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Is venture capital worth it? Effects on firm performance and founder returns

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Abstract

This paper extends research on venture capital (VC) finance by studying its effects on a venture's performance and on its founders' returns beyond an initial public offering (IPO). A "founder performance" construct, defined as a founder's financial and nonfinancial returns, is proposed and used to measure and compare returns to founders with returns to investors and firm performance. In general, venture characteristics pre-IPO and venture performance post-IPO were not significantly different when comparing ventures with and without VC backing. Only when VC backing is very high, do pre-IPO resources and funding improve significantly. However, higher levels of resource endowments did not seem to affect post-IPO performance for the venture or its investors. On the other hand, founders resorting to VC funding before taking their company public generated significantly less wealth for themselves and were less likely to remain as CEOs of their ventures after the IPO. Results suggest that founders motivated primarily by wealth creation and those motivated by remaining in control of their ventures should, in both instances, minimize VC backing when taking their ventures public. The finding that founder performance differs from venture and investor performance calls for future research to explore potential conflicts of interest that may arise from the double role of founders as principals and agents.

Keywords: Founder performance; IPO; Funding strategy; Venture capital

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1. Executive summary

Whether or not to pursue venture capital (VC) to support a high-growth strategy is a question founders of high-potential ventures need to address early on. The effects of this decision on a venture's and its founders' performance (return to founders) 2 years after going public were hypothesized and tested by comparing ventures that did seek VC funding with those that did not but successfully went public in 1996. A single-year sample of initial public offerings (IPOs) was chosen for this study to minimize macroeconomic and market effects, and to ensure that all ventures were capable, based on their strategies and initial endowments, to sell their stocks to institutional and outside investors, and thus be worthy of VC consideration.

Pre-IPO characteristics across three groups, namely, no VC involvement, low VC involvement (equity below 30%), and high VC involvement, were reviewed to establish the comparability between the ventures before their IPOs. Next, post-IPO venture and founder performance were tested and compared. As expected, no significant differences were found in initial endowments between non-VC-backed ventures and low-VC-backed ventures that went public in 1996. On the other hand, ventures where VCs owned a controlling share of the stock before the IPO had a better educated and experienced top management team (TMT), and were able to accumulate more assets for growth through the IPO.

This initial advantage, however, did not result in better performance after the IPO. Firm and IPO investor performance were found to be not significantly different for VC- and non-VC-backed ventures 2 years after the IPO. On the other hand, founders of ventures with high levels of VC backing were significantly financially worse off and had a better chance of being fired from their firms. Thus, results show that returns to founders decrease with VC involvement, with no significant improvement in terms of firm and investor performance after the IPO. The paper concludes with a comparison of non-VC-backed firms that successfully went public in two industries, high tech and manufacturing, and the characteristics that distinguished them from VC-backed firms within their industries. This analysis begins to answer the question of what it takes for non-VC-backed firms to get to IPO.

2. Introduction

Founders of high-growth ventures are the energizers of an entrepreneurial process that leads to innovation and job creation (Johnson, 1990). The study of the ventures they create and lead has been the focus of finance, strategy, and entrepreneurship scholars. From their unique perspectives, these researchers' main focus is to understand the factors that affect venture and investor performance. However, beyond some highly successful role models highlighted in the business press, we know little about how founders of high-growth ventures do, financially and otherwise, and the determinants of their personal success over time.

Kirchhoff (1994) suggests that understanding founder success is central to dynamic capitalism. Venkataraman (1997) defines entrepreneurship as the nexus of opportunities and enterprising individuals. Given their central role in the entrepreneurial process, the

importance of understanding founder success and its determinants cannot be overemphasized. With this in mind, the motivations for this study were (a) to propose and test objective measures of founder success, (b) to hypothesize and test potential determinants of those outcomes, and (c) to explore whether founder outcomes are aligned with the performance of their venture and its investors.

I begin to address these issues by, first, theoretically relating venture and stakeholder performance to early decisions founders make about the design and funding of their high-growth firms (Covin and Slevin, 1997; Sexton and Bowman-Upton, 1991); second, proposing two founder success constructs, wealth creation and management control, derived from entrepreneurship literature on what motivates founders (Amit et al., 2001; Cooper and Artz, 1995; Davidsson, 1989; Naffziger et al., 1994), and third, testing the proposed relationships with a sample of ventures that went public in 1996.

3. Designing a venture for IPO

Choosing a growth strategy and securing resources to support it are the primary concerns of most growth-oriented entrepreneurs (Brush et al., 2001). Small firms going public in the 1990s appeared to have followed two alternative paths to high growth. Many were "born to go public," that is, designed from inception to grow very fast and secure the necessary funds through an IPO (Welbourne and Andrews, 1996). Yet other, older firms, were redesigned to take advantage of an overheated IPO market in their industry sectors to support new, high-growth strategies that became feasible with the new economy or through technological innovation. The central strategic question for these firms evolved from whether or not to grow, to how fast to grow, and how to finance such growth.

The dominant logic for high-growth ventures in emerging and/or rapidly changing industries is that they generally require large injections of capital early on, and can seldom be financed entirely through private placements or debt. Most either quickly and successfully go public or are acquired by their competitors who went public first. The leading firms get big quickly after their IPO and snap up a large market share, which allows them to grow even faster; the extent of such growth being a function of their strategy (Covin and Slevin, 1997; Sexton and Bowman-Upton, 1991), and their TMT's ability to secure funding and manage growth (Covin and Slevin, 1990). This paper challenges these assumptions and identifies alternative paths to growth.

3.1. Pre-IPO endowments

Several factors have been proposed by entrepreneurship and finance literature to affect a TMT's ability to get funding and successfully take a venture public. Brush and Chaganti (1998) state that "the importance of individual resources and organizational resources, and their interrelationships are of increasing importance to survival and continued success in entrepreneurial ventures" (p. 237). Drawing from human capital, resource base view, entrepreneurship, and finance literatures, I classify these resources into founder, TMT, and

venture characteristics. These resource endowments have been related to venture performance and thus provide cues to financial backers and investors as to the venture's potential and risk (Florin et al., 2003).

3.1.1. Founder characteristics

A founder's prior experience in starting new ventures and the number of founders involved in the venture may provide some indication about the know-how available to take a new or redesigned venture through the funding and growth process. However, a founding team's prior start-up experience has not been a consistent predictor of new venture performance in prior studies (Gartner et al., 1998). Several studies have examined characteristics and effectiveness of serial entrepreneurs with mixed results (Alsos and Kolvereid, 1998; VanOsnabrugge, 1998; Westhead and Wright, 1998). Experience in starting a business could act as a liability because of biases, the success syndrome, and other rigidities. Nevertheless, venture capitalists seem to believe that some previous start-up experience is an asset to the venture (Zacharakis and Shepherd, 2001).

Other studies have tested the relationship between founder characteristics and performance of entrepreneurial firms from a resource base perspective. The founding team provides the bulk of the experience, technological and organizational skills required to succeed (Box et al., 1993; Bruno and Tyebjee, 1985; Coleman, 1988; Dollinger, 1995; Dyke et al., 1992; Siegel et al., 1993). Each individual brings unique capabilities to the venture that, in the aggregate, constitute the human capital available to the firm at start-up (Cooper et al., 1994). This initial human capital resides in the capabilities of the founding team and their specificity to the context wherein the firm operates (Gartner et al., 1998), and provides the resource base to develop and lead a competent TMT.

3.1.2. TMT characteristics

The TMT that founders put together before going public is believed to be key to their IPO success and performance later on, as they invest the proceeds to grow. Chandler and Hanks (1994), for example, looked at expertise in functional areas, management, and innovativeness as resource-based capabilities and found a direct relationship to performance. Cooper et al. (1994) found that education and industry knowledge were related to growth. Other studies have found that top management experience and decision-making capabilities influence survival and growth of entrepreneurial firms (Mullins, 1996; Westhead, 1995).

Specifically, studies have stressed the importance of formal college-level education, experience, and ability as a manager and as an entrepreneur (Gartner et al., 1998; Pennings et al., 1998). Experientially acquired knowledge that comes from having worked within an industry (Reuber and Fischer, 1999), as well as the more explicit technological industry knowledge that can be acquired through training, are of particular value to start-ups. This experience has been found to be critical for growth and performance in small firms embarking in high-growth strategies (Box et al., 1993; Bruno and Tyebjee, 1985; Dyke et al., 1992; Siegel et al., 1993).

3.1.3. Pre-IPO venture characteristics

A venture's age, size, and profitability have generally been acknowledged as important indicators of its future performance (Brophy, 1997; Covin and Slevin, 1997; Robinson, 1999; Sandberg and Hofer, 1987). However, the evidence on the direction of influence for these indicators on IPO performance is contradictory and could be reversed in hot IPO markets (Robinson, 1999; Welbourne and Andrews, 1996). That is, although traditionally one would expect that more established and profitable firms should be better positioned for successful growth, investors in hot markets may favor high-risk ventures because of their inherent potential for high gains.

Industry characteristics in which the venture competes are also important factors in understanding pre-IPO funding and successful IPOs (Robinson, 1999; Sandberg and Hofer, 1987). However, Robinson's (1999) findings, that only "stage of industry life cycle" matters, suggest that industry is too broad a construct to explain venture performance. Industry *sector* may be a more accurate measure. In particular, according to the finance literature, what really matters are not necessarily the characteristics of the industry but rather how "hot" the industry sector is in the market for IPOs. This hot IPO construct has been developed in several studies to gauge the effects of a venture's industry sector on the interest shown by high risk investors for a particular offering (Ibbotson and Jaffe, 1975; Ritter, 1989).

3.2. The venture capital firms' pre-IPO role

Research into high-potential ventures shows that companies generally go through two critical stages of financing before significant growth (Barry et al., 1990; Deeds et al., 1997; Megginson and Weiss, 1991). The first stage involves the acquisition of VC and/or private equity for the start-up and development efforts. This stage may include several rounds of financing from seed money to mezzanine financing and often involves attracting venture capitalist firms to help secure resources to support product and technology development. The second critical stage is the IPO as a vehicle to access large amounts of capital to fuel growth. VC firms and private investors are attracted to high-growth ventures with IPO strategies because of the potential for very high gains in combination with the availability of alternative exit strategies through mergers and acquisitions or through the outright sale of the stock (Megginson and Weiss, 1991; Petty, 1997).

The VC literature provides ample research on the multiple roles played by venture capitalists before an IPO (Barry et al., 1990; Bruno and Tyebjee, 1985; Gorman and Sahlman, 1989; MacMillan et al., 1989; Sapienza, 1992; Timmons and Sapienza, 1992). Founding teams interested in VC are generally looking for more than a financing option. They expect that VCs experience and relationships will supplement their own, and improve their IPO performance, a key event for their survival and growth. Furthermore, VC backing has been shown to play a certification role in the IPO process by signaling the quality of the offering to potential investors (Megginson and Weiss, 1991).

One may conclude from the discussion in the previous sections that ventures that do not seek VC backing to help them go public will have, on average, stronger TMTs and financials,

and will be larger in size and more established than those that seek VC involvement. A counterargument, however, suggests that VC capital is scarce and, consequently, VCs pick only the cream of the crop, seeking to finance ventures with the best founders and TMTs, the highest prospects of growth, and minimum risk (Fried and Hisrich, 1994). Contributing to this research stream, and taking an institutional theory perspective[1] (Aldrich and Fiol, 1994), I test the null hypothesis that among ventures that went public, no significant differences in pre-IPO endowments existed between those with and those without VC backing. In other words:

Hypothesis 1: VC and non-VC-backed ventures will exhibit no pre-IPO significant differences in (a) number of founders, (b) start-up experience of founders, (c) experience of the TMT, (d) education of the TMT, (e) firm age, (f) income, (g) sales, and (h) hotness of industry sector.

3.3. The venture capital firms' certification role

We know from finance research that VC involvement improves the venture's IPO performance by helping to secure a top underwriter and reducing underpricing (Lange et al., 2001; Megginson and Weiss, 1991). Megginson and Weiss (1991) compared VC-backed IPOs with a control sample of non-VC-backed IPOs and found that VC backing lowered the costs of going public and maximized net proceeds. However, the study matched samples based on size of the offering, and thus was not intended to test whether VC-backed ventures were getting larger gross proceeds to support an aggressive growth strategy. Given that the research question for this study is to determine whether VC backing improves performance after the IPO, I test whether VC backing improved financial resources available for growth. This would show an important difference between the two groups and a significant head start for VC-backed ventures. Based on the research discussed above, the following is proposed:

Hypothesis 2: VC-backed ventures will on average receive larger proceeds from their IPOs and have more assets available to them than non-VC-backed firms going public in the same year.

A generally accepted but untested belief is that what is good for the firm is good for its founders. In the next section, I develop hypotheses to test this assumption.

4. Venture, investor, and founder outcomes

Kirchhoff (1994) posits that "the question of importance to dynamic capitalism is how successful are entrepreneurs, those persons who chose to start new firms apparently in the

[1] Institutional theory suggests that firms going public will tend to look like other ventures that have done so successfully.

face of stiff barriers to entry, survival, and success" (p. 153). How entrepreneurial success is defined is a matter of continued debate. Strategy, entrepreneurship, and finance researchers generally focus on how ventures and/or their investors perform, but the fate of the founders has not been a part of the conversation. In this section, I derive hypotheses about effects of VC backing on entrepreneurial success, from the firm, investor, and founder perspectives.

4.1. Venture and investor performance

With few exceptions (Jain and Kini, 1995), not much attention has been given to the post-IPO effects of inviting VCs to manage the venture's funding in the early stages of growth. Assuming that VC involvement has a positive effect on IPO performance, as discussed previously, one would expect that the positive effect would carry forward, since most VCs choose to keep their shares after the offering (Megginson and Weiss, 1991). Jain and Kini (1995) found, in fact, that the quality of VC monitoring was positively related to post-IPO operating performance. When not considering quality, other studies have found a negative relationship between VC involvement and post-IPO stock performance (Kutsuna et al., 2000). The speculation for this negative relationship is that VCs choose projects with higher potential that carry higher risk and this is reflected in their stock price volatility, whereas the positive relationship suggests that VCs continue to assist ventures with their operations after the IPO.

Taken together, these studies suggest that VC involvement may have differential effects, depending on stakeholders' perspectives. IPO investors may see their shares decline in price over time even when operating performance may be positive. Given this evidence I choose to test the null hypothesis that VC involvement before IPO is not significantly associated with performance after its IPO. This will be tested with a variety of performance measures to contribute to this emerging line of research, taking into account different stakeholders. More formally:

Hypothesis 3a: IPO ventures with VC backing will exhibit no significant differences in post-IPO performance compared to those without VC backing.

Hypothesis 3b: IPO ventures with VC backing will exhibit no significant differences in post-IPO stock performance compared to those without VC backing.

4.2. Founder performance

Entrepreneurs are the energizers of the entrepreneurial process (Johnson, 1990). What rewards they expect when they embark in the process has received recent attention (Carter et al., 2003; Gundry and Welsch, 2001). However, whether those expectations are met is not well established (Amit et al., 2001). Davidsson (1989) found that expectations of higher financial rewards and increased independence are the most important motivators for entrepreneurs. According to Amit et al. (2001), high-growth entrepreneurs reported that wealth was not the most important reason to start their ventures, and other reasons such as

independence were more important. However, the same subjects believed that their chances of obtaining higher levels of wealth were much greater through the founding of a high-growth venture than through other forms of employment. A recent study of nascent entrepreneurs also identified financial success and independence as two important reasons for starting new ventures (Carter et al., 2003). Gundry and Welsch (2001) report that high-growth entrepreneurs in their study perceived success in terms of their firm's reputation, the quality of their products, the availability of cash to grow, and their effectiveness as leaders.

If and how expectations are met has only been tested through founders' self-reports that are useful to measure satisfaction and beliefs but not very accurate at assessing actual outcomes (Cooper and Artz, 1995). For example, Cooper and Artz (1995) found that those entrepreneurs who had higher initial expectations were later more satisfied, regardless of performance. Ginn and Sexton (1990) also found that differences in psychological preferences have an impact on growth orientation and performance. Thus, more objective measures are needed to assess a founder performance construct and perform analyses to test potential conflicts of interests between founders and other stakeholders.

Motivational measures are effective in identifying growth-oriented entrepreneurs (Miner, 1990) and can point to potential components of a founder performance construct. An owner's personal goals affect strategy and performance in small firms (Cragg and King, 1988) and could also affect persistence in the entrepreneurial effort (Naffziger et al., 1994). These goals may vary from simply seeking to be their own boss to creating personal wealth by growing the venture and cashing out. Expectations of financial reward and independence have repeatedly been found to be important motivators for entrepreneurs (Herron and Sapienza, 1992; Naffziger et al., 1994).

Building on these findings, two conceptualizations of founder performance are proposed for this study based on their potential for being measured with objective indicators, namely, wealth creation and management control. Although both concepts may seem correlated in terms of ex ante motivation, they may be clearly discernible when it comes to decisions concerning funding strategy. That is, while founders interested in retaining control may be reluctant to give away shares to VCs, those interested primarily in personal wealth creation may lean toward seeking VC backing with the expectations of more aggressive growth and higher financial returns, although VC support is costly in terms of the share of equity that must be given up (Brophy, 1997; Bruno and Tyebjee, 1985; Lewis, 2000; Timmons and Bygrave, 1997).

A question that needs to be addressed is whether the dilution of shares associated with VC backing is offset by the actual financial gains that a VC-supported high-growth strategy may afford to the founders. Based on prior findings that VC involvement results in lower share performance after an IPO (Kutsuna et al., 2000), it follows that VC involvement will generally have a negative effect both in a founder's percentage ownership and in the value of those shares. In other words, if prior research is supported in this study, on average, founders will be financially worse off by engaging VCs in their high-growth strategies. Additionally, the potential for loss of control is expected to increase with VC involvement because of

founders' share dilution. This loss will often include being asked to leave the firm or relinquish their top management role.

Hypothesis 4a: Founders of VC-backed ventures will attain lower levels of wealth creation post-IPO than their counterparts of non-VC-backed IPO ventures.

Hypothesis 4b: Founders of VC-backed ventures will have a higher likelihood of loss of control post-IPO than their counterparts of non-VC-backed IPO ventures.

5. Data collection and measures

The sample was drawn from the population of IPOs for 1996. A single-year sample minimizes the confounding effect of macroeconomic variables. In particular, it minimizes the effects of changes in size of the offerings, which increased dramatically year to year in the late 1990s due to an overheated marketplace. The sample included new and reborn[2], small, independent U.S. firms. Banks and other financial institutions, real estate concerns, roll ups, spin-offs or subsidiaries of large firms, and holding companies were excluded. In terms of size, firms that had over 500 employees or assets of over 800 million at the time of the IPO were also excluded, in line with previous studies of high-potential new firms (Robinson, 1999; Welbourne and Andrews, 1996). Information was collected from IPO prospectuses that provide great detail regarding company history and operations, financials, management background, strategy, ownership, and competitive environment; these documents have been found to be a useful and unbiased, nonquestionnaire data source (Marino et al., 1989). The final sample included 277 ventures.

5.1. Initial endowments

5.1.1. Founder characteristics

Number of founders was measured by the number of top managers that owned shares of the firm, had been with the firm since incorporation, and were stated as founders in the prospectus and other publications. Founder start-up experience counted the number of founders that had previously participated in the start-up of new businesses (serial entrepreneurs). In general, venture capitalists view prior experience in founding other firms favorably when the experience is contextually relevant (Wright et al., 1997).

5.1.2. TMT characteristics

Experience counted the number of TMT members that had previously worked in the industry or with similar technology (Cooper et al., 1994; Pennings et al., 1998). *Education* measures the educational attainment of the TMT by counting number of degrees held by each

[2] Reborn firms are older firms that have redesigned their products and services or changed their market or technology since 1990. This information was clearly stated in the prospectus strategy statement.

member (Pennings et al., 1998). A 4-year college degree accounted for one unit and a masters or PhD degree accounted for two units.

5.1.3. Pre-IPO venture characteristics

Firm age counted the number of years since inception up to when the venture went public. The expectation is that older firms will have accumulated more assets, know-how, and sources of finance that would affect their need for equity financing before going public. All firms in the sample had founders leading their ventures; thus, firm age is also a proxy for CEO tenure. *Pre-IPO income* accounts for the profitability of the venture before going public; it is sometimes used as a measure of risk, and was measured by the venture's income the fiscal year before IPO. *Pre-IPO sales* is a measure generally used to control for size and was measured by total revenue the year of the IPO.

5.1.4. Industry sector

The *hotness of IPO* counted the number of IPOs that occurred in the focal firm's industry sector during the period from 2 years before to 2 years after the IPO. This measure captures the legitimacy of the industry sector vis-a-vis investors and is similar to what finance researchers use to identify "hot markets" (Ibbotson and Jaffe, 1975; Ritter, 1989). Ritter (1989) found that same-industry groups of stock were overvalued (hot issues) during certain periods. The industry sectors with most representation in this sample were in the high-tech and manufacturing industries. Table 5 shows an even distribution of subjects by these industries across groups in the sample.

5.2. IPO proceeds

To test Hypothesis 2, two measures were used. First, *IPO proceeds* from the offering, net of expenses, measured the size of the offering. A second measure, *assets at IPO*, represents the financial capital available to the firm for growth. This measure of assets at the time of the IPO included assets in the previous quarter plus the proceeds from the offering (Robinson, 1999). For younger firms, the majority of these assets are the IPO proceeds. Older firms may have already invested cash into productive assets. By including assets as a measure of financial capital, one can compare firms in different stages of development at the time of their IPO.

5.3. Performance variables

5.3.1. Venture performance

Several traditional strategy research measures of firm performance were tested for the second fiscal year after the IPO year. These included absolute sales and assets growth, return on sales, return on assets, and income (Brush and Werf, 1992). To measure investor performance I assumed investors purchased the stock at the opening and held it for 2 years. *Share growth* was computed by subtracting the offer price from the price at the

close of the second fiscal year, and dividing that amount by the offer price (Kutsuna et al., 2000). Stock-split announcements were identified through SEC documents and accounted for.

5.3.2. Founder performance

A founder's wealth creation two fiscal years after the IPO was assessed by the market value of the shares owned by the founders at that time. Founder stock ownership was tracked carefully over time (proxy statements) to check and correct for any sales of stock that might have occurred. A founder's likelihood of remaining in control was measured by whether or not the founder remained as CEO of the firm 2 years after its IPO.

Although the above performance measures may have some correlation with one another, they reflect different facets of firm effectiveness to different stakeholders (Robinson, 1999) and provide a multifaceted approach to measure venture, investor, and founder success (Weinzimmer et al., 1998).

5.4. Moderating variable: venture capital backing

VC equity measures the existence and degree of venture capital involvement before the IPO (Barry et al., 1990). VC backing provides legitimacy to the new firm because of the small percentage of firms that gain access to this source of funding (Fried and Hisrich, 1994). A study in the 1980s found that the presence of VC financial backing in the issuing firms lowered the total cost of going public and maximized the net proceeds to the offering firm (Megginson and Weiss, 1991). Prior research has found that VCs influence governance structure, operations, and ultimately performance of the focal firm (Timmons and Bygrave, 1986; Vesper, 1996). VC equity was computed by measuring the percentage of institutional (NVCA type firms only) VC ownership before the IPO as described in the modified S1 and proxy statements.

6. Methods and results

Descriptive and frequency statistics show interesting characteristics. Firms in the sample had, on average, negative incomes the year they went public and had accumulated losses of 2 billion dollars. Average sales at IPO were about 25 million and average proceeds from the offerings were close to 27 million. In the aggregate, this sample had generated total proceeds of 4 billion from their IPO, sales growth of over 9.4 billion 2 years after the IPO, and employment for over 80 thousand people. Finally, over half of the firms in the sample were born less than 6 years before the IPO, and all of the firms in the sample had founders leading the venture when going public. Correlations and descriptives for the variables under study are shown in Table 1.

A one-way ANOVA (Table 2) procedure was used to test differences amongst VC-backed and non-VC-backed firms. This procedure produces a one-way analysis of

Table 1
Descriptive statistics and correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. VC equity	23.58	20.68	1.00																	
2. No. of founders	1.53	.98	−**.20**	1.00																
3. Start-up experience	.50	.74	−**.13**	**.36**	1.00															
4. TMT experience	5.28	2.33	**.25**	.09	**.12**	1.00														
5. TMT education	9.40	4.05	**.21**	.13	.04	**.80**	1.00													
6. Firm age	7.22	5.00	−.10	−**.18**	−.05	**.13**	.07	1.00												
7. Pre-IPO income	−1.63	4.02	−**.27**	.03	.03	.00	−.09	**.28**	1.00											
8. Pre-IPO sales	25.16	53.38	−.05	.00	.06	**.21**	.12	.06	**.31**	1.00										
9. Hotness of IPO	94.58	68.85	.00	.05	−.05	**.12**	.02	−.03	−.01	.02	1.00									
10. IPO proceeds	26.86	22.32	**.20**	.10	.04	**.25**	**.30**	−.10	.05	**.27**	.05	1.00								
11. Assets at IPO	40.31	32.72	**.16**	.05	.09	**.36**	**.37**	.06	.10	**.57**	.05	**.89**	1.00							
12. Income at T2	−7.20	22.57	−.08	.00	−.09	.02	−.08	**.18**	**.32**	.02	.07	−**.30**	−**.29**	1.00						
13. Sales growth	37.38	92.11	.07	.00	.04	**.18**	.45	−.04	**.20**	**.61**	.06	**.30**	**.40**	.10	1.00					
14. Assets growth	41.07	121.26	−.01	.08	.11	.12	.14	−.06	.12	**.35**	.02	**.41**	**.46**	−**.25**	**.69**	1.00				
15. ROA	−.48	1.22	.06	.09	.02	**.14**	.09	**.17**	**.12**	**.17**	.04	**.18**	**.23**	.10	**.16**	**.16**	1.00			
16. ROS	−9.53	48.95	−.08	.04	−.02	−**.13**	−**.20**	**.13**	.05	.09	.03	−.10	.01	**.21**	.08	.03	.08	1.00		
17. Share growth	−.14	1.00	.03	.12	.11	.07	.08	**.15**	−.04	**.13**	**.17**	.08	.05	.04	**.18**	**.29**	**.17**	.03	1.00	
18. Founder wealth	35.74	112.78	−.09	.03	.01	**.17**	.04	−.04	**.15**	**.16**	**.16**	.14	**.16**	**.20**	**.36**	**.41**	.12	.04	**.33**	1.00
19. CEO at T2	.67	.47	−**.37**	**.30**	**.19**	.03	.00	−.01	.08	.10	−.05	−.14	−.03	−.01	.09	.09	−.01	−.08	.03	.17

Bold: Correlation is significant at the .05 level or better (two-tailed).

Table 2
Differences amongst VC-Backed and non VC-Backed firms

ANOVA		Sum of squares	*df*	Mean square	*F*	Significance
No. of founders experience	Between groups	16.444	2	8.222	8.898	.000
	Within groups	252.263	273	.924		
	Total	268.707	275			
Founder start-up	Between groups	3.232	2	1.616	3.063	.048
	Within groups	143.495	272	.528		
	Total	146.727	274			
TMT experience	Between groups	100.935	2	50.468	9.797	.000
	Within groups	1401.152	272	5.151		
	Total	1502.087	274			
TMT education	Between groups	143.980	2	71.990	4.559	.012
	Within groups	2700.479	171	15.792		
	Total	2844.460	173			
Firm age	Between groups	179.664	2	89.832	3.662	.027
	Within groups	6721.606	274	24.531		
	Total	6901.271	276			
Pre-IPO income	Between groups	397.827	2	198.913	13.373	.000
	Within groups	4060.694	273	14.874		
	Total	4458.521	275			
Pre-IPO sales	Between groups	12,218.966	2	6109.483	2.149	.119
	Within groups	778,960.548	274	2842.922		
	Total	791,179.514	276			
Hotness of IPO	Between groups	1721.120	2	860.560	.181	.834
	Within groups	1,301,558.612	274	4750.214		
	Total	1,303,279.733	276			
IPO proceeds	Between groups	4233.882	2	2116.941	4.412	.014
	Within groups	75,329.160	157	479.804		
	Total	79,563.042	159			
Assets at IPO	Between groups	6748.488	2	3374.244	3.206	.042
	Within groups	288,363.579	274	1052.422		
	Total	295,112.067	276			
Income at IPO	Between groups	607.719	2	303.859	.592	.554
	Within groups	126,813.193	247	513.414		
	Total	127,420.911	249			
Sales growth	Between groups	12,046.131	2	6023.066	.718	.489
	Within groups	2,088,601.740	249	8387.959		
	Total	2,100,647.871	251			
Asset growth	Between groups	6815.412	2	3407.706	.261	.770
	Within groups	3,260,587.900	250	13,042.352		
	Total	3,267,403.312	252			
ROA	Between groups	5.858	2	2.929	1.949	.145
	Within groups	369.721	246	1.503		
	Total	375.578	248			
ROS	Between groups	2494.103	2	1247.052	.516	.597
	Within groups	596,583.529	247	2415.318		
	Total	599,077.632	249			

(continued on next page)

Table 2 (*continued*)

ANOVA		Sum of squares	*df*	Mean square	*F*	Significance
Share growth	Between groups	3.749	2	1.875	1.738	.178
	Within groups	267.406	248	1.078		
	Total	271.155	250			
Founder wealth (log)	Between groups	7.115	2	3.558	7.178	.001
	Within groups	123.904	250	.496		
	Total	131.020	252			
CEO at T2	Between groups	7.218	2	3.609	18.459	.000
	Within groups	51.220	262	.195		
	Total	58.438	264			

variance for a quantitative dependent variable by a single-factor (VC Backing) variable. Although the group sizes are not equal, the one-way ANOVA is robust to these differences. A separate Levene's test for equality of variance assumed was performed confirming no differences in results with and without the assumption of equality of variance.

In order to refine the analysis and explore interaction effects (moderation), VC equity was used to divide the sample in three groups, namely, no VC backing (77 firms), low VC

Table 3
Descriptive statistics per group

	No VC backing		Low VC backing		High VC backing	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
VC equity	0.0	0.0	18.85	6.61	46.63	11.37
No. of founders	1.56	.85	1.81	1.09	1.24	.90
Start-up experience	.53	.66	.59	.88	.35	.59
TMT experience	4.50	2.65	5.09	2.00	6.00	2.19
TMT education	8.17	4.04	9.10	3.80	10.41	4.07
Firm age	8.49	5.48	6.58	4.78	6.82	4.31
Pre-IPO income	.18	2.91	− 1.89	4.09	− 2.78	4.22
Pre-IPO sales	35.62	74.51	19.86	46.51	21.92	38.25
Hotness of IPO	92.96	71.21	92.17	69.00	97.64	67.08
IPO proceeds	20.19	21.82	25.04	19.75	32.79	23.72
Assets at IPO	34.24	34.87	38.33	31.75	46.17	31.17
Income at T2	− 4.67	21.71	− 8.08	24.48	− 8.26	21.44
Sales growth	41.76	87.40	27.41	69.79	41.84	111.23
Assets growth	39.95	92.71	43.98	143.32	32.04	95.45
ROA	− .48	.85	− .66	1.85	− .30	.45
ROS	− 4.47	15.29	− 12.11	36.60	− 10.84	71.22
Share growth	.08	.94	− .10	.89	.17	1.21
Founder % ownership	26.13	20.88	13.55	11.20	6.35	8.83
Founder wealth	58.42	145.19	22.87	62.06	29.51	119.53
CEO at T2	.84	.36	.76	.42	.46	.50

backing (97 firms), and high VC backing (103 firms). This decision was based on prior research identifying a relationship between level of VC ownership and degree of advisory support provided by the VC firm to the TMT through board participation, recruitment of

Table 4
Multiple comparisons (Tukey HSD)

Dependent variable	(I) VC group	(J) VC group	Mean difference (I – J)	S.E.	Significance
No. of founders	.00	1.00	– .2486	.14726	.211
		2.00	.3231	.14536	.069
	1.00	.00	.2486	.14726	.211
		2.00	.5717	.13601	.000
Founders start-up experience	.00	1.00	– .0585	.11127	.859
		2.00	.1865	.11006	.209
	1.00	.00	.0585	.11127	.859
		2.00	.2450	.10301	.047
TMT experience	.00	1.00	– .5796	.34769	.220
		2.00	– 1.4868	.34392	.000
	1.00	.00	.5796	.34769	.220
		2.00	– .9072	.32188	.014
TMT education	.00	1.00	– .9261	.77879	.461
		2.00	– 2.2379	.75865	.010
	1.00	.00	.9261	.77879	.461
		2.00	– 1.3118	.70388	.152
Firm age	.00	1.00	1.9059	.75597	.033
		2.00	1.6683	.74616	.067
	1.00	.00	– 1.9059	.75597	.033
		2.00	– .2376	.70076	.939
Pre-IPO income	.00	1.00	2.0827	.59001	.001
		2.00	2.9699	.58102	.000
	1.00	.00	– 2.0827	.59001	.001
		2.00	.8872	.54713	.238
IPO proceeds	.00	1.00	– 4.8527	4.47122	.525
		2.00	– 12.6019	4.37752	.013
	1.00	.00	4.8527	4.47122	.525
		2.00	– 7.7493	4.03815	.137
Assets at IPO	.00	1.00	– 4.0964	4.95152	.686
		2.00	– 11.9361	4.88728	.040
	1.00	.00	4.0964	4.95152	.686
		2.00	– 7.8398	4.58992	.204
Founder wealth (log)	.00	1.00	.1488	.11333	.389
		2.00	.4056	.11041	.001
	1.00	.00	– .1488	.11333	.389
		2.00	.2568	.10427	.038
CEO at T2	.00	1.00	.0816	.06968	.471
		2.00	.3797	.06848	.000
	1.00	.00	– .0816	.06968	.471
		2.00	.2981	.06354	.000

00 = no VC; 1.00 = low VC; 2.00 = high VC.

TMT members, and tighter monitoring and control[3] (Barney et al., 1994; Lange et al., 2001; Lerner, 1995; MacMillan et al., 1989). A cutoff point of 30% VC equity ownership was decided for this grouping, following the above reasoning and further observation of the data. The 30% cutoff is a natural point where VCs begin to have higher ownership than the TMT and the total ownership between the two is greater than 50%.[4] These two conditions, together, provide greater power to VCs through more directors and suggest higher commitment from them to the success of the venture. As discussed in the Methods and Results section, the three-group comparison allows us to test VC Backing in a moderating role and provides for a better analysis and understanding of the hypothesized relationships. Table 3 shows descriptive statistics for each grouping.

The casual observation of mean differences amongst the three groups (Table 3) illustrates some interesting dynamics regarding founder ownership and wealth creation. As expected, founder ownership decreases as VC backing increases; however, founder wealth (the value of those stocks 2 years after the IPO) is highest for non-VC-backed firms, lowest for ventures with low VC backing and trends upwards with greater VC involvement. These and other significant relationships identified with the ANOVA test described above were further analyzed using a Tukey test to compare the three groups (Table 4). In addition to determining whether differences exist among the means, this procedure allows us to determine which means differ across the three groups and explore differences based on levels of the moderating variable. This analysis is similar to the analysis of interactions in hierarchical regression.

7. Discussion of results

Hypothesis 1a, b, c, and d, that *founder and TMT characteristics* do not significantly differ between firms backed by VC firms and those without VC backing, was strongly supported for low levels of VC backing and partially supported for high VC backing. For founder and TMT characteristics, no significant differences were found between non-VC-backed and low-VC-backed ventures. Ventures with high levels of VC backing displayed on average more experienced and better-educated TMTs than ventures with no VC backing. These findings support prior research on the role of VCs in the development of top quality teams before IPO, but only for high levels of VC ownership. It appears that VCs put most of their effort into those ventures where they have controlling ownership.

Results provide partial support for Hypothesis 1e, f, g, and h, regarding pre-IPO *venture characteristics*. Overall, ventures with no VC backing were not different from the other two groups in terms of size (sales) and the hotness of their industry sector. On the other hand, *firm age* shows a nonlinear relationship, where non-VC-backed ventures were significantly older

[3] The correlation between VC equity and the proportion of board members that are VCs for this sample is .544, significant at the .01 level.

[4] On average for the sample, founders and VCs together owned 49% of the stock before the IPO with a standard deviation of 17, reflecting a large concentration of ownership.

than low-VC-backed ventures but not different from high-VC-backed firms. Income before IPO, however, was found to be significantly better for non-VC-backed ventures (pre-IPO income) than for the other two groups. This clearly indicates that VC-backed ventures were on average of higher risk. Whether non-VC-backed ventures have stronger financials because their founders have other less expensive financing options available to them, or whether this is because VCs look for higher risk and higher potential projects remains an interesting empirical question for future research.

Hypothesis 2, that VC-backed ventures have larger proceeds from their IPOs and are better endowed for growth was supported for high VC backing, but not for low VC backing. This result holds whether one measures only proceeds or when total assets available for growth are included. Thus, results so far suggest that firms with strong VC backing are better endowed for growth after the IPO than ventures with no VC backing and ventures with lower levels of VC backing. The question I address next is, given these similarities and differences, do they matter after the IPO and to whom.

Hypotheses 3a and 3b, that VC backing of IPO ventures does not affect the ventures' post-IPO financial performance was supported for all traditional measures, including the growth of their stock prices, 2 years after the initial offering. Thus, it appears that VC backing is related to higher levels of funding up to the IPO (Hypothesis 2), but not related to the ventures' ability to grow and be profitable after the offering. This finding is intriguing and points to an interesting question for future research: Do VC-backed firms get too much funding early on that leads them to behave more like large organizations and less like cash-strapped entrepreneurs, squandering part of their wealth in unworthy or very risky opportunities? Or is it that VC-backed ventures are more aggressive in pursuing growth after IPO?

Finally, Hypothesis 4a, that VC backing will negatively affect a founder's ability to generate personal wealth through the venture, was strongly supported for high levels of VC backing. That is, founders that gave up large proportions of their ownership in expectation of higher growth were significantly worse off with respect to the personal wealth generated through the venture. Similarly as expected (Hypothesis 4b), the likelihood of maintaining management control was found to be significantly lower for ventures with high levels of VC backing.

8. Post hoc analysis: going public without VC support[5]

One conclusion from this research is that it is possible to successfully take a high-growth venture public without VC support, and that such a growth strategy can result in significant financial rewards for its founders. In this section, I control for industry effects to go deeper into the question of how non-VC-backed IPO ventures differ from their better-endowed competitors. Specifically, are high-tech sector firms more likely to require VC backing and manufacturing firms more likely to go it alone? Second, are firms in the non-VC-backed

[5] Thanks to an anonymous reviewer for suggesting this line of inquiry.

group different in any way from the VC-backed ventures within their industries when going public? And third, are there significant differences across these two industries?

Table 5 shows a cross tabulation of VC groups by industries in the sample. This table clearly shows that industry sectors were proportionally and evenly distributed across the three groups in this study for high-tech and manufacturing ventures. Furthermore, the symmetric test performed shows a value of .218, indicating a high level of independence between the two axes for the sample as a whole. Thus, for this sample, there is no significant industry effect in terms of who gets VC funding.

To explore the second question, I performed an independent samples *t* test between non-VC-backed and high-VC-backed ventures across the variables discussed in this paper that have been found to affect IPO performance, firm, and founder performance. These tests were performed independently for the two largest industries represented in the sample, high tech and manufacturing. None of the firm and investor performance measures were significantly different for the within-industry tests, confirming results obtained for the sample as a whole, when controlling for industry (available from the author). Table 6 summarizes this analysis and shows interesting results that help respond to the question: How do non-VC-backed ventures get to IPO?

First, within industries, non-VC-backed ventures were on average about 2 years older than VC-backed ventures when they went public (although the difference is not significant), looked for one-third less equity at the IPO, were more profitable than VC-backed ventures and less funded (assets at IPO), their TMTs had slightly less industry experience and their founders had significantly more experience in previous start-ups. On the other hand, non-VC-backed ventures mimicked their counterparts in terms of their size (sales and employees at IPO) and TMT education. Second, across industries, manufacturing firms were slightly older and smaller than high-tech firms going public. However, a test of mean differences across the two industries (available from the author) showed no significant differences across industries for all of the variables in Table 6, except for founders' wealth creation. Manufacturing venture founders generated significantly less wealth than high-tech founders; however, non-VC-backed founders did significantly better than their VC-backed counterparts in the same industry.

Table 5
Cross tabulation of industry and VC group participation

Count	No VC backing	Low VC backing	High VC backing	Total
Industry				
High tech	32	38	40	110
Manufacting	23	22	30	75
Other	9	10	2	21
Pharmaceutical	4	12	15	31
Service	4	8	11	23
Telecom	5	7	5	17
Total	77	97	103	277

Symmetric measure value=.218; approx. significance=.179.

Table 6
Independent samples *t* test for high-tech and manufacturing ventures by VC group

	High tech	Manufacturing
Firm age		
Non-VC	8.43	9.26
High-VC	6.72	7.53
IPO proceeds		
Non-VC	**20.70**	19.85
High-VC	**33.98**	27.62
Sales at IPO		
Non-VC	31.10	18.64
High-VC	28.09	18.46
Income at IPO		
Non-VC	**.43**	**− .13**
High-VC	**− 2.65**	**− 2.19**
Assets at IPO		
Non-VC	**33.02**	28.55
High-VC	**50.74**	39.88
Employees at IPO		
Non-VC	149.86	112.52
High-VC	135.72	91.32
TMT experience		
Non-VC	**5.19**	**4.30**
High-VC	**6.46**	**5.76**
TMT education		
Non-VC	8.25	8.18
High-VC	10.59	9.94
Founder Start-up Exp.		
Non-VC	**.64**	.60
High-VC	**.27**	.33
Founder % ownership		
Non-VC	**30.59**	**24.00**
High-VC	**8.44**	**5.03**
Founder wealth		
Non-VC	101.50	**27.41**
High-VC	64.39	**4.86**
CEO at T2		
Non-VC	**.85**	**.86**
High-VC	**.46**	**.36**

Bold figures indicate significant mean differences at $P < .05$ within each cell.

One can conclude from this analysis that VC-backed ventures going public were significantly riskier investments given the larger size of their offerings and their poorer financial performance at the time of IPO. Whether this can be traced to the projects themselves or to the fact that VCs requiring higher returns were involved is an interesting question for future research. It also appears that founders with less prior start-up experience were substituting their lack of experience with VC support. This is in line with previous research that highlights the nonfinancial benefits to ventures associated with VC involvement.

A question that remains unanswered has to do with the alternative sources of pre-IPO funding that high-growth ventures may have. The fact that non-VC-backed firms of similar size and industry had accumulated less funding before IPO and were looking for less equity from the IPO, coupled with the fact that, on average, these ventures were more profitable when going public, suggests that these firms did not need as much equity capital to support their growth strategies. Their prior start-up experience, their profitability, and a more conservative growth strategy may have opened more traditional forms of financing. An in depth, longitudinal analysis of financial conditions at founding would provide a more definitive answer to this question. Such a study is beyond the scope of this paper, but is another interesting avenue for future research derived from it.

9. Discussion and conclusions

In this study I set out to develop a model of founder performance focused on how early funding decisions on the road to IPO could differentially affect venture, investor, and founder outcomes after the IPO. The focus was on founders that take their ventures into a high-growth mode, and the general hypothesis was whether early decisions they make during the pregrowth stage affect their personal outcomes from the entrepreneurial effort. This approach to measuring entrepreneurial success departs from extant research generally interested in venture and investor performance.

A focus on objective measures of founder performance contributes to current research and practitioners in two ways. First, we need to know more about how early decisions in the path to high growth may differentially affect the medium and long-term performance of firms, their founders and their investors. And second, by measuring outcomes from the perspective of different stakeholders we may uncover interesting conflicts of interest for those that perform the double role of principals and agents, such as founders, owner managers, and VC investors. This knowledge would be valuable to outside investors buying stock at the IPO and beyond.

I start off by comparing ventures with and without VC backing before IPO and find no differences between the groups when low VC backing is the comparison group, but significant differences in TMT endowments and financial capital when comparing to the high-VC-backing group. These findings support previous research in that high VC involvement clearly improves IPO performance in terms of the assets available for growth. It extends extant research in that low levels of VC involvement do not significantly improve a firm's growth endowments. An interesting finding from this study is that this initial head start does not matter, as far as investor and venture performance goes, during the first 2 years after the IPO.

The implication for founders that plan on taking their ventures into a high-growth path through an IPO is that their efforts will be better rewarded in terms of personal wealth and control over the venture's management if they avoid high levels of involvement from VC firms. Although high-VC-backed ventures are better able to amass assets for growth, this does not appear to affect firm performance later on. The cost of such an approach, on the other hand, is very high for the founders themselves. An empirical question that arises from these

findings is whether high-VC-backed ventures are overfunded and misuse their resources in less effective ways than their more financially strapped counterparts.

These conclusions are applicable only to founders of small, high-growth, IPO ventures. Although these characteristics may appear to greatly limit the generalizability of the findings, they certainly reflect conditions that have occurred in the 1970s and 1980s, in addition to the 1990s, and are likely to occur in the future with a different set of industry sectors that may become hot in the eyes of IPO investors. These discontinuities in economic and market conditions will continue to provide potential opportunities for high-growth entrepreneurs and their ventures, hence the importance of such focus for entrepreneurship research.

Future research could extend this line of inquiry by focusing on a smaller set of variables and using hierarchical regression to test for interactions, or path analysis to test the potential causal relationships that this paper has uncovered. In terms of the founder performance construct, a true longitudinal design with interviews to founders before their IPOs would further contribute to the development of this important construct. After all, the knowledge of whether and how high growth founders attain higher levels of wealth creation and management control will help entrepreneurs better understand the personal consequences of their decisions and help outside investors uncover potential conflicts of interest of agents that also happen to be principals.

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