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## Venture Capital and the Internet Bubble: Facts, Fundamentals and Food for Thought

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## **Abstract**

This paper examines the recent experiences of the US venture capital industry in the light of the Internet boom and bust. Venture capitalist played a central role in the financing of Internet start-ups. The period of extreme growth in the late nineties is now followed by a sobering experience of negative returns and declining investment levels. This paper provides a perspective on the larger lessons from this experience. It first develops a framework of the fundamental drivers of the venture capital industry, emphasizing in particular the need for investors to add value to their portfolio companies, and presenting evidence on the value added role of venture capitalists. The paper then raises questions about changes that occurred in the Internet boom, related to fund raising and the degree of competition, and how this might affect the value added role of venture capitalists. It provides a number of questions about the Internet episode that are meant to provoke thought and further research.

## 1) Facts

In 2001 the venture capital industry experienced its biggest ever decline. According to the National Venture Capital Association (NVCA), investments of venture capital firms in the fourth quarter of 2001 were at \$7.1B. This was approximately a third of the year before, when it was \$20.9B. Similarly, the amount of money raised in the fourth quarter of 2001 was \$4.6B. This was 80% lower than the year before when it was \$23.4B. This decline has raised alarm bells with many questioning whether this trend signals the eventual demise of venture capital.

However, it is important to put these numbers in perspective. The level of venture capital investments in the last quarter of 2001 was slightly more than in the first quarter of 1999. The annual amount invested in 2001 is \$36.5M. This is more than five times as large as in 1995, when the annual amount was \$5.9B. 2001 ranks as the venture capital industry's third best year in terms of total dollars invested. The developments of 2001 are thus a mere kink in an otherwise exceptional growth curve of the venture capital industry.

Whether the industry is in a boom or a bust only depends on the perspective we take. In the short term, this would appear to be a bust, but in the long term, the industry seems to be on a strong growth trajectory.

A similar picture emerges from the data on the rates of return. The average one-year returns to limited partners of venture capital funds were  $-18.2\%$ . But the 3-year returns were  $54.5\%$ , and the 10-year returns were  $28.4\%$ . These numbers are not always entirely reliable because it is widely suspected that losses are under-declared in the industry. This might bias the returns upwards, but it is not clear how it affects the temporal variation in those returns. The over-time differences provide an important message: while the short-term performance of the industry is weak, the long-term performance is strong.

Where do the recent losses come from? The highest losses were recorded in telecommunications ( $-38.3\%$ ) and in Internet-related ventures ( $-27.7\%$ ). Not surprisingly, these industries also have exceptional 3-year returns of  $69.7\%$  and  $35.7\%$ . Clearly the

Internet and the related telecom boom and bust had a significant effect on the venture capital industry.

What are we to make of this curious difference between short- and long-term performance? In this paper we will be less concerned with explaining the Internet bubble itself, than speculating on changes that seem to have occurred in the venture capital industry. We will summarize some of our academic research that examines the fundamental value of venture capital. We then raise questions about the changing nature of venture capital during the Internet period and the role of competition, and question if these changes weakened the fundamental value added role of venture capital.

## 2) Fundamentals

The question of what venture capitalists do has received surprising little academic research. The most obvious reason for this is that good data is extremely difficult to find. The main sources of data in the industry are Venture Economics and Venture One. These firms rely on voluntary participation of the industry and are often unable to obtain some of the more sensitive but also valuable information. Moreover, these firms tend to focus on easily measurable events, such as who receives money from whom, how much, and when.

Early field research (such as the work by Gorman and Sahlman, 1989, and Sahlman, 1990) suggested that the value of venture capital was not so much related to the money that they provide, but to ancillary services, such as selecting good firms, mentoring entrepreneurs, hiring executives, formulating strategies and professionalizing companies.

If the value of venture capital lies in the provision of these ancillary services, two significant research problems arise. First, how do we measure them? And second, what are we comparing venture capital to? If we only rely on the industry data, then we have the problem that we can only compare venture capitalist against each other. By research design, we would be unable to unearth those effects that are common to all venture capitalists. For this, we need to compare venture capital backed companies to other companies that receive financing from other sources of private equity, mainly angels and corporations.

The Stanford Project on Emerging Companies (SPEC) provided us with a unique opportunity to examine the fundamental contributions of venture capitalists. SPEC is an inter-disciplinary research project, involving researchers from a variety of academic disciplines. The objective is to understand the development of high-technology start-ups in Silicon Valley. The sample consists of over 170 such firms.

The unique feature of this project is that while it examines an environment in which venture capital is prominent, the sampling procedure itself is not contingent on the presence of venture capital. As a consequence, the sample naturally generates variation between firms that do and do not obtain venture capital. Another advantage of SPEC is that it used a large variety of data collection methods, involving all surveys, interviews and direct observation of both quantitative and qualitative information. While any one method of data collection has its strength and weaknesses, the compilation of various methods gives us greater confidence in the accuracy of our results.

The SPEC data allowed us to ask some simple questions about the “real” effects of venture capital. By “real” effect we mean the effect that venture capital has on the growth path of companies. We divided this inquiry into two parts. The effects of venture capital on the market position of firms, and the effects of venture capital inside the firm itself.

In the first paper (Hellmann and Puri, 2000) we examined the effect of venture capital on the time it takes a company to bring its product to market. The first sale of a product is an

important milestone for a company. It proves something about the viability of the product, and it might allow the firm to establish itself as a first mover in the market. Our data allows us to identify not only the point in time when a company takes its product to market, but also the point in time when it obtains venture capital for the first time. To analyze this data, we use a duration model that allows us to estimate by how much the probability of taking a product to market increases with the advent of a venture capitalist. We find that venture capital has a statistically significant effect. Relative to a baseline probability of bringing a product to market, venture capital increases this baseline probability by 79%. This suggests that venture capitalists can have a dramatic effect on a company's market performance.

Naturally, we have to ask to what extent this result stems from venture capitalists selecting better companies versus venture capitalists helping companies to become better. We perform a number of additional tests that reject the hypothesis that these results are driven solely by selection. Along similar lines, the work of Kaplan and Strömberg

(2001a,b) emphasizes that venture capitalists play a dual role of first carefully selecting companies and then monitoring them over time.

Time to market means different things to different companies. In a new industry time to market is particularly critical, as companies are vying for first-mover advantages. We therefore used some of the more detailed information that we have on the sample companies. In particular, we divide our firms into two camps: those that are pursuing truly innovative opportunities versus those that plan to compete in already established industries. We find that innovator firms take somewhat longer to bring a product to market, which is consistent with the notion that they have a longer development cycle. The interesting effect we then find, however, is that venture capital helps to speed up time to market especially among innovator companies. Those innovator companies are precisely the ones that have a greater challenge to bring their product to market, and that also have the greatest strategic interest in being fast to market. The interesting result is thus that it is for those companies that the effect of venture capital is strongest.

Does this also mean that these companies are appreciative of the help that the venture capitalist bring to them? To fully answer that question, we would need data on the valuations paid by the different types of investors. Such data, however, is extremely difficult to obtain. Indeed, while the response rate on many survey items was over 80%, our response rates dropped below 5% on any questions related to valuations. However, something that we can observe in the data is the self-selection into venture capital. Indeed, when we examine the likelihood of innovators and imitators choosing venture capital, we find that innovators are more likely to obtain venture capital. This suggests that firms might choose their investors on the basis of what value the investor will add. Innovators are particularly likely to benefit from venture capital, and therefore also make a better match for venture capitalist. The relationship between venture capital and innovation was further corroborated in a concurrent research project by Lerner and Kortum (2000), which examined differences in the propensity to patent among start-up firms.

In the second part of the research project we “opened up the black box” to look inside firms (Hellmann and Puri, 2002). So far, our research suggests an overwhelmingly positive effect for venture capital. Is there also a dark side to venture capital? Probably the most contentious issue in venture capital is the treatment of founders. Some entrepreneurs claim that venture capitalists are notorious in removing founders from the position of CEO and bringing in an outsider. Venture capitalists tend to counter that part of the value-added that they bring is to professionalize the firm. This may involve hiring the best possible management team, and it may imply that the founder is replaced by an outsider in the position of CEO.

To explore this potentially “dark side” of venture capital, we examine whether the presence of a venture capitalist indeed increases the likelihood of bringing in an outside CEO. We find that to be the case, and again the effect is statistically significant and economically large. But what does it really tell us about whether these founder replacements are friendly or hostile? While it is clearly difficult to measure any degree of hostility, we consider a noisy proxy measure. In particular, we look at whether the

founder remained involved with the company after the arrival of the new CEO. In about 40% of all companies we find that the founder did remained involved with the company after the new CEO had arrived. The founder either remained involved at the level of the board of directors, or by directly taking a position in the company, such as chief technology officer, VP or business development, or other positions (In the case of Yahoo - which is not part of our sample - the founder Jerry Yang became “Chief Yahoo”). The interesting observation is that having venture capital makes no difference to the rate of founder retention. Moreover, the effect of venture capital on outside CEOs applies equally to events where the founder stayed or left. This evidence thus does not support the view that venture capitalists treat founders in a particularly hostile manner. But it does support the view that venture capitalists play an active role in helping companies to recruit professional CEOs.

If venture capitalists can help a company to recruit a professional CEO, we may ask if they also have an effect deeper down in the organization. The strength of the SPEC data is that it features information on the inside of companies that is otherwise not easily

available. We examine a variety of measures about the degree of professionalization. For example we examine at what point companies introduce a stock option plan. We examine whether companies recruit through professional channels, rather than relying on informal channels. And we examine at what point a company appoints a VP of marketing of sales. In each of these cases we find that venture capital is associated with higher degrees of professionalization. We even asked in our surveys whether companies considered having an investor a milestone, or whether investors had influenced their human resource policies. Whenever the companies had venture capital investors, they were much more likely to respond yes to these questions.

All of this evidence strongly points in one direction: venture capitalists provide value-added services, they help to professionalize the companies they finance, and they help their companies to establish themselves in the market place. Our results suggest a new role for financial intermediaries such as venture capitalists, which we call a “support” role in which venture capitalists exert costly effort to enhance the value of the firm by

professionalizing the human resource base of the company. This research therefore highlights the importance of the ancillary services provided by venture capital.

There is one important aspect that we have not mentioned yet. All of the companies we examined were pre-Internet. Our studies capture how venture capital worked before the Internet boom. It provides a useful benchmark for understanding what happened then.

### 3) Food for Thought

We do not have as detailed data on the effect of venture capital on Internet companies.

We are therefore left to speculate about exactly what happened. In this section we

develop a number of questions about what went on. These questions are meant to be

provocative. A more careful analysis would have to be performed before we can answer

these questions with facts. In other words, what follows is food for thought.

Question 1: Is the Internet boom and bust dramatically worse than past booms and busts?

When answering this question, some facts need to be taken into account. The first fact is

that, during the internet boom, companies went public at an earlier stage than ever before.

Before Netscape, it was rare for a company to go public if it relied on a single product for

its profits. After Netscape, relying on a single product became very common. And

companies were able to go public even before they made any profits. Now, most

entrepreneurial companies go through a period of making no profits. What was different

was that these companies were already public at these early stages. For the first time, the general public could witness the triumphs and tribulations of start-ups companies. These risky early stages are not normally so visible to stock market investors, let alone in the popular press. In addition, the access to public markets possibly amplified the cycle. Successful companies could grow even faster and losers could burn more money before going down. To the best of our knowledge, there has actually been no careful study of whether the failure rate of Internet companies is even dramatically different from the failure rates of other new industries. Our suspicion is that the failure rate was high, but not necessarily the highest. The difference was that the failures were more dramatic and especially more visible. This is clearly an issue worthy of research.

Second, it is important not to extrapolate too much information from short time horizons. In the first part of this paper we already saw how swings in the data can lead to exaggerated conclusion: on a one year basis the decline in venture capital investments seems dramatic, on a five year basis there is less to worry about. We can now dig deeper into the Internet boom, and postulate a behavioral explanation. One possibility is that

there was overreaction on the upside and downside of the boom, and this was exacerbated by the Internet boom, which arguably introduced a discontinuity into the system.

Venture capital is inherently risky. However, the winners tend to materialize quickly whereas the losers take a longer time to be identified as losers. In “normal” times a venture capital portfolio is invested in continuous times. At any point in time, the portfolio generates winners and losers that all have different initial starting dates. Overall, the returns are relatively smooth over time. Consider now the Internet, which constituted a discontinuous shock to the system. A lot of related investments were made all within a span of one to two years. It wasn’t long before some big winners emerged, such Amazon or eBay. Arguably, some people interpreted these successes as a permanent shift in the average returns to venture capital. They did not take into account that these were the early winners, and that the losers would take a longer time to be identified. By early 2000 this mistake became painfully evident. People may have overreacted once more, interpreting the poor rates of return as a permanent downward shift of the industry returns. Few people considered that the observed pattern was strongly influenced by a temporary deviation from the steady state flow of winners and losers.

Question 2: How did the competitive structure of the venture capital industry change during the Internet bubble, and what effect did this have on the value added role of venture capitalists?

Causal observation suggests a change in the competition among venture capitalists. In the “old days” Silicon Valley was a closely-knit community of a handful of investors who knew how to avoid excessive competition. Although there never was any evidence of direct collusion, there seems to have been an implicit understanding that venture capitalists should avoid competing on price, that they should not outbid each other by offering higher valuations to entrepreneurs. Although it is hard to say exactly when those days finished, these norms seemed to have already weakened in the early eighties when the industry experienced its first boom. The regime of competition shifted to one of differentiated competition. Different venture capitalists specialized in different areas and different types of investments. In this period a number of firms established themselves as leaders in their respective niches. For example, Kleiner Perkins, probably the most well-

known venture capital firm, developed an expertise in linking up its portfolio companies both with other portfolio companies and with more established companies. During this period venture capitalist were able to achieve high rates of returns by gaining access to proprietary deal flow and by providing value-added services to their portfolio companies. From a limited partner's perspective, venture capital is expensive because the venture capital partners receive not only a hefty management fee (typically around 2% of the funds committed) but also a profit share (called "carry") of 20%. It was the unique expertise and value-added of the general partners that justified this expensive arrangement.

The structure of competition changed once again in the mid-nineties, with the explosion of the Internet. The nature of competition among venture capitalists was altered in two important ways. First, there was massive new entry into the industry. Suddenly, people from all walks of life discovered their "innate venture capital ability." To the best of our knowledge there has been no careful study of the career experiences of venture capitalists, and how they changed with the Internet boom. However, casual observation

suggests that the industry was flooded by investment bankers. The influx of venture capitalists with deep technological or managerial expertise, however, was probably much lower. As we showed in our analysis of the fundamentals, venture capitalists play an important role in guiding the strategic direction and building the human resources of their companies. But how many of the new entrants truly and deeply understood the differences between managing a financial portfolio versus managing people and products? We conjecture that the new entrants were attracted to the high returns that the experienced venture capitalists were producing, but they had less appreciation for what it takes to generate such returns on a consistent basis. As a consequence, the nature of venture capital became more deal-oriented as opposed to company-oriented. What mattered most was to get into the deal flow. Especially for inexperienced venture capitalists this meant paying higher and higher valuations, with perhaps less of a value added role.

Second, the changes in the competitive landscape also affected the more experienced venture capitalists. Success changed their own business model in more radical ways than

they anticipated themselves. The most important change was that limited partners were suddenly throwing enormous amounts of money at them. Few of the experienced venture capitalists could resist the temptation to raise significantly larger funds. In an industry that prides itself on being on the cutting edge of innovation, the experienced venture capitalists were worried about being perceived as lagging behind their times. Most important, the economic incentives for increasing the fund size were simply irresistible. Somewhat uncritical limited partners simply paid a proportional management fee of about 2% irrespective of fund size. Venture capitalist that before would have raised a fund of say \$50M were now able to raise \$500M and still obtain their 2% management fee. Few venture capitalists missed that point. Not surprisingly, they did not hire additional partners to scale their business proportionately. Instead they grew the number of partners only moderately, so as to split the management fees and carry among not too many partners. But with a lot more money for every partner to invest, they had to change their business model. Casual observation suggests that most venture capitalists adopted a combination of three strategies.

First, they started investing in many more companies. What was poorly understood was that this fundamentally changed the nature of business. In particular, the time that venture capitalists had to truly add value to their portfolio companies was dramatically reduced. They all committed to too many investments, sat too many boards, and had too little time to work in depth with any of their companies.

Second, because of the problem that they could not spread their money too thinly, venture capitalists wanted to place larger sums of money into the their portfolio companies. Syndication fell by the wayside, and with it a useful sanity check. It also led to a situation where companies received a lot more money than they ever needed. Just how risky it was to over-fund companies became evident later. Again there was a perception bias in that the early winners tended to benefit from the larger amounts of money. The losers, however, eagerly guzzled equally large amounts of money before meeting their maker.

Third, in order to place their large funds, many venture capitalists moved towards later stage investing. The obvious problem with the explosion of later stage funds was that

everything depended on a well-functioning early stage market. During the height of the Internet boom, this was not a concern, because there were plenty of early stage investors placing large bets on exciting new companies. But as the bubble burst, the attractiveness of the later-stage market changed. Most of the early stage deals had been overvalued. They involved “down-rounds” and required turnaround expertise. This was not what the later-stage investors originally had in mind. At the same time most venture capital funds stopped investing in the early stage market because of the problems they had with their existing deals. As a consequence the deal flow in the later-stage market is likely to remain weak for some time to come.

A fourth option of what to do with the money was probably not anticipated at all by industry participants. But once the Internet bubble burst, venture capitalist realized that they had enormous amounts of money and didn't know where to invest it. Very few decided not to take the money or to return it. But the vast majority decided to simply wait and invest the money much more slowly. This, incidentally, may actually help to stabilize the industry through the current downturn.

Question 3: Did the venture capitalist survive the Internet bust better than other involved parties ?

An old wisdom among divers is that you don't have to swim faster than sharks. All you have to do when you see a shark is swim faster than the person next to you. Something similar also seems to apply to the venture capital market. The bad news is that some venture capitalists lost lots of money. The good news is that it wasn't their money anyway. The losers were mainly the limited partners (and thus mostly people's pensions), and many stock market investors.

Let us not oversimplify here. First, some venture capitalists actually had a personal stake in their business and lost it. Second, some of the venture capitalists are working very hard to recoup whatever value there is left in the portfolio. Third, venture capitalists might face a loss of reputation that could affect their future career path (although it is too early to tell how serious this is, given that everyone can credibly point to lots of others who

made the same mistake). Fourth, several venture capital firms are unlikely to raise another fund. In a few cases the limited partners even reneged on their original fund commitment. Despite all this, the overall economics of having been an Internet venture capitalist were still very attractive. The venture capitalists received large management fees, so that even without ever making a dollar on a carry, it is hard to argue that they faced any economic hardship: it just wasn't as lucrative as they had originally thought it would be.

Some limited partners, on the other hand, truly lost money. Of course, the managers of the various pension funds and endowments themselves are unlikely to face the burden themselves too. However, it is worth dwelling a little longer on what happened to the limited partners. One of the more shocking truths about the venture capital market is the lack of good data. Despite the high level of professionalization that venture capitalists bring to their portfolio companies, the venture capital industry itself is more like a cottage industry with little infrastructure and surprisingly low transparency and governance. Limited partners are mostly to blame for this. Not only is there too little negotiation about

the terms of the limited partnership (for example, it is hard to see why the 20% carry should be adopted as widely as it - see also Lerner, 1999). There is also a problem that limited partners exercise virtually no oversight. They do not even collect credible data that would allow for a systematic comparison of the performance of venture capital funds. Now that many of the limited partners have over-exposed themselves to the venture capital market, this lack of transparency is finally becoming apparent. One hope is that the Internet bust will provide an impetus for limited partners to devise more credible governance structures for the venture capital industry at large.

The other big losers of the Internet bust are obviously the many stock market investors that invested in venture capital backed companies. An analysis of the stock market is clearly beyond the scope of this paper, though it does raise a number of interesting questions. One interesting question that arose with the Internet boom was the debate about whether venture capital firms can be stock market listed entities themselves? While this may improve some of the governance problems that we identified with the limited partners, it is not clear whether it would also be consistent with the fundamentals of

venture capital, namely adding value to investments. We can at least thank the Internet boom and bust for having brought forth these questions for future research.

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