

# The advantage of experienced start-up founders in venture capital acquisition: evidence from serial entrepreneurs

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**Abstract** Entrepreneurs with prior firm-founding experience are expected to have more skills and social connections than novice entrepreneurs. Such skills and social connections could give experienced founders some advantage in the process of raising venture capital. This paper uses a large database of venture-backed companies and their founders to examine the advantage associated with prior founding experience. Compared with novice entrepreneurs, entrepreneurs with venture-backed founding experience tend to raise more venture capital at an early round of financing and tend to complete the early round much more quickly. In contrast, experienced founders whose earlier firms were not venture-backed do not show a similar advantage over novice entrepreneurs, suggesting the importance of connections with venture capitalists in the early stage of venture capital financing. However, when the analysis also takes into account later rounds of financing, all entrepreneurs with prior founding experience appear to raise more venture capital. This implies that skills acquired from any previous founding experience can make an entrepreneur perform better and in turn attract more venture capital.

**Keywords** Firm-founding experience · Serial entrepreneur · Venture capital

**JEL Classifications** G24 · L26 · M13

## 1 Introduction

How does prior firm-founding experience help an entrepreneur to raise venture capital (VC) for a start-up? In this paper, I postulate that earlier founding experience gives an entrepreneur some advantage in terms of the timing of early-stage VC funding and the size of VC deals. I present some supportive evidence based on analyses of a comprehensive VC data set. The findings should help scholars as well as practitioners better understand the value of prior founding experience and the VC investment decision process.

To build a firm, a start-up founder has to assemble a group of people with various kinds of expertise, gain access to capital and other resources, and act as a manager to implement a business plan. A person who can do this job effectively needs to have a wide range of skills. As Lazear (2004, 2005) has observed, an entrepreneur has to be a “generalist,” a “jack of all trades.” An entrepreneur may be born with a general set of skills which he may then supplement by investing in human capital such as formal schooling.<sup>1</sup>

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<sup>1</sup> For convenience of exposition, I will refer to a firm’s founder in singular, male terms throughout the paper, although it is

He can also augment the set of skills through “learning by doing” in the process of building a firm, which is particularly important given that some entrepreneurial skills are subtle, uncodifiable, and difficult to teach in the classroom. Because of the importance of “learning by doing,” experienced start-up founders are expected to have a more complete set of skills and therefore perform better in their subsequent ventures.

In addition, firm-founding experience also gives an entrepreneur a chance to know or work with a wide range of people, including capitalists (such as bankers, venture capitalists, and “angel” investors), professionals (such as accountants, consultants, lawyers, and human resource specialists), suppliers, and customers. Connections with these people established in previous founding experience increase the entrepreneur’s stock of social capital (Hsu 2007). Some of these connections, even if they are only weak or indirect ties, may become useful in the future when the entrepreneur starts another business (Shane and Cable 2002).

Because entrepreneurs with prior firm-founding experience tend to have more human and social capital, they may have an edge over first-time entrepreneurs in the process of resource acquisition (Shane and Cable 2002; Batjargal and Liu 2004; Hsu 2007; Gompers et al. 2009). To test the validity of this presumption, one needs to focus on entrepreneurs and their firms at a fairly early stage because as firms grow larger their performance may become less and less dependent on their founders (Kaplan et al. 2009). In this paper, I examine start-ups and their founders in the context of VC acquisition. I compare experienced start-up founders, which I will refer to as serial entrepreneurs, with first-time founders, which I will refer to as novice entrepreneurs. Using a sample of entrepreneurs who have gained access to VC, I investigate whether serial entrepreneurs show any advantage over novice entrepreneurs.<sup>2</sup> I will distinguish between VC- and non-VC-

backed prior founding experience and examine whether they both help an entrepreneur in the process of raising VC for subsequent firms.

VC acquisition provides an ideal situation in which an entrepreneur’s prior founding experience can be found to make a difference. VC investment is characterized by an asymmetric information problem between equity investors and the entrepreneur (Amit et al. 1990; Fried and Hisrich 1994; Gompers 1995; Kaplan and Strömberg 2001; Shane and Cable 2002). VC investors often bet millions of dollars on a start-up, whose future success will in large part be determined by the quality of the founder. Usually investors possess less information about the entrepreneur’s ability and the viability of his business plan than the entrepreneur himself does. This information asymmetry prevents venture capitalists from investing a large amount of money in start-ups.

There are many ways to overcome this asymmetric information problem (Gompers and Lerner 1999; Kaplan and Strömberg 2001). In a sense, the general practice of staged investment by the VC industry is meant to provide a partial solution to this problem (Gompers 1995; Kaplan and Strömberg 2004). Venture capitalists almost always make investment decisions stage by stage: they only provide a small amount of money to a start-up initially, and base later investment decisions on the start-up’s performance. In this way, venture capitalists can evaluate the entrepreneur’s ability and the viability of his plan over time. Furthermore, as another solution to the asymmetric information problem, venture capitalists rely heavily on the referrals of social contacts to identify and evaluate an entrepreneur (Tyebjee and Bruno 1984). Venture capitalists naturally favor entrepreneurs that have either direct or indirect social connections with them (Shane and Cable 2002). Mutual social connections not only bridge information transfer between investors and the entrepreneur, but may also serve as an informal monitoring group. For example, if the entrepreneur does anything unprofessional that adversely affects the venture capitalists’ financial returns, he would face the possibility of losing the trust of many

Footnote 1 continued

common to have multiple founders for a single firm and there are many female entrepreneurs.

<sup>2</sup> One particular advantage of being experienced entrepreneurs may be that they are more likely to get VC funding than novice entrepreneurs. This issue, although important, cannot be addressed in this study because my data only capture entrepreneurs who had received VC investment. To examine the probability of successfully raising VC, one needs information on all entrepreneurs who intend to raise VC. It requires a

Footnote 2 continued

database of all VC-seeking entrepreneurs in which some succeeded but others failed in securing VC investment. See Audretsch et al. (2007) for an analysis using a unique database of that nature.

other people in the same social network. Therefore, these mutual social connections could greatly bolster VC investors' confidence in the entrepreneur.

Given these features of the VC investment process, there are reasons to believe that experienced start-up founders have advantages over novice founders. First, the multistaged investment process implies that experienced founders, if they indeed acquired entrepreneurial skills from prior founding experience, would have opportunities to reveal such skills over time and raise more VC in later rounds, after investors see their better performance. Second, entrepreneurs with venture-backed prior founding experience should have established connections to many venture capitalists that could help the entrepreneurs in various ways when they seek VC funding again. Novice entrepreneurs, on the contrary, may not have developed these skills or useful connections.

The remainder of the paper is organized as follows. Section 2 reviews related literature in order to formulate some testable hypotheses. Section 3 describes the database used in this study and presents some descriptive statistics. Section 4 presents empirical results. Section 5 concludes with some remarks on this paper's contributions, limitations, and directions for future research.

## 2 Theoretical background and hypotheses

This study is built on two strands of literature. The first concerns the value of entrepreneurial experience and the second is about venture capitalists' investment decisions. In this section, I review the related literature to develop testable hypotheses.

### 2.1 Entrepreneurial experience and experienced entrepreneurs

Entrepreneurs with prior firm-founding experience deserve the attention of researchers primarily for two reasons. First, starting a firm requires a wide range of skills, and prior firm-founding experience helps an entrepreneur acquire and enhance such skills. As will be reviewed below, this observation has been made by many researchers and it has provided the motivation for most of the existing research on experienced entrepreneurs. Second, an entrepreneur's possession of social capital in the form of social connections is

crucial for his success, and prior firm-founding experience helps establish such connections. There is a vast existing literature on the importance of an entrepreneur's social capital, generally focusing on how an entrepreneur's social connections affect his firm's performance. Following this literature, I also emphasize the important role of an entrepreneur's social connections. However, different from this literature that generally ignores how such connections were established, I take the entrepreneur's prior founding experience as a source of social capital.

#### 2.1.1 *Entrepreneurial skills acquired from founding experience*

In the process of starting a firm, an entrepreneur needs to identify potentially profitable opportunities, assemble human and financial resources, launch the new venture, manage its growth, and build a viable business (Baron and Shane 2008). Because this task has so many dimensions, an entrepreneur needs to have a broad variety of skills.<sup>3</sup> He has to be competent in many different areas and should have the ability to play various roles (manager, accountant, salesperson, chief engineer, etc.) in the process of founding a firm (Lazear 2004, 2005). Such entrepreneurial skills can be learned through education and training; they can also be acquired through learning by doing; that is, one could accumulate and improve such skills in the process of actually founding a firm. Therefore, prior founding experience is considered very valuable for an entrepreneur in later ventures.

For this reason, MacMillan (1986) has long called for intensive study of "habitual entrepreneurs" who have the experience of generating multiple businesses. He argues that habitual entrepreneurs have had "the opportunity to learn how to efficiently and swiftly overcome the stumbling blocks they encountered in their first efforts." Thus they have accumulated entrepreneurial skills from their experiences. By studying these entrepreneurs, researchers will be able to uncover and codify their skills and techniques and gain a deeper understanding of the process of business creation. This view is echoed by many other authors (see, e.g., Donkels et al. 1987; Starr and Bygrave 1991; Scott and Rosa 1996; Rosa 1998; Carter and Ram

<sup>3</sup> A recent study of entrepreneurial skills identified a list of 17 different skills (Smith et al. 2007).

2003). Most recently, Ucbasaran et al. (2006, 2008) have argued that not only are there theoretical reasons, but there are also policy reasons to study habitual entrepreneurs. A better understanding of how habitual entrepreneurs differ from novice ones will greatly help design policies to foster entrepreneurship.

Despite the well-recognized value of studying serial entrepreneurs, empirical research in this area is still at the beginning stage (Wright et al. 1998), perhaps due to a lack of suitable data. The bulk of existing research is descriptive, using various sources of data to detect statistically significant differences between novice and serial entrepreneurs. Using data from Great Britain (in some cases, Scotland only), Westhead, Wright, and coauthors compare novice entrepreneurs with multiple-firm founders along many dimensions such as demographic characteristics, background and motivations, skills and knowledge, attitudes to entrepreneurship, organizational capabilities, primary industry activity, geographic location, and business performance (Birley and Westhead 1994; Ucbasaran et al. 2009; Westhead and Wright 1998a, b; Westhead et al. 2005a, b, c; Wright et al. 1997a, b).<sup>4</sup> Similar comparisons have also been made based on data from other countries. Carland et al. (2000) use survey data on US entrepreneurs to study demographic and psychological differences between single and multiple business founders, and Schaper et al. (2005) examine the differences between the two groups in personal and business characteristics using Australian data. This literature has focused primarily on the characteristics of serial entrepreneurs. Overall, there is still only limited understanding of how prior founding experience helps an entrepreneur subsequently.<sup>5</sup>

<sup>4</sup> Some of these studies (Westhead and Wright 1998a, b; Westhead et al. 2005a, b, c; Wright et al. 1997a, b) make a distinction between “serial” and “portfolio” entrepreneurs, with the former referring to those who founded multiple firms in a sequential manner and the latter to those who start multiple firms at the same time. In this paper, I do not distinguish between them and will call all of them serial entrepreneurs.

<sup>5</sup> Two earlier studies explore the performance of experienced entrepreneurs using rather inadequate data. Chambers et al. (1988) examine the performance of 100 new firms in southeastern Michigan and find that the founding team’s previous founding experience does not help, although previous managerial experience has a positive effect. Kolvereid and Bullvag (1993) compare 250 novice and experienced Norwegian entrepreneurs. They find experienced entrepreneurs are more resourceful, tend to get

### 2.1.2 Social connections established in founding experience

The importance of the entrepreneur’s social capital in the process of founding a firm is widely researched.<sup>6</sup> In a study of entrepreneurs in St. Joseph County, Indiana, Birley (1985) reports that informal contacts of family, friends, and colleagues are an entrepreneur’s primary sources of help in the process of assembling resources to build the firm. Uzzi (1999) shows that firms with connections to banks are more likely to get loans and tend to pay lower interest. Using survey data on 202 seed-stage VC investors, Shane and Cable (2002) find that direct and indirect ties between entrepreneurs and the investors affect the selection of ventures to finance. Using data from China, Batjargal and Liu (2004) find that strong ties between entrepreneurs and venture capitalists have significant effects on contractual covenants, investment delivery, and venture valuation. This line of research generally takes some forms of the entrepreneur’s social capital as given and examines their effects on the performance of the firm. It does not specify how the entrepreneur’s social connections are established.

In this study, I accept the importance of the entrepreneur’s social connections in the process of resource acquisition. Specifically, I assume that an entrepreneur’s ties to VC investors should facilitate his access to VC funding. Unlike most of the existing studies that identify social connections using survey data, I instead use venture-backed prior founding experience as a proxy for established ties to the VC world. This practice is based on the assumption that a venture-backed prior founding experience should give the entrepreneur a chance to socially connect with a large number of venture capitalists as well as professionals in the VC supporting industries.

Entrepreneurs with a venture-backed prior founding experience are expected to be well connected to the VC world. First, they should have been in close

Footnote 5 continued  
involved in a more competitive business environment, but show no difference in terms of performance.

<sup>6</sup> See, e.g., Batjargal and Liu (2004), Birley (1985), Cooke and Wills (1999), Davidsson and Honig (2003), Florin et al. (2003), Fried and Hisrich (1994), Elfring and Hulsink (2003), Hansen (1995), Jenssen (2001), Jenssen and Koenig (2002), Shane and Cable (2002), Uzzi (1999), and Yli-Renko et al. (2001).

contact with a number of venture capitalists. It is a common practice that several venture capitalists form a syndication to fund a start-up together (Bygrave and Timmons 1992; Gompers and Lerner 1999; Sorenson and Stuart 2001). To monitor a start-up and provide professional advice to its management team, some of these VC investors will sit on the start-up's board of directors and work closely with the founding team (Bygrave and Timmons 1992; Gompers and Lerner 1999; Hellmann 2000). In this process, a VC-backed entrepreneur will become familiar with a group of venture capitalists. Second, entrepreneurs with venture-backed prior founding experience should also know a large group of professionals, such as accountants and lawyers, who facilitate the VC investment process and thus have a working relationship with many VC investors. I assume that these connections to the VC world (venture capitalists and the professionals working with them) would help a serial entrepreneur in later ventures.<sup>7</sup>

If prior founding experience helps an entrepreneur acquire and improve skills and establish important social connections, such experience can be helpful in many respects. In this study, I focus on the advantage of experienced entrepreneurs in VC acquisition. As will be discussed below, the particular nature of the VC investment process should favor entrepreneurs with enhanced skills and/or social connections in the VC world.

## 2.2 Venture capitalists' investment decision process

### 2.2.1 Entrepreneurial skills and VC investment decisions

There exists a considerable amount of literature on how venture capitalists select start-ups to fund.<sup>8</sup>

<sup>7</sup> It is important to note that only some of the social connections discussed here are observable. For example, if an entrepreneur goes back to a venture capitalist who invested in his previous start-up, we know for sure that he is relying on an established connection in seeking VC funding for a subsequent firm; this, in principle, is verifiable using VC data. However, many other social connections do not necessarily leave a paper trail, and cannot be easily identified.

<sup>8</sup> See, e.g., Bruno and Tyebjee (1983, 1986), Franke et al. (2007), Hisrich and Jankowitz (1990), Hutt and Thomas (1985), MacMillan et al. (1985, 1987), Muzyka et al. (1996),

Research along this line has relied heavily on data obtained through personal or telephone interviews and mail surveys. Shepherd and Zacharakis (1999) review this literature and discuss its methodological limitations. They observe that the most consistent finding across studies is the importance that venture capitalists place on the ability of the founding team, whether it is their managerial capabilities (Tyebjee and Bruno 1981, 1984), track record (Hutt and Thomas 1985), staying power and familiarity with the market (MacMillan et al. 1987) or their general traits (Hisrich and Jankowitz 1990). Naturally, venture capitalists tend to fund entrepreneurs that appear to have more and better skills.

Although the existing literature has focused primarily on which entrepreneurs get VC funding and which get declined, it is important to recognize that the VC investment process involves a series of decisions. Venture capitalists not only have to choose which entrepreneurs/start-ups to fund, they also need to decide how quickly to make the initial investment, how to stage the later rounds of investment, and how much to invest in each round (Bygrave and Timmons 1992; Gompers and Lerner 1999). I hypothesize that, in all these later decisions, the quality of the entrepreneur still matters. In particular, if venture capitalists have recognized an entrepreneur with better skills, they should be willing to invest more in his start-up.

### 2.2.2 Entrepreneurial skills, entrepreneur's connections, and the information asymmetry problem in VC investment

At the center of the series of VC investment decisions is an information asymmetry problem between the entrepreneur and investors (Amit et al. 1990; Fried and Hisrich 1994; Gompers 1995; Shane and Cable 2002); that is, although venture capitalists want to base their decisions on the quality of the entrepreneur and use all possible channels to gather relevant information during the screening process, it is never possible to know as much about the entrepreneur as the person himself does. For example, venture capitalists usually do not know for sure how competent the entrepreneur is as a manager; they are

Footnote 8 continued

Riquelme and Rickards (1992), Sandberg et al. (1988), and Tyebjee and Bruno (1981, 1984).



unlikely to fully understand the technology on which the entrepreneur is building the start-up; they have no way to verify the entrepreneur's evaluation of market opportunities; and they cannot predict how much effort the entrepreneur will put into building the start-up. This information asymmetry problem not only affects who the investors will fund, but also determines how quickly they will invest and how much they will invest.

As Shane and Cable (2002) observed, there are two types of solutions to the information asymmetry problem. The economics and finance literature emphasizes the staging of capital and the risk-sharing feature of the design of VC investment contracts as a solution (Gompers 1995; Gompers and Lerner 1999; Kaplan and Strömberg 2001, 2003, 2004); for example, venture capitalists usually delay the entrepreneur's compensation until some objective performance measures become available. They distribute their investment over different stages and make later-stage investment contingent on outcomes. They also reserve the right to terminate the investment when a certain performance target is not reached. Given these common practices by venture capitalists, if entrepreneurs indeed learn from previous experiences (Ucbasaran et al. 2003), then they will likely raise more VC. This is because their acquired skills will make their start-ups perform better and thus attract more VC investment (MacMillan et al. 1985; Riquelme and Rickards 1992). However, the staged VC investment process implies that acquired skills tend to attract more VC in later stages, when investors have had enough time to observe the experienced entrepreneur's performance.

The second way to overcome the information asymmetry problem is the social embeddedness solution (Shane and Cable 2002). This line of research is inspired by the social embeddedness theory proposed by Granovetter (1985) and is generally pursued by organizational scholars in the economic sociology literature. The main idea is that economic decisions such as VC investment are not made in an isolated economic context. Rather, they are embedded in a social environment. In particular, personal relationships could affect which entrepreneurs get funded, how quickly they get funded, and how much VC money they can raise in each deal. In situations of uncertainty and asymmetric information, people with both direct and indirect ties to investors could gain an advantage (Burt 1997; Podolny 1994; Uzzi 1996).

Direct ties between the entrepreneur and investors provide chances for them to meet in other settings. Such interactions tend to develop mutual trust between them. They also allow investors to see the quality of the entrepreneur before they make an investment decision. Indirect ties could transfer information about the entrepreneur to investors, and information from this source is often more trusted than that acquired through more formal channels. An indirect tie, such as a common friend of the entrepreneur and an investor, may serve as a referral for the entrepreneur. In addition, linkage to the same social network gives the investors more confidence in the entrepreneur because social sanctions help prevent the entrepreneur from engaging in opportunistic behaviors that will hurt the investors. Shane and Cable (2002) show that an entrepreneur's ties to venture capitalists indeed increase the chance of getting funded.

Again, given the staging of VC investment, if social ties to venture capitalists play a role, its importance should be most prominent in an early round of financing. Once an entrepreneur raises some VC and begins to work with the investors, the investors will have time to observe and interact with the entrepreneur. Thus, over time, the disadvantage associated with the lack of social ties to venture capitalists should diminish. This last prediction was not investigated by Shane and Cable (2002) but will be studied in this paper.

Only a few existing studies focus on serial entrepreneurs in the context of VC investment. Wright et al. (1997a) survey 55 venture capitalists in Great Britain to study their perspectives on investing in serial entrepreneurs who have exited from their previous ventures. They find that venture capitalists indeed make extensive use of serial entrepreneurs, especially in management buy-ins. Hsu (2007) examines 149 early-stage start-up firms and finds that an entrepreneur's previous firm-founding experience increases both the likelihood of receiving VC investment through a direct tie and the valuation of the start-up by venture capitalists. Using a sample of 637 serial entrepreneurs, Bengtsson (2008) investigates whether a serial founder repeatedly receives financing from the same venture capitalist. He finds that one-third of serial founders show a repeated financing relationship with venture capitalists. Such a relationship is more likely if the venture capitalist has more information about the founder and is less likely if the founder's

new firm does not fit the venture capitalist's industry or geographic focus. Gompers et al. (2009) use a much larger database to examine venture-backed firms and find that firms started by previously successful entrepreneurs are more likely to go public. However, no one has studied the performance of serial entrepreneurs in terms of the timing of the VC funding and the amount of VC raised, which will be the focus of this paper.

### 2.3 Testable hypotheses

Following the literature, in this paper I will maintain the assumption that prior founding experience helps an entrepreneur acquire and improve his entrepreneurial skills, which in turn leads to better performance of his subsequent start-ups. In addition, I will also emphasize that prior founding experience helps an entrepreneur establish social connections, increasing his stock of social capital. Given the nature of the VC investment process, both an experienced entrepreneur's better skills and his better social connections are expected to give him some advantage in the process of VC acquisition.

Conceptually, an experienced entrepreneur may have four different types of advantages in the process of VC acquisition: (1) obtaining VC investment with a higher probability, (2) receiving VC investment more quickly, (3) receiving a larger amount of VC investment, and (4) receiving VC investment on more favorable terms. To show the first type of advantages, one needs data on all entrepreneurs who intended to raise VC funding, with some of them having succeeded while others failed in securing VC funding. However, the other three types of advantages may be examined conditional on having received some VC investment. Because my data only cover entrepreneurs who have successfully secured VC funding and the data contain no information on VC investment terms, this study will focus on the second and the third types of advantages only.<sup>9</sup> Consequently, all my

hypotheses are concerned with the timing or the size of VC funding.

The first set of hypotheses compares serial with novice entrepreneurs in terms of the timing of their VC funding. The literature reviewed above suggests that venture capitalists favor entrepreneurs who have social connections with them. Such social connections will help overcome the asymmetric information problem and thus expedite venture capitalists' investment decisions. Therefore, entrepreneurs with ties to the venture capitalists are expected to receive their funding more quickly.

Although all experienced founders are expected to have more social connections, only those with ties to the VC world are likely to have an advantage in securing VC funding. I therefore distinguish between two types of serial entrepreneurs: one group with venture-backed prior firm-founding experience and the other group with non-venture-backed founding experience. Venture-backed founding experience is assumed to have helped entrepreneurs establish ties to the circle of venture capitalists. These entrepreneurs not only know venture capitalists (thus have direct ties) but also know professionals working closely with venture capitalists (thus have indirect ties). In contrast, entrepreneurs with only non-venture-backed founding experience most likely have not established ties to venture capitalists. I therefore postulate that their experience does not help in terms of the timing of their VC financing.

**Hypothesis 1a** Entrepreneurs with venture-backed prior founding experience have quicker access to VC than novice entrepreneurs.

**Hypothesis 1b** Entrepreneurs with non-venture-backed prior founding experience do not have quicker access to VC than novice entrepreneurs.

If social connections between entrepreneurs and venture capitalists help overcome the asymmetric information problem, they should not only accelerate the investment decision process but also help the entrepreneurs with such connections raise more VC funding; that is, venture capitalists should have more trust in firm founders who have ties to them and thus invest more money in their start-ups. However, this difference in the amount of VC funding should only appear at the very early stage of VC financing, because ties to the venture capitalists are important

<sup>9</sup> In a study of VC contractual terms, Kaplan and Strömberg (2003) observe that serial entrepreneurs are treated more favorably than novice entrepreneurs in terms of board control, liquidation rights, and the amount of funding received upfront, providing direct evidence for the fourth type of advantages. Hsu (2007) also shows that start-ups founded by experienced entrepreneurs tend to receive higher valuations from venture capitalists before capital infusion.

mainly at the beginning of the financing relationship when the asymmetric information problem is most serious. Therefore, my second set of hypotheses focuses on the size of VC funding at the early stage of financing. As discussed above, only entrepreneurs with venture-backed founding experience are assumed to have established ties to the VC world and thus have the advantage in terms of the size of the early-stage VC funding. Entrepreneurs with only non-venture-backed founding experience are assumed to have no ties to venture capitalists and thus do not enjoy this advantage over novice entrepreneurs.

**Hypothesis 2a** In an early round of VC financing, entrepreneurs with venture-backed prior founding experience raise more VC than novice entrepreneurs.

**Hypothesis 2b** In an early round of VC financing, entrepreneurs with non-venture-backed prior founding experience do not raise more VC than novice entrepreneurs.

The third set of hypotheses concerns experienced founders' advantage derived from their enhanced entrepreneurial skills. Both venture-backed and non-venture-backed serial entrepreneurs should have acquired some skills from prior founding experience. This should help their firms perform better and in turn attract more VC. As discussed above, this advantage will be observed only if one follows the entrepreneurs beyond the early stage of VC financing so that the VC investors will have enough time to recognize the entrepreneur's skill level. Therefore, if the analysis covers the whole process of VC acquisition, including both early and later rounds of VC financing, then all experienced entrepreneurs are expected to raise more VC; that is, over time, experienced entrepreneurs should show an advantage in terms of raising more VC, whether their prior founding experiences are venture backed or not.

**Hypothesis 3a** Over the whole process of VC financing, entrepreneurs with venture-backed prior founding experience raise more VC than novice entrepreneurs.

**Hypothesis 3b** Over the whole process of VC financing, entrepreneurs with non-venture-backed prior founding experience raise more VC than novice entrepreneurs.

To test these hypotheses, I use the VentureOne data.

### 3 Data

#### 3.1 Data source

The data used in this study were provided by VentureOne, a leading VC research company based in San Francisco.<sup>10</sup> Founded in 1987, VentureOne tracks equity investment by regularly surveying VC firms for recent funding activities and portfolio updates, gathering information through direct contacts with venture-backed companies, and scouring various secondary resources such as company press releases and initial public offering (IPO) prospectuses (VentureOne 2001). VentureOne tries to capture all the venture-backed companies in the USA and their early-stage financing events.<sup>11</sup>

VentureOne claims to have "the most comprehensive database on venture-backed companies."<sup>12</sup> For each VC deal, VentureOne keeps a record of its size, stage of financing, closing date, VC firms involved, and detailed information about the firm that received the investment, including its address, start year, industry, and so on. In addition, VentureOne keeps track of the venture-backed company by monthly contacts with the company and its investors. VentureOne continuously updates the information about the venture-backed company's employment size, business status, and ownership status until the VC support is brought to an end by certain events such as a bankruptcy of the venture-backed company, an IPO, or a merger and acquisition (M&A) that allows venture capitalists to cash out. Although VentureOne's database is maintained for commercial

<sup>10</sup> VentureOne, previously owned by Alternative Investor, was acquired by Dow Jones and Company in 2004. Thus it is now often referred to as "Dow Jones VentureOne".

<sup>11</sup> A firm enters the VentureOne database only if it qualifies as a "venture-backed company" that receives some investment from venture capital firms. VentureOne defines a venture capital firm as "a professional, institutional venture capital limited partnership that generally manages over \$20 million in assets and invests in privately held companies" (VentureOne 2000). Once in the database, VentureOne tracks the company's financing from all sources, including bank loans and IPOs. In this study, I will focus on VC funding only. I will not only exclude bank loans and IPOs, but also drop equity investment by non-VC private investors and corporations in order to have a homogeneous sample.

<sup>12</sup> See <http://www.ventureone.com/> (accessed on April 23, 2006).



purposes, its rich information has attracted many academic researchers.<sup>13</sup> Comparing VC databases with actual VC financing contracts, Kaplan et al. (2002) find that the VentureOne data are generally more reliable, more complete, and less biased than the Venture Economics data, the only other major source of US VC data.

The particular version of the data used here covers VC deals completed from the first quarter of 1992 through the fourth quarter of 2001. It includes 22,479 rounds of equity investment in 11,029 venture-backed companies. Among these firms, 83.5% were founded in or after 1990. See Zhang (2007a) for a more detailed description of the database.

VentureOne also provides a separate data set containing information about venture-backed firm founders. The founder data are incomplete: founder information is available for 5,972 of the 11,029 venture-backed firms.<sup>14</sup> Since many firms are co-founded by more than one individual, the data set gives a total of 10,530 individual founders. For each of these founders, there is a data field containing brief biographical information of the person. It describes the founder's previous working experience, which, in most cases, specifies the positions he held as well as the companies or institutions where he worked. Every firm has a unique identification number, which appears in both the firm data and the founder data, making it possible to match a firm with its founder (when the founder information is available).

It is worth noting that, due to VentureOne's database management practice, the availability of founder information seems unlikely to be entirely random. A start-up enters VentureOne's database once it receives equity investment from a VC firm. VentureOne regularly updates the information about the venture-backed firm until it ceases operation, is acquired by another firm or goes public. Therefore, VentureOne will follow some firms longer than others. VentureOne naturally has more chances to obtain a firm's founder information if the firm has been followed longer.

<sup>13</sup> For recent empirical work using the VentureOne data, see, for example, Gompers and Lerner (2000), Cochrane (2005), Gompers et al. (2005, 2009), and Zhang (2007a, 2009).

<sup>14</sup> Some founder information is available for 6,629 firms. However, some cases are missing the most crucial biographical information of the founder, which cuts down the usable sample to 5,972 firms.

Indeed, I find that firms with founder information tend to be privately held, and are less likely to be out of business, acquired by other firms or complete an IPO. Younger firms also tend to have founder information available.<sup>15</sup> In subsequent analyses, I will focus exclusively on firms with founder information. Thus one has to keep this nonrandom selection of sample in mind when interpreting the results.<sup>16</sup>

### 3.2 Identification and characterization of serial entrepreneurs

To test the hypotheses formulated in Sect. 2, the first step is to identify all the serial entrepreneurs in the VentureOne data. For convenience of exposition, I make a distinction between *repeat* entrepreneurs and *experienced* entrepreneurs in the empirical definition of serial entrepreneurs. A founder is defined as a repeat entrepreneur if he is matched with two or more firms in the VentureOne data. A total of 304 founders qualify as repeat entrepreneurs. Among them, 264 entrepreneurs have two firms each in the VentureOne data, 26 have three firms each, 11 have four firms each, and 3 have five firms each. Because founding date is available for every firm, the sequence of founding activities is known for every repeat entrepreneur.

If a founder has only one firm in the VentureOne data, that does not mean he has no previous firm-founding experience. The biographical information of the remaining founders reveals that an additional 2,563 entrepreneurs have been firm founders previously. I will call this group of 2,563 individuals

<sup>15</sup> This is probably because a start-up founded in later years of the sample period tends to have a company website that usually reveals a lot of information about the founding team.

<sup>16</sup> Gompers et al. (2005, 2009) also use the VentureOne data and rely on the founder information to identify "spinoff firms" (in the case of Gompers et al. 2005) and "serial entrepreneurs" (in the case of Gompers et al. 2009). In both papers, they supplement the original VentureOne founder data by searching for the missing information through sources such as Lexis-Nexis and surviving companies' websites. Just like the practice of VentureOne, the added founder information by Gompers et al. could also introduce some biases because the information of successful founders should be found more easily. They noted this problem in both papers, but their search of alternative sources does give them a more complete sample. Unfortunately, I cannot do the same because VentureOne, citing the concern of confidentiality, replaced real company and founder names with identification numbers in the data they provided to me.

**Table 1** Classification of venture-backed entrepreneurs

Entrepreneur type	Definition	Number of individuals	Number of firms founded
Serial entrepreneur		2,867	2,578
Repeat entrepreneur	Has founded at least two firms in the VentureOne database	304	599
Experienced entrepreneur	Has founded only one firm in the VentureOne database but bio shows previous founding experience	2,563	1,979
Novice entrepreneur	Has founded only one firm in the VentureOne database and bio shows no previous founding experience	7,663	3,394

Calculations in this table are based on the full sample

experienced entrepreneurs. Both repeat and experienced entrepreneurs are *serial* entrepreneurs, and there are 2,867 of them in total. All other 7,663 entrepreneurs will be referred to as *novice* entrepreneurs. This classification of entrepreneur types is summarized in Table 1.

Novice entrepreneurs, by definition, have no prior founding experience. They will serve as the reference group for comparison in the regression analysis.<sup>17</sup> Experienced entrepreneurs are identified as serial entrepreneurs only by their biographical information. That is, their previous firms are not captured by the VentureOne data. It is most likely that their previous firms never received any VC, and therefore, VentureOne did not track them. In my analyses below, I will treat experienced entrepreneurs as if they only have non-venture-backed prior founding experience.<sup>18</sup> Repeat entrepreneurs, when they founded their second and later firms in the sample, obviously had venture-backed prior founding experience.

<sup>17</sup> One might be concerned with the probability that some entrepreneurs have had some previous founding experience not captured by the VentureOne data and therefore are misclassified as novice entrepreneurs. Such misclassification errors would downwardly bias my estimate of the difference between novice and experience/repeat entrepreneurs. Given that I found some statistically significant differences between novice and experience/repeat entrepreneurs—which will be shown below—correcting such biases would only make the results even stronger and would not affect my results qualitatively.

<sup>18</sup> This must be true for a great majority of the experienced entrepreneurs because VC was generally unavailable to most firm founders, especially prior to 1995. One cannot rule out the possibility that their previous firms did receive some VC but the deals were all completed before VentureOne started to track venture-backed firms and thus not captured by the database. However, this possibility has to be very small given that the sample shows that only a small fraction of venture-backed entrepreneurs have two or more venture-backed firms.

However, it is reasonable to assume that when they founded their first firms in the sample they had no venture-backed prior founding experience.

From this point on, my unit of analysis will be a firm rather than an entrepreneur because the former is usually more sensible for the empirical question at hand. Recall that a firm may have multiple founders, some of whom may be serial entrepreneurs and others may not be. Thus when I use the firm as the unit of analysis, it is necessary to make clear what it means to say “a firm founded by a serial entrepreneur.” In this paper, I will always assign a firm to its most experienced founder in cases where there are multiple founders. That is, I will consider a firm as founded by a serial entrepreneur if at least one of its founders has previous founding experience. The underlying assumption for this practice is that a start-up’s performance in VC acquisition is determined by the most experienced entrepreneur on its founding team. This assumption, although arbitrary, seems to be the most reasonable way to treat firms with multiple founders given that no other information about the founding team is available.<sup>19</sup>

Table 2 presents the industry distribution of venture-backed firms by entrepreneur type. Compared with firms founded by novice entrepreneurs, firms founded by repeat entrepreneurs are more likely to be in biopharmaceutical, telecommunication, and medical device industries. Notice that these are all highly knowledge-intensive industries, and venture-backed firms in these industries are often built around very complex and advanced technologies that investors are

<sup>19</sup> This is a conservative assumption in that, if access to VC is not determined by the most experienced founder, the advantage of the experienced founder will be underestimated, against finding supportive evidence for hypotheses 1 to 3.

**Table 2** Industry distribution of venture-backed firms, by entrepreneur type

Industry	Firms by novice entrepreneurs	% of total	Firms by repeat entrepreneurs	% of total	Firms by experienced entrepreneurs	% of total
Adv/spec material	14	0.41	4	0.67	8	0.40
Agriculture	5	0.15	0	0	0	0
Biopharmaceutical	215	6.33	53	8.85	83	4.19
Communication	427	12.58	114	19.03	230	11.62
Consumer/bus prod	32	0.94	0	0	20	1.01
Consumer/bus serv	733	21.60	102	17.03	517	26.12
Electronics	97	2.86	16	2.67	57	2.88
Energy	6	0.18	0	0	2	0.10
Healthcare	57	1.68	9	1.50	28	1.41
Information services	364	10.72	72	12.02	223	11.27
Medical devices	126	3.71	58	9.68	58	2.93
Medical information	108	3.18	11	1.84	60	3.03
Retailing	92	2.71	15	2.50	47	2.37
Semiconductor	159	4.68	19	3.17	69	3.49
Software	954	28.11	125	20.87	574	29.00
Other	5	0.15	1	0.17	3	0.15
Total	3,394	100	599	100	1,979	100

Calculations in this table are based on the full sample

unlikely to grasp. It is possible that, because of this feature of such industries, venture capitalists tend to favor entrepreneurs with a track record of VC financing. It is even possible that venture capitalists invest in the same entrepreneurs whom they supported before in those industries.<sup>20</sup> Firms founded by experienced entrepreneurs and novice entrepreneurs have more similar industry distributions, except that experienced entrepreneurs have a significantly larger presence in the consumer/business services industry.

### 3.3 Variables for regression analysis

This study's version of the VentureOne data by design only covers VC deals completed in or after 1992. Although some firms founded before 1992 are captured by the database, they are not representative start-ups of their cohorts. In fact, many firms founded before 1992 in the VentureOne database are existing businesses that seek risk capital to support part of their operations or for a restart rather than brand-new start-ups. Therefore, I decided to exclude all firms founded before 1992 from the regression analysis.

<sup>20</sup> VentureOne does collect this information although it is not available in my version of the VentureOne data.

This section describes the variables used in the regression analysis. A summary of these variables is presented in Table 3.

I focus on four dependent variables at the firm level: time to first-round VC financing, measured by months elapsed between the start-up's founding date and the closing date of the first-round VC<sup>21</sup>; amount of VC raised in the first round; amount of VC raised in any round; and total amount of VC raised. The amount of VC is always measured in millions of 1996 US dollars, converted using the GDP deflator.

Explanatory variables include four entrepreneur-type dummies. These variables indicate whether a start-up is a repeat entrepreneur's first firm, subsequent firm, an experienced entrepreneur's firm or a novice entrepreneur's firm. Firms founded by novice entrepreneurs serve as the reference group. To test hypotheses 1 to 3, I am particularly interested in whether the other three dummy variables are significantly correlated with the dependent variables.

<sup>21</sup> This is not the "first" (earliest) round of venture capital a start-up completed. Rather, it is the round labeled as the "first round" by the round class variable. A small fraction of start-ups completed a "seed round" before the "first round."

**Table 3** Variable definitions and summary statistics

Variable	Definition	Mean	SD
<i>Dependent variables</i>			
Time to first-round VC	Months between a start-up's founding date and closing date of its first-round VC financing	18.43	19.22
Size of first-round VC	Amount of money (in millions of 1996 US dollars) raised in the first-round VC financing	7.47	10.45
Size of any round of VC	Amount of money (in millions of 1996 US dollars) raised in any round of VC financing	10.31	14.80
Total VC raised	Total amount of money (in millions of 1996 US dollars) raised in all rounds of VC financing	16.31	25.12
<i>Founder type</i>			
First firm founded by a repeat entrepreneur	Dummy = 1 if the firm is the first one founded by a repeat entrepreneur	0.03	0.17
Subsequent firm founded by a repeat entrepreneur	Dummy = 1 if the firm is the second or later one founded by a repeat entrepreneur	0.06	0.24
Firm founded by an experienced entrepreneur	Dummy = 1 if the firm is founded by an experienced entrepreneur	0.26	0.44
Firm founded by a novice entrepreneur	Dummy = 1 if the firm is founded by a novice entrepreneur, always excluded as reference group	0.65	0.48
<i>Control variables</i>			
Firm age at VC round	Months between start-up founding date and VC closing date	25.98	21.71
Firm age at last VC round	Months between start-up founding date and closing date of the last round of VC financing	26.97	22.86
Number of VC rounds completed	Total number of rounds of VC completed by the firm	1.64	1.08
Firm start year dummies	Set of ten dummies indicating a firm's start year, 1992–2001	–	–
VC deal closing year dummies	Set of ten dummies indicating the closing year of a VC round, 1992–2001	–	–
VC round class dummies	Set of five dummies indicating the stage of the VC round (seed, first, second, later, and other)	–	–
Industry dummies	Set of 16 dummies indicating a firm's industry (see list in Table 2)	–	–
High-tech center dummies	Set of six dummies indicating whether a firm is located in a VC-rich high-tech center (see list in Appendix)	–	–

All start-ups in this sample were founded in or after 1992

The following variables are used as controls:

*Firm age at VC round:* This variable is measured by months elapsed between a firm's start date and a VC deal's closing date. Older firms tend to be larger and involved in more activities, and thus need more capital. In addition, the promise of an older firm is likely to be clearer to the investors. Given that venture capitalists still want to invest in it, it must be a good business that deserves more money. Thus one expects a positive relationship between start-up age and the amount of VC it raised. When the total amount of VC is used as the dependent variable, the relevant age control is *firm age at the last VC round*.

*Total number of VC rounds completed:* This variable is used as a control when I analyze the total

amount of VC raised by a firm. Naturally, one expects a positive relationship between the number of VC rounds and the total amount of VC raised.

*Year dummies:* The availability of VC changed a lot from one year to the next. Total VC investment in the USA (calculated using the VentureOne data) grew rapidly from US \$3.5 billion in 1992 to US \$88.9 billion in 2000, and sharply declined to US \$28.0 billion in 2001 as the Internet bubble burst. Such year-to-year changes must have affected how quickly a start-up can secure VC funding and how much VC investment it receives. I use a start-up's *start year dummy* or the VC deal's *closing year dummy*, whichever is more appropriate for the analysis at hand, to control for the cohort effect.

*Industry dummies:* A total of 16 industry dummies are generated. Some industries are necessarily more capital intensive than others, and start-ups in such industries should receive more VC. Time to the first-round VC may also vary across industries.

*High-tech center dummies:* These are a set of dummy variables indicating whether a firm is located in one of the major high-tech centers in the USA. (See Appendix for the geographic definition of high-tech centers.) VC is more easily available in high-tech centers such as Silicon Valley and Boston. Start-ups in these regions are expected to have quicker access to VC and raise more money. Also, start-ups in high-tech centers may raise more VC based on need because operating costs are usually higher in such regions.

*Round class dummies:* For every start-up, the amount of VC raised in an early round of financing is likely to be less than in later rounds. For this reason, it is necessary to control for round class when a start-up's different VC rounds are included in a regression as separate observations. Four round class dummies were constructed to indicate seed round, first round, second round, and later round. The comparison group includes other VC rounds such as restart and venture leasing.

## 4 Empirical results

This section presents regression results and examines whether they support hypotheses 1 to 3. All the empirical analyses are conducted at the firm level. For all regressions, I report standard errors robust to heteroskedasticity.<sup>22</sup>

### 4.1 Entrepreneurial experience and the timing of VC funding

I first examine the timing of a start-up's first major VC deal and check whether serial entrepreneurs have quicker access to VC in their subsequent firm-founding activities.

Table 4 shows the average time to the first-round VC by entrepreneur type. On average, novice entrepreneurs wait 19.5 months to have the first-round VC in place; the average is 16.6 months for the first

**Table 4** Time to first-round venture capital, by entrepreneur type

Start-up category	Time to first-round VC, months (standard deviation in parenthesis)	Number of observations
Start-ups founded by novice entrepreneurs	19.46 (19.85)	2,078
First start-ups founded by repeat entrepreneurs	16.57 (15.32)	88
Later start-ups founded by repeat entrepreneurs	9.04 (8.67)	180
Start-ups founded by experienced entrepreneurs	19.22 (18.78)	870

The unit of analysis in this table is the firm. All start-ups in this sample were founded in or after 1992

start-ups by repeat entrepreneurs and 19.2 months for start-ups by experienced entrepreneurs. One-tailed *t*-tests show that the difference between experienced entrepreneurs and novice entrepreneurs is not statistically significant ( $p$ -value = 0.38) and that the difference between repeat entrepreneurs when founding their first firms and novice entrepreneurs is only marginally significant ( $p$ -value = 0.09). In contrast, it takes much less time for repeat entrepreneurs to obtain capital for their subsequent firms. For the second and later start-ups founded by repeat entrepreneurs, the average waiting time to first-round VC is 9.0 months, statistically significantly lower than all the other averages at the 1% level in one-tailed *t*-tests. These seem to be consistent with hypotheses 1a and 1b.

However, these differences in waiting time may simply reflect a cohort effect. The second and subsequent start-ups by repeat entrepreneurs, by definition, were founded later in the sample period. VC was more easily available in the late 1990s during the Internet boom, which might have made it easier for start-ups to secure VC investment quickly. So I conduct regression analyses to control for cohort effect and other relevant factors. I estimate two models: an OLS model and a Cox proportional hazards model.<sup>23</sup> The results are reported in Table 5.

<sup>22</sup> In one case, when different VC deals completed by a single VC-backed firm are treated as separate observations, I report standard errors that cluster on the firm.

<sup>23</sup> The duration analysis follows Shane and Stuart (2002), which examines the hazard of VC funding, IPO, and failure events for 134 firms founded to exploit inventions at MIT.



**Table 5** Timing of a firm's first-round venture capital

Independent variables	OLS Dependent variable: months between founding date and first-round VC closing date	Cox proportional hazards model Duration variable: time to first-round VC
Constant	19.926** (8.724)	
First firm founded by a repeat entrepreneur	-0.195 (2.062)	0.040 (0.095)
Subsequent firm founded by a repeat entrepreneur	-9.463*** (1.461)	1.928*** (0.161)
Firm founded by an experienced entrepreneur	-0.317 (0.751)	1.007 (0.042)
VC deal closing year dummies	Yes	Yes
Industry dummies	Yes	Yes
High-tech center dummies	Yes	Yes
Adjusted $R^2$	0.066	
Log likelihood		-20,985.2
Number of observations	3,216	3,001

The unit of analysis in this table is the firm. All start-ups in this sample were founded in or after 1992

Heteroskedasticity-robust standard errors are in parentheses

Cox regression coefficients (rather than the hazard ratios) are presented in the second column

\*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively

Yes—dummy variables are included as controls

The OLS results show that, compared with start-ups founded by novice entrepreneurs, subsequent start-ups founded by repeat entrepreneurs have much quicker access to VC. On average, they are 9.5 months younger at the first-round VC financing, after controlling for confounding factors. This is consistent with hypothesis 1a. The first start-ups by repeat entrepreneurs and those founded by experienced entrepreneurs have no advantage in terms of the timing of the first-round VC. The coefficients of the first-firm-repeat-entrepreneur dummy and the experienced-entrepreneur dummy are very small (-0.2 and -0.3, respectively) and not statistically different from zero. Since neither

experienced entrepreneurs nor repeat entrepreneurs when founding their first firms have any venture-backed prior founding experience, these results support hypothesis 1b. The Cox regression results are qualitatively similar. They show that subsequent firms founded by repeat entrepreneurs are more likely to have secured the first-round VC funding than those founded by novice entrepreneurs. Again, the first firms founded by repeat entrepreneurs and firms founded by experienced entrepreneurs do not show quicker access to VC.

Venture-backed firms concentrate in high-tech industries, in which the fast pace of innovation gives the first mover a large advantage. As Zhang (2007a) shows, quicker access to VC is correlated with a higher probability of completing an IPO, a better chance of making profit, and a larger employment size. Therefore, repeat entrepreneurs' quicker access to VC could have a substantial effect on the performance of their subsequent ventures.

#### 4.2 Entrepreneurial experience and the size of VC funding

I next examine whether experienced start-up founders raise more VC than novice entrepreneurs. The regression results, using three different VC size measures as dependent variables, are presented in Table 6.

Model (1) in Table 6 explains the amount of money raised in the first-round VC financing. It is expected that the asymmetric information problem is the most serious in this round because it is often the case that venture capitalists and the entrepreneur just started their relationship in the first round. Model (1) shows that, compared with start-ups founded by novice entrepreneurs, subsequent firms founded by repeat entrepreneurs receive US \$4.1 million more at the first round of financing. This difference is substantial given that the total amount of VC money raised in the first round is only US \$7.47 million on average.

In contrast, repeat entrepreneurs' first firms did not raise more money in the first round. In other words, when repeat entrepreneurs themselves for the first time received some VC investment, they were just like other novice entrepreneurs in the first round. Similarly, experienced entrepreneurs do not raise more money for their start-ups in the first round,

**Table 6** Venture capital raised

Independent variables	(1) Dependent variable: size of first-round VC	(2) Dependent variable: size of any round of VC	(3) Dependent variable: total VC raised
Constant	2.259 (1.785)	1.832 (2.395)	-23.510*** (3.303)
First firm founded by a repeat entrepreneur	0.708 (0.652)	2.184** (1.048)	4.154* (2.390)
Subsequent firm founded by a repeat entrepreneur	4.064*** (1.354)	3.657*** (1.118)	5.605*** (1.752)
Firm founded by an experienced entrepreneur	0.027 (0.352)	0.760* (0.446)	1.608** (0.775)
Firm age at VC round	0.015* (0.009)	-0.038*** (0.010)	
Firm age at last VC round			0.137*** (0.018)
Number of VC rounds completed			11.155*** (0.555)
Firm start year dummies			Yes
VC deal closing year dummies	Yes	Yes	
VC round class dummies		Yes	
Industry dummies	Yes	Yes	Yes
High-tech center dummies	Yes	Yes	Yes
Adjusted $R^2$	0.089	0.197	0.304
Number of observations	3,410	7,547	4,734

The unit of analysis in this table is the firm. All start-ups in the sample were founded in or after 1992. All financial variables are measured in millions of 1996 US dollars. For models (1) and (3), heteroskedasticity-robust standard errors are in parentheses. For model (2), robust standard errors are computed by clustering at the VC-backed firm level. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels, respectively. Yes—dummy variables are included as controls

although they are expected to have acquired some skills from their prior founding experience.

These results from model (1) support hypotheses 2a and 2b. They suggest that entrepreneurs with venture-backed prior founding experience raise more VC in an early stage of VC financing, but this advantage is entirely derived from the connections to VC investors that they previously established instead of from their enhanced entrepreneurial skills. In the previous section, I showed that subsequent firms founded by repeat entrepreneurs also have significantly quicker access to VC. Together, these results clearly show that entrepreneurs with venture-backed prior founding experience have a head start in the process of raising VC. However, entrepreneurs with non-VC-backed prior founding experience do not have any advantage at the very early stage of VC financing.

Because some start-ups completed a seed round before the first round, I tried a different specification using the sum of these two rounds of VC as the

dependent variable. The results are almost identical to those of model (1). This is not surprising given that generally the size of a seed round is much smaller than the first round and thus adding the seed-round VC to the first round yields essentially the same dependent variable.

Model (2) in Table 6 uses the size of any VC round as the dependent variable. That is, if a firm completed several rounds, every round is included in the regression as a separate observation. I added an additional set of dummy variables to control for round class since early rounds naturally have a smaller size than later rounds. Model (2) again shows that subsequent firms founded by repeat entrepreneurs receive more VC than novice entrepreneurs. The difference is US \$3.7 million. This is actually smaller than the extra VC received by repeat entrepreneurs in the first round, suggesting that their advantage diminishes in later rounds.

In contrast with the results from model (1), the coefficient of firms founded by experienced entrepreneurs

in model (2) is also positive and statistically significant. On average, an experienced entrepreneur raises US \$0.8 million more than a novice entrepreneur. This suggests that, although at the first round of financing venture capitalists do not favor previous firm-founding experience that does not involve VC, those entrepreneurs do learn a great deal from that experience. Such acquired skills or knowledge may soon be recognized by venture capitalists and help experienced entrepreneurs raise more VC money in later rounds of financing. The results in model (2) support hypotheses 3a and 3b.

Unlike the results of model (1), in model (2) the first firms founded by repeat entrepreneurs also raise more money. They raise US \$2.2 million more VC per round, substantially larger than the extra amount of VC raised by experienced entrepreneurs. One possible explanation of this result is that repeat entrepreneurs are a special group of individuals whose qualities are particularly suitable for business creation. Although venture capitalists did not recognize this in the first round of financing when they invested in their first firms, they might soon learn about the superior qualities of those entrepreneurs based on observed performance.<sup>24</sup> Consequently, venture capitalists might have invested more money in repeat entrepreneurs' first firms in their second and later rounds of financing, which explains why repeat entrepreneurs raise more VC money per round even for their first start-ups in the data.

It is important to note that even repeat entrepreneurs themselves might not know at the very beginning that they have a comparative advantage in business creation. They might not recognize their own qualities until they have raised a large amount of capital in the process of starting their first firms. And perhaps raising a lot of money for their first firms is exactly the reason why they decided to repeat the

experience. In any case, this seems to be a result of self-selection that individuals choose to become repeat entrepreneurs partly because they raised more VC for their first firms. Unfortunately, the Venture-One data contain no information about the founder's individual characteristics that can be used to correct for this selection bias econometrically.

Unexpectedly, in model (2), start-up age has a negative and statistically significant coefficient. Recall that my sample period is 1992–2001, so older firms in the sample tend to complete their VC deals in the early 1990s when VC was much scarcer than in the late 1990s. Most likely, the negative sign of the age coefficient reflects the increasing availability of VC funding over the sample period. The closing year dummies should have picked up some of the effect of this trend, but perhaps not all of it.

Model (3) in Table 6 tests hypotheses 3a and 3b using an alternative specification: taking each firm as a single observation to examine the total amount of VC it raised over different rounds of financing. Results here are qualitatively similar to those of model (2). Again, consistent with hypothesis 3a, subsequent firms founded by repeat entrepreneurs raise more money than those founded by novice entrepreneurs.<sup>25</sup> The difference is US \$5.7 million. However, as shown in model (1), such firms receive US \$4.1 million more in the first round of financing. This suggests that in later rounds of financing, although VC deals are much larger, repeat entrepreneurs raise only US \$1.6 (= 5.7 – 1.4) million more

<sup>24</sup> Here one should not confuse the performance of the entrepreneur with the performance of the firm. Even a great entrepreneur may produce failures, because many other factors affect the performance of the firm. Such factors may include the overall economic trend, unanticipated demand, supply or price shocks, and luck, which are all out of the entrepreneur's control. See Sarasvathy and Menon (2003) for an alternative and more sophisticated argument.

<sup>25</sup> In Table 5, it is shown that subsequent firms founded by repeat entrepreneurs tend to raise their first-round VC at a younger age. Therefore, they may appear to raise more VC in total not because they indeed raise more VC over their lifetime, but only because they have secured VC more quickly and the data are censored at the end of the sample period (fourth quarter of 2001). I tried to address this issue by including "time to first-round VC" as a control variable in model (3). This is done in two different ways: (1) including this variable as an additional control variable, and (2) including this variable as a control and excluding "age at last VC round" from the regression. The results are qualitatively identical to those reported in Table 6; that is, holding "time to first-round VC" constant, by the end of 2001 subsequent firms founded by repeat entrepreneurs tend to raise more VC than those founded by novice entrepreneurs. This suggests that the results in model (3) of Table 6 are not an artifact of the censored data.

for their subsequent firms. This again shows that the advantage associated with venture-backed prior founding experience is most prominent in the first round. This makes sense because over time all entrepreneurs, including those without previously established ties to VC investors, would gradually overcome the asymmetric information problem between them and the venture capitalists. Therefore, entrepreneurs without prior founding experience should become less disadvantaged in later rounds of financing.

Like in model (2), the coefficient of the experienced-entrepreneur dummy in model (3) is still positive and statistically significant. This suggests that skills learned from prior founding experience indeed help a start-up founder raise more VC money over a longer run. Again, this result supports hypothesis 3b.

Model (3) also shows that even the first firm founded by a repeat entrepreneur raises more VC in total. Assuming that there is self-selection and only the most capable entrepreneurs choose to become repeat entrepreneurs, then one can consider the coefficient of the first-firm-repeat-entrepreneur dummy as the extra VC money they command only because of their superior skill endowment before they founded their first firms.<sup>26</sup> When they found the subsequent firms, they have more skills from prior experience and also have established connections, both of which help them raise more VC money. Thus it is reasonable to see that the coefficient of the subsequent-firm-repeat-entrepreneur is bigger than that for the first-firm-repeat-entrepreneur dummy (5.60 versus 4.15). However, the difference between these two ( $1.45 = 5.60 - 4.15$ ) seems too small given that an experienced entrepreneur, with only the enhanced skills but not established ties, raises US \$1.61 million more than novice entrepreneurs. A possible explanation is that repeat entrepreneurs,

when they found their subsequent firms, need less VC than before, either because they become richer as successful entrepreneurs or they become more reluctant to give up their ownership in exchange for equity investment.

In model (3), start-up age has a positive and statistically significant coefficient; that is, older firms raise a larger amount of VC than younger ones. The number of VC rounds also has a significant and positive coefficient. More VC rounds bring more money, which is not surprising.

## 5 Conclusions and discussion

### 5.1 Findings and contributions

This paper examines whether entrepreneurs with prior founding experience have any advantage over novice entrepreneurs in the process of raising VC. I distinguished between venture- and non-venture-backed founding experiences and examined their effects on four measures: time to the first-round VC, the amount of VC raised in the first round, and in any round, and the total amount of VC raised.

I find that entrepreneurs with venture-backed founding experience gain access to VC more quickly and raise more VC in the first round than novice entrepreneurs. This advantage at the early stage appears to be a result of their previously established connections to VC investors, because experienced entrepreneurs, also with prior founding experience but without connections to VC investors, do not have quicker access to VC and do not raise more VC in the first round than novice entrepreneurs. Repeat entrepreneurs' first firms, founded when they themselves had no connections with venture capitalists, do not have this advantage either, further confirming the importance of ties to VC investors at the very early stage of VC financing.

When I also consider VC raised in later rounds, whether included as separate rounds or added to the total, all serial entrepreneurs appear to raise more VC than novice entrepreneurs. In particular, experienced entrepreneurs (whose previous firms were not venture backed) also raise more VC than novice entrepreneurs. This suggests that entrepreneurs indeed learn from their previous experience, and venture capitalists will recognize this over time and invest more

<sup>26</sup> Throughout the discussion, I have assumed that repeat entrepreneurs, when founding their first start-ups captured in the VentureOne data, are novice entrepreneurs. However, one might suspect that some of them actually had some non-VC-backed founding experience before they started their first VC-backed firms and that such experience was not captured by the VentureOne data. Indeed, this alternative assumption would also be consistent with the finding that the first firms founded by repeat entrepreneurs show some advantages in later rounds of financing.

money in them later on. Thus the skills these entrepreneurs acquire from earlier founding experience do benefit their later firms.<sup>27</sup>

These findings constitute this paper's major contributions to the literature, which are twofold. First, it helps scholars as well as practitioners better understand the importance of an entrepreneur's prior firm-founding experience. A large body of literature on experienced firm founders is motivated by the hypothesis that prior experience enhances entrepreneurial skills. This paper provides empirical evidence consistent with that hypothesis. What distinguishes this paper from most existing literature is that it also considers prior founding experience as a way of building up the entrepreneur's social capital that can help his later firms. Second, this paper helps scholars as well as practitioners better understand the venture capitalists' investment decision process. Existing literature suggests that venture capitalists will favor start-up founders with more entrepreneurial skills and with ties to the VC world. This paper's findings suggest that better skills and established connections are important at different stages of VC financing. At the very early stage, the entrepreneur's ties to the VC world are most advantageous; in later rounds, enhanced entrepreneurial skills become helpful too.

Out of the existing literature on entrepreneurial experience and serial entrepreneurs, two recent studies are most closely related to this one. Hsu (2007) uses survey data of 149 technology start-ups to investigate how the entrepreneur's human and social capital is related to VC funding and valuation. He finds that entrepreneurs with prior founding experience are more likely to receive funding through direct ties in the VC world and have a higher valuation of the start-up by the VC investors. My study here finds that such experienced founders also have quicker access to VC and raise more VC, which is consistent with and complementary to Hsu's findings.

<sup>27</sup> Given that experience matters, one would expect that an inexperienced entrepreneur will have incentive to assemble a more experienced management team and a board of directors with many veterans to compensate his lack of experience. Unfortunately, the VentureOne data I am using do not have detailed information about the management team or board members. So it is impossible to check directly whether this hypothesis is true and whether the experience of the management group and board members also matters.

In a forthcoming paper, Gompers et al. (2009) also use data from VentureOne to examine the importance of entrepreneurial skills. They find that successful entrepreneurs (defined as those whose previous firms went public) are more likely to succeed in subsequent ventures than novice entrepreneurs and entrepreneurs whose previous firms failed. They interpret this finding as evidence that actual as well as perceived entrepreneurial skills lead to persistence in entrepreneurial performance. Consistent with the findings in this paper, Gompers et al. also notice that later ventures of repeat entrepreneurs tend to receive first-round funding at a younger age.<sup>28</sup> They focus exclusively on the entrepreneurs who had multiple VC-backed firms (i.e., repeat entrepreneurs in my terminology), whereas I also examine the entrepreneurs with non-VC-backed experience. They study whether firms founded by serial entrepreneurs are more likely to go public, whereas I investigate the performance of serial entrepreneurs in the process of raising VC. Therefore, Gompers et al. (2009) and this study are also highly complementary in the attempt to better understand serial entrepreneurs.

## 5.2 Limitations and future research

This study's regression analyses, when taking into account later rounds of VC financing, reveal that a repeat entrepreneur's first firm also receives more VC. This is a sign of self-selection that high-ability entrepreneurs are more likely to become serial entrepreneurs. Although the technique for correcting this kind of selection biases has become standard (Heckman 1979), it is impossible to implement here because the VentureOne founder data provide no information about an entrepreneur's individual characteristics. This inability to overcome the problem of self-selection is the primary limitation of this study.

Another limitation of the paper is related to the practice of using entrepreneurs' prior venture-backed founding experience to proxy their ties to venture capitalists. Given that VC investment tends to be local and that repeat entrepreneurs do not move far away from their previous firms when they found their

<sup>28</sup> They present this as evidence that serial entrepreneurs, when founding their later ventures, are not necessarily wealthy individuals.



next firms,<sup>29</sup> this proxy should be a good one. However, the nature of the ties between repeat entrepreneurs and venture capitalists remains unclear, as does the channel through which those ties become useful; for example, it is not known whether repeat entrepreneurs go back directly to their previous investors to raise VC or find new ones through their connections in the VC world.

Given these limitations of the paper, the results as summarized above should be taken as suggestive rather than conclusive, calling for further investigation along this line. Future work on the following topics will likely be fruitful.

First, it is highly desirable to control for self-selection biases and conduct a cleaner test of hypothesis 3a. More specifically, one wants to study to what extent the observed extra VC raised by repeat entrepreneurs can be explained by the fact that only particular types of entrepreneurs choose to become repeat entrepreneurs. To answer this question, one needs a database that contains a wide range of individual characteristics for both serial and novice entrepreneurs.

Second, it is useful to examine directly whether serial entrepreneurs go back to the venture capitalists they know to seek support in their subsequent ventures and whether that is the key factor that explains why they have quicker access to a larger amount of VC. A crucial assumption I used to motivate this study and explain some of the findings is that repeat entrepreneurs exploit their previously established connections to the VC world in the process of raising VC for their subsequent ventures. It is important to check whether this assumption resembles reality. In fact, VentureOne does collect data about the major investors involved in each round of VC financing, although I do not have access to such information. Thus a more complete version of the VentureOne data can help answer this question.

Third, it is also useful to investigate how the advantage of serial entrepreneurs in the process of

raising VC contributes to their subsequent successes. Zhang (2007a) shows that early access to a large amount of VC gives a start-up an edge in fast-paced technology industries, which leads to better performance later on in terms of profitability, employment growth, and completing an IPO. This implies that the advantage of serial entrepreneurs over the lifetime of their subsequent ventures may be even more significant than is shown in this study.

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## Appendix

### Geographic definition of high-tech centers

Following Saxenian (1999), I define Silicon Valley as the whole Santa Clara County and adjacent cities in Alameda, San Mateo, and Santa Cruz Counties.

City	Zip code
<i>Santa Clara County</i>	
All	All
<i>Alameda County</i>	
Fremont	94536–39, 94555
Newark	94560
Union City	94587
<i>San Mateo County</i>	
Atherton	94027
Belmont	94002
East Palo Alto	94303
Foster City	94404
Menlo Park	94025
Redwood City	94061–65
San Carlos	94070
San Mateo	94400–03
<i>Santa Cruz County</i>	
Scotts Valley	95066–67

<sup>29</sup> In fact, over three-quarters of repeat entrepreneurs' subsequent firms in these VentureOne data are located within 50 miles from their previous firms (Zhang 2007b).

Other regions are defined using telephone area codes.

Region	Area code
San Francisco Bay Area	Silicon Valley, plus 408, 415, 510, 650, 925 if not already in Silicon Valley
Boston	508, 617, 781, 978
New York	201, 212, 347, 516, 646, 718, 732, 845, 908, 914, 917, 973
Seattle	206, 253, 360, 425
Washington, DC	202, 240, 301, 571, 703

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