	[-3.65]	[-2.69]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No of Obs.	2383	1744	860	627	1523	1117
Adjusted R^2	50.50%	49.26%	29.85%	32.32%	33.61%	31.41%

Panel C.	**Cash Ratio of PE-Backed IPOs**											
	WW Index				KZ Index				Dividend Payout Ratio			
	Unconstrained		*Constrained*		*Unconstrained*		*Constrained*		*Unconstrained*		*Constrained*	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-1.12***	-1.38***	-0.39	-0.15	-1.08***	-0.98*	-0.35	-0.27	-1.22***	-1.44***	-0.87***	-1.02***
	[-4.05]	[-3.90]	[-0.51]	[-0.24]	[-2.58]	[-1.69]	[-0.52]	[-0.40]	[-3.33]	[-2.37]	[-2.85]	[-2.91]
RETENTION DUMMY	-0.01		-0.04		0.06		-0.17		-0.02		-0.08	
	[-0.20]		[-0.36]		[0.94]		[-1.04]		[-0.25]		[-1.21]	
VOLUNTARY OWN		-0.39***		-0.16		-0.04		-0.15		-0.29		-0.30***
		[-3.42]		[-0.82]		[-0.30]		[-0.61]		[-1.30]		[-2.66]
BANK AFFILIATED DUMMY	-0.27***	-0.20*	-0.43***	-0.59***	-0.11	-0.12	0.31*	0.58***	-0.29**	-0.33*	-0.24***	-0.29***
	[-2.90]	[-1.95]	[-2.36]	[-2.88]	[-1.00]	[-0.90]	[1.67]	[2.70]	[-2.25]	[-1.85]	[-2.54]	[-2.78]
LARGE SYND. DUMMY	0.10*	0.16***	0.15*	0.21**	0.04	0.09	-0.14	-0.23*	0.27***	0.33***	0.09*	0.12**
	[1.85]	[2.77]	[1.78]	[2.22]	[0.74]	[1.23]	[-1.11]	[-1.75]	[3.72]	[3.04]	[1.71]	[2.21]
SIZE	-0.08***	-0.05	-0.16***	-0.16***	-0.07***	-0.05	-0.06	-0.13*	-0.16***	-0.17***	-0.09***	-0.06**
	[-3.38]	[-1.60]	[-4.34]	[-3.41]	[-2.62]	[-1.38]	[-0.99]	[-1.96]	[-5.33]	[-3.26]	[-3.46]	[-2.12]
M/B	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	[-0.77]	[-0.47]	[-1.32]	[-1.29]	[0.19]	[0.01]	[-0.91]	[-1.22]	[1.52]	[0.89]	[-1.12]	[-0.91]
CF	1.25***	1.14***	1.13***	1.39***	1.05***	1.43***	0.06	0.26	1.22***	1.14*	1.02***	1.19***
	[4.11]	[3.33]	[2.72]	[2.87]	[3.15]	[3.49]	[0.07]	[0.27]	[3.08]	[1.92]	[3.59]	[3.84]
NWC	-0.84***	-0.79***	0.11	0.30	-0.63***	-0.46**	-1.04***	-1.01***	-0.50***	-0.23	-0.68***	-0.69***
	[-6.74]	[-5.53]	[0.41]	[0.91]	[-3.23]	[-2.09]	[-5.38]	[-5.22]	[-2.83]	[-0.54]	[-4.89]	[-4.88]
R&D	1.95***	3.03***	2.61***	3.75***	2.15***	2.80***	3.88	3.05	-0.49	1.07	2.57***	3.36***
	[2.34]	[3.03]	[2.62]	[3.29]	[2.48]	[2.79]	[1.20]	[0.82]	[-0.30]	[0.47]	[3.73]	[4.29]
CAPEX	-0.46	-0.31	-1.12**	-1.37***	0.71*	0.60	-0.50	-0.16	0.30	1.19**	-1.13***	-1.28***
	[-1.19]	[-0.71]	[-2.25]	[-2.38]	[1.65]	[1.18]	[-0.48]	[-0.14]	[0.79]	[2.06]	[-3.07]	[-3.08]

ACQ	-0.65***	-0.45	-1.20***	-1.42***	-1.57***	-1.68***	-0.96	-0.91	-0.99***	-0.98***	-0.91***	-0.82***
	[-2.63]	[-1.48]	[-2.97]	[-3.01]	[-3.31]	[-3.29]	[-1.64]	[-1.42]	[-3.63]	[-2.41]	[-3.26]	[-2.76]
DIV DUMMY	0.07	0.07	0.36***	0.41***	-0.11	-0.12	0.45***	0.46***				
	[1.14]	[0.95]	[3.41]	[3.28]	[-1.56]	[-1.37]	[2.39]	[2.32]				
LEV	0.03	0.03	-0.03	-0.09	0.06	0.07	-0.48*	-0.42	-0.12*	-0.06	0.02	0.02
	[0.74]	[0.79]	[-0.46]	[-0.95]	[1.26]	[1.37]	[-1.72]	[-1.46]	[-1.82]	[-0.60]	[0.55]	[0.53]
SALES G	-0.04	-0.14	-0.13	-0.05	-0.06	-0.17	-0.04	-0.03	0.04	-0.09	-0.18**	-0.22***
	[-0.50]	[-1.63]	[-0.87]	[-0.30]	[-0.68]	[-1.57]	[-0.34]	[-0.19]	[0.47]	[-0.70]	[-2.06]	[-2.43]
FIRM AGE	-0.07***	-0.08***	-0.14***	-0.17***	-0.11***	-0.13***	-0.06	-0.08	-0.04	-0.03	-0.10***	-0.10***
	[-2.70]	[-2.53]	[-3.42]	[-3.52]	[-3.70]	[-3.19]	[-1.17]	[-1.39]	[-1.27]	[-0.56]	[-3.66]	[-3.15]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	591	425	269	202	259	192	119	100	263	143	631	497
Adjusted R^2	28.53%	31.39%	35.13%	38.29%	36.85%	38.01%	35.94%	41.31%	38.29%	40.71%	31.26%	33.13%

Panel D.	**Cash Ratio of VC-Backed IPOs**											
	WW Index				KZ Index				Dividend Payout Ratio			
	Unconstrained		*Constrained*		*Unconstrained*		*Constrained*		*Unconstrained*		*Constrained*	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	0.30	0.53*	0.00	-0.14	-0.02	0.24	-0.69	-0.53	0.69	-1.43	0.22	0.36
	[1.42]	[1.88]	[0.02]	[-0.66]	[-0.11]	[1.08]	[-1.58]	[-1.11]	[1.54]	[-1.61]	[1.48]	[1.15]
RETENTION DUMMY	0.21***		0.10***		0.08**		0.13		0.02		0.18***	
	[5.93]		[2.66]		[2.03]		[1.60]		[0.39]		[6.41]	
VOLUNTARY OWN		0.20*		0.12		-0.02		0.28		-0.35		0.10
		[1.82]		[1.20]		[-0.20]		[1.57]		[-0.82]		[1.28]
BANK AFFILIATED DUMMY	-0.05	-0.05	0.08	0.11*	0.05	0.03	-0.31***	-0.26**	0.08	-0.22	-0.02	0.01
	[-0.97]	[-0.77]	[1.47]	[1.72]	[0.91]	[0.45]	[-2.65]	[-2.05]	[1.01]	[-1.22]	[-0.47]	[0.25]
LARGE SYND. DUMMY	0.10***	0.12***	0.09***	0.11***	0.07***	0.09***	0.09	0.14**	0.06	-0.09	0.09***	0.12***
	[3.59]	[3.52]	[3.11]	[3.19]	[2.41]	[2.78]	[1.60]	[2.11]	[1.16]	[-0.73]	[4.46]	[4.93]
SIZE	-0.13***	-0.14***	-0.04**	-0.01	-0.07***	-0.09***	-0.10***	-0.10***	-0.09***	-0.05	-0.10***	-0.10***
	[-8.67]	[-7.24]	[-2.29]	[-0.74]	[-4.58]	[-4.42]	[-3.12]	[-2.75]	[-3.07]	[-0.94]	[-9.06]	[-7.14]
M/B	0.01***	0.01***	0.00	0.00	0.01*	0.00	0.00	0.00	0.01***	0.00	0.01***	0.01***
	[4.09]	[2.83]	[0.41]	[-0.10]	[1.92]	[1.42]	[1.15]	[1.24]	[4.65]	[-0.36]	[3.26]	[2.86]
CF	0.11*	0.11	0.01	-0.02	0.10	0.11	0.01	-0.10	0.05	-0.10	0.18***	0.19***
	[1.75]	[1.45]	[0.20]	[-0.31]	[1.35]	[1.22]	[0.06]	[-0.59]	[0.58]	[-0.69]	[4.45]	[3.76]
NWC	0.00	-0.02	-0.13***	-0.48***	-0.02***	0.12*	-0.46***	-0.45***	-0.33***	-0.11	-0.03***	-0.03
	[-0.12]	[-0.45]	[-7.49]	[-4.59]	[-2.54]	[1.85]	[-5.35]	[-4.69]	[-2.82]	[-0.53]	[-3.01]	[-0.94]
R&D	0.32***	0.32***	-0.02	-0.11	-0.11	-0.07	0.06	-0.09	-0.15	-0.15	0.38***	0.43***
	[3.46]	[2.95]	[-0.30]	[-1.15]	[-1.47]	[-0.69]	[0.27]	[-0.36]	[-1.54]	[-0.99]	[5.82]	[5.62]
CAPEX	-0.20	-0.05	-0.21	-0.05	-0.44	-0.62*	0.95**	1.05**	-0.57*	0.75	-0.35**	-0.21
	[-0.96]	[-0.19]	[-0.72]	[-0.14]	[-1.61]	[-1.89]	[2.05]	[2.09]	[-1.68]	[0.73]	[-1.97]	[-0.99]

ACQ	-0.11***	-0.10***	-0.52**	-0.12	-0.96***	-0.89***	-0.52***	-0.47***	-0.46	1.45***	-0.11***	-0.09***
	[-2.81]	[-2.34]	[-2.20]	[-0.41]	[-3.80]	[-3.03]	[-4.36]	[-3.70]	[-1.44]	[2.75]	[-3.15]	[-2.44]
DIV DUMMY	0.08	0.10	-0.05	-0.09	0.00	0.05	-0.44	-0.45				
	[1.23]	[1.06]	[-0.55]	[-0.76]	[-0.09]	[0.68]	[-1.30]	[-1.23]				
LEV	0.02	0.03	-0.52***	-0.54***	0.34***	0.08	-0.15	-0.23	-0.95***	-0.65***	0.01	0.01
	[0.60]	[0.76]	[-5.22]	[-4.90]	[8.42]	[0.74]	[-0.90]	[-1.21]	[-6.24]	[-2.59]	[0.31]	[0.33]
SALES G	-0.05***	-0.05***	0.04	0.10***	-0.14***	-0.11**	0.02	0.02	-0.27***	-0.37**	-0.03***	-0.03***
	[-3.52]	[-3.19]	[1.45]	[2.70]	[-3.03]	[-1.98]	[1.25]	[1.12]	[-3.63]	[-2.21]	[-2.29]	[-2.43]
FIRM AGE	-0.10***	-0.11***	-0.03	-0.01	-0.02	-0.04	0.07	0.06	-0.12***	-0.34***	-0.08***	-0.06**
	[-3.89]	[-3.19]	[-0.94]	[-0.29]	[-0.81]	[-1.04]	[1.19]	[0.76]	[-3.33]	[-3.27]	[-3.62]	[-2.14]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	1004	717	519	400	316	237	149	128	234	64	1416	1092
Adjusted R^2	35.46%	35.03%	35.92%	34.97%	44.34%	35.74%	70.71%	68.83%	51.31%	68.79%	35.58%	33.08%

Table 6. Backed IPOs' Mean Financial Constraints.

Table 6 presents mean financial constraints by PE and VC ownership for the two samples of IPOs pre-flotation, 1, 2, and 3 years post-flotation (*Panel A*). Ownership terciles for PE and VC samples are redefined every year. It also presents t-statistics for differences-in-means between top and bottom ownership terciles for PE and VC samples. *Panel B* presents t-statistics for differences-in-means between current time period and last time period. *Panel C* reports the summary statistics for backed IPOs financial constraints around the year of PE/VC syndicates' full exit post-IPO. 'Pre-event' ('post-event') refers to one year before (after) the financial sponsors' full exit post-flotation. Also, t-statistics for differences-in-means between financial constraints post- and pre- PE/VC syndicate full exit are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Mean Financial Constraint by PE and VC Ownership.

	Ownership Terciles	PE-Backed IPOs			VC-Backed IPOs		
		KZ Index	WW Index	Div. Payout (Constrained)	KZ Index	WW Index	Div. Payout (Constrained)
[1]	Top Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		8.12	56.00%		13.90	61.00%
[2]	Bottom Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		25.65	52.94%		-1.52	70.00%
	Difference [1]-[2]		*-1.89**	*0.43*		*1.30*	*-1.87**
[3]	Top Tercile: PE/VC Ownership$_{t+1}$	1.21	16.27	79.82%	-0.27	23.07	95.31%
[4]	Bottom Tercile: PE/VC Ownership$_{t+1}$	0.66	10.24	75.93%	-0.54	14.40	91.94%
	Difference [3]-[4]	*1.78**	*0.89*	*0.69*	*0.94*	*1.65**	*1.35*
[5]	Top Tercile: PE/VC Ownership$_{t+2}$	1.36	4.94	83.18%	-0.50	34.04	93.06%
[6]	Bottom Tercile: PE/VC Ownership$_{t+2}$	0.67	9.05	69.05%	-0.44	14.07	93.13%
	Difference [5]-[6]	*1.33*	*-1.04*	*2.32***	*-0.12*	*3.77***	*-0.02*
[7]	Top Tercile: PE/VC Ownership$_{t+3}$	1.47	4.03	81.48%	-0.76	53.88	94.67%
[8]	Bottom Tercile: PE/VC Ownership$_{t+3}$	0.45	18.40	65.08%	-0.61	37.88	91.67%
	Difference [7]-[8]	*2.20***	*-2.60**	*2.43****	*-0.39*	*1.92**	*0.92*

Panel B. Differences-in-means (t-stat) between current time period and last period.

	PE-Backed IPOs			VC-Backed IPOs		
	KZ Index	WW Index	Div. Payout (Constrained)	KZ Index	WW Index	Div. Payout (Constrained)
Top Tercile						
Difference [3]-[1]		1.06	3.81***		1.52	8.95***
Difference [5]-[3]	0.41	-1.79*	0.63	-0.55	1.74*	-0.92
Difference [7]-[5]	0.35	-0.47	-0.32	-0.56	2.52***	0.62
Bottom Tercile						
Difference [4]-[2]		-1.88*	3.57***		1.56	5.61***
Difference [6]-[4]	0.02	-0.92	-1.06	0.22	-0.09	0.39
Difference [8]-[6]	-0.29	1.05	-0.50	-0.74	2.88***	-0.40

Panel C.

Timing	No of IPOs		KZ Index [1]	WW Index [2]	Div. Payout (Constrained) [3]
PE/VC Syndicate full exit 1 year post-IPO	322	Pre-event Financial Constraint	-1.67	12.39	56.28%
		Post-event Financial Constraint	0.02	13.34	85.06%
		Difference [post-pre]	*2.13***	*0.24*	*6.07****
PE/VC Syndicate full exit 2 years post-IPO	145	Pre-event Financial Constraint	-0.16	17.72	86.00%
		Post-event Financial Constraint	-1.04	16.94	75.76%
		Difference [post-pre]	*-0.73*	*-0.07*	*-1.18*
PE/VC Syndicate full exit 3 years post-IPO	256	Pre-event Financial Constraint		19.72	84.85%
		Post-event Financial Constraint		27.86	88.46%
		Difference [post-pre]		*0.94*	*0.61*

Table 7. OLS Analysis of the Aftermarket Performance

Table 7 presents results of OLS regression of the aftermarket performance of PE-backed (*Panel A*) and VC-backed IPOs (*Panel B*). The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is three years market-adjusted BHARs. t is the IPO year. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

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	Three year market-adjusted BHARs											
	Panel A. PE-Backed IPOs						Panel B. VC-Backed IPOs					
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
	[1]		[2]		[3]		[4]		[5]		[6]	
INTERCEPT	-1.18***	[-2.61]	-1.15***	[-2.54]	-1.17***	[-2.59]	-1.99***	[-6.65]	-2.03***	[-6.88]	-1.96***	[-6.28]
PE/VC RETENTION DUMMY	-0.05	[-0.50]			-0.08	[-0.86]	-0.04	[-0.79]			-0.01	[-0.09]
IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$			-0.08	[-0.29]	-1.19**	[-2.23]			0.10	[1.44]	0.22	[1.57]
IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY					1.40**	[2.29]					-0.16	[-1.00]
FDR	-0.08	[-0.79]	-0.08	[-0.81]	-0.02	[-0.23]	-0.02	[-0.79]	-0.02	[-0.91]	-0.02	[-0.86]
SIZE$_{IPO\ YEAR+1}$	0.40***	[5.20]	0.40***	[5.20]	0.38***	[5.00]	0.16***	[5.99]	0.16***	[6.18]	0.16***	[5.84]
M/B$_{IPO\ YEAR+1}$	-0.01	[-1.42]	-0.01	[-1.42]	-0.01	[-1.43]	-0.01	[-0.08]	-0.01	[-0.11]	-0.01	[-0.12]
LEV$_{IPO\ YEAR+1}$	-0.06	[-0.86]	-0.06	[-0.88]	-0.04	[-0.60]	-0.08	[-1.20]	-0.03	[-0.25]	-0.01	[-0.09]
PE VC LOCKUP DUR.	-0.01	[-1.05]	-0.01	[-1.04]	-0.01	[-1.18]	0.01	[1.09]	0.01	[1.03]	0.01	[0.68]
UNDERW. REPUTATION	-0.08*	[-1.87]	-0.08**	[-2.02]	-0.07*	[-1.82]	0.01	[0.69]	0.01	[0.61]	0.01	[0.54]
MGT OWN$_{IPO\ YEAR+1}$	0.16	[0.56]	0.16	[0.53]	0.23	[0.79]	-0.14	[-1.10]	-0.11	[-0.92]	-0.13	[-1.04]
IBH OWN$_{IPO\ YEAR+1}$	0.27	[0.61]	0.29	[0.65]	0.35	[0.79]	-0.09	[-0.29]	-0.06	[-0.21]	-0.02	[-0.07]
FIRM AGE	0.01	[0.06]	0.01	[0.08]	0.01	[0.22]	0.06**	[2.30]	0.07***	[2.46]	0.06**	[2.29]
INDUSTRY DUMMIES	YES		YES		YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES		YES		YES	
No of Obs.	244		244		244		428		428		428	
R^2	0.2461		0.2455		0.2594		0.2695		0.2700		0.2731	

Table 8. Analysis of the Industry-Adjusted Annual Excess Stock Returns

Panel A provides descriptive statistics of post-IPO accounting characteristics. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. Δ signifies the change at time t which is calculated as the difference between t and t-1. Financial variables except for leverage are scaled by lagged market capitalization. $r_{i,t}$-$R_{i,t}$ is the industry-adjusted annual excess stock returns. Industry-adjusted annual buy-and-hold abnormal returns are calculated by computing IPO company's annual fiscal year buy-and-hold returns and subtracting corresponding Fama-French industry value-weighted returns. $Cash_t$ is cash and short-term investments at time period t. Δ$Earnings_t$ is the change in earnings scaled by lagged market capitalization. Δ$Net\ Assets_t$ is the change in net assets scaled by lagged market capitalization. Δ$R\&D_t$ is the change in Research and Development expense scaled by lagged market capitalization. Δ$Interest_t$ is the change in interest scaled by lagged market capitalization. Δ$Dividends_t$ is the change in common dividends scaled by lagged market capitalization. $Leverage_t$ is calculated as all debt (long-term and current liabilities) divided by market value of total assets. $Net\ Financing_t$ is calculated as new net equity issues plus net new debt issues. *Panel B* presents results of OLS regressions. The dependent variable is the industry-adjusted annual excess stock returns. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. "Retained IPOs" are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are those firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Post-IPO Accounting Characteristics					
	PE-Backed IPOs [1]		**VC-Backed IPOs** [2]		**Differences** [1]-[2]	
	Mean	Median	Mean	Median	t-stats	[MW]
$r_{i,t}$-$R_{i,t}$	-0.115	-0.189	-0.277	-0.524	4.37***	[0.00]
$\Delta Cash_t$	0.086	0.000	0.041	-0.018	0.39	[0.00]
$Cash_{t-1}$	0.259	0.111	0.544	0.264	-6.59***	[0.00]
$\Delta Earnings_t$	0.128	0.004	0.124	0.001	0.03	[0.15]
ΔNet $Assets_t$	-0.366	0.000	-0.010	0.000	-0.88	[0.00]
$\Delta R\&D_t$	-0.023	0.000	-0.039	0.000	1.76*	[0.00]
$\Delta Interest_t$	-0.006	0.000	0.000	0.000	-0.92	[0.67]
$\Delta Dividends_t$	-0.005	0.000	0.000	0.000	-1.27	[0.08]
$Leverage_t$	0.439	0.265	0.126	0.020	17.26***	[0.00]
Net $Financing_t$	47.225	1.539	36.451	6.565	2.92***	[0.00]

Panel B.

	PE-Backed IPOs				VC-Backed IPOs			
	Exited		**Retained**		**Exited**		**Retained**	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
	[1]		[2]		[3]		[4]	
Intercept	0.19	[0.85]	-0.28	[-1.35]	0.28	[0.77]	-0.25	[-1.62]
$\Delta Cash_t$	0.72	[0.38]	1.70**	[1.99]	0.48	[0.80]	0.09	[0.56]
$Cash_{t-1}*\Delta Cash_t$	1.34	[1.51]	-0.32**	[-2.18]	-0.25	[-1.05]	-0.06***	[-3.31]
$Leverage_t*\Delta Cash_t$	0.28	[0.32]	-0.30**	[-2.25]	-0.68	[-0.86]	-0.37*	[-1.76]
HP $Index_t$ Dummy$*\Delta Cash_t$	0.26	[1.03]	0.15	[1.27]	-0.02	[-0.20]	-0.02	[-0.79]
$Cash_{t-1}$	-0.61***	[-3.58]	-0.44***	[-4.24]	-0.11	[-1.49]	-0.13***	[-4.79]
$Leverage_t$	0.00	[-0.03]	-0.09***	[-2.46]	0.23***	[4.53]	-0.24***	[-3.44]
HP $Index_t$ Dummy	-0.54*	[-1.90]	-0.20	[-0.79]	-0.27***	[-2.87]	-0.19***	[-4.71]
$\Delta Earnings_t$	0.15	[0.67]	0.06	[1.01]	0.04	[0.40]	0.01	[0.98]
ΔNet $Assets_t$	25.42	[0.25]	10.16	[1.10]	-0.48	[-0.83]	-2.78	[-1.20]
$\Delta R\&D_t$	-5.10	[-0.70]	1.72	[1.33]	0.85**	[2.06]	0.14	[0.96]
$\Delta Interest_t$	-31.22	[-0.68]	11.45	[1.22]	-7.11	[-0.74]	-6.51	[-0.91]
$\Delta Dividends_t$	0.51	[0.45]	0.10	[0.25]	-6.94	[-1.14]	0.89	[0.39]
Net $Financing_t$	0.10	[0.93]	-0.04	[-1.49]	-0.06*	[-1.69]	0.01	[0.25]
INDUSTRY DUMMIES	YES		YES		YES		YES	
YEAR DUMMIES	YES		YES		YES		YES	
No of Obs.	180		671		310		1123	
R^2	0.2801		0.1673		0.2459		0.1921	

Table 9. Endogeneity Tests

Table 9 reports the results of endogeneity tests. I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1] and [3], whereas the dependent variable is equal to the natural logarithm of cash ratio (cash and short-term investments over total assets) one, two and three years post-flotation in Models [2] and [4]. In Model [2], the equation is estimated with PE house age as an instrument for PE syndicate ownership retention. PE house age is calculated as the difference between time t (IPO year) and lead PE house founding year. In Model [4], the equation is estimated with underpricing as an instrument for VC syndicate ownership retention. Underpricing is calculated as the ratio of the difference between closing price at the first day of trading and offer price, divided by the offer price. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Interaction Effects					
PE-Backed IPOs			**VC-Backed IPOs**		
	First Stage [1]	2SLS [2]		First Stage [3]	2SLS [4]
INTERCEPT	0.92***	-5.99	INTERCEPT	0.45***	-0.43*
	[8.15]	[-1.85]		[2.53]	[-1.72]
RETENTION IV: PE HOUSE AGE	0.01**	6.33*	RETENTION IV: UNDERPRICING	0.07***	0.57
	[2.08]	[1.78]		[2.44]	[1.36]
FIN. CONSTRAINT INDEX (KZ)	-1.34***	7.70	FIN. CONSTRAINT INDEX (KZ)	0.04***	-0.06***
	[-11.69]	[1.59]		[3.38]	[-2.58]
FIN. CONSTRAINT INDEX (KZ)*RETENTION	1.34***	-7.77	FIN. CONSTRAINT INDEX (KZ)*RETENTION	-0.06***	0.05*
	[11.69]	[-1.61]		[-4.43]	[1.90]
BANK AFFILIATED DUMMY	0.01	-0.12	BANK AFFILIATED DUMMY	0.01	-0.16***
	[0.63]	[-0.70]		[0.09]	[-2.49]
LARGE SYND. DUMMY	-0.02	0.10	LARGE SYND. DUMMY	0.13***	0.05
	[-1.49]	[0.69]		[4.12]	[0.81]
SIZE	0.00	-0.17**	SIZE	0.02	-0.12***
	[0.35]	[-2.26]		[0.89]	[-5.31]
M/B	0.01	-0.01	M/B	0.01**	0.00
	[0.46]	[-1.60]		[2.31]	[0.14]
CF	0.05	0.20	CF	0.08	-0.02

	[0.51]	[0.27]		[1.04]	[-0.27]
NWC	-0.01	-0.62***	NWC	0.00	-0.02*
	[-0.30]	[-2.71]		[-0.11]	[-1.93]
R&D	-0.08	4.05*	R&D	0.20**	-0.11
	[-0.30]	[1.91]		[2.09]	[-0.78]
CAPEX	0.06	-0.95	CAPEX	0.13	-0.12
	[0.45]	[-0.95]		[0.44]	[-0.39]
ACQ	-0.02	-0.42	ACQ	0.03	-0.50***
	[-0.15]	[-0.46]		[0.26]	[-4.61]
DIV DUMMY	0.01	-0.21	DIV DUMMY	-0.30***	0.11
	[0.48]	[-1.18]		[-3.47]	[0.72]
LEV	0.01	-0.18*	LEV	-0.11**	0.18***
	[1.09]	[-1.72]		[-2.02]	[2.52]
SALES G	0.00	-0.14	SALES G	0.01	-0.04***
	[-0.09]	[-0.94]		[0.15]	[-3.67]
FIRM AGE	0.01	-0.18*	FIRM AGE	0.10***	-0.04
	[0.57]	[-1.93]		[3.06]	[-0.72]
INDUSTRY DUMMIES	YES	YES	INDUSTRY DUMMIES	YES	YES
YEAR DUMMIES	YES	YES	YEAR DUMMIES	YES	YES
No of Obs.	196	196	No of Obs.	465	465
Adjusted R^2	42.58%	15.45%	Adjusted R^2	22.72%	40.61%

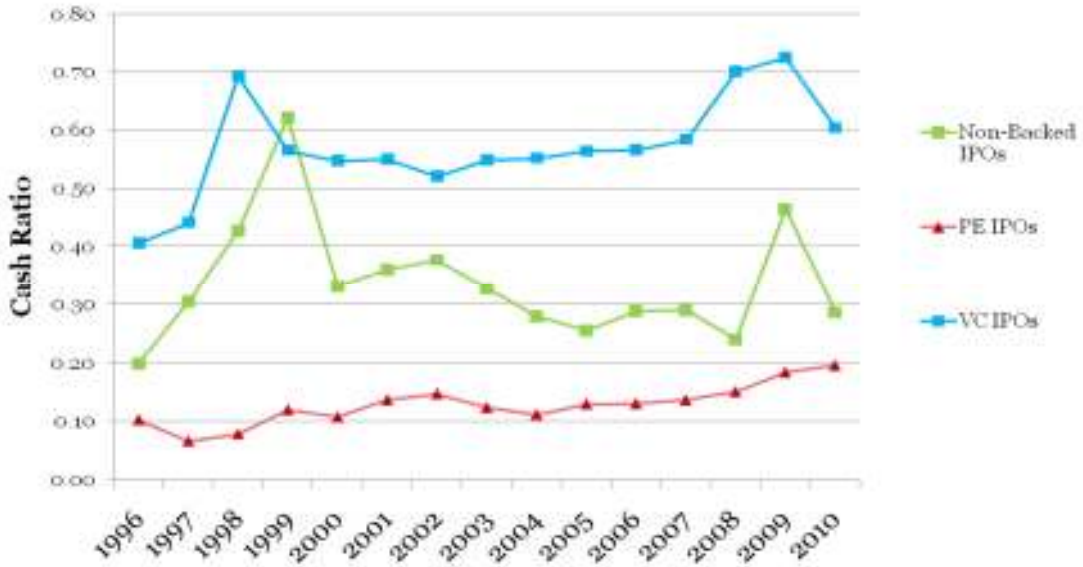
Table 10. Endogeneity Tests

Table 10 reports the results of endogeneity tests. I use instrumental variables approach. The sample consists of 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable is equal to PE/VC ownership retention in Model [1] and [3], whereas the dependent variable is the three year market-adjusted BHARs. In Model [2], the equation is estimated with low proximity dummy as an instrument for PE syndicate ownership retention. Low proximity dummy equals 1 if PE/VC lead fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. In Model [4], the equation is estimated with syndicate size as an instrument for VC syndicate ownership retention. Syndicate size is defined as the number of different VC investors listed in the "Major Shareholders" section of IPO prospectus. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

PE-Backed IPOs	First Stage [1]	2SLS [2]	**VC-Backed IPOs**	First Stage [3]	2SLS [4]
INTERCEPT	0.97***	-2.40*	INTERCEPT	0.23	-0.73
	[3.62]	[-1.88]		[0.81]	[-0.73]
RETENTION IV: LOW PROXIMITY DUMMY	-0.25***	0.52	RETENTION IV: SYNDICATE SIZE	0.02***	-0.86
	[-3.48]	[0.53]		[3.14]	[-0.83]
IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$	0.14	-4.54**	IND. ADJ. CASH RATIO$_{IPO\ YEAR+1}$	-0.09***	-0.13
	[0.23]	[-2.15]		[-3.68]	[-0.98]
IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY	-0.12	4.35**	IND.ADJ.CASH RATIO$_{IPO\ YEAR+1}$ * PE/VC RETENTION DUMMY	0.85***	0.93
	[-0.20]	[2.00]		[11.55]	[0.98]
FDR	0.01	-0.36***	FDR	-0.02	-0.14*
	[0.02]	[-2.71]		[-0.86]	[-1.84]
SIZE$_{IPO\ YEAR+1}$	0.01	0.47***	SIZE$_{IPO\ YEAR+1}$	0.02	0.64***
	[0.03]	[3.92]		[0.85]	[7.38]
M/B$_{IPO\ YEAR+1}$	0.01	0.00	M/B$_{IPO\ YEAR+1}$	0.00	0.00
	[0.24]	[-0.17]		[-1.12]	[0.07]
LEV$_{IPO\ YEAR+1}$	0.01	-0.09	LEV$_{IPO\ YEAR+1}$	0.27**	0.46
	[0.22]	[-0.97]		[2.29]	[0.98]
PE VC LOCK-UP DUR.	0.01	0.00	PE VC LOCK-UP DUR.	0.00	-0.01
	[0.23]	[0.99]		[-1.38]	[-1.62]

UNDERW. REPUTATION	0.01	-0.10	UNDERW. REPUTATION	0.01	-0.04
	[0.03]	[-1.58]		[0.60]	[-0.79]
MGT $OWN_{IPO\ YEAR+1}$	0.12	-0.04	MGT $OWN_{IPO\ YEAR+1}$	0.11	-0.56
	[0.76]	[-0.07]		[0.89]	[-1.45]
IBH $OWN_{IPO\ YEAR+1}$	0.19	1.06	IBH $OWN_{IPO\ YEAR+1}$	0.20	0.42
	[0.61]	[1.03]		[0.70]	[0.45]
FIRM AGE	0.01	0.02	FIRM AGE	0.02	0.05
	[0.34]	[0.30]		[0.68]	[0.57]
INDUSTRY DUMMIES	YES	YES	INDUSTRY DUMMIES	YES	YES
YEAR DUMMIES	YES	YES	YEAR DUMMIES	YES	YES
No of Obs.	126	126	No of Obs.	429	429
Adjusted R^2	24.02%	47.07%	Adjusted R^2	43.61%	12.64%

Figure 1: Annual Cash Ratio for Backed and Non-Backed IPOs



Appendix 1. Description of Proxy Variables.

All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels.

Variables	Definition
Sub-samples:	
Backed IPOs or financially sponsored IPOs	Firms which had a private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in IPO prospectus.
Retained IPOs	Those backed IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date.
Exited IPOs	Those backed firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date.
Proxy Variables Used to Test Hypotheses:	
Cash Ratio	Defined as cash and short-term investments over total assets.
IND. ADJ. CASH RATIO	Industry-adjusted cash ratio is defined as the firm's cash ratio minus relevant industry median cash ratio.
RETENTION DUMMY	Dummy variable that equals 1 if at first quarter post-unlock day PE/VC syndicates have retained some equity stake, and 0 if PE/VC syndicates have conducted a full exit (i.e. sold all shares).
PE/VC VOL OWN	The proportion of the firm's shares held by PE or VC syndicate as a group voluntarily at time t, specified in decimals.
Fund and Syndicate Characteristics:	
SYNDICATE SIZE	Number of different PE/VC investors listed in the "Major Shareholders" section of IPO prospectus.
LARGE SYND. DUMMY	Dummy variable that equals 1 if the syndicate size is larger than PE or VC sample median respectively.
BANK AFFILIATED DUMMY	Dummy variable that equals 1 if PE/VC fund investor type is an Investment Bank or Other Banking/ Financial Institution, and 0 otherwise (Corporate PE/Venture Fund, Evergreen, Independent Private Partnership, and Investment Advisory Affiliate).
Financial Constraints Measures:	
WW Index	The Whited and Wu (2006) index, which is calculated every year for each firm as follows: WW $index_{it}$ = - 0.091*Cash $Flow_{it}$ - 0.062*Dividend $Dummy_{it}$ + 0.021*$Leverage_{it}$ - 0.044*$Size_{it}$ + 0.102*Industry Sales $Growth_{it}$ - 0.035*Sales $Growth_{it.}$, where Cash $Flow_{it}$ is operating income plus depreciation (Item 14 + Item 18) divided by lagged total assets; Dividend $Dummy_{it}$ is a binary variable that equals 1 if the firm pays dividends, and 0 otherwise; $Leverage_{it}$ is the ratio of long-term debt (Item 9) over total assets; $Size_{it}$ is the natural logarithm

	of total assets; Industry Sales Growth$_{it}$ is two-digit SIC industry average of sales growth; Sales Growth$_{it}$ is annual percentage change in sales.
KZ Index	The Kaplan and Zingales (1997) index, which is calculated as in Baker *et al* (2003): KZ Index$_{it}$ = -1.002* Cash Flow$_{it}$ - 39.368*Dividends$_{it}$ - 1.315*Cash$_{it}$ + 3.139*Leverage$_{it}$ + 0.283*Q$_{it}$, where Cash Flow$_{it}$ is cash flow (Item 18 and Item 14) over lagged total assets; Dividends$_{it}$ is total cash dividend (Item 21 and Item 19) over lagged total assets; Cash$_{it}$ is cash and short-term investments (Item 1) over lagged total assets; Leverage$_{it}$ is calculated as total debt (Item 9 + Item 34) over total debt plus stockholders' equity (Item 9+ Item 34 + Item 216); Q$_{it}$ is market value of equity plus book value of total assets minus book value of equity over book value of total assets.
Dividend Payout Ratio	Calculated as the ratio of dividends to earnings.
'Div. Payout - Constrained'	Dummy variable that equals 1 if the firm has not paid a dividend in year t, and 0 otherwise.
DIV DUMMY	Dummy variable that equals 1 if the firm pays some dividend in a particular year, and 0 otherwise.
Control Variables:	
MGT OWN (%)	Management ownership is defined as the percentage of outstanding shares held by the management team.
IBH OWN (%)	Institutional pre-IPO investors' ownership is defined as the percentage of outstanding shares held by institutional investors as a group.
UNDERW. REPUTATION	Underwriter reputation dummy variable that equals 1 if the underwriter is the global underwriter, and 0 otherwise as defined in Derrien and Kecskes (2007).
PE DUMMY	Dummy variable that equals 1 if an IPO is classified as private-equity backed, and 0 if venture capital backed. For IPOs floated between 1997 and 2007, names of PE and VC-backed IPOs were taken from Liu and Ritter (2011). For IPOs floated between 2008 and 2010, SDC Platinum Database was used to collect the names of backed IPOs.
FIRM AGE	Difference between IPO year and firm's incorporation year. Firm age data was gathered from Jay Ritter website. In regressions, it is defined as the natural logarithm of one plus the IPO firm's age in a particular year.
SIZE	Total assets, specified in USD million. In regressions, it is defined as the natural logarithm of total assets.
ACQ	Acquisition expenditure scaled by total assets. If missing, this variable is set to zero.
CAPEX	Capital expenditure scaled by total assets. If missing, this variable is set to zero.
CF	Operating cash flows scaled by total assets.
R&D	Research & Development expenditure scaled by total assets. If missing, this variable is set to zero.

NWC	Net working capital scaled by total assets. Net working capital is defined as current assets minus current liabilities and cash.
M/B	Market-to-book ratio is calculated as the market value of equity divided by book value.
LEV	Leverage is defined as total debt scaled by total assets.
SALES G	Sales growth which is defined as the change in sales.
Underpricing (FDR)	Calculated as the ratio of the difference between closing price at the first day of trading and offer price divided by the offer price.
Market adjusted buy-and-hold abnormal returns (BHARs)	Calculated by computing the company's one, two, three year buy-and-hold return and subtracting one, two, three year market buy-and-hold return. For companies listed on the NYSE (NASDQ) market, S&P 500 price index (NASDQ All-Share price index) is used to calculate market buy-and-hold return.
NASDAQ QUOTED	Dummy variable that equals 1 if the company is floated on the Nasdaq market, and 0 otherwise.
HIGH-TECH DUMMY	Dummy variable that equals 1 if the company belongs to the following industries: technology, health care and telecommunications.

Appendix 2. Cash Ratio for US IPOs Using Alternative Definitions of Cash Ratio.

The sample consists of 579 non-backed and 1346 backed IPOs which have been floated on the US stock markets during 1997 and 2010. Cash Ratio is defined as cash and short-term investments over sales (*Panel A*), and cash and short-term investments over net assets (*Panel B*). "Backed IPO" are those firms which had a private equity (PE) or venture capital (VC) investor listed as a major shareholder immediately before the flotation in IPO prospectus. In *Panel A*, mean and median cash ratio for non-backed (NB), PE- and VC-backed IPOs are presented. For years t-1 and t=0, all NB and PE/VC IPOs are considered. For t+1, t+2, t+3, mean and median cash ratios for all NB IPOS are presented, whereas for PE and VC IPOs only those firms retained by financial sponsors in corresponding year post-flotation are considered in the analysis. In *Panel B*, descriptive statistics of backed IPOs are presented. "Retained IPOs" are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and "Exited IPOs" are those firms in which PE/VC investors have sold all their equity stake at first quarter post lockup expiration date. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Cash Ratios of Backed and Non-Backed IPOs

Years around IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
t-1	1.48	0.15	0.25	0.06	3.05	0.44	3.32***	[0.00]	-2.92***	[0.00]	-4.95***	[0.00]
t=0	4.53	0.38	0.35	0.10	6.16	1.41	3.74***	[0.00]	-1.38	[0.00]	-5.85***	[0.00]
t+1	2.21	0.26	0.26	0.10	3.80	1.16	2.74***	[0.00]	-2.26**	[0.00]	-5.92***	[0.00]
t+2	1.38	0.27	0.26	0.10	3.12	0.87	4.03***	[0.00]	-3.62***	[0.00]	-5.64***	[0.00]
t+3	1.11	0.24	0.22	0.10	3.61	0.77	3.20***	[0.00]	-3.38***	[0.00]	-4.25***	[0.00]

Panel B. Cash Ratios of Backed and Non-Backed IPOs

Years around IPO Year	**Non Backed IPOs** [1]		**PE-Backed IPOs** [2]		**VC-Backed IPOs** [3]		**Differences** [1]-[2]		[1]-[3]		[2]-[3]	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW	t-stat	MW	t-stat	MW
t-1	0.96	0.16	0.14	0.05	2.06	0.08	5.23***	[0.00]	-4.90***	[0.00]	-8.16***	[0.00]
t=0	1.95	0.41	0.30	0.08	3.92	2.01	6.11***	[0.00]	-6.26***	[0.00]	-12.27***	[0.00]
t+1	1.14	0.25	0.27	0.08	2.84	1.43	3.87***	[0.00]	-6.65***	[0.00]	-10.16***	[0.00]
t+2	0.81	0.21	0.24	0.09	2.76	1.15	3.92***	[0.00]	-6.53***	[0.00]	-7.61***	[0.00]
t+3	0.83	0.22	0.23	0.08	2.97	1.09	4.15***	[0.00]	-5.13***	[0.00]	-5.93***	[0.00]

Appendix 3. Aftermarket Performance of PE- and VC-Backed IPOs (excluding IPOs quoted during the Dot Com Bubble).

The sample consists of 379 PE- and 516 VC-backed IPOs floated on the U.S. stock markets. All admissions which have taken place during the bubble period (i.e. January 1999-December 2000) were excluded from the sample. Summary statistics of underpricing, buy-and-hold return, and market-adjusted buy-and-hold abnormal returns are reported. 'High cash ratio' is defined as those firms whose cash ratio at one year post-IPO is higher than industry-median in a particular year. 'Low Cash Ratio' is defined as those firms whose cash ratio at one year post-IPO is lower than industry-median in a particular year. 'Retained IPOs' are those IPOs in which PE/VC syndicates have maintained some ownership at first quarter post lockup expiration date, and 'Exited IPOs' are those firms in which PE/VC investors have sold their entire equity stake at first quarter post lockup expiration date. *Panel A* presents performance descriptive statistics of PE-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between PE high cash ratio retained and exited IPOs ([1]-[2]). In column [3], [a], [b] and [c], refer to the statistical difference between PE low cash retained and exited IPOs ([3]-[4]). *Panel B* presents summary statistics for VC-Backed IPOs. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively. Statistical significance of the difference in means and medians between various samples are reported by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [5], [a], [b] and [c], refer to the statistical difference between VC high cash ratio retained and exited IPOs ([5]-[6]). In column [7], [a], [b] and [c], refer to the statistical difference between VC low cash retained and exited IPOs ([7]-[8]).

Panel A. Performance of PE-Backed IPOs

	High Cash Ratio		**Low Cash Ratio**		**Differences t-stats**	
	Retention	**Exit**	**Retention**	**Exit**		
	[1]	[2]	[3]	[4]	[1]-[3]	[2]-[4]
Underpricing:						
1st Day	0.60	2.19	-4.13[c]	-14.58	*0.95*	*1.72**
Buy-and-hold Returns:						
1 year	9.88	-6.14	3.77	0.88	*0.72*	*-0.62*
2 years	6.10	-15.86	-0.34	0.57	*0.55*	*-0.75*
3 years	-11.96	-26.63	-17.48[a]	19.28	*0.50*	*-1.36*
Market-Adjusted Buy-and-hold Returns:						
1 year	5.66	-10.96	0.38	-6.27	*0.67*	*-0.44*
2 years	-4.46	-21.25	-8.89	-16.20	*0.45*	*-0.29*
3 years	-10.78	-23.78	-19.76[a]	7.12	*0.88*	*-1.14*

Panel B. Performance of VC-Backed IPOs

	High Cash Ratio		Low Cash Ratio		Differences	
	Retention	Exit	Retention	Exit	t-stats	
	[5]	[6]	[7]	[8]	[5]-[7]	[6]-[8]
Underpricing:						
1st Day	4.92	12.30	7.86[c]	-3.54	*-0.48*	*2.18***
Buy-and-hold Returns:						
1 year	-8.86[a]	10.60	-24.64	-1.93	*1.85**	*0.61*
2 years	3.85[a]	60.69	-27.00	16.71	*1.32*	*0.99*
3 years	-6.21	9.03	-56.39[c]	83.74	*1.96***	*-1.04*
Market-Adjusted Buy-and-hold Returns:						
1 year	-12.51[c]	1.88	-30.44	-14.49	*2.25***	*0.84*
2 years	-24.33[b]	11.06	-45.20	-33.28	*1.54*	*1.35*
3 years	-30.68	-30.80	-68.76	19.33	*2.48****	*-0.90*

Appendix 4. Multivariate Analysis of the Cash Ratio Using Alternative Definitions.

The following table presents results of multivariate analysis of backed IPOs' cash ratio. The sample consists of 3600 firm year observations for 446 PE- and 900 VC-backed IPOs floated on the US stock markets. The dependent variable in Models [1] through [6] is defined as the natural logarithm of cash ratio (cash and short-term investments over sales) one, two and three years post-flotation. The dependent variable in Models [7] through [12], is defined as the natural logarithm of cash ratio (cash and short-term investments over net assets) one, two and three years post-flotation. In Panel A, individual effects of PE and VC ownership retention, fund characteristics and financial constraints are examined. In Panel B, the interaction effects on cash holdings of PE- and VC-backed IPOs are analyzed. All USD Dollars values are deflated to 2005 dollars. All continuous variables are winsorized at the 1% and 99% levels. t-statistics are reported in brackets. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Individual Effects with Two Alternative Definitions of the Cash Ratio

	Cash Ratio=(Cash + Short-term Investments)/Sales						Cash Ratio=(Cash + Short-term Investments)/Net Assets					
	All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs		All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-0.40	-0.93*	-3.57***	-3.66***	-0.06	0.35	1.57***	1.00**	-1.68***	-2.03***	1.22***	1.03*
	[-0.91]	[-1.94]	[-5.58]	[-4.79]	[-0.09]	[0.48]	[3.92]	[2.23]	[-2.70]	[-2.52]	[2.32]	[1.64]
PE DUMMY	-1.44***	-1.38***					-1.19***	-1.13***				
	[-14.75]	[-11.87]					[-13.16]	[-10.49]				
RETENTION DUMMY	0.43***		-0.12		0.81***		0.32***		-0.1		0.52***	
	[5.16]		[-0.85]		[7.87]		[4.24]		[-0.79]		[6.00]	
VOLUNTARY OWN		0.06		-0.90***		1.09***		-0.14		-0.92***		0.87***
		[0.29]		[-3.48]		[3.84]		[-0.79]		[-3.80]		[3.64]
BANK AFFILIATED DUMMY	-0.32***	-0.19	-0.73***	-0.69***	-0.11	-0.02	-0.20*	-0.09	-0.73***	-0.73***	0.03	0.08
	[-2.51]	[-1.30]	[-3.33]	[-2.81]	[-0.75]	[-0.12]	[-1.76]	[-0.69]	[-3.40]	[-3.11]	[0.27]	[0.57]
LARGE SYND. DUMMY	0.28***	0.34***	0.30***	0.38***	0.24***	0.28***	0.32***	0.39***	0.27***	0.41***	0.32***	0.36***
	[4.28]	[4.41]	[2.61]	[2.98]	[3.04]	[2.98]	[5.29]	[5.62]	[2.47]	[3.38]	[4.90]	[4.54]
FIN. CONSTRAINT INDEX	-0.01	-0.01	0.01	0.01	-0.01	-0.01	-0.01	-0.01	0.01	0.01	-0.01	-0.01
	[-1.09]	[-0.80]	[0.75]	[0.51]	[-1.40]	[-1.01]	[-0.63]	[-0.37]	[1.03]	[0.83]	[-1.05]	[-0.68]
SIZE	-0.01	0.03	0.06	0.17***	-0.02	0.01	-0.37***	-0.32***	-0.30***	-0.21***	-0.26***	-0.21***
	[-0.21]	[0.77]	[1.20]	[2.73]	[-0.43]	[-0.06]	[-12.15]	[-8.93]	[-5.75]	[-3.48]	[-6.84]	[-4.88]
M/B	-0.01	-0.01	-0.01	-0.01	0.01***	0.01***	-0.01	-0.01	-0.01	-0.01	0.01***	0.01***

	[-0.75]	[-0.89]	[-1.51]	[-1.35]	[3.06]	[2.46]	[-0.67]	[-0.81]	[-1.22]	[-1.00]	[3.97]	[2.86]
CF	-0.67***	-0.56***	0.77	0.87	-0.49***	-0.37**	0.45***	0.39**	2.78***	2.96***	-0.07	-0.11
	[-4.17]	[-3.14]	[1.22]	[1.20]	[-2.97]	[-1.98]	[2.93]	[2.27]	[4.58]	[4.34]	[-0.45]	[-0.66]
NWC	-0.11	-0.07	-1.39***	-1.41***	0.04	0.02	-1.36***	-1.27***	-1.41***	-1.22***	-1.47***	-1.50***
	[-0.93]	[-0.53]	[-4.80]	[-4.17]	[0.28]	[0.13]	[-7.42]	[-6.19]	[-3.64]	[-2.82]	[-7.72]	[-6.95]
R&D	0.53**	0.72***	5.41***	8.71***	0.48**	0.58**	0.55***	0.68***	6.07***	8.86***	0.02	0.06
	[2.19]	[2.67]	[3.33]	[4.56]	[2.00]	[2.11]	[2.40]	[2.64]	[3.89]	[4.94]	[0.10]	[0.23]
CAPEX	-1.06**	-0.87	0.21	0.34	-0.97	-0.8	-2.86***	-2.40***	-1.49**	-1.49*	-3.01***	-2.36***
	[-2.15]	[-1.48]	[0.27]	[0.38]	[-1.49]	[-1.00]	[-6.15]	[-4.33]	[-1.97]	[-1.76]	[-5.39]	[-3.40]
ACQ	-0.52***	-0.42***	-2.03***	-1.71***	-0.31**	-0.27*	-3.33***	-2.93***	-2.19***	-2.00***	-3.36***	-3.02***
	[-3.87]	[-3.01]	[-3.70]	[-2.60]	[-2.14]	[-1.73]	[-11.11]	[-8.54]	[-4.14]	[-3.25]	[-10.00]	[-7.94]
DIV DUMMY	0.27**	0.33**	0.29**	0.29*	0.24	0.3	0.27***	0.38***	0.34***	0.41***	0.11	0.08
	[2.25]	[2.24]	[2.00]	[1.71]	[1.15]	[1.08]	[2.49]	[2.81]	[2.46]	[2.52]	[0.63]	[0.36]
LEV	0.11	0.11	0.14	0.12	-0.19	-0.19	-0.09	-0.08	0.12	0.11	-2.82***	-2.72***
	[1.57]	[1.43]	[1.57]	[1.14]	[-1.31]	[-1.18]	[-1.29]	[-1.03]	[1.37]	[1.17]	[-12.85]	[-11.24]
SALES G	-0.15***	-0.12***	-0.49***	-0.52***	-0.13***	-0.09*	0.19***	0.18**	-0.14	-0.41**	0.16**	0.24***
	[-3.21]	[-2.44]	[-2.66]	[-2.65]	[-2.76]	[-1.77]	[2.47]	[1.98]	[-0.81]	[-2.16]	[2.05]	[2.56]
FIRM AGE	-0.32***	-0.31***	-0.25***	-0.27***	-0.50***	-0.46***	-0.24***	-0.22***	-0.20***	-0.24***	-0.26***	-0.18**
	[-7.18]	[-5.45]	[-4.51]	[-3.94]	[-6.55]	[-4.62]	[-5.79]	[-4.28]	[-3.79]	[-3.67]	[-3.94]	[-2.17]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	2356	1732	854	627	1502	1105	2360	1732	849	623	1511	1109
Adjusted R^2	47.46%	45.75%	32.33%	35.37%	31.36%	30.06%	57.07%	55.43%	31.24%	34.36%	45.55%	44.09%

Panel B. Interaction Effects with Two Alternative Definitions of the Cash Ratio

	Cash Ratio=(Cash + Short-term Investments)/Sales						Cash Ratio=(Cash + Short-term Investments)/Net Assets					
	All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs		All Backed IPOs		PE-Backed IPOs		VC-Backed IPOs	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
INTERCEPT	-0.34	-0.94*	-3.57***	-3.67***	0.05	0.36	1.64***	1.00**	-1.68***	-2.04***	1.32***	1.05*
	[-0.77]	[-1.95]	[-5.56]	[-4.79]	[0.08]	[0.50]	[4.09]	[2.23]	[-2.69]	[-2.53]	[2.52]	[1.66]
PE DUMMY	-1.43***	-1.38***					-1.18***	-1.13***				
	[-14.67]	[-11.86]					[-13.07]	[-10.48]				
RETENTION DUMMY	0.36***		-0.13		0.72***		0.25***		-0.10		0.44***	
	[4.16]		[-0.89]		[6.71]		[3.14]		[-0.76]		[4.82]	
VOLUNTARY OWN		0.01		-0.91***		1.19***		-0.18		-0.94***		0.97***
		[0.07]		[-3.44]		[3.76]		[-0.99]		[-3.75]		[3.62]
FIN. CONSTRAINT INDEX	-0.01***	-0.01	-0.01	-0.01	-0.01***	-0.01	-0.01***	-0.01	0.01	0.01	-0.01***	-0.01
	[-2.96]	[-1.11]	[-0.06]	[-0.03]	[-2.86]	[-0.44]	[-3.38]	[-0.79]	[0.30]	[0.11]	[-3.17]	[-0.12]
FIN. CONSTRAINT INDEX*RETENTION	0.01***		0.01		0.01***		0.01***		0.01		0.01***	
	[2.84]		[0.29]		[2.72]		[3.33]		[0.00]		[3.07]	
FIN. CONSTRAINT INDEX*VOLUNTARY OWN		0.01		0.01		-0.01		0.01		0.01		-0.01
		[0.81]		[0.25]		[-0.71]		[0.91]		[0.24]		[-0.80]
BANK AFFILIATED DUMMY	-0.31***	-0.20	-0.73***	-0.69***	-0.10	-0.01	-0.20*	-0.10	-0.73***	-0.73***	0.04	0.09
	[-2.45]	[-1.37]	[-3.33]	[-2.79]	[-0.70]	[-0.07]	[-1.69]	[-0.77]	[-3.40]	[-3.08]	[0.33]	[0.61]
LARGE SYND. DUMMY	0.28***	0.34***	0.30***	0.38***	0.24***	0.28***	0.32***	0.39***	0.27***	0.41***	0.33***	0.36***
SIZE	-0.01	0.03	0.06	0.17***	-0.02	-0.01	-0.37***	-0.32***	-0.30***	-0.21***	-0.26***	-0.22***
	[-0.23]	[0.79]	[1.21]	[2.74]	[-0.54]	[-0.10]	[-12.21]	[-8.90]	[-5.75]	[-3.45]	[-6.99]	[-4.92]

M/B	0.00	0.00	0.00	0.00	0.01***	0.01***	0.00	0.00	0.00	0.00	0.01***	0.01***
	[-0.75]	[-0.87]	[-1.51]	[-1.34]	[3.15]	[2.46]	[-0.68]	[-0.79]	[-1.22]	[-0.99]	[4.07]	[2.85]
CF	-0.68***	-0.57***	0.76	0.88	-0.49***	-0.37*	0.45***	0.39**	2.78***	2.98***	-0.06	-0.11
	[-4.21]	[-3.16]	[1.21]	[1.21]	[-2.99]	[-1.95]	[2.90]	[2.25]	[4.57]	[4.34]	[-0.42]	[-0.62]
NWC	-0.12	-0.07	-1.37***	-1.41***	0.03	0.02	-1.38***	-1.26***	-1.41***	-1.21***	-1.50***	-1.51***
	[-1.00]	[-0.52]	[-4.79]	[-4.16]	[0.21]	[0.12]	[-7.54]	[-6.15]	[-3.64]	[-2.79]	[-7.87]	[-6.97]
R&D	0.50**	0.71***	5.39***	8.73***	0.45*	0.58**	0.52**	0.67***	6.07***	8.88***	-0.01	0.06
	[2.09]	[2.63]	[3.31]	[4.56]	[1.88]	[2.14]	[2.27]	[2.62]	[3.88]	[4.94]	[-0.03]	[0.26]
CAPEX	-1.08**	-0.86	0.21	0.34	-1.02	-0.80	-2.88***	-2.39***	-1.49**	-1.49*	-3.04***	-2.37***
	[-2.19]	[-1.47]	[0.27]	[0.38]	[-1.57]	[-1.00]	[-6.21]	[-4.32]	[-1.97]	[-1.76]	[-5.46]	[-3.41]
ACQ	-0.52***	-0.42***	-2.04***	-1.70***	-0.32**	-0.26*	-3.33***	-2.93***	-2.19***	-2.00***	-3.35***	-3.02***
	[-3.88]	[-3.03]	[-3.70]	[-2.59]	[-2.18]	[-1.71]	[-11.13]	[-8.56]	[-4.13]	[-3.24]	[-10.01]	[-7.93]
DIV DUMMY	0.26**	0.33**	0.29**	0.29*	0.21	0.30	0.26***	0.38***	0.34***	0.41***	0.08	0.09
	[2.15]	[2.24]	[1.99]	[1.70]	[1.00]	[1.09]	[2.37]	[2.82]	[2.46]	[2.51]	[0.45]	[0.37]
LEV	0.11	0.12	0.14	0.12	-0.17	-0.19	-0.09	-0.08	0.12	0.12	-2.78***	-2.73***
	[1.61]	[1.47]	[1.57]	[1.14]	[-1.19]	[-1.19]	[-1.27]	[-0.98]	[1.37]	[1.18]	[-12.68]	[-11.26]
SALES G	-0.15***	-0.12***	-0.47***	-0.52***	-0.13***	-0.09*	0.18***	0.18**	-0.14	-0.41**	0.15*	0.24***
	[-3.26]	[-2.43]	[-2.65]	[-2.65]	[-2.81]	[-1.77]	[2.36]	[2.01]	[-0.81]	[-2.15]	[1.94]	[2.55]
FIRM AGE	-0.33***	-0.31***	-0.25***	-0.27***	-0.50***	-0.46***	-0.25***	-0.22***	-0.20***	-0.24***	-0.26***	-0.18**
	[-7.32]	[-5.44]	[-4.51]	[-3.94]	[-6.57]	[-4.60]	[-5.94]	[-4.26]	[-3.78]	[-3.67]	[-3.96]	[-2.15]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
No of Obs.	2356	1732	854	627	1502	1105	2360	1732	849	623	1511	1109
Adjusted R^2	47.80%	45.76%	32.34%	35.37%	31.70%	30.10%	57.26%	55.42%	31.15%	34.25%	45.86%	44.07%

Appendix 5. Backed IPOs' Median Financial Constraints.

Appendix 5 presents median financial constraints by PE/VC ownership for the two samples of IPOs pre-flotation, 1, 2, and 3 years post-flotation (*Panel A*). Ownership terciles for PE and VC samples are redefined every year. It presents p-values for difference-in-medians (Mann-Whitney rank-sum test) between top and bottom ownership terciles for PE and VC samples. *Panel B* presents p-values for difference-in-medians (Mann-Whitney rank-sum test) between current time period and last time period. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Median Financial Constraint by PE and VC Ownership.

	Ownership Terciles	**PE-Backed IPOs** KZ Index	**PE-Backed IPOs** WW Index	**VC-Backed IPOs** KZ Index	**VC-Backed IPOs** WW Index
[1]	Top Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		1.22		6.47
[2]	Bottom Tercile: PE/VC Ownership$_{pre\text{-}IPO}$		2.19		4.77
	Difference [1]-[2]		*[0.21]*		*[0.42]*
[3]	Top Tercile: PE/VC Ownership$_{t+1}$	1.35	1.33	-0.29	6.09
[4]	Bottom Tercile: PE/VC Ownership$_{t+1}$	0.76	1.57	-0.58	5.91
	Difference [3]-[4]	*[0.02]*	*[0.38]*	*[0.51]*	*[0.73]*
[5]	Top Tercile: PE/VC Ownership$_{t+2}$	1.52	0.55	-0.40	11.66
[6]	Bottom Tercile: PE/VC Ownership$_{t+2}$	1.10	1.57	-0.42	4.36
	Difference [5]-[6]	*[0.04]*	*[0.02]*	*[0.76]*	*[0.00]*
[7]	Top Tercile: PE/VC Ownership$_{t+3}$	1.61	1.07	-0.49	10.60
[8]	Bottom Tercile: PE/VC Ownership$_{t+3}$	0.70	1.13	-0.44	4.64
	Difference [7]-[8]	*[0.04]*	*[0.28]*	*[0.89]*	*[0.06]*

Panel B. Differences-in-medians (MW) between current time period and last period.

	PE-Backed IPOs		**VC-Backed IPOs**	
	KZ Index	WW Index	KZ Index	WW Index
Top Tercile				
Difference [3]-[1]		[0.90]		[0.49]
Difference [5]-[3]	[0.38]	[0.04]	[0.85]	[0.00]
Difference [7]-[5]	[0.95]	[0.59]	[0.31]	[0.58]
Bottom Tercile				
Difference [4]-[2]		[0.52]		[0.21]
Difference [6]-[4]	[0.40]	[0.82]	[0.56]	[0.27]
Difference [8]-[6]	[0.90]	[0.51]	[0.37]	[0.10]