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# Entrepreneurial Spawning: Experience, Education, and Exit

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# Non-Technical Summary

Venture capital (VC) backed firms are among the most dynamic entrepreneurial firms contributing significantly to innovation and economic growth. This is particularly true for firms in high-tech industries on which most of venture-capital financing is concentrated on. One of the key inputs in this process is, besides VC financing, the spirit and human capital of the founders and entrepreneurs.

While being a decisive input in this process, rather little is known about the career paths (after leaving the VC-backed venture) and personal backgrounds of VC-backed entrepreneurs. An important benefit of venture capital finance is that it spawns the creation of new ventures. That is, entrepreneurs backed by venture capitalists (VCs) tend to form new companies, or become coaches for new entrepreneurs in the form of business angels, after VCs exit the venture. Nevertheless, hitherto existing literature, which addresses the exit issue of entrepreneurs, mostly focuses (exclusively) on non-high-tech firms and hence, look – given the very different type of activities and firms – into a very different setting. Yet in this context, it would be of considerable importance to understand the role of VC in spawning new entrepreneurial activity, since it has implications for practice and policymakers alike. Where VC spawns new entrepreneurial activity, positive externalities emerge that exacerbate the benefits of VC finance.

Hence, we aim to narrow this gap in the literature on the analysis of career paths of entrepreneurs in high-tech firms. In order to do so we address two main research questions. First, we relate the entry decision of founders (that is, whether they have worked for a start-up before, and their founding experience and education) with their exit decision, i.e. whether they stick with entrepreneurial activity or become dependently employed. Second, we investigate other drivers of the founders' exit decision such as the exit choice of the company itself or the financial success of the company. By answering both questions, we depict a broader picture of the dynamics of entrepreneurial careers, their patterns as well as the driving forces. We thereby also provide important new insights into the dynamics of the corporate governance of venture-financed high-tech firms. In order to achieve these goals, we deploy a hand-collected sample of high-tech firms, which have received venture financing. Thereby, we focus on the patterns of the entrepreneurs' career paths as well as on the determinants of the likelihood of an entrepreneur and founder to stick with entrepreneurial activity.

The analysis shows that experiencing VC-backing does not lead entrepreneurs to become repeat entrepreneurs, unless they had prior experience either founding or working for a start-up, or unless the entrepreneur is a 'jack-of-all-trades' with a general management education. VC-backing by itself will give rise to future entrepreneurial activities in terms of repeat founders or creating business angels only where the VC-backed venture generates a substantial financial return to the entrepreneur. Hence, future academic and policy work on the role of VC in creating serial entrepreneurs should recognize that entrepreneurial characteristics, including their prior experience with entrepreneurship and their education, appear to play a stronger role

than the experience of VC itself. VC-backing spawns new entrepreneurial activity only insofar as there is a large financial reward to entrepreneurs associated with VC exit. It is the large financial success in entrepreneurship making founders more inclined to become repeat entrepreneurs and business angels.

# Entrepreneurial Spawning:

# Experience, Education, and Exit*

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# Entrepreneurial Spawning: Experience, Education, and Exit


## Abstract

We investigate the career dynamics of high-tech entrepreneurs by analyzing the exit choice of entrepreneurs: to act as a business angel, to found another firm, or to become dependently employed. Our detailed data from CrunchBase indicate that founders are more likely to stick with entrepreneurship as a serial entrepreneur or as an angel investor in cases where the founder had prior experience either in founding other startups or working for a startup, or had a 'jack-of-all-trades' education.



Keywords: Venture governance, entrepreneurship, entrepreneurial spawning, angel finance, venture capital, exit

JEL Codes: G24, G34, L26

## 1. Introduction

Gompers, Lerner, and Scharfstein, (2005) Gompers Kovner, Lerner, and Scharfstein (2010), and Cumming and Knill (2012), show an important benefit of venture capital (VC) finance is that it spawns the creation of new ventures. That is, entrepreneurs backed by venture capitalists (VCs) tend to form new companies, or become coaches for new entrepreneurs in the form of business angels, after VCs exit the venture.

We examine for the first time the specific conditions under which entrepreneurs actually stick with entrepreneurship in the form of starting a new company or becoming a business angel. By examining detailed data on the personal characteristics of these entrepreneurs, we address more precisely the questions of exactly when and why does entrepreneurial finance lead to the creation of new ventures.

Venture capital backed firms are among the most dynamic entrepreneurial firms contributing significantly to innovation and economic growth (Sapienza, Manigart and Vermeir, 1996; Manigart, Collewaert, Wright, Pruthi, Lockett, Bruining, and Landstrom, 2007; Nahata, 2008; Schwienbacher, 2008; Yung, 2009; Cumming and Johan, 2013; Ritter, 2015; and, Audretsch, Lehmann, Paleari, and Vismark, 2016). This is particularly true for firms in high-tech industries on which most of venture-capital financing is concentrated.[1] One of the key inputs in this process is, besides VC financing, the spirit and human capital of the founders and entrepreneurs (Bonardo, Paleari, and Vismara, 2011; and, Meoli, Paleari, and Vismara, 2013). While being a decisive input in this process, little is known about the career paths (after leaving the VC-backed venture) and personal backgrounds of

[1] VC-backed firms also embrace growth capital firms which invest in tangible assets and the acquisition of other companies. Among IPOs from 1980-2012, 12% of VC-backed firms are classified as growth capital-backed (see Ritter, 2015). See also Deli and Santhanakrishnan (2010), Hoban Jr. (1978), Jindra and Leshchinskii (2015), and Wang, Wang, and Zhang (2013).

VC-backed entrepreneurs. Papers which address the exit issue of entrepreneurs mostly focus (exclusively) on non-high-tech firms (see e.g., Wennberg and DeTienne, 2014); given the very different type of activities and firms, look into a very different setting.

We aim to narrow this gap in the literature on the analysis of career paths of entrepreneurs in high-tech firms. We address two main research questions. First, we relate the entry decision of founders (that is, whether they have worked for a start-up before, and their founding experience and education) with their exit decision (i.e., whether they stick with entrepreneurial activity or become dependently employed). Second, we investigate other factors of the founders' exit decision such as the exit choice of the company itself. By answering both questions we depict a broader picture of the dynamics of entrepreneurial careers, their patterns, as well as the driving forces.

We analyze these dynamics of the career paths of VC-backed entrepreneurs by using a hand-collected sample of high-tech firms which have received venture financing. We focus on the patterns of the entrepreneurs' career paths as well as on the determinants of the likelihood of an entrepreneur and founder to stick with entrepreneurial activity. We relate different patterns of career paths to characteristics of the entrepreneurs (e.g. starting point of the career, education and work experience) as well as to company and industry characteristics. We aim to draw a picture of the dynamics of career paths of VC-backed entrepreneurs and contribute to a better understanding of the link between entrepreneurial finance and entrepreneurial enterprises. The focus of our analysis is on the determinants of serial entrepreneurship rather than on factors affecting the decision to become an entrepreneur for the first time.

In particular, we show that working for a start-up firm provides ground for repeated entrepreneurial activity. With this finding we reject the notion that large companies are the starting point of entrepreneurs who are not able or willing to pursue their new ideas within

the large organization. Furthermore, our analysis provides clear-cut support for the jack-of-all-trades theory: non-specialists are more likely to stay in entrepreneurial activity after having founded their first venture. Serial entrepreneurship seems to be a persistent pattern: people who have founded a venture before, are significantly more likely to stick with entrepreneurship after having left the current venture they have founded, thereby pointing to the existence of an entrepreneurial genotype.

This paper is organized as follows. Section 2 reviews the prior literature. Section 3 summarizes the testable hypotheses. Section 4 describes the data. Descriptive statistics, comparison tests, and multivariate tests are provided in section 5. The final section concludes with a discussion of the results and future research.

## 2. Literature Review

Our analysis relates to a number of branches of the literature. First, considerable research exists on the entry decision into entrepreneurship that investigates driving forces behind this decision using rather large data sets (see e.g., Evans and Jovanovic, 1989; Georgarakos and Tatsiramos; 2009). However, these studies also include the decision to own a business in general, and also the choice to become self-employed.

In contrast, the approach of Lazear (2002) focuses on the decisions to found new ventures and stresses the "jack of all trades" characteristics of successful entrepreneurs by showing that successful entrants into entrepreneurship are more likely to be generalists rather than specialists. Wagner (2003) and Silva (2007) provide further empirical evidence that "jack of all trades" individuals are more likely to become first-time entrepreneurs (however, see Astrebo and Thompson, 2011, for a more differentiated view). We ask in our

analysis to what extent this carries over into the decision to become a serial entrepreneur, i.e., to move from the newly founded venture into further entrepreneurship.

Our analysis aims to contribute to recent general literature which links human capital formation with entrepreneurial finance and financial markets. We note the fact that successful ventures require a set of inputs, including ideas, and capital, as well as the human capital of entrepreneurs and founders. By studying university spin-offs in Europe, Bonardo, Paleari, and Vismara (2011) find that academic entrepreneurship positively affects the performance of the firm in the post-IPO market by reducing investors' uncertainty and increasing the likelihood of the firm to survive. Further evidence on the complementarity between financial and (academic) human capital is provided by Bonardo, Pleari, and Vismara (2010). They show that science-based ventures often attract significantly more potential buyers during the M&A process (see Meoli, Paleari, Vismara, 2013). Colombo and Grilli (2010) show that both financial and human capital add to the success by pointing out that the founders' human capital directly adds to firm growth rather than only indirectly by attracting venture capital.

A second strand of the literature analyzes "entrepreneurial spawning", tackling the question of how entrepreneurs are "born". From a theoretical point of view, a number of studies investigate how new ideas are implemented given disclosure risk and idea-stealing risk (see, e.g., Anton and Yao, 2002; Biais and Perrotti; 2007). Innovations may be implemented when employees leave their companies to become entrepreneurs, or when employees of established organizations stay and develop innovation internally. Gompers, Lerner and Scharfstein (2005) test the decision to become a first-time entrepreneur in the context of venture capital backed IPOs. Controlling for firm size, patents, and industry, they show that the most prolific spawners are venture-backed companies located in Silicon

Valley and Massachusetts. We extend the analysis of whether or not entrepreneurs become serial entrepreneurs by examining all types of venture capital backed exits (successful and otherwise), and the full array of career choices which includes serial entrepreneurship, paid employment, and becoming a business angel.

A third branch of literature is concerned with entrepreneurial exit decisions. This literature aims to overcome the view that entrepreneurial process is complete when the new venture is founded (DeTienne, 2010). Most of these studies focus on the exit timing decisions (Boeker and Karichalil, 2002; Butler, Phan, Saxberg, and Lee,, 2001; DeTienne, 2010; Sorensen and Phillips, 2011; Wassermann, 2003). Papers which address the exit issue of entrepreneurs mostly focus (exclusively) on non-high-tech firms (Wennberg and DeTienne, 2014); given the very different type of activities of non-tech and high-tech firms, this is a very different setting.

In contrast to the prior literature, we do not consider only the exit choice, but investigate where precisely founders go when they leave the startup they founded. We distinguish whether they found another venture, become angels, or turn to dependent employment. In that sense, we consider the exit channel after a phase of entrepreneurship. In contrast to Wennberg, Wiklund, DeTienne, and Cardon (2010), we focus on the exit channel of the entrepreneur rather than the one of the company. In another related paper, Ucbasaran, Lockett, Wright, and Westhead (2003) examine entry and exit from entrepreneurial teams but unlike our paper they do not consider the array of places where entrepreneurs go after exit or the array of things done prior to entry.

Given that we also consider the possibility that current founders have been founders before or decide to found another venture afterwards, our analysis also relates to the

literature on serial entrepreneurship. Serial entrepreneurs are typically defined as persons who enter and exit entrepreneurship repeatedly (Hyytinen and Ilmakunnas, 2007). A main focus of the literature on serial entrepreneurship is on the relative performance of such serial entrepreneurs (see e.g., Gompers, Kovner, Lerner, Scharfstein, 2010; Gottschalk, Greene, Hower, Muller, 2014). The persistence of success proves to be a main issue. Gompers, Kovner, Lerner and Scharfstein show that success indeed breeds success, i.e., previously successful entrepreneurs are more likely to be successful in subsequent ventures, thereby strengthening performance persistence.

We distinguish ourselves from this literature by looking mainly into the determinants of serial entrepreneurship rather than on its performance consequences. We are close to the seminal paper of Wright, Robbie, and Ennew (1997) on serial entrepreneurship. In addition, we focus on the determinants of serial entrepreneurship in high-tech industries. We consider this type of serial entrepreneurship to be potentially very different to serial entrepreneurship in other industries, not only because the risk and upside are significantly more pronounced, but also because high-tech firms probably require specific skills.

## 3. Hypotheses

Based on the prior literature, we develop a number of hypotheses which we bring to our data in the subsequent sections. The "jack-of-al-trades" theory of Lazear (2004) can be extended to the decision to stay in entrepreneurship after having founded a venture in the first place. The main argument of the "jacks-of-all-trades"-theory is the notion that entrepreneurship requires balanced or more general skills (Astebro and Thomson, 2011). In

contrast, specialists are less likely to succeed and, in anticipating this, are less likely to choose to found a new venture. We conjecture that this carries over to subsequent decisions to found a new company. Founders with a general-education background learn during the life-time of the current venture that this fits very well with skills required for entrepreneurship and decide to stick with the "entrepreneurial career.

> **Hypothesis 1:** *[Jack-of-all-trades] The fact that founders have a more general (management) education makes them more likely to stay in the entrepreneurial arena. Hence, we would expect founders with such an educational background to be more likely to be engaged in subsequent entrepreneurship after having left the initially founded venture.*

With regard to the exit decisions of our founders, we investigate where founders come from, relating their entry decision (to become founders) to the actual exit decision. The entrepreneurial spawning discussion suggests that an entrepreneurial environment breeds entrepreneurs (Gompers, Lerner and Scharfstein, 2005; Hsu, 2007). Working for a startup firm makes a person more likely to go into entrepreneurship. Learning from others in an entrepreneurial environment induces them to switch to entrepreneurship (see Lévesque, Minniti, and Shepherd, 2009). This contrasts with the view that large companies are a spawning ground for founders. We postulate that this effect is even stronger and more lasting, thus extending the entrepreneurial spawning argument to the decision to become a serial entrepreneur. First experiences in a venture do not only spawn founders, but make them significantly more inclined to stay in entrepreneurship thereafter.

**Hypothesis 2**: *[Entrepreneurial Spawning] Working for a (high-tech) startup company before becoming a founder makes founders more inclined to stick to entrepreneurship after leaving the initially founded venture.*

In line with the literature on serial entrepreneurs, we investigate to which extent a pattern of serial entrepreneurship exists. By focusing on only high-tech firms, we are able to investigate the pattern of serial entrepreneurship in very innovative, high-tech firms. We ask whether there is a breed of founders that is able and willing to found not only one venture at a time, but are founding *high-tech* ventures repeatedly. Hence, we establish:

**Hypothesis 3:** *[Serial Entrepreneurship in High-Tech Ventures] The likelihood to stay in an entrepreneurial environment after having left the venture is higher for founders who have previously been active in founding a new high-tech venture.*

We test these hypotheses below by controlling for the financial success of the venture, among other things. Financial success may have an effect on the founders' willingness to initiate or finance another startup and stay in the entrepreneurial arena (see for example Colombo and Grilli, 2005, 2010). These details are discussed further below.

## 4. Data

### 4.1 Data Sample

Our analysis is based on venture-backed startups listed in the CrunchBase online database (see www.CrunchBase.com). CrunchBase was developed and is maintained by TechCrunch, the most influential technology blog in the United States. Professionals in the technology community can add information to the database, which then goes through an

approval process before being made available online. We focus on those startups that, receive funding from VC firms and from a corporation. We define corporate venture capitalists (CVCs) as NASDAQ100 companies, which directly or indirectly (via their associated CVC fund) invest in the respective startups.

By focusing on startups that also have CVC investors we bias our sample by purpose on cases in which the company backing the CVC may become the spawning ground of entrepreneurs since founders may leave the company with the idea they had not been able to implement in the large organization due to e.g., organizational slackness. We show later that our data does not support this idea of spawning new ventures and entrepreneurs. Using a retrieval mechanism we were able to detect 190 firms in the CrunchBase data which reportedly received CVC funding. Due to our aim to focus exclusively on startup firms we dropped carve-out firms leaving us with 178 observations.

Using websites of the respective companies as sources, we hand-collected information on the founder or the founder team of each of these startups. Information about the founders' education, employment and entrepreneurship experience stem from their respective LinkedIn pages and personal websites as well as from other sources such as Bloomberg Businessweek. We limit our analysis to those founders who have actually left the venture at the time of our latest observation (June 2014). This brings down the number of founders to 243. These 243 founders were with 111 startup firms. In the following we describe the characteristics of these founders as well as of their startup firms.

The details of the variables used are outlined in Table 1. Our data allows us to describe the characteristics of all founder teams.

INSERT TABLE 1 ABOUT HERE

### 4.2 Data Overview

By construction of the data set, our startup companies are all from the high-tech industry. Despite this fact, they cover quite a range of industries that includes web-based and related products and services, semiconductor and software industry, and biotech firms (see Table 2).

INSERT TABLE 2 ABOUT HERE

Table 2 shows our sample covers a total of 111 firms which are concentrated in California, where more than half of all firms are located there (61 firms). Of these, 48 firms have their headquarters in Silicon Valley. We also have 14 high-tech firms in our sample that are based outside the US, but receive money from US venture capitalists. Most of them (5) are in Israel, the rest is disbursed across the globe. At the time we have observed these firms for the last time (June 2014), a significant number of them have experienced an exit (83 out of 111 firms). Most of them have been acquired (71 firms), but we observe some IPOs (6 cases) and some failures (7 firms ended up in the deadpool). The firms are, by construction of the database, very young. At the moment of the initial VC funding these companies are on average 2.3 years old. At the time of the observed exit (acquisition, IPO, liquidation) firms are on average 7.7 years old, which indicates an average holding period of 5.4 years for the respective first VC investors in these 83 firms.

Table 3 displays the main founder characteristics. Almost all of our founders have completed a bachelor's degree (233 out of 243). One third of them (83 founders) has earned a master's degree while 45 (44) went successfully for a PhD (MBA). The majority of founders specialized in IT and computer science (140 out of 243), while only a third of them has a management or economics background (71 founders). As can be seen from the

numbers in Table 3, many of them have backgrounds from different fields. Out of the 233 founders with a degree, 68 have degrees from two different subjects, while 7 founders have degrees from three different subjects. The work experience of founders is diverse. While most of them have worked for other employers, 34 of them have no previous job position, i.e., became founders when they were still students. The majority of our founders have had more than one position before founding the venture under consideration (161 founders out of 243). When it comes to the previous entrepreneurial experience, table 3 reveals that most of our founders (144) did not pursue any entrepreneurial activity before founding the venture under observation. There are, however, a number of founders who have significant entrepreneurial experience. Thirty-nine founders have already founded at least three ventures (including the present one).

INSERT TABLE 3 ABOUT HERE

## 5. Empirical Analysis

We test our hypotheses in two steps. First, we examine the univariate statistics of our main variables of interest. Second, we provide a number of regressions to test our main hypotheses.

### 5.1. Descriptive Analysis

Table 4 provides some summary statistics. It shows that roughly one quarter of all founders who left the venture become subsequent founders. Of these 61 subsequent founders, 11 also acted as a business angel (see Table 6). In total, 41 founders become

business angels (see Table 6), the remaining are dependently employed after having left the venture. We define the combination of subsequent founders and business angels as (subsequent) entrepreneurs. The average gap between college and the founding year of the venture is almost 13 years, ranging from 3years (indicating that founders were still students) to a maximum of 43 years.

INSERT TABLE 4 ABOUT HERE

We employ as a proxy for our non-specialist education (see Hypothesis 1) the management studies background, which roughly thirty percent of the founders in our sample possess. The measure for a potential positive effect of employment with small firms as source for entrepreneurial spawning (see Hypothesis 2) is the fact whether the founder was previously employed with a startup firm. This holds true for approximately one quarter of our founder sample (23.5%). An alternative proxy for this is the Silicon Valley dummy, which measures whether the VC-backed venture is located in Silicon Valley. The idea behind this measure is the notion that founders of Silicon Valley firms have previously been living in the proximity of Silicon Valley and thus have been exposed to the entrepreneurial spirit stemming from young, innovative firms. However, this variable captures other effects such as access and exposure to ideas and financing. We rely on our first success measure and use the Silicon Valley dummy as a control variable. The serial entrepreneurship analysis (see Hypothesis 3) is based on whether the founder has previous entrepreneurial experience as measured by the number of prior ventures founded by the current entrepreneurs. We observe that founders have on average founded 0.66 ventures (see table 4).

INSERT TABLES 5 AND 6 ABOUT HERE

Table 7 reports the correlation matrix. The correlations are consistent with our hypotheses and comparison tests and regression results discussed below. Also, because there are a number of cases in which we observe a strong correlation between our explanatory variables, we considered alternative specifications of different right-hand-side variables to assess robustness.

INSERT TABLE 7 ABOUT HERE

The main aim of our analysis is to investigate the determinants of the founder's exit decision and relate it to the entry choice of the founder. We focus our analysis on two "exit channels" which the founder may select after leaving the venture: to become a founder in a new venture or to become a business angel. The third exit route, namely to become dependently employed, is, together with those founders which state no activity after having left the venture (16 observations), the residual. We summarize the two former exit channels (to become a founder or business angel) in the (subsequent) entrepreneurship variable. To get a first impression on the determinants of these exit channels we provide some univariate statistics (see Table 8).

These univariate statistics reveal that there are a number of variables which seem to have a strong impact on the decision to become a subsequent founder after having left the venture. Comparing the means between subsamples indicates that entrepreneurs with a management studies background have a 12.9% higher probability to become founders after their exit from the current venture. Entrepreneurs which have had previous entrepreneurship experience, i.e., are already serial entrepreneurs, are significantly more likely to subsequently found a new company as compared to those entrepreneurs which have had no previous entrepreneurial experience. Our data also suggests that working in a

startup company before founding the current venture makes people significantly more inclined to exit via the founding route. Female founders also show a tendency to create a new venture after having left the current one. In a nutshell, the univariate evidence supports our Hypotheses 1, 2, and 3.

Turning to our (subsequent) entrepreneurship variable, the results for the variables just discussed do not change (except for the female variable which turns out to be insignificant). We find, however, some support for the idea that success of the current venture has an impact on the decision to stay in the entrepreneurial arena after leaving the current venture. Founders leaving firms which have gone through an IPO or in which the previous owner had a financially successful exit (captured by our successful-exit variable) are significantly more likely to become a founder or a business angel once again.

INSERT TABLE 8 ABOUT HERE

To analyze whether these univariate results carry over when taking controls into account, we now move to multivariate regressions to test our hypotheses in the next subsection.

**5.2. Regression Analysis**

In Table 9 we present regressions on the determinants of subsequent entrepreneurship (which includes being a subsequent founder or business angel). In all our regressions we use a standard regression model with the following right-hand side variables: management studies (as proxy for a non-specialist background of the founder (H1)), startup employment (as proxy for young entrepreneurial firms being the spawning

ground for future founders (H2)) and the number of prior employers (standing for the opposite notion) as well as prior ventures (depicting the idea of serial entrepreneurs (H3)). In addition to these variables we employ a number of control variables listed in Table 1 such as the Silicon Valley variable capturing geographical aspects as well as the exposure to ideas and financing, the B2B dummy (capturing industry effects), as well as the gender effect in general measured by the female variable. Furthermore, we use year-fixed effects in all regressions. All specifications are logit regressions, the reported coefficients are the marginal effects.

INSERT TABLE 9 ABOUT HERE

The first set of regressions displayed in Table 9 confirms our findings from the univariate statistics. We find strong support for Hypothesis 1: Non-specialists (measured by the fact that they have earned a management degree) are 19.7% more likely to found a new venture or become a business angel after having left the current startup, and this effect is significant at the 5% level of significance. We find a similar result with a somewhat different measure of non-specialization: our variable non-specialization (including founders with degrees from more than one subject plus management studies) displays a positive 14.2% and significant effect at the 5% level on the probability of staying in the entrepreneurial arena (see Model 2 of Table 9). In contrast, our Ph.D. dummy which we interpret as proxy for specialization has a -15.0% and statistically significant at the 10% level (see Model 3 in Table 9) coefficient thereby providing further support for our Hypothesis 1.

Furthermore, startups rather than other firms are the spawning ground for future entrepreneurship, thus confirming our Hypothesis 2 (see all specifications in Table 9). The

effect is statistically significant in all models at the 1% level, and the economic significance ranges from 25.9% in Model 3 to 53.5% in Model 4.

We also find strong evidence for the serial entrepreneurship pattern (Hypothesis 3) as indicated by the fact that having been engaged in more prior ventures makes people significantly more likely to stick with entrepreneurship. The effect is not only statistically significant but also economically pronounced (see Table 9). Each additional venture increases the probability to stick to an entrepreneurial activity by 8.68% (Model 1), and this effect is significant at the 5% level in Models 1, 2, and 4, and at the 1% level in Model 3.

In addition, in Table 9 we analyze the effect of (financial) success on founders' subsequent decisions using the IPO dummy. The IPO dummy proves to be highly statistically (at the 5% level) and economically significant (35.1% marginal effect).

In Model 4 of Table 9, we address the impact of success in more detail, by employing a variable which measures financial success for the investors and founders. The downside is that due to missing observations with our exit-multiple variable, the sample size drops to 100 observations. Despite the reduced sample size, we find strong evidence for the fact that founders who have exited a financially successful venture are significantly more likely to pursue entrepreneurial activities (see Model 4 in Table 9). A 1-standard deviation increase in the exit multiple increases the probability of subsequent entrepreneurial activities by 18.3%, and this effect is significant at the 5% level of significance. We note, however, that due to the smaller sample size that these exploratory findings regarding the relationship between the decisions of founders to stay in the entrepreneurial arena and the success of the venture are worthy of future research.

## 6. Discussion and Conclusion

We present theory and empirical evidence consistent with the view that both the entrepreneur's experience prior to becoming a founder and the success of the business founded affect his career choice after VC exit. This issue is important for understanding the role of VC in spawning new entrepreneurial activity, which has implications for practice and policymakers alike. Where VC launches new entrepreneurial activity, there is a positive externality that exacerbates the benefits of VC finance.

We analyze these entrepreneurial career dynamics by using a detailed sample of high-tech firms take from the CrunchBase database and enhance it by hand-collected data on the respective founder and founder teams. Entrepreneurs are primarily from Silicon Valley, but also from other regions in the U.S. We focus on the patterns of the entrepreneurs' career paths as well as on the determinants of the likelihood of a founder to stick with entrepreneurial activity. We relate different patterns of career paths to characteristics of the entrepreneurs (e.g., education and work experience), to company and industry characteristics as well as to the success of the venture. In doing so, we draw a picture of the dynamics of career paths of VC-backed entrepreneurs and contribute to a better understanding of the evolution of entrepreneurial spawning and the positive externalities of VC investment.

The empirical analysis shows that VC-backing does not lead entrepreneurs to become repeat entrepreneurs, unless they had prior experience founding or working for a startup, or unless the entrepreneur is a 'jack-of-all-trades' with a general management education. VC backing by itself seems to give rise to future entrepreneurial activities in

terms of repeat founders or creating business angels where the VC-backed venture generates a substantial financial return to the entrepreneur.

Much work has highlighted the importance of VC financing for spawning future entrepreneurial activity in the U.S. (Gompers, Lerner and Scharfstein 2005) and other countries around the world (Cumming and Knill, 2012). Future academic and policy work on the role of VC in creating serial entrepreneurs should recognize that entrepreneurial characteristics, including their prior experience with entrepreneurship and their education, appear to play a stronger role than the experience of VC itself.

Future research with more detailed data could examine other aspects of VC-entrepreneur interactions in more detail, and what coaching activities better enable entrepreneurial spawning. Our empirical analysis provides an evaluation of the typical VC investment without accounting for specific things that entrepreneurs may or may not have done for their investees. Such detailed data could enable a more critical assessment of the value of VC coaching provided to entrepreneurs to enable long term entrepreneurial benefits after VCs exit their investment. Although we find some preliminary results on the relationship between a venture's success and the founder's decisions to stay in the entrepreneurial arena, this theme is clearly of interest and worth future research.

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Table 1
**Variable definitions**

| Variable | Description |
|---|---|
| Dependent variables | |
| Subsequent founder | After leaving the startup founder starts a new startup, i.e. the indicator is one if his first position after the is founder |
| Subsequent angel | After leaving the startup founder invests at least in one new startup, i.e. indicator is one if he becomes or is an angel investor |
| Subsequent Entrepreneurship | Summarizes subsequent founder and subsequent angel indicator, i.e. indicator is one if founder is subsequent founder or angel and zero if he is neither |
| Founder variables | |
| Prior employers | Number of founder's unique prior employers; only paid, dependent employment is considered |
| Prior ventures | Number of startups founded prior to the last startup; only startup firms are considered, not one-person consultancy positions etc. |
| Management studies | Founder studied management science, economics or finance; any degrees are considered (BSc., MSc., MBA, PhD) |
| Startup employment | The last employer prior to founding the venture was at a startup company, i.e. was raising funding and did not have an exit |
| Female | Founder is female |
| Years since college | Number of years since leaving college (approximates the founder's age or experience) |
| Startup variables | |
| IPO | Venture was by means of an initial public offering (IPO) |
| No exit | Venture has not yet experienced an exit (trade sale, liquidation or IPO) |
| Successful exit | Venture experienced an exit where the exit valuation (IPO) or the acquisition price was at least as high as the total VC funding |
| Exit multiple | Ratio of IPO valuation or acquisition price and total VC funding |
| Silicon valley | Venture is located in Silicon Valley |
| B2B | Venture offers services to other enterprises (B2B products or services) |

Table 2
**Firm characteristics**

| Industry | B2B | B2C | Both | Total |
|---|---|---|---|---|
| Advertising | 7 | 0 | 0 | 7 |
| Biotech | 0 | 0 | 5 | 5 |
| Ecommerce | 0 | 3 | 1 | 4 |
| Enterprise | 9 | 0 | 0 | 9 |
| Games/Video | 1 | 8 | 0 | 9 |
| Hardware | 6 | 1 | 0 | 7 |
| Mobile | 6 | 7 | 0 | 13 |
| Network-hosting | 6 | 0 | 1 | 7 |
| Semiconductor | 8 | 0 | 0 | 8 |
| Software | 18 | 1 | 0 | 19 |
| Web | 1 | 16 | 3 | 20 |
| Other | 1 | 1 | 1 | 3 |
| Total | 63 | 37 | 11 | 111 |

| Geography | |
|---|---|
| USA (97; 87.4%) | Thereof California (61, thereof 48 in Silicon Valley), Massachusetts (9), New York (7), Washington (7), Texas (3), Maryland (2), Arizona (1), Colorado (1), D.C. (1), Georgia (1), Illinois (1), North Carolina (1), New Jersey (1), Pennsylvania (1) |
| Others (14; 12.6%) | Thereof Israel (5), China (2), U.K. (2), Australia (1), Canada (1), France (1), Spain (1), Turkey (1) |

| Ventures with exit | Obs. | Mean | S.D. | Minimum | Maximum |
|---|---|---|---|---|---|
| Age of venture at initial VC funding (years) | 83 | 2.28 | 2.13 | 0 | 8.75 |
| Age of venture at exit (years) | 83 | 7.70 | 3.38 | 1.83 | 16.00 |

| Exit mode | Obs. |
|---|---|
| IPO | 6 |
| Acquisition | 71 |
| Liquidation | 6 |

Table 3
**Founder characteristics**

| Education | | | |
|---|---|---|---|
| Degree | Bachelor | 233 | |
| | Master | 83 | |
| | MBA | 44 | |
| | Ph.D. | 45 | |
| Subject (thereof more than one Degree) | Management, Economics | 71 | (41) |
| | IT, Computer science | 140 | (49) |
| | Natural sciences | 56 | (36) |
| | Social sciences, humanities | 42 | (25) |
| | Law | 6 | (6) |

| Experience | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number of prior employers | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Frequency | 34 | 48 | 62 | 53 | 26 | 15 | 2 | 1 | 2 |
| Number of prior ventures | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Frequency | 144 | 61 | 26 | 6 | 5 | 1 | 1 | 0 | 0 |

Table 4
**Summary statistics**

| | Obs. | Mean | S.D. | Minimum | Maximum |
|---|---|---|---|---|---|
| (Subseq.) Founder | 243 | 0.243 | 0.430 | 0 | 1 |
| (Subseq.) Angel | 243 | 0.165 | 0.372 | 0 | 1 |
| (Subseq.) Entrepreneurship | 243 | 0.362 | 0.482 | 0 | 1 |
| Prior employers | 243 | 2.243 | 1.562 | 0 | 8 |
| Prior ventures | 243 | 0.658 | 1.018 | 0 | 6 |
| Management studies | 243 | 0.292 | 0.456 | 0 | 1 |
| Startup employment | 243 | 0.235 | 0.425 | 0 | 1 |
| Female | 243 | 0.054 | 0.226 | 0 | 1 |
| Years since college | 212 | 12.901 | 9.090 | -3 | 43 |
| Female interaction | 212 | 0.236 | 0.152 | 0 | 1 |
| IPO | 243 | 0.074 | 0.262 | 0 | 1 |
| No exit | 243 | 0.210 | 0.408 | 0 | 1 |
| Successful exit | 243 | 0.510 | 0.501 | 0 | 1 |
| Exit multiple | 104 | 5.762 | 8.914 | 0.075 | 44.526 |
| Silicon valley | 243 | 0.465 | 0.499 | 0 | 1 |
| B2B | 243 | 0.646 | 0.479 | 0 | 1 |

Table 5
**Career dynamics**

| | | *Subsequent role* | | | |
|---|---|---|---|---|---|
| | | Employed | Founder | Angel | Neither |
| *Prior position/role* | Student (25 obs) | 19 | 5 | 5 | 1 |
| | Employee (176 obs.) | 128 | 36 | 26 | 8 |
| | Founder (49 obs.) | 19 | 20 | 10 | 7 |

The category prior position/role captures the predominant occupation of the founder at the moment of starting the venture: student, employee, and founder. Subsequent role considers the immediate activities following the exit from the venture. Numbers do not add up to 100% as the role of being an angel investor is compatible with being an employee or a founder. Furthermore, seven observations were both employee and founder.

Table 6
**Founder exit**

| | | *Subsequent angel* | | |
|---|---|---|---|---|
| | | 0 | 1 | Total |
| *Subsequent founder* | 0 | 155 *(63.8%)* | 29 *(11.9%)* | 184 *(75.7%)* |
| | 1 | 48 *(19.8%)* | 11 *(4.5%)* | 59 *(24.3%)* |
| | Total | 203 *(83.5%)* | 40 *(16.5%)* | 243 *(100%)* |

Of the 243 founders, 59 are subsequent founders and 40 are subsequent angels. The variable Entrepreneur covers both, subsequent founder and as subsequent angels. Numbers do not add up to 100% as a founder can at the same time be an angel investor in another startup (11 observations).

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