Power Sharing in the Boardroom and its Impact on IPO Performance

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Abstract

This paper studies the impact of five dimensions of venture capitalist (VC) power on the likelihood that VCs hold board seats in their portfolio firms at the initial public offering (IPO) as well as the effect of VC board representation on IPO performance. The five dimensions of VC power are based on Finkelstein's (1992) four dimensions of power which are ownership power, structural power (i.e. the VC's rank within the firm's financial hierarchy), expert power (i.e. VC industry specialization), prestige power (i.e. VC reputation), plus controlling power (i.e. how pivotal the VC is to the voted decision). We find that all five dimensions of power have a significantly positive impact on the likelihood of VC board representation. In turn, underpricing and the IPO premium are higher when VCs hold board seats, which is consistent with both the grandstanding and management support hypotheses. When VC board membership and IPO performance are simultaneously determined, there is a positive effect of the former on the latter, but no effect of the latter on the former. This suggests that VCs have a real impact on IPO performance and that they do not just maintain a strong presence in their better performing portfolio companies.

1- Introduction

Existing studies on venture capitalist (VC) firms in initial public offerings (IPO) have mainly focused on the contrasting effects of VC involvement on IPO performance. On one hand, the involvement of a VC in an IPO firm may certify the quality of the offering, thereby positively affecting the IPO's pricing. On the other hand, the VC may be tempted to take its portfolio companies public too early to build its reputation via successful IPOs, which will negatively affect IPO pricing. The decision to go public is thus the result from the balance of power within the IPO firm, and more specifically within its boardroom.

Although VCs benefit from numerous stipulations and provisions in the term sheet agreements that enable them to intervene in their portfolio companies, many VCs also hold board seats (Lerner, 1995). Ultimately, VC board membership is the result of a bargaining process between the VC and the CEO with the bargaining power of each side depending on its relative power. VC board representation is therefore a complex decision which depends on the characteristics of the VCs, the CEO and the firm itself.

On the one side, VCs may use their power – and board representation – purely to their own benefit and to the detriment of the other shareholders. In other words, via their power over the senior management of their portfolio companies, they may push through decisions which are in their own interest, but not in the interest of the other shareholders. For example, VCs may grandstand and take their portfolio companies public prematurely to enhance their own reputation (Gompers, 1999). The power of VCs may thus increase investors' concerns about the risk of adverse selection, thus increasing underpricing. On the other side, VC power and board representation may have a positive effect on firm performance as VC firms play a significant role

in the development of their portfolio companies. Although they are not normally involved in the day-to-day management of their investee firms, they provide management guidance, networking for strategic alliances (Hellmann and Puri, 2002, Sorensen, 2007, Hochberg, Ljungqvist and Lu, 2007), and financial support (Gorman and Sahlman, 1989; Sahlman, 1990, Bygrave and Timmons, 1992, Gompers and Lerner, 1999). Moreover, VCs help firms design their organizational structure, build their teams, and develop their market share (Hellmann and Puri, 2002). They are also active investors and they put in place mechanisms aimed at monitoring the management (Cornelli and Yosha, 2003; Hellman, 1998). All of this helps alleviate moral hazard and adverse selection problems between insiders and investors (Fama, 1985 Kaplan and Strömberg, 2003). VCs may therefore play a positive role which is likely to increase the growth opportunities of the IPO firm and thus increase the premium paid by outside investors, i.e. the difference between the offer price and the book-value per share. VC firms may also certify the quality of the company and increase its market value (Megginson and Weiss, 1991). Nelson (2003) argues that the price premium demonstrates the difference between accounting and the market value and measures "intangible assets, monopoly control, and investor enthusiasm, or some other factor that would dislocate stock price from accounting-based figures" (p.715).

Based on a representative sample of 262 US VC-backed IPOs during 1997 and 2004, this paper sheds light on the outcome of the bargaining between CEOs and VCs. Loosely based on the bargaining model of Hermalin and Weisbach (1998), we expect that the probability for a VC to sit on the board depends on both VC and CEO characteristics. We find empirical evidence in support of this hypothesis. First, the probability for a VC to sit on the board of directors is positively related to the VC's controlling power and/or financial stake. The probability is higher

for "lead" VCs who participate in the first round of financing as well as more reputable VCs.[1] It is also higher for VCs who are geographically close to their IPO firms, those specializing in the same industry as that of the investee firm, independent VCs, and foreign VCs. Second, VCs are more likely to hold a board seat in IPOs with more educated CEOs and those chairing the board of directors, whereas they are less likely to sit on the board of firms with higher CEO pre-IPO ownership. Finally, VCs are more likely to be on the boards of IPO firms with a loss in the year prior to the IPO, and in those managed by more reputable underwriters, whereas the probability to sit on the board is lower for firms going public during the bubble period of the late 1990s.

Our empirical findings also suggest an effect of the oversight role of VCs on IPO pricing and firm performance. VC board representation increases underpricing and the IPO premium, which provides support to both the grandstanding and management support hypotheses. This is consistent with Casamatta (2003) who argues that, under a wealth constraint and costly unverifiable effort, it is optimal for the entrepreneur to hire a VC-director who is also a provider of finance. Moreover, our empirical results indicate that the VC exiting the firm at the IPO positively affects underpricing, whereas it negatively affects the IPO premium. This suggests that the VC exiting at the IPO reflects the riskiness of the issuing firm, whereas the retention of shares makes investors confident enough to pay a premium for the IPO firm.

However, the positive association between the decision to sit on the board and IPO performance may be due to the quality of the issuing firm and to the VC's screening ability rather than to the

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[1] Our paper has parallels with Sorensen (2007) who argues that VCs use their influence to add value and their screening skills to invest in better companies. He finds that companies with more experienced VCs are more likely to go public. The present study however differs markedly from that paper in the sense that it analyses the factors that explain VC board representation and in turn the impact of the latter on IPO performance. The hypothesized factors that influence VC board representation include VC reputation, i.e. experience.

latter's monitoring skills. In other words, the question arises as to whether VC-related directors truly add value to their portfolio companies or whether they simply hold board positions in better quality firms. To answer this question, we first control for the possible endogenous self-selection bias in the decision to sit on the board. Our initial result of a positive association between VC board membership on one side and underpricing and the IPO premium on the other side is upheld. Second, we also allow for the simultaneous determination of VC board membership and IPO performance. This confirms the positive effect of VC board membership on IPO performance, while we do not find an effect of the latter on the former. This suggests that VCs have an impact on IPO performance via their monitoring capabilities rather than VCs keeping their investment in better quality firms after the IPO.

There are two major contributions of this paper to the existing research. First, whereas previous research has focused on the effect of board independence on both underpricing and IPO premium, this paper considers the equivalent effect of VC board representation. In particular, the paper provides empirical support for Casamatta (2003) who models the rationale for partnering with a VC. Second, contrary to prior research which measures VC power indirectly by the VC's reputation (Baker and Gompers, 2003), we use a more direct measure of the manifestation of VC power which is VC board representation. In addition to VC board representation, we use five other measures of VC power. Four of these measures are based on Finkelstein's (1992) four dimensions of power which are ownership power, structural power, expert power and prestige power. We add a fifth dimension to the list which is controlling power which measures how pivotal the VC is to the voted decision. We also use other more indirect measures of VC power such as the level of independence of the VC, its location, an industry focus and the fact whether it is a US or overseas VC.

The remainder of the paper is structured as follows. Section 2 reviews the literature and develops the hypotheses. Section 3 discusses the data and the research methodology. Section 4 presents the empirical results. Section 5 provides some robustness tests and Section 6 concludes.

2- Review of the Literature and Hypotheses

Despite a large number of studies on the board of directors, its attributes and its relationship with firm performance, the empirical findings remain inconclusive (see e.g., Dalton, Daily, Ellstrand, and Johnson, 1998). However, in a nutshell, the composition of the board of directors results from a bargaining process depending on the relative power of insiders (in particular the CEO) and outsiders (Hermalin and Weisbach, 1988). The composition of the board reflects the power sharing among different stakeholders (Lynall et al., 2003: 14), and is mainly influenced by the CEO and the external financiers, i.e. the most salient actors in the organization (Mitchell, Agle, and Wood, 1997).

2.1. VC board membership and VC power

Prior research indicates that venture capital firms play a significant role in monitoring their portfolio companies. Sahlman (1990) argues that venture capitalists use contracts which provide them with extensive powers such as terminating managers' employment and ceasing funding. These contracts provide the VCs with extensive power to curb managerial discretion if the need arises. However, a more direct way of keeping a check on the management is via board representation.

More precisely, a board seat held by the VC is the result of the power the former has over the CEO. Finkelstein (1992) proposed four dimensions of power. While he focused on CEO power,

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these dimensions can also be used to qualify VC power. In particular, VCs may have *ownership power* which they derive from the percentage of shares they hold in the portfolio company (Kaplan and Strömberg, 2003). Kotha and Talmor (2004) argue that, since oversight is a costly activity, VCs need to have a sufficiently high financial stake to participate in the board of directors. Moreover, a VC may have *structural power* via the portfolio firm's organizational structure and, in particular, the VC's position within the firm's financial hierarchy. This type of power is likely to be higher for lead VCs, especially those who assume board positions to protect their initial investments. Since the role of VCs in recruiting key personnel is more important during the early stages of the venture (Hellman and Puri, 2002), the power of early stage VCs is likely to be stronger as reflected by boardroom representation. A VC firm with an industry focus is also likely to have *expert power* and the ability to deal with various contingencies (Hickson et al., 1971). Such specialized VCs are more likely to assume board positions given their industry expertise (Hsu, 2004). A VC firm may also have *prestige power* derived from its reputation within the capital markets. Since entrepreneurs may accept a higher IPO discount in return for an affiliation with a more reputable VC (Sorenson and Stuart, 2001; Hsu, 2004), the latter may insist on a board seat to protect its reputational capital. We add a fifth dimension of power which measures how pivotal VCs are to the voted decision, i.e. their *controlling power* (Zingales, 1994, and Nenova, 2003).

More loosely defined, power may also be derived from geographic proximity, VC independence and cultural distance. For example, prior research suggests that geographic proximity alleviates the cost of oversight. Hence, VCs are more likely to be on the board of geographically close firms (Lerner, 1995). Further, independent VCs are more likely to seek out a powerful position to influence the going public process of their portfolio companies. Finally, foreign VCs tend to use

their board seats as a way to compensate for the cultural distance between them and their portfolio firms. Hence, we propose the following hypothesis.

H1: Powerful VCs are more likely to hold a board seat

2.2. VC board membership and CEO power

Prior research suggests that small shareholders are usually subject to free-riding problems which are exacerbated by the power of owners-managers (Fama and Jensen, 1983). For example, powerful CEOs are likely to appoint board directors who match their own preferences. They tend to avoid independent board members who are legally bound to monitor the management and to protect minority shareholders against potential expropriation (Kaplan and Reishus, 1990; Rosenstein and Wyatt, 1990).

VCs are less likely to sit on the board of IPO firms with powerful CEOs and CEOs with substantial ownership (Hermalin and Weisbach, 1988). VCs are also less likely to sit on the board of a portfolio company with a more experienced CEO and a CEO with a higher degree in sciences. VCs are less likely to sit on the board of firms where the CEO also assumes the position of the chairman.

The above discussion suggests the following hypothesis.

H2: VCs are less likely to hold a board seat in firms with more powerful CEOs.

2.3. VC board membership and firm performance

VC firms play a significant role in financing new ventures. However, VCs do not limit their role to the supply of capital, but they also provide advice on strategic and financial matters. As such,

VCs are frequently long-term investors who collaborate with the management of their portfolio companies in order to create value.

Several studies have examined the effect of VCs on the performance of their portfolio firms at the time of the IPO. For example, Megginson and Weiss (1991) argue that investors are more likely to give credence to information disclosed by IPO firms whose existing investors have reputational capital at stake and therefore "certify" the quality of the offering. In particular, the VC may use its reputational capital and monitoring skills to mitigate the adverse selection and moral hazard problems which are prevalent in IPO firms (Brav and Gompers, 2003; Megginson and Weiss, 1991). In addition to formal contractual mechanisms usually used by VCs to monitor and control their portfolio firms, their presence on the board of directors may be a further mechanism to protect their reputational capital. Hence, by providing issuing firms with both certification and monitoring VCs may reduce the extent to which an issue is underpriced (Barry et al., 1990) as well as increase the offer price of the shares in the IPO relative to their book value (i.e. the IPO premium).

While past evidence by Megginson and Weiss (1991) has suggested a negative impact of VCs on IPO underpricing, recent studies have called for a reversal of this relationship. Indeed, recent VC-backed IPOs have higher underpricing than IPOs without VC backing (Francis and Hasan (2003) and Lee and Wahal (2004) for the US; Hamao et al. (2000) for Japan; Espenlaub et al. (1999) for the UK). One explanation for this reversal may be that VC firms are often in the form of partnerships that require fast results and timely realization of their investments (Lerner, 1995). In particular, Gompers (1996) proposes the "grandstanding hypothesis" whereby younger VC firms bring firms to the stock market sooner in order to build their good reputation or prestige

power through successful deals, thereby increasing funding from private investors. Gompers finds evidence in support of his hypothesis as IPOs backed by younger VCs have greater underpricing than those backed by older and more experienced VCs. Hence, younger VCs may take companies public prematurely to improve their own reputation (Gompers, 1999). VC representation on the board of directors may thus give them the required power to accelerate the IPO process and to push through higher underpricing.

Hence, VC representation on the board of directors should certify the quality of the IPO firm. Investors are also more likely to pay a price premium for IPO firms with greater involvement of VCs on the board of directors.

H3a: The IPO premium is positively related to VC board representation

H3b: The IPO premium is positively related to VC prestige power

H3c: The IPO premium is positively related to the fraction of VCs with strong prestige power on the board

The impact of the VC on underpricing depends on the VC's reputation or prestige power. While highly reputable VCs may decrease underpricing, VCs that still have to build up a reputation are likely to create more underpricing. Further, the negative impact of less reputable VCs on underpricing is likely to be more pronounced if there is VC board representation.

H4a: Underpricing is positively related to VC board representation

H4b: Underpricing is negatively related to VC prestige power

H4c: Underpricing is negatively related to the fraction of VCs with strong prestige power on the board

3- Data Sources, Sample and Methodology

3.1. Data Sources and Sample

The sample consists of 262 US VC-backed IPOs from 1997 to 2004. The sample is selected by applying a couple of filters to the list of all US IPOs in the US markets obtained from the Securities Data Company (SDC) database. First, REITs, ADRs, closed-end funds, foreign IPOs, unit offerings, financial IPOs, and those with a lower than five dollar offer price are excluded. Second, all IPOs without VC-backing are excluded. This results in a sample of 1,094 VC-backed IPOs.

The paper focuses on a random sample of 262 VC-backed IPOs which amounts to 24% of all VC-backed IPOs over the period of study. VC characteristics are obtained from the Venture Expert database, whereas details on board composition, CEOs, and IPO firms are extracted from the IPO prospectuses available from the Securities and Exchange Commission's (SEC's) Electronic Data Gathering, Analysis, and Retrieval system (EDGAR).

Table 1 compares the sample to the entire population of VC-backed IPOs. The distribution of IPOs across time and industries for the sample is very similar to that for the entire population of VC-backed IPOs. There is also a similar percentage of hi-tech IPOs, which confirms the representativeness of the sample.

[Table 1 Near Here]

3.2. Methodology

In order to test our hypotheses on the determinants of VC board representation as well the impact of VC and CEO power on IPO performance, we estimate the following two regressions:

VC Board Membership = β_0 + β_1 VC Controlling Power + β_2 VC Ownership Power + β_3 VC Structural Power + β_4 VC Expert Power + β_5 VC Prestige Power + β_6 VC Other Power + β_7 CEO Controlling Power + β_8 CEO Ownership Power + β_9 CEO Experience + β_{10} CEO Education + β_{11} CEO Duality + β_{12} Log (Total Asset) + β_{13} Loss dummy + β_{14} Pre-IPO Leverage + β_{15} Hi-tech dummy + β_{16} IB Rank+ β_{17} Bubble Period dummy + β_{18} VC Participation + ε_1   *(1)*

IPO Performance = β_0 + β_1 VC Board Membership + β_2 VC Controlling Power + β_3 VC Ownership Power + + β_4 VC Structural Power + β_5 VC Expert Power + β_6 VC Prestige Power + β_7 VC Other Power + β_8 CEO Controlling Power + β_9 CEO Ownership Power + β_{10} CEO Experience + β_{11} CEO Education + β_{12} CEO Duality + β_{13} Log (Total Asset) + β_{14} Loss dummy + β_{15} Pre-IPO Leverage + β_{16} Hi-tech dummy+ β_{17} IB Rank + β_{18} Market Return + β_{19} Bubble Period dummy + β_{20} VC Participation + ε_2   *(2)*

The dependent variable in regression (1) is either *VC Board Membership dummy* or *Proportion VC-related Directors on Board*. If the former is the dependent variable, regression (1) is in the form of a binary probit regression. If the latter is the dependent variable, regression (1) is estimated as an ordinary least squares (OLS) regression. *VC Board Membership dummy* is equal to one if the VC has a related director or a previously related director on the board, and zero

otherwise. *Proportion VC-related Directors on Board* is the number of board members related and formerly related to the VC expressed as a fraction of board size.

IPO performance, the dependent variable in OLS regression (2), is measured by underpricing or the IPO premium. *Underpricing* is equal to the percentage difference between the price at the end of the first day of trading and the offer price. The *Premium* is defined as the difference between the offer price and the book value per share expressed as a fraction of the offer price.

3.3. Primary Explanatory Variables

VC power

VC Controlling Power measures the extent to which a VC is pivotal to the voted decision (Zingales, 1994, and Nenova, 2003). It is equivalent to the Shapley value, derived from the Milnor and Shapley (1978) power index for oceanic games for a given shareholder. This measure captures the concentration of voting power based on the ownership structure.[2] It is used by Zingales (1994) who explores the benefits of control of Italian firms with multiple classes of equity. We also use pre-IPO *VC Ownership Power* as an alternative proxy for VC power within the IPO firm. *VC Ownership Power* is calculated as the number of VC owned shares prior to the IPO expressed as a fraction of the total shares outstanding immediately prior to the IPO date.

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[2] For example, assume a game with three shareholders A, B, and C who own 40%, 35%, and 25%, respectively. Although shareholder C is the least powerful in this game, there are three winning coalitions (i.e. majority coalitions) he can form with A and B. In detail, A and C represent 65% of the voting power whereas B and C have 60% of the votes and A, B and C 100%.

VC Structural Power is a dummy variable which is equal to one if the VC firm participates in the first round of financing, and zero otherwise. *VC Expert Power* is a dummy variable which is equal to one if the VC firm is specializing in the industry of the IPO firm, and zero otherwise.

In line with Li and Masulis (2004), *VC Prestige Power* or reputation is measured by the age of the VC firm at the time of the IPO. The other, more indirect measures of VC power used in this paper are as follows. *VC Same Location dummy* is equal to one if the VC firm has a representation office in the state of the IPO firm, and zero otherwise. *VC Independent dummy* is equal to one if the VC firm is independent, i.e. a private equity firm investigating its own capital, a private equity advisor or fund, and zero otherwise. *VC Foreign dummy* is equal to one if the VC firm is not a US VC, and zero otherwise.

CEO power

A VC's involvement in his portfolio companies may also depend on CEO characteristics. As such, VC involvement is expected to be negatively related to the power and ownership of the CEO in the portfolio company (Hermalin and Weisbach, 1988). VCs are also less likely to sit on the board of a portfolio company with a more experienced CEO and a CEO with a higher education in sciences. Finally, VCs are less likely to sit on the board of firms where the CEO also assumes the position of the chairman.

CEO Controlling Power is calculated using the Shapley power index measured based on pre-IPO ownership data provided in IPO prospectus. It represents the extent to which the CEO is pivotal to the voted decision (Zingales, 1994, and Nenova, 2003). *CEO Ownership Power* is calculated as a fraction of shares outstanding prior to the IPO using data provided in IPO prospectus. *CEO*

Experience is the number of years since the CEO's graduation. *CEO Duality* is a dummy variable equal to one if the CEO is also the chairman of the board of directors, and zero otherwise. *CEO Education* is a dummy variable equal to one if the CEO holds a Ph.D., a J.D. or an M.D., and zero otherwise.

3.4. Secondary Explanatory Variables

Prior research suggests that VC board representation is positively related to the ex-ante uncertainty and the need for monitoring and control (Lerner, 1995), including the time of the IPO (Baker and Gompers, 2003). VC board representation should thus be lower when VC firms use the IPO to exit their portfolio firm. It is higher in younger and smaller firms where the need for financial advice and managerial support is greater (Hellman and Puri, 2002). It is also greater in science-based and hi-tech firms where entrepreneurs may lack some of the essential business and management skills. VCs may also insist on board representation in firms with high losses whereas they may be less interested in board representation in firms with high leverage where monitoring is likely to be performed by the lenders.

In line with prior research, this study controls for *VC Participation* which is equal to the number of shares sold by the VCs in the IPO expressed as a fraction of the total number of shares offered in the IPO. This study also controls for the following firm characteristics: *Log(Assets)* is equal to the logarithm of total assets during the last year prior to the IPO date. *Pre-IPO Leverage* is equal to pre-IPO long-term debt expressed as a fraction of pre-IPO total assets during the last year prior to the IPO date. *Loss dummy* is equal to one if the IPO firm suffered a loss, i.e. had negative

net earnings, during the last fiscal year prior to the IPO date, and zero otherwise. *Hi-tech dummy* is equal to one if the IPO firm is a hi-tech firm, and zero otherwise.[3]

Other control variables used in the previous literature relate to underwriter reputation and market conditions. The underwriter's ranking, IB Rank, is based on Carter and Manaster (1990) and Loughran and Ritter (2004).As reputable underwriters certify the quality of managed offerings, this should affect IPO performance in a positive way. *Bubble Period dummy* is also added to control for the effect of the internet bubble in 1999-2000. The IPO performance regressions finally include a *Market Return* variable, which is equal to the compounded daily return of a value weighted index over the 20 trading days, preceding the IPO date. *Market Return* controls for the effect of market momentum. It is expected to affect IPO premium and underpricing positively (Logue, 1973; Hanley, 1993; Loughran and Ritter, 2002, Lowry and Schwert, 2002).

4- Empirical Results

We start the empirical analysis by discussing the descriptive statistics of CEO, IPO firm and VC characteristics. We then proceed by investing the determinants of VC board membership. Finally, we study the impact of VC board membership on IPO performance.

4.1. Descriptive Statistics

Table 2 shows the descriptive statistics for the sample. The average IPO firm exhibits underpricing of 46.26%, which is highly skewed as evidenced by the much lower median of

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[3] In line with Loughran and Ritter (2004), hi-tech stocks are defined as those with SIC codes 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3677, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), 7371, 7372, 7373, 7374, 7375, 7378, and 7379 (software).

11.42%. This skewness reflects the concentration of a large fraction of our IPOs during the bubble period in the late nineties. Despite the high initial return during the first day of trading, investors still pay a positive IPO premium. Indeed, IPO investors pay an average premium of 75.3% above the book value per share.

Table 2 also reports an average board size of about 7 members. The board of directors consists of roughly a third of executives, a third of VC-related directors, and a third of independent directors, i.e. directors who are not executives and have no business relationship with the IPO firm. In terms of VC firm characteristics, there are on average roughly 4 VCs involved with each IPO, with an average 2.24 VCs who directly or indirectly hold board seats.[4] This number is equal to almost two thirds of the total number of VCs in the VC syndicate.

Table 2 also indicates that VC participation, i.e. the proportion of secondary shares offered by the VCs in the IPO, represents only 3.6 percent. For the subsample of IPOs with actual VC participation in the IPO, this figure becomes 27.3% per IPO firm and 11.74% per VC firm (the figures are not reported in Table 2).

[Table 2 Near Here]

In terms of CEO characteristics, the average CEO holds 11.4% of the shares immediately prior to the IPO date (ownership power), which confers an average controlling power of 11.7%. About 18% of CEOs have a Ph.D., J.D., or an M.D., and the average CEO has about 15 years of working experience (with a minimum of five and a maximum of 39 years). The CEO on the

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[4] While directly related directors are partners within the VC firm, indirectly related directors previously held a position within the VC firm.

board of 43.5% of the firms is also the chairman, which is consistent with prior research on the US markets.[5]

Table 2 also reports the characteristics of the IPO firms and the market conditions. Seventy-eight percent of firms suffered a loss in the year preceding the year of the IPO. The average leverage is low with total debt amounting to only 26% of total assets. About 42% of the sample firms are hi-tech firms and the average rank of the underwriter is 8.6. Finally slightly more than half of the sample firms went public during the bubble period of 1999-2000 and the average market return during the 20 trading days preceding the IPO was 1.1%.

Table 3 reports the VC characteristics in the average IPO firm and examines the link between VC characteristics and VC board representation. The table shows that in the average IPO firm, there are more VCs sitting on the board than not: more than half of the VCs within the VC syndicate (2.244 out of 3.782 VCs) hold a board seat. The aggregate ownership power of all the VCs in the average IPO firm is equal to 54.6% and controlling power is 49.6%. VCs with board representation have higher controlling power than VCs without board representation (the difference is significant at the 1% level) as well as higher ownership power ($p=1\%$).

The average IPO firm has an average *cumulative* VC age, i.e. *Prestige Power*, of 59 years, which reflects the substantial experience of VCs taking companies public and is in line with Sorensen (2007). Moreover, VCs on the board have a significantly higher average cumulative age (roughly

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[5] Linck et al. (2008) document CEO duality in 58.2% of 53,602 firm-year observations covering 6,931 firms over the period 1990–2004 in the U.S.

40 years) than those that do not sit on the board (28.54 years).[6] This suggests that more prestigious VCs look for board representation and thus better involvement in their IPO firms.[7]

There is an average of 1.752 VCs per IPO firm who specialize in the industry of the IPO firm, i.e. have *Expert Power*. This represents almost half of the average number of VCs in the VC syndicate. VCs with board membership are more likely to have *Expert Power* than those without (*p=5%*). Similarly, almost half the VCs in the VC syndicate (1.775 VCs) participate in the first financing round of an average IPO firm, i.e. have *Structural Power*. VCs with board membership have higher structural power than those without (1.389 versus 0.385, respectively), which suggests that VCs on the board are early investors who participate in the first financing round (*p=1%*).[8]

Moreover, an average IPO firm includes 0.847 VCs who are located in the same state as the IPO firm, and this number is not significantly different between both subsamples. Although not shown in Table 3, VCs located in the same state as their portfolio firms are a rare occurrence (0.072 of VCs), which suggests that geographic distance is not a concern for VCs in US IPOs.

Table 3 indicates that most VC firms within the typical VC syndicate are independent (2.802 VCs out of 3.782) whereas the numbers of VCs affiliated to financial and corporate groups are smaller (0.519 and 0.473 per IPO, respectively). VC board members are more likely to be independent (*p=1%*), whereas VCs owned by financial institutions and those owned by

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[6] IPOs that do not have VCs in one category, e.g. no VCs without board representation, are ignored in the calculation of the averages for the two subsamples.

[7] Not shown in Table 3, VCs in the average IPO firm have a cumulative reputation of about 47 previous IPO deals, and this is significantly higher for VCs on the board.

[8] Although not shown in Table 3, the first round occurs on average 4.2 years prior to the IPO date.

corporations are no more likely to sit on the board than other types of VCs. Finally, there is an average of 0.305 foreign VC-related directors per IPO and they are not likely to sit more on the board of directors. Not shown in Table 3, there is a total of 28 IPOs in our sample of 262 IPOs with foreign VC-related directors, and this represents 10.69% of the sample with a maximum of three VC-related directors per IPO.

[Table 3 Near Here]

Table 4 is similar to Table 3, but rather than reporting the VC characteristics for the average IPO firm (i.e. in the form of averages across the 262 IPO firms) the table reports them for the average VC (i.e. in the form of averages across the 946 VC firms involved in the 262 sample firms). The table shows that 543 out of the 946 VCs (i.e. 57.4%) sit on the board of their portfolio companies. It also shows that an average VC has 13.8% controlling power and 15.1% ownership power, and both variables are significantly higher for VCs who sit on board (*p=1%*). VC Prestige, i.e. age, is equal to 16.28 years on average, and this is significantly higher for VCs with board representation.

Moreover, Table 4 shows that 45.1% of VCs have structural power as they participated in the first round of financing. It also indicates that 30% of VCs have representative offices within the same state of their IPO firms, and 73.4% are independent VCs. The binomial test for the difference between dichotomous variables (VC Same Location, VC Independent, VC Financial, VC Corporate, and VC Foreign) shows that except for VC Expert Power and VC Foreign, proportions are significantly different (at the 1% to 5% levels). Specifically, VCs with board representation have a greater structural power and are more likely to be located in the same state than VCs without board representation (p=1%). Moreover, VCs on the board are more (less)

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likely to be independent (financial or corporate) than those VCs without board representation. Not shown in Table 4, a VC-related director has an average experience of about 13 years and 34.4% of them hold a Ph.D., a J.D., or an M.D. The average VC owns 15.1% of the equity immediately prior to the IPO date, which represents average controlling power of 13.8%. Both percentages are significantly higher for VCs who sit on the board of directors (*p=0.1%*). This suggests that the higher the VC's ownership and controlling power, the more likely it will monitor its portfolio company through board membership.

As to our measure for VC reputation, VC firms have an average age of 16.76 years, and VCs who sit on the board are significantly older (*p=0.1%*). This suggests that more reputable VCs are likely to have higher bargaining power thus allowing them to sit on the board and influence the decisions made by the management. Also, 30% of VC firms are geographically close and this is significantly higher for those who decide to hold a board seat (*p=0.1%*). Almost half of the VCs focus on the industry of their portfolio companies. However, there is no significant difference in this respect between both sub-samples (with or without board representation). Interestingly, independent VCs who represent 73.4% of the VCs in the IPO sample are more likely to sit on the board (*p=0.1%*). This is in contrast with both corporate and financial VCs who are less likely to hold a board seat (*p=0.1%*). This may reflect the need for independent VCs to gain greater influence on IPO managers, such as to accelerate the decision to go public. Table 4 further shows that foreign VCs represent 12.6% of all the VCs involved studying the sample of IPOs.

[Table 4 Near Here]

4.2. VC Board Membership

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Table 5 shows the results for the probit regressions explaining the likelihood of the VC to hold a board seat. The regressions in the table are based on the 946 VC firm observations rather than the 262 IPO firm observations. Later on in Section 5, we carry out a battery of robustness checks, including the re-estimation of the regressions from Table 5 based on the 262 IPO firm observations rather than the 946 VC firm observations. Returning to Table 5, since *VC Controlling Power*, i.e. the VC Shapley value, and *VC Ownership Power* are highly correlated (79.73%), Model (1) measures VC power by *VC Controlling Power* whereas Model (2) measures power by *VC Ownership Power*.

Model (1) shows that VCs are more likely to sit on the board when they have structural power, i.e. they participate in the first round of financing (*p*=1%), and they are more powerful in the voted decision (*p=1%*). More reputable VCs, i.e. older VCs, (*p=1%*),[9] those geographically close to their portfolio companies (*p=5%*) and those with an industry focus (*p=5%*) are more likely to act as directors. Independent VCs (*p=10%*) and interestingly foreign VCs (*p=10%*) are also more likely to hold board positions. Model (2) confirms these findings measuring VC power by *VC Ownership Power*. The coefficients have similar or even higher levels of significance. To summarize, there is strong support for Hypothesis 1 which states that powerful VCs are more likely to sit on the board of directors.

In terms of the CEO characteristics, the results in Table 5 show that the likelihood for the VC to sit on the board is negatively associated by the power of the CEO, as measured by *CEO Controlling Power* (*p=10%*) in Model (1) and *CEO Ownership Power* (*p=5%*) in Model (2).

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[9] Further empirical investigations using *VC Experience*, i.e. the number of previous IPOs by the VC, as a proxy for VC reputation confirm the results from Models (1) and (2). These results are available upon request.

Hence, there is evidence that powerful CEOs are reluctant to share their power in the boardroom as they reduce the influence of VCs and ultimately the degree of monitoring by the latter. These results support Hypothesis 2.

Interestingly, Models (1) and (2) show that VCs are more likely to sit on the board of directors of firms with more educated CEOs. They are also more likely to be part of the board if the role of the CEO and chairman is assumed by the same person. One explanation for this result is that VCs sit on the board of firms where the potential for managerial entrenchment by the CEO is high.

In terms of the firm characteristics, VCs are more likely to be on the board of loss-making IPO firms ($p=10\%$), and those underwritten by more reputable investment bankers ($p=10\%$). They are also more likely to hold a board seat in firms going public during the bubble period ($p=10\%$). This may reflect the need for the VC to influence the decisions made by the management in order to accelerate the IPO date. Interestingly, higher pre-IPO leverage, which may act as a substitute for VC monitoring and hence VC board membership, has no impact on the likelihood of the latter.

[Table 5 Near Here]

4.3. The Impact of VC Board Membership on IPO Performance

Table 6 examines the effect of VC board membership on the performance of IPO firms. Similar to Table 5, the regressions in Table 6 are estimated on the 946 VC firm observations rather than the 262 IPO firm observations. As stated above, Section 5 will investigate the robustness of the results if the regressions are based on the 262 IPO firm observations. In line with the prior

literature on IPOs, we use the following two proxies for performance: IPO underpricing (Models (3) and (4)) and premium (Models (5) and (6)). Models (3) and (5) include CEO Controlling Power, and Models (4) and (6) include CEO Ownership Power.

All models show the existence of a positive impact of VC board membership on both underpricing and the IPO premium (at the 5% level and the 10% level, respectively), which is consistent with Hypothesis 3a and Hypothesis 4a, respectively. Hence, there is evidence that VCs create value via their advice and monitoring. This confirms the management support provided by VCs and is consistent with Casamatta (2003). However, at the same time, there is also evidence in favor of the grandstanding hypothesis, which states that, to build up their reputation, VCs are likely to exercise their power in the boardroom in such a way that their portfolio companies go public earlier than expected at the cost of greater underpricing. Models (3a), (4a), (5a) and (6a) show the existence of a negative (positive) association between VC prestige power and Underpricing (IPO Premium), which is consistent with hypotheses (3b) and (4b). Further, models (3b), (4b), (5b) and (6b) investigate the interaction between VC board representation and VC prestige power (i.e. reputation) and the interaction's impact on IPO performance as measured by IPO underpricing and the IPO premium. In other words, these models test the validity of Hypothesis 3c and Hypothesis 4c. The models contain an interaction term between the *VC Board Membership dummy* and *VC Prestige Power* and an interaction term between the *VC No Board Membership dummy* and *VC Prestige Power* as measured by VC age. While the latter interaction term is significant neither in the regressions on underpricing nor in those on the IPO premium, the former is significantly negative in Models (3) and (4) and significantly positive in Models (5) and (6). This significant interaction term provides support for Hypothesis 3c about the negative

impact of more reputable VCs with board representation on the IPO premium and Hypothesis 4c about the positive impact of more reputable VCs with board representation on underpricing.

[Table 6 Near Here]

In terms of the control variables, Models (3) to (6) show that underpricing is higher in firms with more powerful VCs and those owning a higher percentage of the equity. Moreover, Table 6 shows that powerful CEOs, as measured by ownership and controlling power, increase underpricing, but have no impact on the IPO premium. Also, Models (3) and (4) indicate that underpricing is negatively related to the size of the IPO firm ($p=10\%$) and its pre-IPO leverage ($p=1\%$). Underpricing is higher in hi-tech firms ($p=1\%$), firms taken public by more reputable underwriters ($p=1\%$), firms going public following a positive market momentum ($p=10\%$), and those going public during the bubble period ($p=1\%$). Models (5) and (6) exhibit a positive association between IPO premium and the size variable ($p=10\%$). This suggests that investors consider that larger firms are more likely to benefit from higher growth opportunities than smaller firms. Also, the negative impact of pre-IPO leverage and the hi-tech dummy on the IPO premium may reflect the lower growth opportunities for firms with more tangible assets and therefore more debt capacity.

5- Robustness Checks

5.1. The Selection Bias of VC Board Membership

VC board membership may however be the endogenous outcome of a number of CEO and firm characteristics. In other words, VCs and their board membership may not truly add value to their portfolio companies, but VCs may rather decide to hold board positions (and maintain large

equity stakes after the IPO) in high quality firms. The Heckman self-selection model deals with the possible endogeneity by controlling for the self-selection of VCs to choose to sit on the board of high quality firms (such as those with good past performance). In the first stage, the probit regression in equation (3) is used to estimate the inverse Mills ratio (*Lambda*) that accounts for the correlation between the error terms of the firm performance at the IPO, i.e. IPO underpricing and premium, and VC board membership. In the second stage, the inverse Mills ratio is included in equation (4) as an additional regressor to obtain unbiased coefficient estimates for the VC board membership dummy and the other explanatory variables. Formally, the procedure is as follows:

First step (Selection Equation):

$$\text{(Probit): Probability (Board Membership)} = \alpha_0 + \alpha_1 \text{ Control variables} + \varepsilon \qquad (3)$$

Second step:

$$\text{(OLS): IPO Performance} = \beta_0 + \beta_1 \text{ Board Membership dummy} + \beta_2 \text{ Control variables}$$
$$+ \beta_3 \text{ Lambda} + \eta \qquad (4)$$

Models (7) to (10) in Table 7 report the estimation results for the Heckman self-selection model. As shown in Table 7, the coefficient estimate for the VC board membership dummy is significantly positive in all four models. Therefore, after the endogenous self-selection of VCs has been controlled for, the VC board membership dummy still positively affects underpricing as well as the IPO premium, which is consistent with the grandstanding and management support hypotheses, respectively.

[Table 7 Near Here]

In addition, lambda, the inverse Mills ratio or self-selection parameter is significant only in Models (7) and (9) but insignificant in Models (8) and (10). Hence, the sample selection bias does not appear to be a serious problem after CEO and firm-specific characteristics are added to the regression (as in Models (8) and (10)). In other words, it does not seem to be important to control for the selection bias associated with the VC's decision to hold a board seat in their portfolio companies.

5.2. The Simultaneous Determination of VC Board Membership and IPO Performance

Furthermore, the decision of a VC to sit on the board may be related to IPO performance and vice-versa. On the one hand, a VC may sit on the board to influence the decision to go public and/or to provide better support to its portfolio company. On the other hand, the VC may sit on the board of firms that are about to go public to protect its interests after the IPO. This is especially likely to be the case in more underpriced and more attractive issues where the initial owners, including the VC, may face a greater dilution of their power following the public offering. This suggests that higher underpricing or a higher IPO premium is likely to increase the likelihood of VCs sitting on the board.

A three-stage least-squares estimation procedure is thus used to control for the possible simultaneous relationship between IPO performance and VC board membership.[10] The system of simultaneous equations includes a probit regression based on the VC board membership dummy

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[10] Three-stage least-squares (3SLS) is asymptotically more efficient than two-stage least-squares (2SLS) as it takes into account information on the error covariances as well as information contained in the endogenous variables included in the other equations (see Greene (2003) and Brooks (2008)).

(equation (5)), and an OLS regression of IPO performance, i.e. IPO underpricing or the premium

(equation (6)). In detail, the system is as follows:

VC Board Membership dummy $= \alpha_0 + \alpha_1$ *IPO Performance* $+ \alpha_2$ *Control variables* $+ \varepsilon$ (5)

IPO Performance $= \beta_0 + \beta_1$ *VC board membership dummy* $+ \beta_2$ *Control variables* $+ \eta$ (6)

The instrumental variables we use include VC characteristics, such as VC structural power, VC location, industry focus, independence, and nationality for equation (5), and market return for equation (6).

Models (11) and (12) in Table 8 report the estimation results for the 3SLS model of the *VC Board Membership dummy* and underpricing, and Models (13) and (14) show the 3SLS results for the *VC Board Membership dummy* and IPO premium. After the possibly endogenous relationship is controlled for, Table 8 indicates that the *VC Board Membership dummy* positively affects underpricing and the IPO premium, whereas neither of the IPO performance variables affects the *VC Board Membership dummy*. VC board membership may help accelerate the IPO process and improve the VC's reputation by adding another successful IPO to its track record at the cost of greater underpricing. VC board membership may also grant VCs greater access to information and ensure higher levels of control over the management, thus allowing them to add more value to their portfolio firms as evidenced by the higher IPO premium. Again, we find strong support for both the grandstanding and the management support hypotheses.

[Table 8 Near Here]

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In terms of the control variables, Table 8 also confirms the results from Table 6. Specifically, Models (11) and (13) indicate that VCs are more likely to sit on the board when they are more powerful and when the CEOs are less powerful. VCs are also more likely to be involved with the board of directors of firms with better educated CEOs, and in firms with a dual leadership structure where the CEOs are more likely to get entrenched.

Moreover, Models (12) and (14) show that underpricing is positively related to VC power, VC participation, and CEO power. Underpricing is also lower in large firms, and those with higher financial leverage, whereas it is higher in hi-tech firms, those managed by more reputable underwriters, those going public during the bubble period and those going public following a period of positive momentum. Similarly, the IPO premium is positively related to the power of the VCs, but is negatively related to their participation in the IPO via the sale of secondary shares. This is consistent with our prior results which suggest that VCs exiting at the IPO may reflect their lack of ability to add value to their portfolio companies. The IPO premium is higher in large firms and those with losses. It is however lower in hi-tech firms, those with more financial leverage and those going public following a positive market momentum and within the bubble period. To summarize, the results from the 3SLS estimation procedure confirm our previous results. In addition, they suggest that the direction of causality flows from VC board membership to IPO performance and not vice-versa.

5.3. IPO Performance and the Percentage of VC-related Directors on the Board

So far, the regressions have focused on *individual* VCs and how the power held by an individual VC influences its board representation and in turn how VC power and board representation affects IPO performance. However, VCs may *collectively* share power with the CEO in the

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boardroom (Zingales, 1994; and Nenova, 2003). The percentage of seats held by VC firms may thus reflect the power sharing within the IPO firm (Zingales, 1994; and Nenova, 2003). Baker and Gompers (2003, p.570) argue that "because existing shareholders bear the cost of suboptimal governance, board structure is more likely to be chosen optimally at the time of the IPO". They show that the percentage of venture capital directors on the board, rather than their mere presence on the board, is negatively related to the power of the CEO.

While Table 8 examined the association between IPO performance and VC board membership for individual VCs (as measured by the *VC Board Membership dummy*) based on the 946 VC firm observations, Table 9 investigates the association between IPO performance and the fraction of all VC-related directors for the 262 IPOs. Similar to the results from the dummy variable in Table 8, the fraction of VC-related directors on the board may affect and/or may be affected by IPO performance. As such, the models in Table 9 examine the simultaneous association between the fraction of VC-related directors and IPO performance using a 3SLS procedure. Table 9 confirms the results from Table 8. Specifically, there is a positive effect of the fraction of VC-related directors on both underpricing and IPO premium, whereas IPO performance does not affect VC presence on board.

In detail, Models (15) and (17) show that the fraction of VC-related directors is positively related to their cumulative VC controlling power ($p=1\%$), and their pre-IPO ownership ($p=1\%$). The fraction is also greater in firms with a greater cumulative prestige power or reputation of the VC syndicate ($p=1\%$), as measured by the number of previous IPOs they have undertaken. The fraction of VC-related directors is positively related to the fraction of VCs with expert power, i.e. the fraction of industry focused VCs who are likely to look for a board seat in order to provide

better management support (p=5%), and it is also positively associated with the fraction of independent VCs.[11]

Moreover, there is evidence of a negative association between the fraction of VC-related directors and CEO controlling power (p=10%).[12] Also VCs have a stronger representation on the board of IPOs with more educated CEOs (*p=5%*), and IPOs during the bubble period (*p=10%*). Finally, there is a lower fraction of VC-related directors in larger firms (*p=1%*), and those with greater pre-IPO leverage (*p=10%*).

[Table 9 Near Here]

In line with the results from Table 8, Models (16) and (18) indicate that both underpricing and the IPO premium are positively related to the fraction of board seats held by VC-related directors. These results suggest that more powerful VCs, as evidenced by a higher fraction of board seats held by the VCs, are more likely to take firms public earlier at the cost of higher underpricing. Nevertheless, the VCs still provide their portfolio companies with significant management support, thus increasing the premium paid by IPO investors (Sorensen, 2007).

5.4. IPO Performance and Types of VCs

Previous research has usually ignored that VCs are heterogeneous and may thus have different goals according to their type and experience. In addition to independent VCs, prior research has

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[11] Replacing VC and CEO controlling power by VC and CEO ownership power and measuring VC reputation by VC age does not affect the main conclusions of the paper. The results are available upon request.

[12] Including VC and CEO ownership power in the regressions yields consistent results; the results are available upon request.

distinguished bank-related and corporate VCs.[13] Gompers and Lerner (2000) focus on corporate VCs and argue that large corporations invest in young innovative companies which are closely related to their core business in order to pursue their strategic goals and benefit from synergies. Corporate VCs are therefore more likely to provide management support and monitoring and are also more likely to hold higher equity stakes than other types of VCs. Further, Hellmann et al. (2003) argue that bank-related VCs, i.e. financial VCs, are not strongly involved in the management of their portfolio companies as they focus on expanding the pool of potential future borrowers for their affiliated banks.

Table 10 is similar to Table 9, but it also accounts for the possible differential effect of the type of a VC firm (corporate, financial, and independent VCs) sitting on the board on the performance of IPO firms. While Models (19) and (20) investigate the direct effects on underpricing and IPO premium, respectively, of the types of VCs sitting on the board, Models (21) and (22) control for differences in prestige power (reputational capital) across the various types of VCs on the board. Models (23) and (24) consider the presence of expert power for the various VC types, and Models (25) and (26) concentrate on the effect of their geographic location.

Model (19) indicates that underpricing is significantly higher in those IPOs that have a larger fraction of independent VCs on the board of directors. Model (20) shows that the IPO premium is positively related to the fraction of VC-related directors, regardless of their type. Interestingly, the effect of corporate VC-related directors is significantly higher than that of independent VC-related directors. Models (19) and (20) suggest that although independent VCs take companies public with a higher discount, i.e. underpricing, they still add value to their portfolio companies

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[13] Prior research has also considered the role of publicly owned VCs. Our sample however does not include any IPOs with publicly owned VCs.

evidenced by the higher premium. However, corporate VCs both add more value and reduce IPO underpricing.

Value added by venture capitalists is however closely linked to their knowledge and experience (Gorman and Sahlman, 1989), and the incentives to grandstand may be moderated by their prestige power or reputation. More reputable independent VCs are for example less likely to grandstand and take companies public prematurely to build up their reputation. Sorensen (2007, p.2726) argues that "since companies more willingly accept financing from better VCs, these VCs have more feasible investments to choose from". This suggests that more experienced VCs have access to a proprietary deal flow giving them a distinct competitive advantage. As such, Sorensen (2007) predicts that investments held by more experienced VCs perform better because the investee companies are inherently better given the VCs' better screening skills. Models (21) and (22) examine the effect of directors related to reputable VCs while controlling for the types of VCs. Model (21) shows that underpricing decreases with the fraction of board members who are related to more reputable corporate VCs (p=5%). It also indicates that underpricing is no longer affected by independent VCs, which suggests that more reputable VCs are less likely to grandstand. Moreover, Model (22) confirms the positive effect of both the presence of reputable corporate and independent VCs on the IPO premium (p=5%).

[Table 10 Near Here]

Further, Models (23) and (24) consider the differential effect of the types of VCs by controlling for expert power, i.e. industry focus (or the absence thereof), on IPO performance. Model (23) shows a positive effect of the fraction of VC-related directors with expert power on underpricing (*p=5%*) whereas VC-related directors without expert power do not have an effect on

underpricing. Moreover, underpricing is negatively related to the fraction of financial VC-related directors (*p=10%*). While Model (24) indicates a positive effect of the fraction of independent VC-related directors—with and without expert power—on the IPO premium, both effects are significantly lower than their respective equivalent effect for corporate VC-related directors (at the 5% level). This pattern suggests that there is a higher managerial contribution of corporate VCs to their portfolio companies. Model (24) also shows that the premium increases in IPOs with higher fractions of financial VC-related directors without expert power. Overall, there is no indication from Models (23) and (24) that VC expert power increases the impact of VC board representation on IPO performance.

Models (25) and (26) examine the differential effect of the types of VCs that exist in a given IPO (and their relative importance) by controlling for their geographic location (i.e. for the fact whether the VCs are based in a different state than or the same state as the portfolio company) on IPO performance. Model (25) indicates that both the fraction of independent VC-related directors located in the same state as the IPO firm and the fraction of independent VC-related directors located in a different state positively affect underpricing. However, the Wald test for the difference between these two coefficients is not significant, suggesting that independent VCs have a positive effect on underpricing independent of their geographic location. Model (26) shows a positive association between the IPO premium and the fraction of independent VCs regardless of their location. In addition, both financial and corporate VC-related directors located in the same state as the IPO firm also add value, as evidenced by the higher IPO premium: the coefficients are significant at the 10% and 1% level, respectively. Interestingly, geographic location in the same state helps corporate VCs add more value than independent and financial VC-related directors, and the Wald test for the difference between the coefficients is significant

at the 1% level. Hence, overall VCs located in the same state create more value as evidenced by the higher IPO premium.

To summarize, Table 10 shows that, in addition to their certification and screening abilities, corporate and financial VCs have usually better access to funding through their affiliated companies and financial institutions than independent VCs. This reduces their need to grandstand, i.e. to underprice, while increasing the price premium.

6- Conclusion

At the time of the initial public offering (IPO), powerful venture capitalists (VCs) may have beneficial as well as negative effects on their portfolio companies. According to the management support hypothesis, the beneficial effects are mainly via the monitoring of the management and the advice that VCs provide, both of which ultimately result in improved IPO performance as evidenced by lower underpricing and a higher IPO premium. As per the grandstanding hypothesis, the negative effects stem from powerful VCs pursuing their own interests rather than those of the entire shareholder body. Indeed, powerful VCs who are keen on building up a good reputation and adding another successful IPO to their portfolio may be tempted to take their investee firms public prematurely at the cost of higher underpricing. While existing research has measured VC power indirectly by the VC's reputation (Baker and Gompers, 2003), this paper uses a better proxy for VC power which is VC board representation. Based on Finkelstein's (1992) augmented categorization of power in corporations, we also investigate the impact on IPO performance of VC controlling power, ownership power, expertise power, structural power and prestige power, as well as other VC firm characteristics such as geographic closeness and VC

type, and the fact whether the VC is independent or affiliated as alternative measures of VC power.

This paper's aim is twofold. First, the paper proposes to test the determinants of VC board representation. The hypothesized determinants relate to VC, CEO power and firm characteristics. Loosely based on the bargaining model of Hermalin and Weisbach (1998), we expect that the probability for a VC to sit on the board mainly depends on both VC and CEO power. Second, we study the impact of VC board representation and VC power on IPO performance as measured by underpricing and the IPO premium.

Based on a representative sample of 262 US VC-backed IPOs during 1997 and 2004 and 946 equivalent VC firm observations, we find the following. First, the probability for a VC to sit on the board of directors is positively related to its controlling power (as measured by its Shapley value) and/or ownership power (as measured by its ownership stake). The probability is higher for VCs with structural power, i.e. those who participate in the first round of financing, as well as VCs with prestige power, i.e. those with a high reputation. It is also higher for VCs who are geographically close to their IPO firms, those with expert power (i.e. those with an industry focus), independent VCs, and foreign VCs. Second, VCs are more likely to hold a board seat in IPOs with more educated CEOs and those chairing the board of directors, whereas they are less likely to sit on the board of firms with higher CEO pre-IPO ownership. Finally, VCs are more likely to sit on the boards of IPO firms making a loss in the year prior to the IPO, and in those managed by more reputable underwriters as well as those going public during the bubble period of the late 1990s.

Our empirical findings also suggest an effect of the oversight role of VCs on IPO pricing and valuation. VC board representation increases underpricing and the IPO premium, which provides support to both the grandstanding and management support hypotheses. This is consistent with Casamatta (2003) who argues that, under a wealth constraint and costly unverifiable effort, it is optimal for the entrepreneur to hire a VC-director who is also a financial provider. Moreover, our empirical results indicate that the VC exiting at the IPO positively affects underpricing, whereas it negatively affects the IPO premium. This suggests that the VC exiting at the IPO reflects the riskiness of the issuing firm, whereas the retention of shares makes investors confident enough to pay a premium for the IPO firm.

However, the positive association between VC board membership and IPO performance may be due to the quality of the issuing firm and to the VC's screening ability rather than the latter's monitoring capabilities. In other words, the question arises as to whether VC-related directors truly add value to their portfolio companies or whether they simply hold board positions in high quality firms. To answer this question, we first control for the possible endogenous self-selection bias of VC board membership. Our initial result of a positive association between VC board membership on one side and underpricing and the IPO premium on the other side is still upheld. Second, we also allow for the simultaneous determination of VC board membership and IPO performance. This confirms the positive effect of VC board membership on IPO performance, while there is no effect of the latter on the former. This suggests that VCs have an impact on IPO performance via their monitoring capabilities rather than via their screening skills in the sense that they maintain their stake in better quality firms after the IPO. In relation to this, the empirical evidence from individual VC firm observations indicates that VC participation is positively related to underpricing and negatively related to the IPO premium. However, the

results based on IPO firm observations show no significant association between VC participation on the one hand and underpricing and IPO premium on the other hand. Further empirical investigations indicate that the latter result may be due to the fact that financial VCs are more likely to sell their shares in the IPO than both independent and corporate VCs, and this fact has a negative effect on IPO performance.

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Table 1 - Data Representativeness

Panel A – Number and Percentage of VC-backed IPOs per Year

Year	Studied Sample (N=262)		Entire Population (N=1094)	
	No.	%	No.	%
1997	73	27.86	172	15.72
1998	22	8.40	97	8.87
1999	62	23.66	305	27.88
2000	71	27.10	265	24.22
2001	7	2.67	48	4.39
2002	7	2.67	42	3.84
2003	7	2.67	42	3.84
2004	13	4.96	123	11.24

Panel B – Number and Percentage of VC-backed IPOs per Industry

Industry Classification	No.	%	No.	%
Consumer Products and Services	27	10.31	110	10.05
Consumer Staples	4	1.53	16	1.46
Energy and Power	9	3.44	34	3.11
Healthcare	54	20.61	201	18.37
Software & IT Consulting Services	110	41.98	468	42.78
Industrials	11	4.20	30	2.74
Materials	4	1.53	23	2.10
Media and Entertainment	7	2.67	44	4.02
Retail	6	2.29	67	6.12
Telecommunications	30	11.45	99	9.05
Transportation	0	0.00	2	0.18
Hi-Tech IPOs (%)	262	42.4	1094	44.8

Table 2 - Descriptive Statistics for IPO Firms (per IPO firm)

Underpricing is equal to the percentage difference between the price at the end of the first day of trading and the offer price. The *Premium* is equal to the ratio of the difference between the offer price and the book value per share to the offer price. *Board Size* is the number of total seats on the board. *Board independence* is the number of non-executive and VC-unrelated board directors as a fraction of the total number of board members. *Number of VCs* is the total number of VCs per IPO firm. *Number of VCs on Board* is the total number of directly or indirectly related directors on the board of directors, and *Proportion VC-related Directors on Board* is the fraction of VC-related directors on the board. *VC participation* is equal to the number of shares sold by the VCs in the IPO as a fraction of the total number of shares offered in the IPO. *CEO Controlling Power* represents the extent to which the CEO is pivotal to the voted decision. *CEO Ownership* is the number of shares held by the CEO as a fraction of shares outstanding immediately prior to the IPO. *CEO Education* is equal to one if the CEO holds a Ph.D., a J.D. or an M.D., and zero otherwise. *CEO Experience* is equal to the number of years of experience prior to the IPO date. *CEO Duality* is a dummy variable which is equal to one if the CEO is also the chairman of the board of directors, and zero otherwise. *Log(Total Assets)* is the logarithm of total assets for the last year prior to the IPO date. *Pre-IPO Leverage* is equal to pre-IPO long-term debt as proportion of pre-IPO total assets. *Loss dummy* is equal to one if the IPO firm suffered from negative net earnings during the last fiscal year prior to the IPO date, and zero otherwise. *Hi-tech dummy* is equal to one if the IPO firm is a hi-tech firm, and zero otherwise. *IB Rank* is calculated based on underwriter ranking in Loughran and Ritter (2004). *Bubble Period dummy* is equal to one if the IPO occurs in 1999-2000, and zero otherwise. *Market Return* is equal to the compounded daily return of a value weighted index over the 20 trading days prior to the IPO date.

(*Per IPO*)	Mean	Median	s.d.	Min	Max
IPO Performance					
Underpricing (%)	46.26	11.43	76.44	-9.113	370.8
Premium	0.753	0.723	0.522	-0.031	4.301
Board Composition and VC Participation at IPO					
Board Size	6.947	7.000	2.780	2.000	13.00
Board Independence (out of VC-related dir)	0.398	0.400	0.207	0.000	0.875
Number of VCs	3.782	4.000	1.858	1.000	11.00
Number of VCs on Board	2.244	2.000	1.260	0.000	6.000
Proportion VC-related directors on board	*0.333*	*0.333*	*0.181*	*0.000*	*0.800*
VC Participation	0.036	0.000	0.122	0.000	1.000
CEO Power and Characteristics					
CEO Controlling Power	0.117	0.053	0.181	0.000	1.000

CEO Ownership Power	0.114	0.065	0.142	0.000	0.980
CEO Education	0.176	0.000	0.381	0.000	1.000
CEO Experience	14.67	13.00	7.853	5.000	39.00
CEO Duality	0.435	0.000	0.497	0.000	1.000
IPO Firm Characteristics					
Log (Total Asset)	7.306	7.239	0.617	5.329	9.385
Loss dummy	0.775	1.000	0.419	0.000	1.000
Pre-IPO Leverage	0.261	0.116	0.394	0.000	3.236
Hi-tech dummy	0.424	0.000	0.495	0.000	1.000
IB Rank	8.589	9.100	1.319	0.000	9.100
Market Conditions					
Bubble Period dummy	0.515	1.000	0.501	0.000	1.000
Market Return	0.011	0.018	0.043	-0.128	0.145

Table 3 - VC Characteristics and Board Representation across the IPO firms

This table reports data on VC firms' characteristics per IPO and distinguishes between VC board members (i.e. those who are directly or indirectly related to the VCs) and VC non-board members. Variables include the *Number of VCs* per IPO firm as mentioned in the Venture Expert database. *VC Controlling Power* is the extent to which VCs within an IPO firm are pivotal to the voted decision (Milnor and Shapley, 1978). *VC Ownership Power* is the total number of shares held by VCs as a fraction of the shares outstanding immediately prior to the IPO. *VC Prestige Power* is the number of years since the inception of the VC vehicle or the parent firm for affiliated VCs. *VC Expert Power* is the number of VCs specializing in the industry of the IPO firm. *VCs with Structural Power* is the number of VCs who participate in the first round of financing. *VC Same Location* is the number of VCs with a representation office in the state of the IPO firm. *VC Independent* is the number of VCs who are private equity firms investing their own capital and private equity advisors or fund managers whereas *VC Financial* and *VC Corporate* are the number of VCs owned by financial institutions and corporations, respectively. *VC Foreign* is the number of non US VC firms.

(*Per IPO*)	Total VCs in the 262 IPOs		VCs without board membership		VCs with board membership		
	Mean	s.d.	Mean	s.d.	Mean	s.d.	T-Diff
Number of VCs	3.782	1.858	1.538	1.418	2.244	1.260	0.000
VC Controlling Power	0.496	0.311	0.135	0.180	0.361	0.313	0.000
VC Ownership Power	0.546	0.266	0.180	0.191	0.366	0.235	0.000
VC Prestige Power	59.00	44.32	28.54	26.91	40.64	32.93	0.000
VC Expert Power	1.752	1.655	0.771	1.080	0.981	1.056	0.025
VCs with Structural Power	1.775	1.356	0.385	0.700	1.389	1.229	0.000
Other measures of VC power							
VC Same Location	0.847	1.117	0.370	0.714	0.477	0.801	0.108
VC Independent	2.802	1.683	0.992	1.165	1.809	1.275	0.000
VC Financial	0.519	0.772	0.279	0.535	0.240	0.502	0.400
VC Corporate	0.473	0.838	0.267	0.565	0.206	0.536	0.205
VC Foreign	0.305	0.682	0.172	0.492	0.134	0.421	0.341

Table 4 - VC Characteristics and Board Representation across the VC firms

This table presents VC firms characteristics across all the VC firms and distinguishes between VC board members (i.e. those who are directly or indirectly related to the VCs) and VC non-board members. The variables are defined as follows. *VC Controlling Power* is the extent to which a VC is pivotal to the voted decision (Milnor and Shapley, 1978). *VC Ownership Power* is equal to the number of shares held by VCs as a fraction of the shares outstanding immediately prior to the IPO. *VC Prestige Power* is the number of years since the inception of the VC vehicle or the parent firm for affiliated VCs. *VC Expert Power* is equal to one if the VC firm is specialized in a particular industry, and zero otherwise. *VC Structural Power* is a dummy variable which is equal to one if the VC firm participates in the first round of financing, and zero otherwise. *VC Same Location* dummy is equal to one if the VC firm has a representation office in the state of the IPO firm, and zero otherwise. *VC Independent* is a dummy variable equal to one if the VC firm is a private equity firm investing its own capital and private equity advisor or fund manager, and zero otherwise. *VC Financial* and *VC Corporate* are dummy variables which are equal to one if the VC is owned by a financial institution and a corporation, respectively, and zero otherwise. *VC Foreign dummy* is equal to one if the VC firm is a non US VC firm, and zero otherwise.

(Per VC firm)	Total of 946 VCs Mean	s.d.	VCs without board membership N= 403 Mean	s.d.	VCs with board membership N= 543 Mean	s.d.	Test for Diff. in Means/ Prop's
VC Controlling Power	0.138	0.197	0.089	0.110	0.174	0.235	0.000
VC Ownership Power	0.151	0.144	0.117	0.124	0.177	0.152	0.000
VC Prestige Power	16.28	15.16	13.81	14.48	18.11	15.39	0.000
VC Expert Power	0.471	0.499	0.501	0.501	0.448	0.498	0.680
VC Structural Power	0.451	0.529	0.251	0.434	0.600	0.544	0.000
VC Same Location dummy	0.300	0.459	0.241	0.428	0.379	0.486	0.006
Other measures of VC power							
VC Independent dummy	0.734	0.442	0.645	0.479	0.801	0.400	0.000
VC Financial dummy	0.142	0.349	0.181	0.386	0.113	0.316	0.020
VC Corporate dummy	0.124	0.330	0.174	0.379	0.087	0.282	0.001
VC Foreign dummy	0.126	0.332	0.109	0.312	0.138	0.345	0.175

Table 5 – Determinants of VC Board Membership

This table shows the binary probit regressions explaining VC board membership for the 946 VC firm observations. Model (1) uses Shapley values as a proxy for VC and CEO power whereas Model (2) uses VC and CEO pre-IPO ownership. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the standard errors.

| | VC Board Membership dummy | |
	Probit Model (1)	Probit Model (2)
Constant	-2.314	-2.016
	0.986	*0.968*
VC Controlling Power	2.328***	
	0.473	
VC Ownership Power		2.494***
		0.588
VC Prestige Power	0.015***	0.015***
	0.004	*0.004*
VC Expert Power	0.317**	0.324**
	0.128	*0.126*
VC Structural Power	0.597***	0.583***
	0.116	*0.116*
VC Same Location dummy	0.248**	0.199*
	0.123	*0.120*
VC Independent dummy	0.239*	0.242**
	0.121	*0.123*
VC Foreign dummy	0.303*	0.292*
	0.165	*0.168*
VC Participation	-1.677*	-2.085*
	0.938	*1.149*
CEO Controlling Power	-0.281*	
	0.147	
CEO Ownership Power		-1.352*
		0.692
CEO Education	0.169*	0.164*
	0.102	*0.095*
CEO Prior experience	-0.002	-0.003
	0.007	*0.007*
CEO Duality	0.205*	0.203*
	0.112	*0.115*
Log (Total Asset)	-0.028	-0.052*
	0.110	*0.110*
Loss dummy	0.206*	0.179*
	0.121	*0.105*
Leverage	-0.103	-0.116
	0.153	*0.148*
Hi-tech dummy	-0.091	-0.087
	0.130	*0.129*
IB Rank	0.128**	0.102*
	0.062	*0.058*
Bubble Period dummy	0.213*	0.187*
	0.122	*0.111*

McFadden R-squared	0.172	0.159
LR statistic (19 df)	139.764***	130.452***

Table 6 – VC Board Membership and IPO Performance: Does VC Prestige Power Matter?

The table examines the combined effect of VC age and VC board membership on underpricing and the IPO premium for the 946 VC firm observations. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the White heteroskedasticity-consistent standard errors.

	Underpricing				Premium			
	Model (3a) OLS	Model (3b) OLS	Model (4a) OLS	Model (4b) OLS	Model (5a) OLS	Model (5b) OLS	Model (6a) OLS	Model (6b) OLS
Constant	-0.006	-0.039	0.056	0.017	0.989***	0.987***	0.960***	0.959***
	0.242	*0.240*	*0.244*	*0.242*	*0.196*	*0.198*	*0.200*	*0.201*
VC Board Membership dummy	0.134***	0.177**	0.135***	0.183***	0.070**	0.072*	0.072**	0.074*
	0.043	*0.073*	*0.043*	*0.074*	*0.032*	*0.041*	*0.031*	*0.042*
VC Controlling Power	-0.186*	-0.188*			0.069	0.069		
	0.111	*0.111*			*0.116*	*0.117*		
VC Ownership Power			-0.199*	-0.203*			0.059	0.059
			0.114	*0.114*			*0.140*	*0.140*
VC Participation	0.004***	0.004***	0.004***	0.004***	-0.001***	-0.001***	-0.001***	-0.001***
	0.001	*0.001*	*0.001*	*0.001*	*0.001*	*0.001*	*0.000*	*0.000*
CEO Controlling Power	0.290***	0.290***			-0.100	-0.100		
	0.111	*0.110*			*0.078*	*0.078*		
CEO Ownership Power			0.399***	0.406***			-0.150*	-0.150*
			0.148	*0.148*			*0.090*	*0.090*
VC Prestige Power	-0.005***		-0.005***		0.002*		0.002*	
	0.002		*0.002*		*0.001*		*0.001*	
VC Board Membership x VC Prestige Power		-0.006**		-0.006**		0.002*		0.002*
		0.003		*0.003*		*0.001*		*0.001*
VC No Board Membership x VC Prestige Power		-0.003		-0.003		0.000		0.000
		0.002		*0.002*		*0.001*		*0.001*
CEO Duality	-0.036	-0.037	-0.050	-0.052	-0.024	-0.024	-0.020	-0.020
	0.044	*0.044*	*0.043*	*0.044*	*0.032*	*0.033*	*0.033*	*0.033*
Log (Total Asset)	-0.043*	-0.043*	-0.044*	-0.044*	0.129*	0.129*	0.132*	0.132*
	0.023	*0.023*	*0.023*	*0.023*	*0.072*	*0.072*	*0.072*	*0.072*
Loss dummy	0.025	0.028	0.032	0.035	0.096***	0.097***	0.093***	0.093***
	0.054	*0.054*	*0.054*	*0.054*	*0.029*	*0.029*	*0.029*	*0.029*
Leverage	-0.112***	-0.110***	-0.110***	-0.108***	-0.072***	-0.072***	-0.072***	-0.071***
	0.035	*0.035*	*0.035*	*0.036*	*0.027*	*0.027*	*0.028*	*0.028*
Hi-tech dummy	0.377***	0.377***	0.386***	0.386***	-0.103***	-0.103***	-0.105***	-0.105***

	0.043	*0.043*	*0.043*	*0.043*	*0.029*	*0.029*	*0.029*	*0.029*
IB Rank	0.028***	0.029***	0.025**	0.027***	-0.047***	-0.047***	-0.047***	-0.047***
	0.011	*0.011*	*0.011*	*0.010*	*0.013*	*0.013*	*0.013*	*0.013*
Market Return	0.409*	0.408*	0.459**	0.457**	-2.053***	-2.053***	-2.020***	-2.020***
	0.224	*0.203*	*0.223*	*0.214*	*0.427*	*0.427*	*0.423*	*0.423*
Bubble Period dummy	0.639***	0.636***	0.630***	0.627***	-0.055*	-0.056*	-0.052*	-0.052*
	0.041	*0.042*	*0.041*	*0.041*	*0.029*	*0.029*	*0.029*	*0.029*
R-squared	0.324	0.324	0.321	0.322	0.080	0.080	0.079	0.079
Adjusted R-squared	0.31407	0.314	0.312	0.312	0.067	0.066	0.067	0.066
F-statistic	34.073	31.708	33.914	31.590	6.200	5.751	6.188	5.740
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Table 7 – VC Board Membership and IPO Performance – Robustness Check

The table examines the effect of VC board membership on underpricing and the IPO premium by controlling for the self-selection bias in the VC's decision to hold a board seat for the 946 VC firm observations. It is based on the Heckman self-selection procedure. In the first stage, a probit regression is used to estimate the inverse Mills ratio that accounts for the correlation between the error terms of firm performance at the IPO, i.e. IPO underpricing and premium, and the decision to sit on the board. In the second stage, the inverse Mills ratio (*Lambda)* is included in the regressions on IPO performance as an additional regressor to obtain unbiased coefficient estimates for the VC board membership dummy and other explanatory variables. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the White heteroskedasticity-consistent standard errors.

	Underpricing		Premium	
	Model (7) OLS	Model (8) OLS	Model (9) OLS	Model (10) OLS
Constant	-0.148	-0.111	1.261***	1.495***
	0.227	*0.316*	*0.357*	*0.523*
VC Board Membership dummy	0.091**	0.082**	0.071**	0.064*
	0.043	*0.040*	*0.035*	*0.033*
VC Controlling Power	0.166*	0.155*	0.182	0.175
	0.096	*0.210*	*0.167*	*0.173*
VC Prestige Power	-0.005**	-0.005**	0.002*	0.002*
	0.002	*0.002*	*0.001*	*0.001*
VC Participation	0.005***	0.005**	-0.018*	-0.019*
	0.002	*0.002*	*0.010*	*0.011*
CEO Controlling Power		0.295*		-0.116
		0.170		*0.120*
CEO Duality		-0.013		-0.028
		0.076		*0.043*
Log (Total Asset)		-0.037*		0.111*
		0.021		*0.061*
Loss dummy		0.043		0.074*
		0.101		*0.042*
Leverage		-0.115*		-0.116**
		0.066		*0.051*
Hi-tech dummy		0.486***		-0.148***
		0.075		*0.052*
IB Rank	0.061*	0.076**	-0.047*	-0.048*
	0.032	*0.034*	*0.028*	*0.028*
Market Return	1.701**	1.746**	-2.160***	-2.373***
	0.839	*0.790*	*0.662*	*0.653*
Bubble Period dummy	0.806***	0.707***	-0.071*	-0.062*
	0.080	*0.080*	*0.037*	*0.035*
Lambda	-0.077**	-0.055	-0.053**	-0.030
	0.032	*0.123*	*0.025*	*0.051*
Adjusted R-squared	0.246	0.326	0.064	0.082

Table 8 – VC Board Membership and IPO Performance – Robustness Check

This table examines the simultaneous relationship between VC board membership and IPO performance, i.e. IPO underpricing and premium, respectively, for the 946 VC firm observations. Both the 1st and the 2nd simultaneous relationships are estimated using three-stage least squares (3SLS). ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the White heteroskedasticity-consistent standard errors.

	1st Simultaneous Relationship		2nd Simultaneous Relationship	
	VC Board membership	Underpricing	VC Board membership	Premium
	Model (11)	Model (12)	Model (13)	Model (14)
Constant	-0.302	-0.221	-0.363	1.018***
	0.694	*0.373*	*0.357*	*0.293*
Underpricing	-0.107			
	0.782			
Premium			0.030	
			0.203	
VC Board Membership dummy		0.232**		0.028*
		0.144		*0.016*
VC Controlling Power	0.621***	0.170*	0.598***	0.169
	0.192	*0.101*	*0.103*	*0.148*
VC Prestige Power	0.006***	-0.006***	0.006***	0.002*
	0.002	*0.002*	*0.001*	*0.001*
VC Expert Power	0.094**		0.095**	
	0.046		*0.043*	
VC Structural power	0.273***		0.243***	
	0.064		*0.033*	
VC Same Location dummy	0.107**		0.085***	
	0.043		*0.026*	
VC Independent dummy	0.078*		0.081**	
	0.043		*0.038*	
VC Foreign dummy	0.136*		0.110*	
	0.072		*0.061*	
VC Participation	-0.306	0.013**	-0.233	-0.016*
	0.265	*0.007*	*0.266*	*0.009*
CEO Controlling Power	-0.235*	0.295*	0.031	-0.148
	0.127	*0.163*	*0.391*	*0.128*
CEO Education	0.156*		0.142	
	0.086		*0.105*	
CEO Experience	-0.002		-0.001	
	0.008		*0.006*	
CEO Duality	0.090*	-0.014	0.106*	-0.026
	0.074	*0.050*	*0.055*	*0.039*
Log (Total Asset)	-0.020	-0.076*	-0.016	0.102*
	0.083	*0.044*	*0.033*	*0.060*
Loss dummy	0.117	0.046	0.111	0.084*
	0.107	*0.064*	*0.097*	*0.050*
Leverage	-0.049	-0.100*	-0.044	-0.101**
	0.089	*0.059*	*0.099*	*0.047*
Hi-tech dummy	-0.053	0.417***	0.031	-0.124***
	0.172	*0.049*	*0.094*	*0.038*

IB Rank	0.077*	0.057**	0.074*	-0.028
	0.042	*0.026*	*0.038*	*0.021*
Market Return		0.596**		-1.943***
		0.285		*0.423*
Bubble Period dummy	0.155*	0.613***	0.120*	-0.076*
	0.086	*0.051*	*0.070*	*0.040*
Pseudo R^2	0.187	0.322	0.198	0.081

Table 9 – Fraction of VC-related Board Members and IPO Performance

This table examines the possible simultaneous relationship between the fraction of VC-related board members and IPO performance, i.e. underpricing and premium, for the 262 IPO firm observations. Both the 1st and the 2nd simultaneous relationships were run using a three-stage least squares model. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the White heteroskedasticity-consistent standard errors.

	1st Simultaneous Relationship		2nd Simultaneous Relationship	
	Frac. VC-related Directors on Board Model (15)	Underpricing Model (16)	Frac. VC-related Directors on Board Model (17)	Premium Model (18)
Constant	0.463***	-0.291	0.372*	1.394**
	0.162	*0.794*	*0.213*	*0.607*
Underpricing	-0.022			
	0.180			
Premium			0.072	
			0.162	
Frac.VC-related Directors on Board		1.380**		0.832*
		0.641		*0.474*
VC Controlling Power	0.129***	0.245*	0.135***	0.184*
	0.048	*0.133*	*0.038*	*0.102*
VC Prestige Power	0.001*	-0.005***	0.001***	0.002*
	0.001	*0.002*	*0.000*	*0.001*
VC Expert Power (%)	-0.077**		-0.064**	
	0.035		*0.028*	
VC Structural Power (%)	0.031		0.016	
	0.049		*0.026*	
VC Same Location (%)	0.026		0.026	
	0.050		*0.033*	
VC Independent (%)	0.110*		0.137***	
	0.063		*0.049*	
VC Foreign (%)	0.093		0.090	
	0.103		*0.085*	
VC Participation	0.116	0.373	0.109	0.031
	0.100	*0.393*	*0.088*	*0.301*
CEO Controlling Power	0.008	0.278	0.008	-0.012
	0.068	*0.277*	*0.064*	*0.213*
CEO Education dummy	0.066*		0.063**	
	0.037		*0.026*	
CEO Experience	-0.001		0.000	
	0.002		*0.001*	
CEO Duality	-0.018	-0.074	-0.012	0.004
	0.032	*0.091*	*0.021*	*0.070*
Log (Total Asset)	-0.058**	-0.068*	-0.054***	0.111*
	0.030	*0.040*	*0.016*	*0.062*
Loss dummy	0.000	-0.099	0.010	0.034
	0.030	*0.109*	*0.026*	*0.084*
Leverage	-0.047*	-0.182*	-0.024	-0.145*
	0.025	*0.115*	*0.031*	*0.088*
Hi-tech dummy	0.042	0.304***	0.023	-0.132**
	0.072	*0.091*	*0.029*	*0.060*

IB Rank	0.014	0.020	0.013	-0.006
	0.012	*0.040*	*0.010*	*0.031*
Market Return		1.546*		-1.636**
		0.852		*0.805*
Bubble Period dummy	0.048*	0.616***	0.034*	-0.002
	0.026	*0.098*	*0.020*	*0.075*
Pseudo R^2	0.205	0.292	0.234	0.185

Table 10– IPO Performance and the Differential Effects of the Type of VCs on the Board

This table reports the results from the Ordinary Least Squares regression of IPO performance, i.e. underpricing and the premium, for the 262 IPO firm observations. It examines the differential effect of the nature of VC-related directors on the board on IPO performance, and controls for the prestige power, the expert power and the geographic position of their related VC firms. *Frac. Independent VCs on Board*, *Frac. Financial VCs on Board*, and *Frac. Corporate VCs on Board* are the fraction of independent, financial, and corporate VCs on the board of directors, respectively. ***, **, * stand for statistical significance at the 1%, 5%, and 10% level, respectively. The figures in italic are the White heteroskedasticity-consistent standard errors. a, b indicate that the Wald test statistic for two coefficients is significantly different from zero at the 1% and 5% level, respectively. The number following "a" and "b" helps identify the pair of coefficients with a significant Wald test statistic.

	Underpricing Model (19)	Premium Model (20)	Underpricing Model (21)	Premium Model (22)	Underpricing Model (23)	Premium Model (24)	Underpricing Model (25)	Premium Model (26)
Constant	0.281	0.470	-0.008	1.015**	0.366	0.498	0.277	0.452
	0.408	*0.319*	*0.491*	*0.410*	*0.395*	*0.318*	*0.419*	*0.316*
Differential Effect of the Type of VCs								
Frac. Independent VCs on Board	0.574**	0.517***[b]						
	0.243	*0.160*						
Frac. Financial VCs on Board	-0.231	1.129**						
	0.553	*0.506*						
Frac. Corporate VCs on Board	-0.091	2.340**[b]						
	0.756	*0.912*						
Differential Effect of the Type and the Reputation of VCs								
Frac. Independent VC Prestige Power on Board			0.214	0.149***[a]				
			0.136	*0.057*				
Frac. Financial VC Prestige Power on Board			0.158	0.009				
			0.188	*0.091*				
Frac. Corporate VC Prestige Power on Board			-0.489**	0.548*[a]				
			0.203	*0.320*				
Differential Effect of the Type and Expert Power of VCs								
Frac. Independent VCs without Expert Power on Board					0.454	0.494***[b1]		
					0.278	*0.174*		
Frac. Independent VCs with Expert Power on Board					0.851**	0.567**[b2]		
					0.362	*0.235*		
Frac. Financial VCs without Expert Power on Board					-0.889*	0.905*[b3]		

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
							0.531	*0.482*
Frac. Financial VCs with Expert Power on Board							0.763	1.453
							1.105	*0.973*
Frac. Corporate VCs without Expert Power on Board							1.127	2.207* [b1, b3]
							1.485	*1.124*
Frac. Corporate VCs with Expert Power on Board							-0.512	2.697* [b2]
							0.744	*1.583*
Differential Effect of the Type and the Geographic Position of VCs								
Frac. Independent VCs from Different State on Board							0.483*	0.452***
							0.277	*0.148*
Frac. Independent VCs from Same State on Board							0.963*	0.736*** [a1]
							0.507	*0.264*
Frac. Financial VCs from Different State on Board							0.200	1.541
							0.653	*1.198*
Frac. Financial VCs from Same State on Board							-1.023	0.855* [a2]
							0.893	*0.439*
Frac. Corporate VCs from Different State on Board							-0.336	0.679
							0.917	*0.445*
Frac. Corporate VCs from Same State on Board							0.486	3.165*** [a1, a2]
							1.348	*1.215*
VC Controlling Power	0.273*	0.154*	0.274*	0.149*	0.287*	0.157*	0.202*	0.105*
	0.163	*0.087*	*0.151*	*0.081*	*0.160*	*0.087*	*0.112*	*0.061*
VC Prestige Power	-0.005***	0.002*	-0.005***	0.002*	-0.005***	0.002*	-0.005***	0.002*
	0.002	*0.001*	*0.002*	*0.001*	*0.002*	*0.001*	*0.002*	*0.001*
VC Participation	0.333	0.144	0.400	0.117	0.355	0.155	0.365	0.252
	0.269	*0.204*	*0.357*	*0.203*	*0.262*	*0.225*	*0.297*	*0.238*
CEO Controlling Power	0.266*	-0.046	0.417	-0.026	0.247*	-0.051	0.288*	-0.063
	0.155	*0.118*	*0.240*	*0.118*	*0.147*	*0.122*	*0.167*	*0.129*
CEO Duality	-0.056	0.016	-0.027	-0.018	-0.050	0.017	-0.044	0.003
	0.101	*0.054*	*0.109*	*0.061*	*0.099*	*0.054*	*0.100*	*0.049*
Log(Total Asset)	-0.055*	0.057*	-0.075*	0.045*	-0.068*	0.056*	-0.064*	0.065*
	0.032	*0.034*	*0.041*	*0.024*	*0.040*	*0.033*	*0.036*	*0.038*
Loss dummy	-0.057	-0.025	-0.039	0.009	-0.076	-0.030	-0.053	-0.040
	0.122	*0.045*	*0.155*	*0.052*	*0.123*	*0.046*	*0.122*	*0.049*
Leverage	-0.206**	-0.056	-0.174*	-0.154*	-0.189**	-0.053	-0.190**	-0.060
	0.081	*0.062*	*0.103*	*0.079*	*0.084*	*0.062*	*0.081*	*0.068*
Hi-tech dummy	0.325***	-0.118**	0.384***	-0.117*	0.275***	-0.131***	0.320***	-0.128***
	0.092	*0.050*	*0.103*	*0.062*	*0.104*	*0.047*	*0.091*	*0.048*
IB Rank	0.016	-0.025	0.050	-0.063*	0.013	-0.026	0.015	-0.030

	0.025	*0.020*	*0.042*	*0.033*	*0.025*	*0.020*	*0.025*	*0.020*
Market Return	1.398*	-1.382*	1.924*	-1.874*	1.108*	-1.486*	1.373*	-1.595**
	0.801	*0.720*	*1.154*	*0.988*	*0.672*	*0.774*	*0.753*	*0.743*
Bubble Period	0.635***	-0.072	0.657***	-0.017	0.640***	-0.070	0.639***	-0.069
	0.090	*0.048*	*0.100*	*0.060*	*0.091*	*0.050*	*0.091*	*0.049*
R-squared	0.294	0.188	0.319	0.200	0.306	0.191	0.302	0.227
Adjusted R-squared	0.254	0.142	0.274	0.141	0.258	0.135	0.253	0.173
F-statistic	7.340	4.090	7.074	4.683	6.336	3.398	6.204	4.204
Prob(F-statistic)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of Observations (IPOs)	262	262	262	262	262	262	262	262