

RESTARTS OF VENTURE CAPITAL-BACKED FIRMS:
EVIDENCE FROM THE US SOFTWARE INDUSTRY

By

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The venture capital (VC) industry is a game of “home runs,” with a few lucrative exits compensating investors for the many “strike outs” along the way (Gompers and Lerner 2001). Consistent with this view, finance scholars report that VCs aggressively prune weaker startups in their investment portfolios to re-allocate resources to their more likely winners (Puri and Zarutski 2012). Using data on VC-backed software startups, I nonetheless find many numerous instances where distressed startups “restart” rather than cease operations. I investigate broader trends affecting the financing opportunities of software startups and compare characteristics of restart and non-restart firms within the sector. To complement this quantitative analysis, I conduct three case studies that illuminate the factors that could lead firms to be in a “restart situation” and the actions taken to turn around these fledgling companies.

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I. Introduction

In the troubled economic times of the 1930s, Joseph Schumpeter extolled the entrepreneur as the “hero” of capitalism. The eminent economist concluded that, entrepreneurs—through their innovative activities and “new combinations” of resources—were responsible for the “creative destruction” of existing industries and played a vital role in the dynamism of capitalistic economies (Schumpeter 1950). Eighty years later entrepreneurs are seen as no less critical to the economy, especially in technology intensive industries (Kauffman 2013).

Despite the vital role of entrepreneurship at the economy-level, founding a new firm and navigating the pitfalls of the market remains a risky and challenging endeavor. Failure is an ever-present shadow. Of particular importance, entrepreneurs can find it difficult to secure the capital required to bring new ideas to market. In science and technology-based industries, where the path to commercialization is uncertain and costly, entrepreneurs depend critically on venture capital (VC) investors for sources of funding (Gompers and Lerner 2004). Even then, the venture capital industry is commonly portrayed as a game of “home runs,” with a few lucrative exits compensating investors for many “strike-outs” along the way (Gompers and Lerner 2001). Consistent with this view, finance scholars report that VCs aggressively prune weaker startups in their investment portfolios to re-allocate resources to their more likely winners (Puri and Zarutskie 2012).

This thesis investigates an under-explored phenomenon within the entrepreneurship literature: VC-backed startups seemingly en route to failure that “restart” rather than cease their operations. Using data on VC-backed software startups,

I find many numerous instances where distressed startups restart rather than disband. I investigate broader trends affecting the financing opportunities of software startups and compare characteristics of restart and non-restart firms within the sector. To complement this quantitative analysis, I conduct three case studies that illuminate the factors that could lead firms to be in a “restart situation” and the actions taken to turn around these fledgling companies.

The thesis is organized as follows. Section II provides background information on the entrepreneurial process and highlights sources of potential friction between entrepreneurs and their VC investors. Section III reports my quantitative analysis. The Internet bubble and its subsequent collapse was a pivotal economic event affecting technology startups, including but not limited to VC-backed software companies. To set the stage for the analysis that follows, I investigate this event and consider its implications for the supply of venture capital available for software startups. I then turn to my firm-level analysis, where I compare restart and non-restart firms on several observable dimensions and analyze potential differences in the ultimate fates of these companies.

To gain additional insights on why a software company might become a “restart” (i.e., encounter a severe devaluation event yet continue operations in new form) and to illustrate actions taken in the post-restart period, I supplement the quantitative analysis with three case studies in Section IV. I discuss the main findings from my study and the opportunities they provide for future research in Section V, the concluding section.

II. Background

Failure of Entrepreneurial Ventures

Entrepreneurship has been defined as an activity that

“Involves the discovery, evaluation, and exploitation of opportunities to introduce new goods and services, ways of organizing markets, processes, and raw materials through organizing efforts that previously had not existed...”

in short, entrepreneurship involves exploiting the unknown (Shane 2003, p. 4). A critical step in the entrepreneurial process is the recognition of viable economic opportunities within this unknown. Where do these opportunities come from? One perspective, originally espoused by Hayek (1945), views these opportunities as arising from an individual’s unique access to information. Entrepreneurs’ “local knowledge,” or access to industry specific or opportunity specific information that is not readily available allows them to exploit opportunities that would be unrecognized by others without such information (Shane 2003). On the other hand, Schumpeter argued that changes in the technological, political, and economic environments are necessary to create an entrepreneurial opportunities (Shane 2003). Schumpeter’s perspective views entrepreneurship as a rare occurrence as these environmental changes occur less frequently than do opportunities through the availability of local information. Notwithstanding the origins of an entrepreneurial opportunity, once formed, entrepreneurial firms must secure the capital and resources required to grow the business, a task that can be especially difficult in technology-intensive industries. Investors may be reluctant to invest in such companies for several reasons. A prime

cause is it may be difficult to secure outside financing is that entrepreneurship often results in failure, as “failure and entrepreneurship are natural siblings” (Mantere 2013). The prevalence of entrepreneurial failure has been documented in numerous studies. For example, in a study of 1,091 Canadian inventors seeking to commercialize their inventions, Åstebro (2003) found that only seven percent achieved commercialization. This success rate is in contrast to the twenty-seven percent probability of commercial success of research and development projects in established firms (Mansfield et al. 1977).

Even if investors are knowledgeable of the likelihood of failure and willing to embrace this risk, information gaps between the entrepreneur and the potential investor may make it difficult to raise funds. One deterrent is the classic “lemons” problem (Akerlof 1970)—if an entrepreneur is better informed about an opportunity than a potential investor, investors will be concerned that the opportunity is a “lemon,” and be either unwilling to invest or expect a premium on their returns. This, in turn, will discourage entrepreneurs, even with promising opportunities, from seeking outside investment.

Investors may also be concerned about “moral hazard,” or deleterious actions that entrepreneurs make take after receive funding that would be counter to their original agreement or expectations (Gompers and Lerner 2001).

One market mechanism that has arisen to address these “failures” in the market for new venture financing is the rise of the venture capital firm. According to Mason and Harrison (1995), venture capital is “an activity by which corporate investors provide long-term equity finance, supported by business skills, to unquoted companies

with the potential to grow rapidly with the aim of making an eventual capital gain commensurate with the high risk and illiquidity involved in the investment rather than interest income or dividend yield.”

Venture capital firms possess expertise and resources that enable them to critically understand the investment opportunity and reduce asymmetric information between the entrepreneur and investor. VCs monitoring the activities of entrepreneurial firms in their investment portfolios through several means, including membership on the board and frequent site visits (Gompers and Lerner, 2001; Hellmann and Puri, 2002). To motivate teams while also safeguarding against actions that could devalue their investments, VCs also sequence their investments across rounds of financing—waiting to release additional funds until milestones have been met (Gompers 1995). By using these mechanisms to overcome many of problems inherent in the new-venture financing process, venture capital firms play a critical role in realization of entrepreneurial opportunity (Metrick and Uasyda 2010).

Despite these advantages that venture capitalists possess in the evaluation and financing of entrepreneurial opportunities, almost two out of every three firms with venture capital funding either do not generate positive revenue or ever break even Hadzima (2007). Furthermore in a study of 22,000 VC-backed from 1987 to 2008, fifteen percent were liquidated or went bankrupt, and another nineteen percent expected no return to investors (Kauffman 2013).

Internal Sources of Failure

As discussed above, entrepreneurial firms, even those backed by venture capital firms, face low success rates. Nevertheless, determined individuals frequently pursue

their entrepreneurial goals despite these low odds, and for them, entrepreneurship often represents a personal journey. Identifying successful entrepreneurs based on their personal traits, however, is difficult, as those who fail often possess similar traits to those who succeed (Ucbasaran 2008). Whether successful or not, however, these traits can play a role in the development of the entrepreneurial team that works cohesively and effectively. Problematic internal dynamics or behavioral issues are often major contributors to the decline and failure of entrepreneurial firms.

Overconfidence and the presence of asymmetric information between insiders and external constituencies are two other problems often common among failed firms. Optimism is a widely recognized as a necessary trait for successful entrepreneurship:

“Realists will have withdrawn from entrepreneurship...though not all optimists necessarily become entrepreneurs, all entrepreneurs will be optimists” (Arabsheibani, et al. 2000).

While the confidence by entrepreneurs is often essential to overcome the many obstacles that they often face, it can also lead to their downfall (Lowe and Ziedonis 2006). Åstebro (2003) found that fully half of 1,091 Canadian inventors creating inventions of low quality persisted in developing projects despite negative expert recommendations to abandon the commercialization effort.

External Indicators of Failure

External and environmental factors can also put pressure on entrepreneurial firms and lead to failure. A prominent example is the “money chasing deals” era of the late 1990s, when an unprecedented amount of funding flowed into VC investing (Gompers and Lerner 2001). The widespread availability of VC funding make it easier

for firms to secure capital and remain in business. In the quantitative analysis below, I explore, in more detail, a related event—the Internet bubble and its subsequent collapse—and consider its implications for the software startups in my sample.

III. Quantitative Analysis

The Internet bubble and its subsequent collapse was a pivotal economic event affecting technology startups, including but not limited to VC-backed software companies. To set the stage for the analysis that follows, I therefore first investigate this event more closely and consider its implications for the supply of venture capital available for software startups. I then define my data sources, explain the types of firms included in the sample, and clarify the method used to identify the subset of “restarts.”

After describing overall trends within the sample, I compare restart and non-restart firms on several observable dimensions and analyze potential differences in the ultimate fates of these companies. To gain additional insights on why a software company might become a “restart” (i.e., encounter a severe devaluation event yet continue operations in new form) and to illustrate actions taken in the post-restart period, I supplement the quantitative analysis with three case studies in the section that follows.

Analysis of Internet Bubble and Effects on VC Investments in Software Startups

The collapse of the Internet “boom years” is often evidenced by trends in the Nasdaq index, where shares of leading technology companies such as Apple Inc. and Google Inc. are traded (e.g., see Madsien 2008). As shown in Figure 1, the Nasdaq index climbed steeply in the late 1990s to a height of 4691 on March 24, 2000. By 2002, however, most of those gains had been lost.

Figure 2 reveals even larger swings in annual VC investments in the software sector during the 1998-2002 period. Between 1998 and 2000, annual VC investments in software surged from \$5B to a peak of \$26B in 2000, a more than five-fold increase.

The annual supply of VC funds to software startups fell back to pre-boom levels of \$5B by 2002, where it remained through the end of that decade.

The volatility in annual VC spending in software is particularly striking in Figure 3, which plots annual percentage changes in investment levels. After large increases prior the year 2000, the supply of VC funding to software startups declined by over 50% in this year alone, followed by another 50% decline in the following year. A large-scale study by Gompers et al. (2008) finds a high correlation between the value of shares in public equity markets and levels of VC investments. The authors also report that trends in VC investing tend to follow public equity markets with a short lag but with steeper up-and-down patterns. In combination, the evidence from Figures 1-3 mirrors these prior findings.

Startup-Level Data and Sample Construction

I now turn to my firm-level quantitative analysis. Data for this study comes from *Dow Jones VentureSource*, an agency that monitors the funding of venture capital activity of all VC-backed firms in the United States¹. Data provided to me for purposes of this thesis covers VC-backed software startups founded between 1987 and 1999 that received at least one round of venture capital by 2008.

VentureSource was first established in 1986. Although the agency provides information about startups founded prior to 1986, Gompers and Lerner (2004) recommend omitting observations prior to 1987 when use of VentureSource data due to under-reporting bias. Restricting attention to startups founded prior to 2000 provides an

¹ Professors Rosemarie and Arvids Ziedonis provided me access to these data through a research-use agreement with VentureSource.

8-year “window” to trace what happens to these firms both before and following the collapse of the Internet bubble.

For each company, I observe its founding year, the state in which its headquarter locations is based, the year of a “restart” round (if any), and information about the company’s status as of 2008 (e.g., failed? had IPO? acquired?) and its reported value at exit.² The sample consists of 2,133 US-based software startups founded between 1987 and 1999, all of which had exited in some fashion (whether via IPO/acquisition or liquidation) by 2008.

To identify “restarts,” I rely on categories from VentureSource. More specifically, the vendor defines restarts as firms suffering a “significant” decline in value at the funding round, or a “down round.” VentureSource does not disclose the threshold of “significant” in this context, but reports that the value of existing shares in the company is typically “washed out.” Based on VentureSource’s classification, I find that 128 firms with “restarts,” which represents 6% of all firms within the sample. Despite significant devaluations, these firms continue operations in new form rather than closing down and disbanding outright.

As shown in Figure 4, the number of new software startups entering the sample rises in the latter part of the 1990s, with 480 sample companies founded in 1999 alone—in the peak of the Internet boom period. Given the large influx of VC funds in software shown earlier in Figure 2, this trend is not surprising.

² VentureSource’s information on exit dates and values was supplemented with additional data from Sandhill Econometrics, which tracks outcomes of VC-backed companies. These data were provided to me through a data-use agreement with Professors Ziedonis.

Figure 5 graphs the timing of “restart” events involving software companies in the sample. Although a few firms continued operations despite significant down-rounds prior to 2000, the number of restarts jumped sharply following the collapse of the Internet bubble and withdrawal of VC financing from the sector. Prior to 2000, roughly three software firms in the sample had a restart event each year. In 2002 alone, the number climbed to a within-sample peak of 24 firms.

The trend in Figure 5 is likely driven by multiple related factors. As shown above, more firms entered the sample in the late 1990s, thus increasing the number of firms “at risk” for an event, including but not limited to restarts. Equally important, the decline in market conditions (Figure 1) and retreat of VC money from the sector (Figure 2) could have placed software firms formed in the boom-period in precarious financial situations, increasing the numbers of distressed companies.

Geographic Distribution of Software Startups and Restarts

Prior studies report that a few US states and regions dominate the supply of VC to US startups, and that VCs located within these states/regions prefer to invest in nearby startups (Gompers and Lerner, 2004). In Figure 6, I plot statistics reported by the National Venture Capital Association on the share of all US VC funding represented by VCs in California’s famous Silicon Valley as well as other areas in the state.

Consistent with conventional wisdom, Figure 6 reveals that California-based investors supply a large share of all VC dollars invested in startups. This percentage has been steadily increasing since the mid-1990s, exceeding 40% of national investments by 1999 and 50% by 2009. A large fraction of these funds are further targeted towards

Silicon Valley. Figure 6 further suggests that Silicon Valley firms capture approximately 80% of VC investments made in California.

Recent data from the National Venture Capital Association (2014) further reports that California-based startups received \$3.2B in venture capital funding in 2012, representing by far the largest total investment of all states. Massachusetts, Texas, New York, and Washington ranked second through fifth, receiving \$1.7B in funding. Firms in the remaining 45 states received \$1.4B.

As Silicon Valley is dominated by information technology, Internet, and software startups, we would expect that this region is also heavily represented the VentureSource software startup sample. To investigate this possibility, Tables 5 and 6 reports the distribution of firms by region. The sample is divided between those residing within the top five states in terms of funding and the rest of the country. The subset of top five states is further disaggregated by California and the other four top five states. As shown in Table 7, California firms represent almost of the half of the overall sample (954 of 2,133 firms, or 44.7%).

Given the more widespread availability of VC funds within California—overall and presumably in times of duress, one might expect that restarts are more highly represented in this state than is true of non-restart companies. Surprisingly, however, I find no evidence that this is the case: Although 44.7% of all startups in the sample reside in California (954 of 2,133 firms), the percentage of restarts also located in California is 44.5% (57 of 128 firms). Based on a two-sample test of proportions, I find that the difference in proportions is statistically insignificant [$\Pr(|Z| < |z|) = 0.96$].

At first glance, this result is puzzling. Restarts face significant set backs yet somehow are able to secure the funds required to continue operations. Since VC funds are more plentiful in CA relative to other states, it is reasonable to expect that restart firms are more likely to reside within this resource-rich state relative to the broader population of startups. My inability to discern this effect could be due to superior capabilities of CA-based VCs in the early pruning of potential strikeouts, as documented in prior studies (e.g., Hellmann and Puri, 2002; Puri and Zarutski, 2012). In principle, one could disentangle these explanations if characteristics of these companies could be better tracked at common intervals in time. For example, one could estimate whether a startup backed by CA investors is more likely to fail outright rather than having an opportunity to “restart” relative to comparable startups backed by VCs from other states. Since my data provided information at only certain snapshots in time, such an analysis is infeasible in the context of this study.

Analysis of Exit Outcomes

In the final part of my quantitative analysis, I trace the ultimate outcomes of restart companies and compare them with non-restart firms within the sample. VentureSource reports several types of “exits” for startups, ranging from outright “failure,” or termination of operations, to exits via acquisition (ACQ) and other forms of buy-out, to the filing of initial public offerings (IPO).

For non-restarts, identifying the exit event is straightforward as type of exit and value is clearly identified in the VentureSource data. For restarts however, identifying final value is less straightforward. Although VentureSource identifies these firms, they are coded as terminated at the “first” exit event. The data include however, histories

subsequent to the initial exit. One-hundred twenty-seven restarts report a second “exit” event and exit value at this time, and one restart went through a second restart event and reports a third exit value. For restarts, therefore, I utilize the value of the firm at the second or (third) exit event as the final exit value.

Although it is possible that startups may remain private, VCs funds tend to liquidate and return funds to investors within ten years of the establishment of a fund (Puri and Zarutskie 2012). Thus, it is unusual that a VC-backed firm would not exit within ten years. Indeed, in my sample, there are no firms that remain private at the end of 2008—all firms have exited the sample in one of the modes discussed above.

To make more direct comparisons among firms, I create three categories of exit outcomes: (a) “successful,” (b) “mid-range,” and (c) “failed” firms based on their final valuation at exit. Successful firms are defined as those that exit with an IPO filing. An IPO is the goal of most VCs and typically results in the greatest value for founders and investors (Gompers and Lerner 2004). “Mid-range” firms, or firms deemed moderately successful, are defined as those with positive exit values (typically through an acquisition) but that did not have an IPO. Finally, failed firms are defined as those that disbanded or that had a final exit value of zero.

Comparison of Restart and Non-Restart Firms

Of the 2,133 software startups in my sample, more than half of the firms (1,137, or 53%) exited with “mid-range” outcomes, typically through acquisition. Of the remainder, 727 firms (34%) failed while 237 (11.1%) reached IPO.

Tables 11 and 12 compare the exit success of restarts with non-restarts. The most obvious difference between the groups is in IPO outcomes. Among non-restarts in

the sample, over 11% had IPOs. In contrast, IPOs were far more rare among restarts, representing the ultimate outcome for only 3.9% of the restart sample. A two-sample test of proportions reveals that this difference is highly significant [$\Pr(|Z| < |z|) = 0.008$]. This is the first indication that restart firms as a group do less well on average than firms that do not undergo a restart.

Turning next to valuation, the mean exit value of the entire sample of firms is \$55.88M. The 2,005 non-restart firms report a higher mean value of \$57.50 million at exit while restarts averaged a value of \$30.44M. This difference is statistically significant at the 5% level based on a two-tailed t-test assuming unequal variances.

Figure 7 shows a histogram of final exit values for the entire sample, and reveals a highly skewed distribution. Numerous firms exit the sample with a final value of zero while a few firms exit with values exceeding \$1M. Figures 8 and 9 show similar patterns for restart and non-restart firms. These patterns are consistent with the notion that VC investing is a game with few “home runs” and many “strike-outs” (Gompers and Lerner 2001). This pattern is also consistent with the low fraction of successfully commercialized inventions reported by Åstebro (2003).³

Given the skewed nature of the exit-value distribution, I test for differences in median exit values since mean values could be misleading. Median tests are also less affected by outlier observations, such as the few home-run successes visible in my sample. As reported in Table 2, median exit value for both the entire sample and for non-restarts is \$7.00M. For restarts, the median exit value is much lower, at only

³ Skewed value distributions have been shown to exist in many innovative contexts. For example Scherer and Harhoff (2000) examined various proxies of value for a sample of 994 US and German patents and found that depending on the measure, just 10% of the sample generated between 48% and 93% of total value.

\$3.70M. A two-sample Wilcoxon rank-sum test reveals that this difference between restarts and non-restarts in median exit value is statistically significant at the 1% level ($\Pr > |z| = 0.001$).

Based on these tests, it appears that restart firms tend to do less well than do firms that have not suffered a significant down round in value during financing rounds. On the one hand, this result could stem from “selection” (Furman and Stern 2011). By definition, restarts are firms that have encountered significant devaluations. Given this fact, it is logical to conclude that these firms are in more precarious financial situations than the broader pool of startups from which they are drawn. On the other hand, there could be something about the restart process itself, such as a change in management, onerous financial terms imposed by new investors, or another artifact of the procedure that hinders the firm going forward. Although I am unable to test between these explanations with my data, these results suggest interesting questions that could be explored more fully in follow-on studies.

V. Qualitative Analysis

The quantitative analysis presented in the previous section found that restarts are found in the most active areas of venture capital funding of startups, but are equally well represented throughout the country. Despite the sophistication of California VCs, restarts appear to be no more likely to occur in that state than elsewhere. Restarts, however, were found to exit at a lower median value than did non-restarts. The analysis was unable, however, to identify factors that could contribute to this lower final exit value. The purpose of the qualitative analysis conducted in this section is to examine more closely several cases within the data to identify factors that could have led to their distress and subsequent outcomes.

Ideally, such an inductive approach would select cases that represent both successes and failures of restarts. Selecting only successful restarts could impose a “selection bias” and result in erroneously attributing a particular factor or action to a successful outcome (Eisenhardt 1989). Unfortunately, obtaining information on “failed” restarts has proven to be difficult. News reports and documentation of successful restarts is much more readily available. The three selected cases are those for which I was able to find information. The case studies are based upon a compilation and analysis of the news articles, company statements, narrative accounts and other public information.

The three companies selected for analysis are Constant Contact of Massachusetts, QPass from Washington, and Omneon Video Networks of California. Geographically, they collectively represent three of the top five states that received venture capital. Each firm was able to avoid termination as an ultimate fate. Constant

Contact achieved an IPO of \$340M while the other two firms were acquired at valuations near \$275M.

Despite the large valuations at exit, each of these three firms faced challenges that led to a value decline and subsequent restart. And each was able to undertake actions that allowed it to “turn things around.” Table 13 summarizes the challenges and responses by each firm. Below I discuss the three restarts in more detail.

Constant Contact

Constant Contact is a restart firm based in Waltham, Massachusetts. The idea underpinning this entrepreneurial venture is the insight by Gail Goodman, the founder and CEO, that the rise of social media would spur demand by small businesses for a modern print shop that manages marketing communications and customer relationships (“Globe 100”). As Constant Contact’s mission statement states,

“Constant Contact®, Inc. wrote the book on Engagement Marketing™ — the new marketing success formula that helps small organizations create and grow customer relationships in today's socially connected world. Through its unique combination of online marketing tools and free personalized coaching, Constant Contact helps small businesses, associations, and nonprofits connect and engage with their next great customer, client, or member” (“About Constant Contact”).

According to Goodman, Constant Contact targets small businesses, typically around 10 employees. These customer firms pay a monthly subscription for access to Constant Contact’s software-based tools to organize their social media and conduct online marketing (“Globe 100”).

In a speech at the TedxBeaconStreet event in December 2013, Goodman described several of the challenges that Constant Contact encountered in growing the

company. She highlighted significant obstacles in creating an effective leadership style, learning how to effectively scale-up the business, and how to find and exploit competitive advantages (Goodman 2013b). She further outlined the need for founders to reevaluate their contribution styles and roles, as their current styles often impeded the growth of the company. She argued that as the firm grows, the founders (and especially the CEO), needed to be able to switch focus and see the larger picture. Goodman found that she often was preoccupied on areas of the business that were already operating smoothly while neglecting other areas needing her attention. To combat this tendency, Goodman instituted an anonymous unfiltered feedback system. This feedback allowed her to become aware of the areas that others saw to be lacking and bridge the informational gap between not only herself and her employees, but with the company's investors as well.

Constant Contact also needed to reevaluate its business plan in order to succeed within the marketplace and establish profitable margins. Prior to receiving venture capital, Constant Contact expected to sell shares at a price point of fifteen dollars, which would have left slim margins, and a very high breakeven point. By following the advice of investors, however, Constant Contact was able to build an increasingly sound plan to achieve profitability over time (Goodman 2013a). Before the correction, this major flaw in their financial analysis caused the firm to twice come close to disbanding (Kirsner). By revising its business plan and improving informational flow with its investors, Constant Contact was able to avoid failure, however. These changes eventually led to an initial public offering of the company for \$340M. Achieving an IPO could only be accomplished by bridging internal as well as external informational

and strategic problems, thus attracting new investors such as Greylock Partners, who funded Constant Contact's restart with an investment of \$10 million (Garland).

Qpass

Constant Contact's challenges consisted primarily of lack of informational flow among the leadership and a flawed business model. QPass, a Seattle-based software firm, faced similar issues but on a much different scale. Bo Wandell founded QPass in 1997 as a platform for media firms to sell content over the Internet (Soto 2002).

According to its website:

“QPass solutions and services are the critical infrastructure required to operate premium services businesses profitably, with the agility required to fully capture new opportunities, and with the sound business controls and processes required to scale operations efficiently.”

QPass saw a growing opportunity as the rise of the digital music industry generated demand for selling and exchanging this music over the Internet. A difficult economic environment, however, almost resulted in *QPass*' failure.

QPass experienced both the exuberance running up to Internet bubble and the deflation after it burst. In the late 1990s QPass gained significant investor funding only to be impelled to lay off 75% of its workforce a short time later (Thurm 2004). This drastic step resulted from the loss of almost 90% of its revenue and 28 out of 32 of its dot-com clients in 2000 and 2001 due to the bursting of the Internet bubble (Soto 2002). Due to this massive shock to the industry, QPass was forced to reevaluate its business model and find a viable position within a devastated market. While the firm first hit rock bottom in revenues and human capital losses, QPass managed to refocus its

offerings to a more profitable and diverse segment, providing business systems to network operators (Duryee 2005).

The major shift in direction produced significant challenges in the time and effort it took to redirect the company's vision (Duryee 2005). QPass was also forced to recapitalize and convince many of its existing investors to support this redirection while simultaneously seeking additional financing from other investors. Over the course of a difficult two years and through the drive and determination of its employees as well as a complete shift in direction, QPass successfully restructured, recapitalized, and narrowed its scope to a stable more profitable position following the shakeout of the internet bubble. Qpass was eventually be acquired by Amdocs for \$275 million in 2006 (Amdocs Inc. 2006).

Omneon Video Networks

The strategic shifts that helped to propel QPass into a profitable sector and away from failure also played a significant role in the journey of Omneon Video Networks. Three former *Sony* executives, Larry Kaplan, Ed Hobson, and Mike Gilbert, founded Omneon in 1998, a software company that markets storage and networking servers to television broadcasters to record, store, and edit news feeds for their clients (Business Wire 2002).

Although pursuing a promising opportunity, Omneon faced complications with delivery of its services. Initially after Omneon's founding the company faced significant delays in product development. A prototype was not ready for testing until 2000 (Dickson 2008). This delay caused considerable concern among investors and other stakeholders, causing them to doubt the future success of Omneon.

The slow product development process stemmed from the inability of Omneon to produce key components that would increase the attractiveness of its products in the marketplace. For example, the firm faced difficulties in developing features that enabled editing on multi channel servers, which was a key component of its product value proposition (Business Wire 2003). Omneon eventually overcame its product development difficulties by forming strategic alliances to obtain the necessary development capabilities. For example, it formed an alliance with Editware to obtain multichannel editing features (Business Wire 2003). Partnerships such as the one with Editware allowed Omneon to reach beyond its existing capabilities to produce a unique and superior product. The partnership with Editware is only one of the many alliances Omneon created in order to overcome industry barriers and compensate for its own weaknesses. As it gained capabilities, Omneon was finally able to overcome the costly product development cycle that had been limiting its prospects. Media 100 acquired Omneon in 2002 for \$273M (Reuters 2002).

VI. Discussion and Conclusion

Summary of Findings

Throughout this study, the risky nature of entrepreneurship remains a constant despite its vital role of entrepreneurship at the economy-level. For entrepreneurs, failure remains a constant shadow causing the role of VC firms to become critical sources for funding and guidance. Yet even the VC industry is filled with many “strike-outs” and few “homeruns” (Gompers and Lerner 2001). Due to this reality, VC firms often prune their portfolio to reallocate their resources to more promising firms (Puri and Zarutskie 2012). By studying these pruned out firms, one encounters the phenomenon of ‘restart’ firms. Rather than disband, following this significant loss of capital, in numerous cases, as seen in the VentureSource data, these firms “restart” with the backing of new investors and/or new management.

In order to investigate this under-explored phenomenon of ‘restart’ firms, this thesis combines the use of both quantitative and qualitative analysis. The quantitative analysis further investigates the impact of the “Internet bubble” and its subsequent collapse as well as firm level dimensions which point to unique differences within these firms. As previously stated the collapse of the Internet “boom” years led to a large amount of volatility in annual VC investments as well, particularly in the software industry. Within the sample of firms, the greatest amount of firms was established during the peak of the Internet boom, 1999 (Figure 4). Furthermore, the greatest number of “restarts” occurred following the collapse of the Internet bubble and the withdrawal of VC investments, in 2002 (Figure 5).

The impact of VC firms and their investment habits on these restarts can also be seen in regards to where these firms are located. The geographic locations of these firms is consistent with conventional wisdom that VCs prefer to invest in nearby startups as the great majority of these firms lie in areas known for their high concentration of VC firms (Gompers and Lerner 2004). The high agglomeration and sophistication of VC investors within California and other highly concentrated areas of VC investment suggests that restarts may also be more prevalent in these areas. Consistent with this conventional wisdom, I find that California dominates the sample, accounting for 44.7% of all entrepreneurial firms and 44.5% of all restarts (Table 7). Yet the proportion of restarts in California was found to be not significantly greater than the proportion of restarts among VC-backed firms in other states, suggesting that restarts is a more widespread phenomenon than may have been expected. ,

Consistent with conventional wisdom, however, I do find that restart firms appear to do less well on average than non-restart firms, as IPOs are more rare among restart firms than non-restarts. Moreover, restart firms “exit” at a significantly lower median exit value than do non-restarts. As restarts have already demonstrated that they have been on the path to failure, that they are less successful than firms that have not “signaled” such low performance, this result is not surprising.

To gain additional insight on why a software firm might “restart,” and to illustrate the paths taken during this restart process, I conducted three case studies of restart firms. The first, Constant Contact from Waltham, Massachusetts, struggled to overcome a failed business model and economic troubles as it lost investors. Through

a change of leadership style and a refocused business model, however, Constant Contact eventually rebounded and successfully completed an IPO for \$340 million.

QPass from Seattle, Washington was the focus of the second case study. QPass' troubles stemmed from maintaining too broad a product scope, and were exacerbated by the collapse of the Internet bubble. Despite reaching rock bottom, however, QPass was able to narrow its scope, undergo additional reforms, and as a result gain new investors. Eventually Amdocs acquired the company for \$275 million (Amdocs Inc. 2006).

Finally, Omneon Video Networks of Sunnyvale, CA faced significant product development setbacks and subsequent loss of investors, initially due to poor communication with investors and other stakeholders. Through strategic partnerships and increased efforts on communication, Omneon was able to develop a marketable product. Media 100 Inc. subsequently acquired the company for \$273 million (Reuters 2002).

Limitations and Further Research

This investigation of restart firms is subject to several limitations. While my quantitative analysis has illuminated similarities and differences between restart and non-restart firms, I am unable to identify causal factors that may account for these differences. To do so would require the identification and testing of explanatory variables.

The qualitative case studies, while informative, also require caution in arriving at any conclusions regarding effective actions that may “turn around” a failing restart. First, the studies represent a small sample of only three firms. It is not clear how generalizable their experience is to the population of restarts. Furthermore, due to the

difficulty of obtaining information on failing restarts, investigating only relatively successful restarts constitutes a “selection on the outcome,” thus introducing bias.

Other limitations include the necessity to impose an arbitrary taxonomy of performance levels. “Successful” firms were classified as those who achieved an IPO, while “mid-range” firms were defined as those having final exit values above zero, but without reaching an IPO. Many mid-range firms were acquired for “pennies on the dollar,” while some were purchased for substantial premiums (including both QPass and Omneon Video Networks). This category therefore, includes some firms that are similar to “failed” firms while others that could arguably be considered a “success.” Future research could look more closely at these mid-range firms and improve the classification used in this analysis.

Other promising avenues of future study include investigating whether a startup backed by a VC in one area is more likely to fail, or lose their investors, than a firm in another state. Such a study could provide insight into the psychological environment that these ‘restart firms’ face, and how this affects their development.

Conclusion

Once again, according to entrepreneurship scholar Scott Shane, entrepreneurs “introduce new goods and services, ways of organizing markets, processes, and raw materials through organizing efforts that previously had not existed,” they also face risk at each stage of the process (Shane 2002). These risks often result in entrepreneurial failure, as has been well documented. Some seemingly failed entrepreneurs get a “second chance” through a restart. Despite this important mechanism within the entrepreneurial process, little is known about restarts. In order to better understand this

phenomenon, this thesis investigates the incidence of restarts, their geographic concentration, and how they perform relative to non-restart firms. I also explore the restart process through a detailed investigation of three restart firms.

I find similarities among their potential relationship to economic events, such as the Internet Bubble, and their geographic proximity to areas of venture capital financing. I also observe that restart firms tend to perform less well than non-restart firms. Finally, I identify actions undertaken by entrepreneurs who “turned things around” and survived the restart process. The two-part analysis contained in this thesis helps to shed light on the restart phenomenon as well as providing a basis for further research.

VIII. Tables and Figures

Tables

Table 1. Distribution of Overall Sample

	Total	Successful Firms	Mid-Range Firms	Failed Firms
Overall Sample	2133	237	1137	727
Non-Restart Firms	2005	232	1071	702
Restart Firms	128	5	66	25

Table 2. Restart and Non-Restart Initial Comparison

	Restart Firms	Non Restart Firms
Average Values	30.44	57.50
Median Value	6.50	7.46

Table 3. Non-Restart Firms: Initial Descriptive Statistics

Software Industry	Average Value	Median Value	# of Companies	Percentage
Successes	198.05	173.21	232	12%
Mid-Range	64.22	13.68	1071	53%
Failures	0.00	0.00	702	35%

Table 4. Restart Firms: Initial Descriptive Statistics

Type of Restart	Average Value	Median Value	# of Companies	Percentage
Successes	374.64	340.09	5	5%
Mid-Range	30.50	11.84	66	69%
Failures	0.00	0.00	25	26%

Table 5. Non-Restart Firms: Geographic Statistics

State	# of Successes			# of MID			# of Failures			Total off All		
	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage
AL	0	0	0%	2	45.39	50%	2	0.00	50%	4	0.00	0.20%
AZ	1	131.46	5%	8	45.39	42%	10	0.00	53%	19	58.95	0.95%
CA	125	271.90	14%	462	64.74	51%	311	0.00	35%	898	112.22	44.90%
CO	5	115.67	9%	31	24.08	56%	19	0.00	35%	55	46.58	2.75%
CT	2	172.47	11%	10	9.51	53%	7	0.00	37%	19	60.66	0.95%
DE	0	N/A	0%	1	7.12	50%	1	0.00	50%	2	3.56	0.10%
FL	4	144.08	18%	13	171.96	59%	5	0.00	23%	22	105.35	1.10%
GA	6	211.18	12%	25	35.00	49%	20	0.00	39%	51	82.06	2.55%
HI	0	N/A	0%	0	N/A	0%	1	0.00	100%	1	0.00	0.05%
ID	0	N/A	0%	1	13.36	100%	0	N/A	0%	1	13.36	0.05%
IL	4	168.96	11%	21	33.21	57%	12	0.00	32%	37	67.39	1.85%
IN	1	71.56	20%	3	16.03	60%	1	0.00	20%	5	29.20	0.25%
IA	0	N/A	0%	0	N/A	0%	1	0.00	100%	1	0.00	0.05%
KS	0	N/A	0%	1	87.00	20%	4	0.00	80%	5	43.50	0.25%
KY	0	N/A	0%	2	6.45	67%	1	0.00	33%	3	3.22	0.15%
ME	0	N/A	0%	1	7.55	100%	0	N/A	0%	1	7.55	0.05%
MD	5	193.62	21%	10	25.51	42%	9	0.00	38%	24	73.04	1.20%
MA	26	184.51	10%	147	73.46	58%	79	0.00	31%	252	85.99	12.60%
MI	0	N/A	0%	6	58.65	75%	2	0.00	25%	8	29.32	0.40%
MN	9	102.41	35%	12	32.43	46%	5	0.00	19%	26	44.95	1.30%
MO	0	N/A	0%	3	35.13	75%	1	0.00	25%	4	17.57	0.20%
MT	1	157.40	100%	0	N/A	0%	0	N/A	0%	1	157.40	0.05%
NE	0	N/A	0%	1	25.50	50%	1	0.00	50%	2	12.75	0.10%
NH	3	103.37	18%	10	31.97	59%	4	0.00	24%	17	45.11	0.85%
NJ	6	213.39	13%	25	33.57	54%	15	0.00	33%	46	82.32	2.30%
NM	0	N/A	0%	0	N/A	0%	2	0.00	100%	2	0.00	0.10%
NY	3	172.41	3%	44	69.44	47%	47	0.00	50%	94	80.62	4.70%
NC	2	490.90	5%	23	64.58	59%	14	0.00	36%	39	185.16	1.95%
OH	0	N/A	0%	11	19.16	52%	10	0.00	48%	21	9.58	1.05%
OR	1	159.67	5%	13	22.01	65%	6	0.00	30%	20	60.56	1.00%
PA	3	116.04	9%	18	19.94	53%	13	0.00	38%	34	45.32	1.70%
RI	0	N/A	0%	2	21	50%	2	0.00	50%	4	10.50	0.20%
SC	0	N/A	0%	1	9.30	50%	1	0.00	50%	2	4.65	0.10%
TN	1	177.01	14%	5	4.36	71%	1	0.00	14%	7	60.46	0.35%
TX	10	212.88	9%	62	40.36	57%	37	0.00	34%	109	84.41	5.45%
UT	3	283.21	13%	14	24.44	58%	7	0.00	29%	24	102.55	1.20%
VT	0	N/A	0%	0	N/A	0%	1	0.00	100%	1	0.00	0.05%
VA	3	425.84	4%	43	62.70	62%	23	0.00	33%	69	162.85	3.45%
WA	7	274.75	10%	37	31.41	54%	24	0.00	35%	68	102.05	3.40%
WI	0	N/A	0%	0	N/A	0%	2	0.00	100%	2	0.00	0.10%

Table 6. Restart Firms: Geographic Statistics

State	# of Successes			# of MID			# of Failures			Total of All		
	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage	# of Firms	Average Value	Percentage
CA	1	52.60	2%	29	34.70	67%	13	0.00	30%	43	29.10	48%
CO	0	N/A	0%	4	8.83	100%	0	N/A	0%	4	8.83	4%
FL	0	N/A	0%	2	12.22	100%	0	N/A	0%	2	12.22	2%
IL	0	N/A	0%	1	7.27	33%	2	0.00	67%	3	3.64	3%
MD	0	N/A	0%	3	17.55	100%	0	N/A	0%	3	17.55	3%
MA	1	340.09	13%	3	27.55	38%	4	0.00	50%	8	122.55	9%
MI	0	N/A	0%	1	8.11	100%	0	N/A	0%	1	8.11	1%
NJ	0	N/A	0%	1	0.10	100%	0	N/A	0%	1	0.10	1%
NY	1	837.15	33%	2	13.72	67%	0	N/A	0%	3	425.43	3%
NC	0	N/A	0%	1	3.00	100%	0	N/A	0%	1	3.00	1%
OH	0	N/A	0%	2	7.93	67%	1	0.00	33%	3	3.96	3%
TN	0	N/A	0%	0	N/A	0%	1	0.00	100%	1	0.00	1%
TX	1	619.36	20%	3	11.01	60%	1	0.00	20%	5	210.12	6%
VA	0	N/A	0%	2	26.27	40%	3	0.00	60%	5	13.14	6%
WA	1	24.02	17%	4	110.98	67%	1	0.00	17%	6	45.00	7%

Table 7. Geographic Distribution Concentrating in California

	Overall Sample	Restarts	Non-Restarts
California	954	57	897
Top 5 s/California	562	39	523
Remaining States	617	32	585
Total	2133	128	2005

Table 8. Non-Restart: Founding Year Statistics

Year		1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Successful	# of Successes	0	0	0	0	1	0	0	3	0	0
	Average Value	0.00	0.00	0.00	0.00	24.02	0.00	0.00	598.87	0.00	0.00
Mid - Range	# of Mid Range	1	3	0	5	6	16	16	4	10	0
	Average Value	16.02	6.13	0.00	28.91	8.50	18.72	41.53	82.87	25.46	0.00
Failures	# of Failures	2	0	2	2	0	4	0	4	8	0
	Average Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
All Firms	Average Value	16.02	6.13	0.00	28.91	32.52	18.72	41.53	681.74	25.46	0.00

Table 9. Restart Firms: Founding Year Statistics

Year		1991	1992	1993	1994	1995	1996	1997	1998	1999
Successful	# of Successes	23	19	15	24	30	26	12	6	3
	Average Value	206.27	174.41	198.71	315.06	241.72	334.81	339.68	759.40	161.63
Mid-Range	# of Mid Range	51	48	51	64	111	142	107	142	218
	Average Value	33.65	46.29	38.14	42.69	59.44	89.31	73.03	69.04	37.45
Failures	# of Failures	0	0	0	0	0	0	0	0	0
	Average Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Firms	Average Value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table 10. Restart Firms: Restart Year Statistics

Table 11. Non-Restart Firms: Exit Type Statistics

	GONE		ACQ		LBO		MBO		IPO	
	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total
Successful firms	0	0%	0	0%	0	0%	0	0%	232	100%
Mid-Range Firms	0	0%	1047	99%	10	1%	0	0%	0	0%
Failure Firms	576	96%	0	0%	0	0%	25	4%	0	0%

Table 12. Restart Firms: Exit Type Statistics

Firms By Exit Type	GONE		ACQ		LBO		MBO		IPO	
	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total	# of Firms	% of Total
Successful firms	0	0%	0	0%	0	0%	0	0%	5	100%
Mid-Range Firms	0	0%	62	95%	2	3%	1	2%	0	0%
Failure Firms	22	85%	4	15%	0	0%	0	0%	0	0%

Table 13. Case Study Overview

Firm Name	Constant Contact	QPass	Omneon Video Networks
Location	Waltham, MA	Seattle, WA	Sunnyvale, CA
Founding Year	1998	1997	1998
Restart Year	2002	2002	2002

Industry Sector	Business Applications Software	Vertical Market Applications Software	Multimedia Networking Software
Core Weaknesses	<ul style="list-style-type: none"> - Founders' leadership weaknesses - Flawed Business Model and Financial Plan - Lack of ability to exploit competitive advantages - Susceptible to major economic changes: the Internet bubble 	<ul style="list-style-type: none"> - Susceptible to major economic changes: the Internet bubble - Too broad of a scope for their capabilities through a flawed business model 	<ul style="list-style-type: none"> - Significant product development delays - Inability to initially overcome industry barriers as well as their expertise barriers
Solutions	<ul style="list-style-type: none"> - Instituting a unfiltered feedback system to point out informational gaps and improve leadership styles 	<ul style="list-style-type: none"> - Redirecting their scope on a narrower sector of the market - Maintaining a constant flow of information among stakeholders to successfully recapitalize and redirect their business 	<ul style="list-style-type: none"> - Actively utilized and created strategic alliances in order to produce superior product and value - Assuring and remaining in constant contact with stakeholders remain funded throughout the development process
Exit Type	Initial Public Offering	Acquisition	Acquisition
Final Valuation	\$340 million	\$275 million	\$273 million

Figures

Figure 1. The “Internet Bubble” as Evidenced by the Nasdaq Index



Figure 2. US Venture Capital Investments in Software Startups, 1995-2012

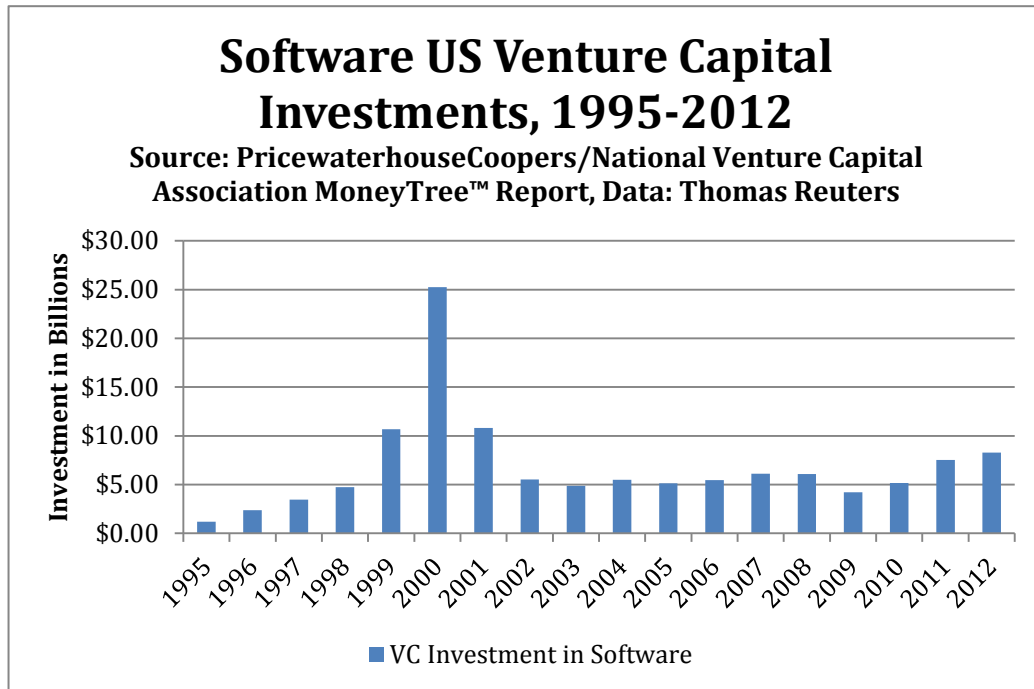


Figure 3. Annual Percentage Change in VC Investments in Software Startups, 1995-2011

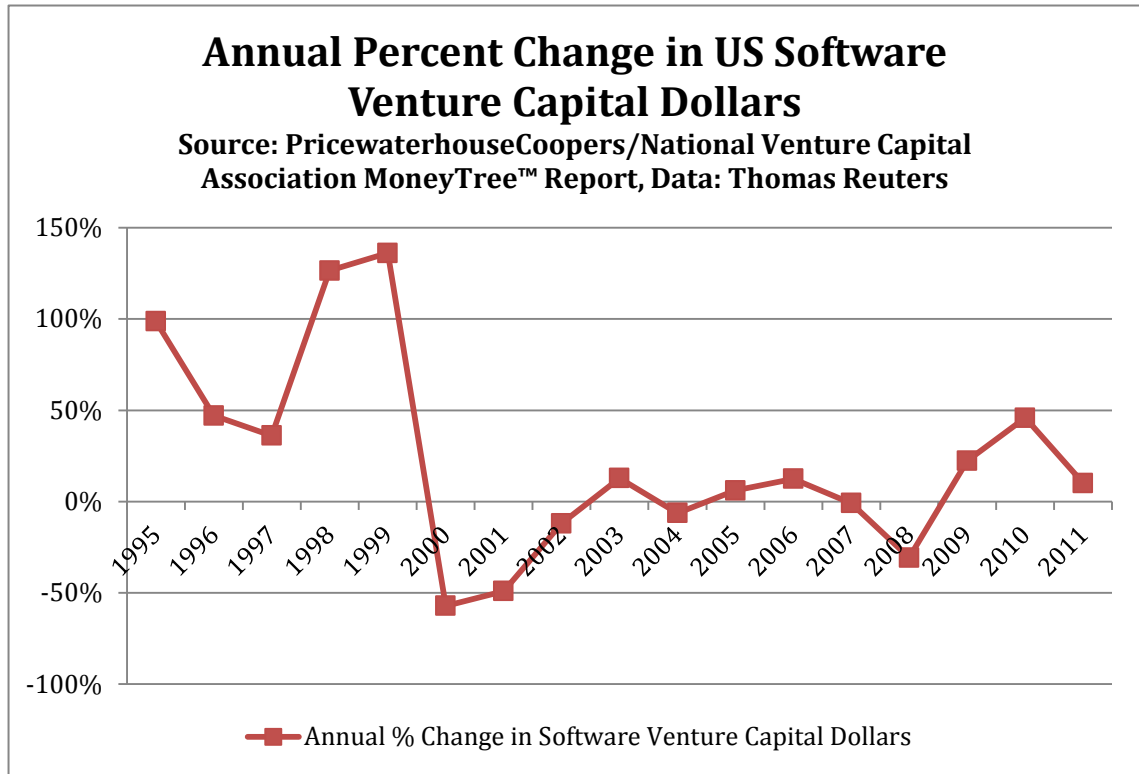


Figure 4. VC-backed Software Startups by Year Established, 1991-1999

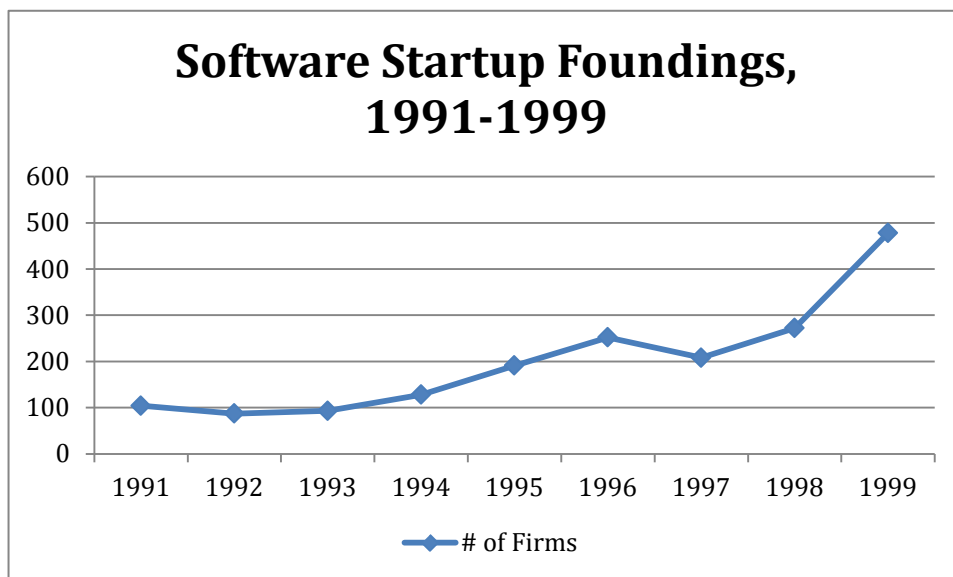


Figure 5. Software “Restarts” in the Sample, 1991-2009

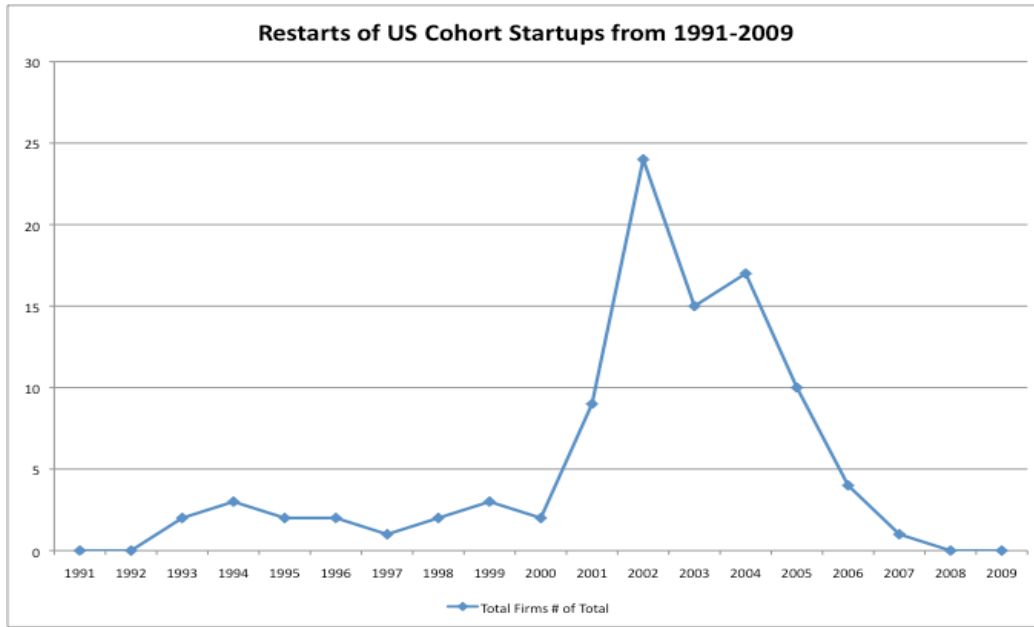


Figure 6. Silicon Valley vs. All California Venture Capital Investments

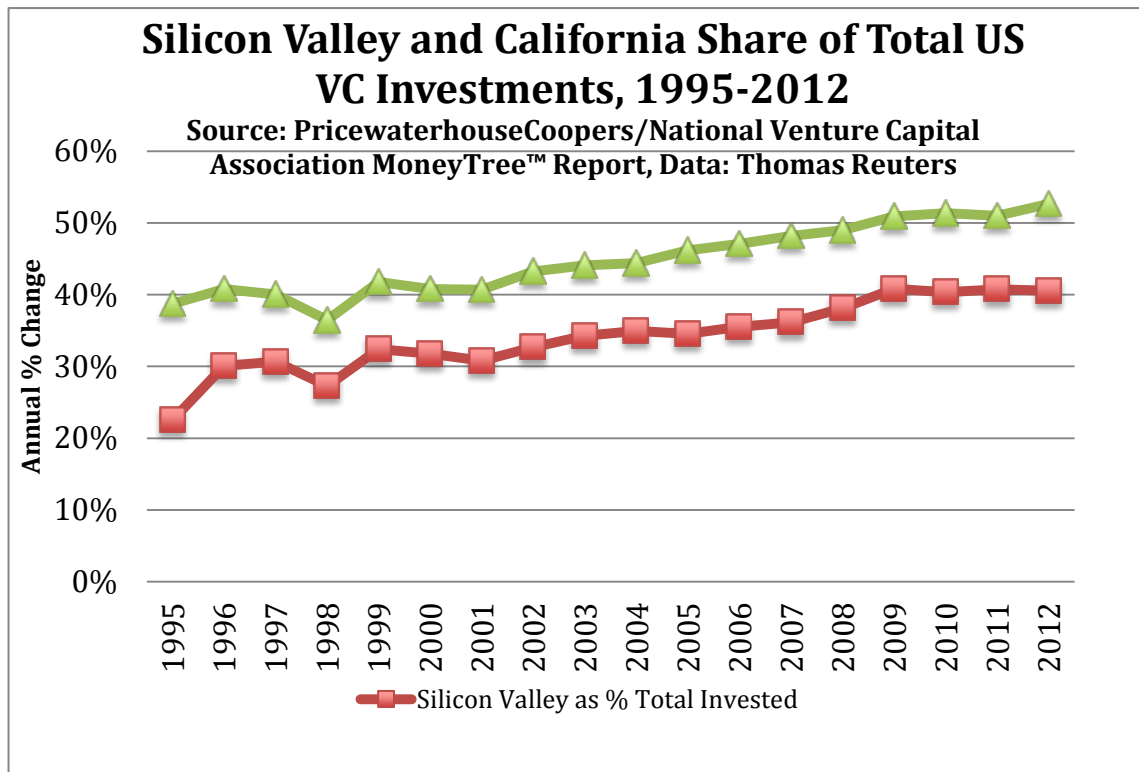


Figure 7. Histogram of Final Exit Value for Overall Sample

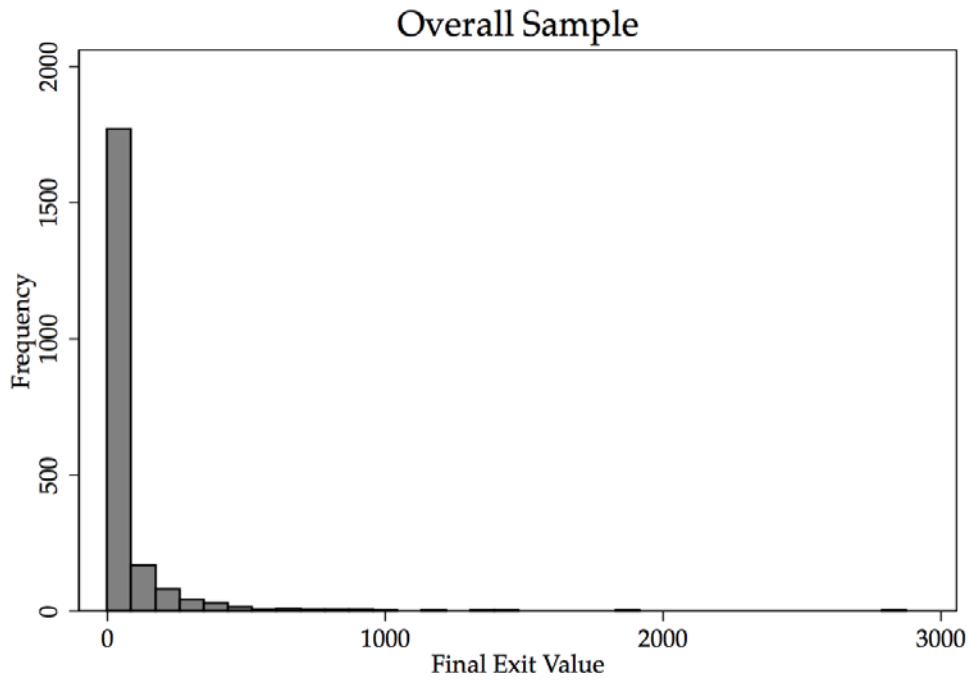


Figure 8. Histogram of Final Exit Value for Restart Sample

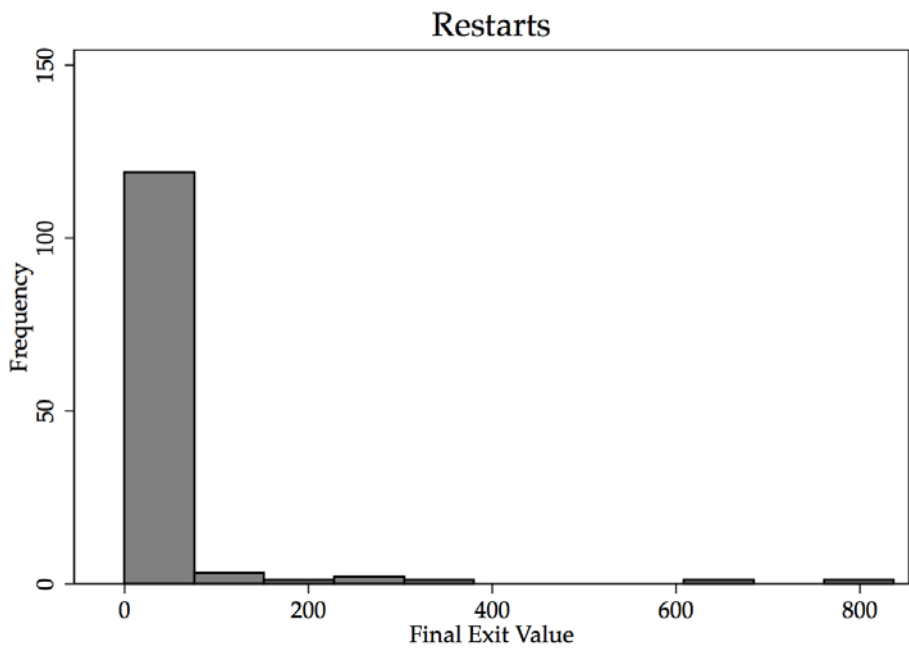
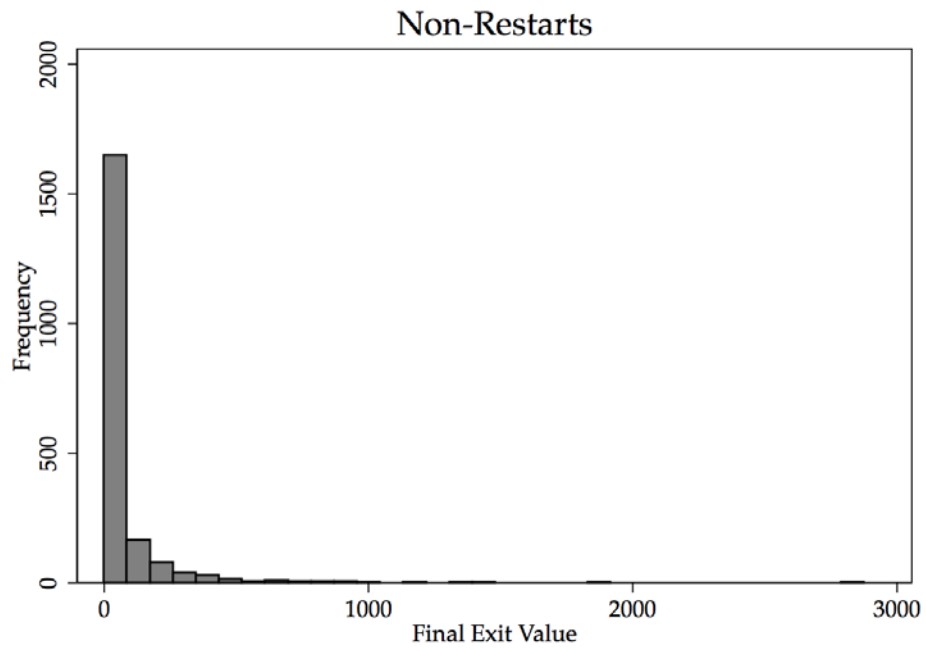


Figure 9. Histogram of Final Exit Value for Non-Restart Sample



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