

*Journal of***APPLIED CORPORATE FINANCE**

A MORGAN STANLEY PUBLICATION

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# It Ain't Broke: The Past, Present, and Future of Venture Capital

by Steven N. Kaplan, University of Chicago Booth School of Business and NBER, and Josh Lerner, Harvard Business School and NBER\*

**T**he U.S. venture capital (VC) industry is currently subject to a great deal of uncertainty and controversy. Some observers and practitioners believe that the VC model is broken and that the U.S. VC industry needs to shrink.<sup>1</sup> In this paper, we put the U.S. VC industry into its historical context, assess the current state of the VC market, and discuss the implications of that history and the current conditions for the future.

We begin by describing the fundamental problem that entrepreneurs face and VCs need to solve in order to invest successfully. There is a great deal of evidence to support what is now a highly developed theory of how the U.S. VC model provides an efficient solution to this basic problem of entrepreneurial finance. And there is little doubt that the U.S. venture capital industry has been very successful. A large fraction of IPOs, including many that are now among the most successful public companies in the world, have been funded by VCs. And, where possible, the U.S. VC model has been copied around the world.

Next we look at the historical patterns of commitments to U.S. VC funds and investments in companies by those funds. U.S. VC investments in companies have represented a remarkably constant 0.15% of the total value of the stock market over the past three decades—the period for which we have reliable data. Commitments to VC funds, while more variable, have been consistently in the 0.10% to 0.20% range. These percentages have not changed in recent years.

Third, we consider the historical record on VC fund returns, paying particular attention to returns of post-2000 “vintages.” Contrary to the popular impression, we do not find that returns to VC funds this decade have been unusually low (or high) relative to the overall stock market. This is true despite the relatively low number of IPOs. Overall, VC investment and returns have been subject to boom-and-bust cycles over time.

Based on our historical analyses, we make some observations about the current situation and consider what is likely to happen going forward. The level of commitments to and the investment pace of VC funds since 2002 have been consistent with the long-term historic averages. At the same time, the returns relative to the overall stock market appear to have

been roughly average. This does not suggest to us that there is too much money in U.S. VC, or that the VC model is broken. Instead it appears to reflect the natural evolution of a relatively competitive market.

In fact, given the unusual and unexplained paucity of IPOs between 2004 and 2007, we argue there is more upside than downside for the VC vintages of 2001 to 2007. The costs for public companies associated with Sarbanes-Oxley are now smaller and more manageable than they were in 2005 and 2006. There are more boutique investment banks with incentives to market IPOs. And according to anecdotal reports, there has recently been growth in the pipeline of IPO candidates.

We also note that commitments to U.S. VC partnerships were historically low in 2009, a trend that is likely to continue into 2010 and, possibly beyond. Based on the historical relationship between commitments and performance, the low level of commitments suggests that returns to the 2009 and 2010 vintage years are likely to be strong.

Finally, we consider some of the longer-term drivers of venture capital financing. Corporate funding of innovation has increasingly moved from large, centralized research facilities to various “open innovation” models, including acquisitions and strategic alliances with smaller firms. This increased willingness to reach outside the organization, which reflects the difficulties of managing early-stage innovation within a large corporation, appears likely to create more opportunities for venture investors in the years to come.

## The Problem and Solution

An important problem in a market economy, and the one that VCs attempt to solve, is to connect entrepreneurs with good ideas (but no money) with investors who have money but are looking for good ideas. The solution, as suggested by theoretical analysis and implemented by venture capitalists, involves (at least) three distinct activities.<sup>2</sup>

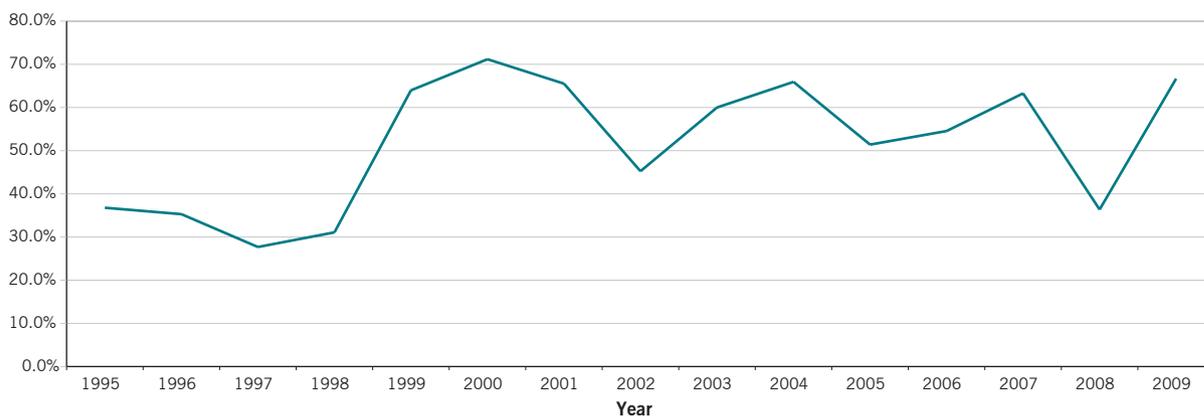
First, VCs spend a large amount of time and resources screening and selecting deals. VCs systematically evaluate the attractiveness and risks of the opportunity, considering factors that include market size, strategy, technology, customer adoption, competition, and the quality and experience of the

\* Chris Allen and Jacek Rycko provided excellent research support for this article. We thank Harvard Business School's Division of Research and the Kauffman Foundation for financial support. All errors and omissions are our own.

1. For example, see Kedrosky (2009) and Austin (2009). Full citations for all articles appear at the end of the article.

2. See Kaplan and Strömberg (2001) for a more detailed discussion.

Figure 1 **Share of all Non-financial, Non-reverse LBO, Non-REIT, Non-SPAC IPOs that are Venture-backed from 1995–(July) 2009**



management team. The screening process is an intensive and disciplined one that often takes several months.<sup>3</sup>

Second, VCs engage in sophisticated contracting and structuring of their investments.

VC contracts are efficiently designed to ensure the following: the entrepreneur does very well if he or she performs well; the VC takes control if the entrepreneur does not perform. VCs implement this design by carefully allocating cash flow rights (the equity upside that provides incentives to perform), control rights (the rights VCs have to intervene if the entrepreneur does not perform, liquidation rights (the senior payoff to VCs if the entrepreneur does not perform), and employment terms, particularly vesting (which gives the entrepreneur incentives both to perform and stay with the firm). The various aspects and provisions of the contracts typically reflect the VC's earlier analysis (during the screening phase) of the attractiveness and risks of the investment.<sup>4</sup>

Third, VCs improve the outcomes of and add value to their portfolio companies by monitoring and aiding companies after they invest. Part of the added value comes from providing governance and monitoring. This often means replacing the entrepreneur when it becomes clear the entrepreneur is not up to the task of growing the company. Part of the added value involves assisting the entrepreneur with strategy, hiring other executives, introductions to customers and other partners.<sup>5</sup>

### Historical Impact

It is generally believed that VC investing has been important to the U.S. economy. In this section, we provide several

measures or indicators of that importance and success.

Let's start by recognizing how uncommon VC funding is. While roughly 600,000 new businesses (that employ others) are started each year in the U.S., reports from Venture Source suggest that, in an average year, roughly 1,000 businesses will receive their first round of funding from a VC. That means that only 1/6 of 1% of new businesses manage to obtain VC funding.<sup>6</sup>

But while very few companies receive VC funding, a remarkably large fraction of the start-ups that make it to the public company stage are funded with venture capital. To estimate this fraction, we used Thomson Banker to identify all IPOs in the U.S. since 1995—and then attempted to eliminate IPOs that were not true industrial start-ups by excluding blank-check companies, corporate spin-outs or spin-offs, financial institutions, REITs, and reverse leveraged buyouts.

Using this better measure of the true start-up population that goes public, we found that from 1999 through 2009 (as illustrated in Figure 1), over 60% of IPOs have had VC backing. This is an extraordinary percentage considering that only 1/6 of 1% of all companies are VC-backed. What's more, in only two years of these eleven years have fewer than 50% of IPOs been VC-backed.<sup>7</sup> One way of interpreting these results is that receiving VC funding and going public are both very uncommon, but highly related events. While not a necessary condition for going public, VC funding very significantly increases the likelihood that a start-up will eventually go public.

Venture capital has fueled many of the most successful start-ups of the last 30 years. Four of today's 20 largest (in

3. For a detailed description and analysis of VC screening, see Kaplan and Strömberg (2004).

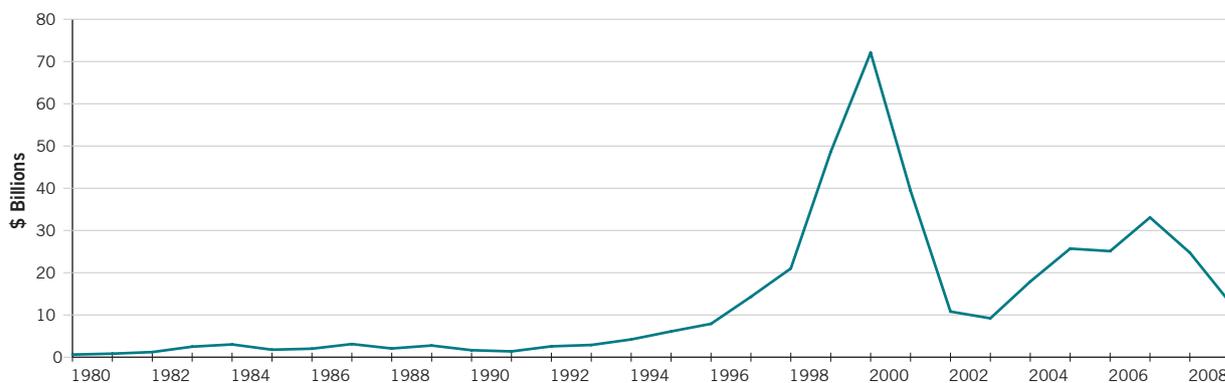
4. For a detailed description and analysis of VC contracts, see Kaplan and Strömberg (2003).

5. Hellmann and Puri (2002), Kaplan and Strömberg (2004), and Lerner (1995) all document different aspects of this VC value-added. Sorensen (2007) seeks to assess the relative importance of deal screening and subsequent value-added and concludes that the two are of roughly equal importance for top VCs.

6. Using detailed Census data, Puri and Zarutskie (2009) obtain similar percentages for the 1996 to 2000 period.

7. If anything, our numbers underestimate the percentage of start-ups that are VC-backed. Kaplan, Sensoy and Strömberg (2009) study 2004 IPOs in greater detail and find a somewhat higher percentage are VC-backed than the Thomson database indicates. In other words, it is highly unlikely that a company that does not take venture capital ends up going public.

Figure 2 **Commitments to U.S. Venture Capital Partnerships, 1980–2009 (\$ billions)**



Source: Private Equity Analysis

Figure 3 **Commitments to U.S. VC Partnerships as Fraction of Stock Market Capitalization 1980–2009**



Source: Private Equity Analyst, Steven N. Kaplan

terms of market capitalization) U.S. companies—Microsoft, Apple, Google, and Cisco—have been funded in part by venture capital in the last 30 years. And so were a large number of other highly valuable companies, including Gilead, eBay, Amazon, Yahoo, Amgen, Adobe, Celgene, Starbucks, Genzyme, Juniper, Symantec, Stryker, and Intuit. Thanks in part to such highly visible successes, U.S. venture capital practices have been exported to other parts of the world.<sup>8</sup>

### Fundraising and Investment

Those who believe that the U.S. venture model is broken argue that there is an excessive amount of capital in the venture industry and point out that the recent financial performance of the venture industry has been poor. In this section, we examine the amount of capital in the industry and consider whether it appears excessive. In the following section, we

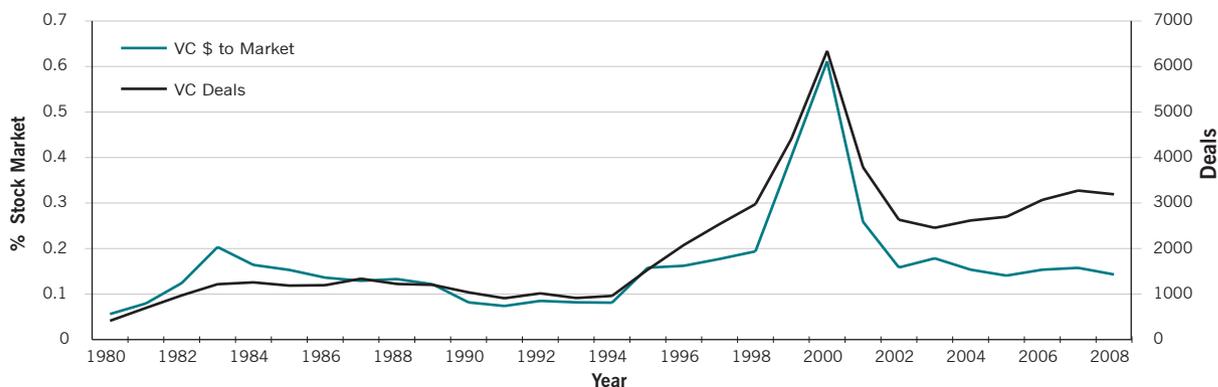
analyze historical performance.

Figure 2 presents annual limited partner commitments to venture capital funds from 1980 to 2009 (using data from Private Equity Analyst) in nominal (or actual) dollars. The figure documents the huge run-up in venture capital through the dot-com era and the subsequent decline. From 2005 to 2008, annual commitments to venture capital ran in the range of \$25 to \$33 billion.

But these depictions do not take account of the fact that the size of the economy and the stock market has increased markedly since 1980. In Figure 3, we address this shortcoming by scaling annual commitments by the total value of the U.S. stock market at the beginning of each year. This scaling, then, presents VC commitments as a fraction of the total market value of equity. Measured this way, VC commitments are much more stable. VC commitments have never

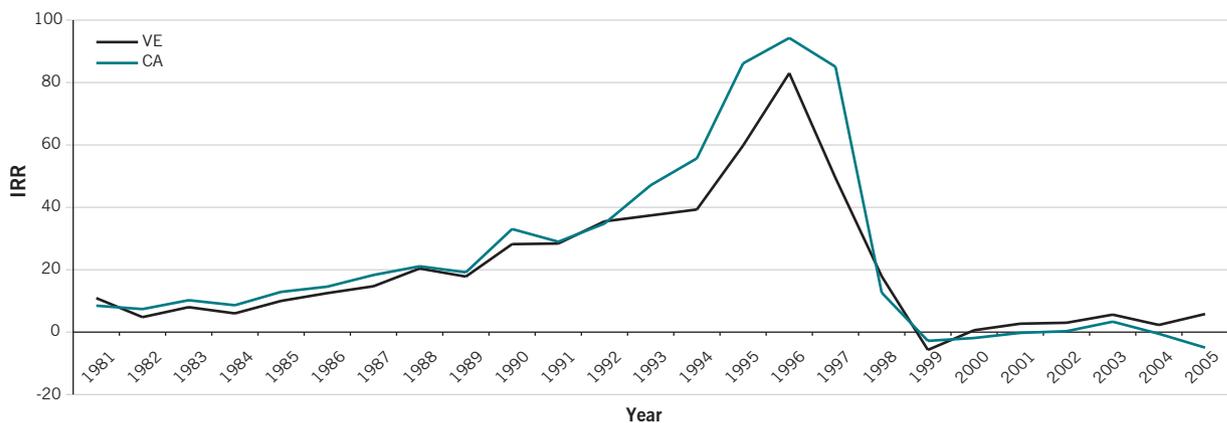
8. There has been a proliferation of efforts by the public sector in many nations in recent years to encourage the formation of local venture clusters, albeit with mixed results. See Kaplan, Martel and Strömberg (2007) and Lerner and Schoar (2006).

Figure 4 U.S. VC Deals and \$ Invested (as % of Market)



Source: NVCA

Figure 5 U.S. VC Vintage Year IRRs



Source: Private Equity Analyst, Steven N. Kaplan

gone below 0.05% of the total stock market; and with the exception of the three years of the dotcom boom (1999 to 2001), commitments have not gone above 0.23%. Since 2002, commitments have run just slightly above the historical average (0.146% versus 0.138%).

Figure 4 presents the analogous analysis for venture capital investments in portfolio companies (through 2008). The left axis shows VC investments as a fraction of total stock market value at the beginning of each year. The right axis shows the number of VC investments. Like Figure 3, Figure 4 shows that VC investment has been remarkably stable. On average, U.S. VCs have invested 0.164% of the value of the stock market each year in portfolio companies. Except in the three dotcom boom years, investment has not exceeded 0.203% of the stock market. Since 2002, investments have run slightly below the historical average (0.155% versus 0.164%).

Both Figures 3 and 4, then, indicate that the U.S. VC market has been remarkably stable over the last 30 years

relative to the overall stock market. And the recent pace of VC commitments and, particularly, investments is historically average, not high.

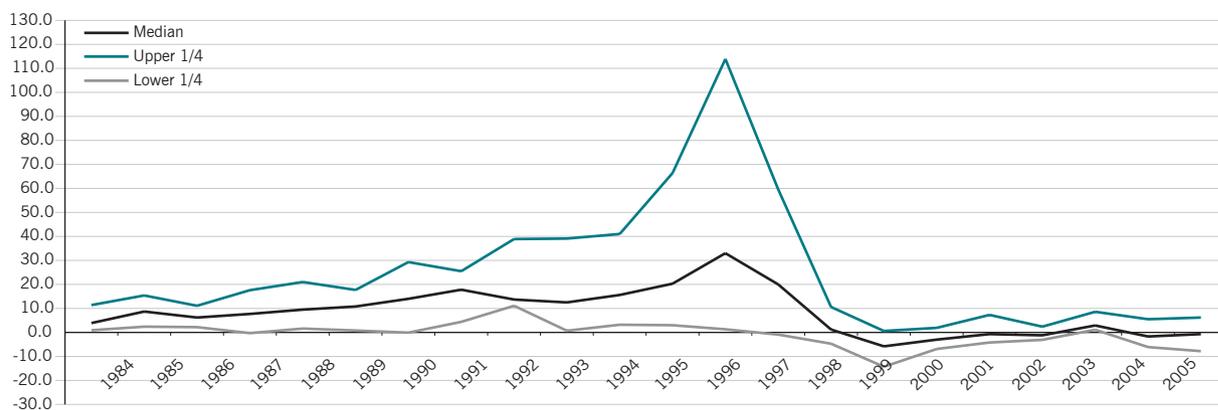
### Performance

What about the performance of VC funds? Figure 5 presents the average vintage year returns reported by Cambridge Associates (CA) and by Venture Economics (VE) as of December 2008. The two series track each other very closely, with CA being higher in the mid-90s vintages and lower in the most recent vintages. The figure illustrates the large variation in performance across different vintage years.

Figure 6 presents VE vintage year returns by quartile of fund performance. The figure illustrates the large differences in performance between funds in the top and bottom quartiles of the distribution.

But these figures—and most publicly available data—do not provide enough information to answer three important

Figure 6 **Venture Returns by Vintage Year Median, Upper, and Lower Quartile 1984–2005**



Source: Venture Economics

questions. First, how do VC returns really compare with public stock market returns? Second, do the same general partners (GPs) consistently outperform? And, third, how does fund-raising affect subsequent performance?

In a much-cited study, Kaplan and Schoar (2005) attempted to answer each of these questions using detailed fund performance data from Venture Economics on U.S. VC funds from 1980 through the end of 2001. We now review the findings of that study.<sup>9</sup>

### VC Performance vs. Public Markets

Kaplan and Schoar (2005) evaluated VC performance relative to the public stock market by calculating a public market equivalent (PME). The PME compares an investment in a VC fund to an investment in the S&P 500 by assuming that all cash payouts (net of fees) by a fund to LPs are reinvested at the total return to the S&P 500. The resulting fund value is then divided by the value of the cash inflows (or investor contributions) including the fees the investors would have earned if the funds have been invested in the S&P 500. Using this measure, any fund with a PME greater than 1.0 outperformed the S&P 500 (net of all fees). The PME is a particularly relevant measure for LPs who view VC investments as an alternative to investments in public equities.

To illustrate, if a VC invested \$10 million in March of 1997 and sold the investment in March of 2000 for \$20 million, the investment would have had an IRR of 26% gross of fees and earned a multiple of two times. During that period, however, \$10 million invested in the S&P 500 would have grown to \$20.7 million. As a result, the PME of the investment would have been only 0.97 (20/20.7) gross of fees. Net of a carry of \$2 million, the net cash outflow to

investors would have been \$18 not \$20 million, and the PME would have been only 0.87 (18/20.7).

Kaplan and Schoar restrict their analysis largely to funds raised (or committed) before 1997. Their study finds that the average VC fund in their sample, net of fees and carry, had a PME of 0.96. This means that the average fund slightly underperformed the public stock market after the VCs' share. Gross of fees, the average PME was estimated to be 1.25 or above, and thus well above 1.0.

When Kaplan and Schoar weight their sample by the amount of capital in the funds, they find an average PME of 1.22 net of fees, indicating that the VC industry as a whole outperformed the public markets net of fees (as well as gross of fees).

The reason for the difference between average and capital-weighted average has to do with timing. As Figure 7 indicates, PMEs were higher for 1990s vintage years than for 1980s vintage years. And because more money was committed to VC in the 1990s than the 1980s, the capital-weighted average gives more weight to the performance of the fund of the 1990s.

We believe there are several takeaways here. First, VC returns net of fees have been competitive with the return from public markets. Second, VC outperforms public markets gross of fees, but GPs capture a lot of the outperformance (on average). Third, there is a great deal of variation over time in whether VC returns outperform or underperform the public markets.

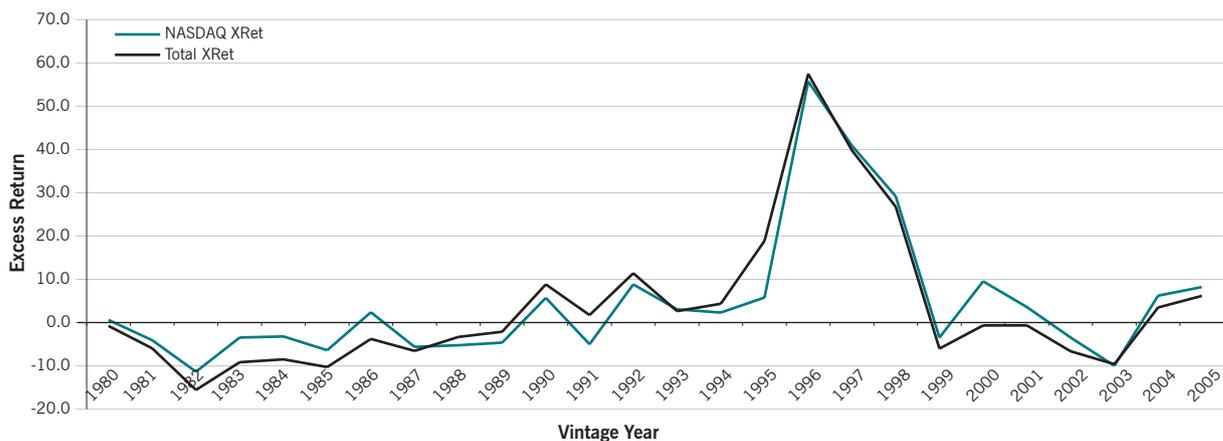
There are two caveats to these results, one positive and one negative. On the negative side, the results do not include the dot-com bust. On the positive side, Cambridge Associates has a larger sample and has reported higher returns, indicating that Kaplan and Schoar may understate VC performance.

9. Later work by others – Gottschalg and Phallipou (2007) and Hochberg et al. (2009) – using somewhat later data for U.S. VC funds is largely consistent with the findings in Kaplan and Schoar (2005).

Figure 7 U.S. VC PME by Vintage Year



Figure 8 Excess Vintage Year Return versus Total Market and NASDAQ



What about more recent vintages? There are two problems in estimating the performance of the more recent vintages. The first is a practical one: the cash flows to the individual funds are not readily available. Thus, we cannot undertake PME analyses, only a cruder assessment of overall performance. Second, because the investments remain largely in the portfolios of the venture groups, we do not know how much the more recent funds are really worth. Given the difficulty of valuing venture firms and the varying practices regarding marking-to-market portfolios, we cannot be sure of the underlying values. As a result, the analysis that follows is somewhat speculative.

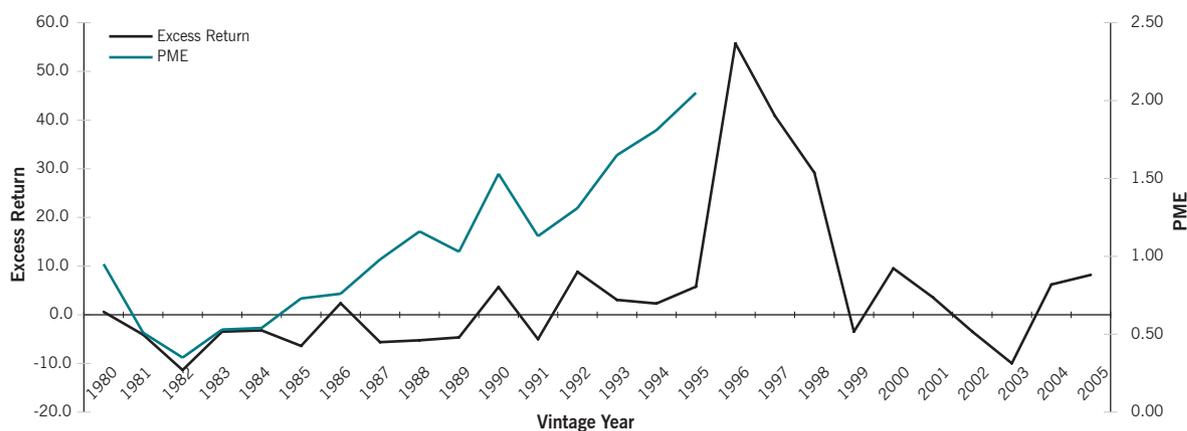
With these qualifications, we now compare the performance of recent vintages to that of the stock market. We compare the average vintage year IRR (using Venture Economics returns) to the five-year IRR of the total stock market and to the five-year IRR of NASDAQ. (For the 2005

vintage, we use the four-year IRRs because five-years are not available.) Because of timing differences, this provides an imperfect measure of the net-of-market performance of these vintages. We arbitrarily stop at 2005 because more recent vintages have likely not had enough time to establish even an inexact estimate of their performance.

Figure 8 shows excess returns by vintage year from 2000 to 2005. For the entire period, performance has been roughly equal to the total stock market. Two vintages have IRRs below the total market return; two have IRRs roughly the same; and two have IRRs above. When compared to NASDAQ, four of the six vintages exceed NASDAQ. These results suggest that VC funds have held their own relative to public stock markets over this decade.

Figure 9 plots the PMEs from Kaplan and Schoar (2005) against the excess returns we calculated relative to the total market. This graph indicates that the excess returns calculated

Figure 9 Vintage Year Return less NASDAQ Return versus PME



this way correlated with PMEs. In particular, when excess returns are positive, PMEs tend to be greater than 1.

We confirmed this by estimating a regression of the PMEs against the excess return measure. We obtained the following result:

$$\text{PME} = 1.1 + 0.05 \times \text{Excess Return \%}$$

[0.01]

where 0.01 is the standard error of the estimated relationship. This regression indicates a highly significant relationship. Given that recent vintages have returns comparable to those of the overall stock market, this regression suggests that the recent vintages will perform about as well as public markets when all is said and done.

As we noted earlier, this analysis assumes that the 2000 to 2005 vintages are correctly marked-to-market. To the extent that bad investments have not yet been written down, the funds are overvalued and the ultimate results will be worse than the public markets. To the extent that good investments have not yet been written up, the funds are undervalued and the ultimate results will be better than the public markets.

We suspect that, on average, those vintages are undervalued because most bad investments have been written down as they have failed or needed additional financing (at lower valuations). At the same time, many companies that are performing well, particularly in IT, have not been written up.

### Persistence

The second question that Kaplan and Schoar address is the consistency, or “persistence,” of performance. It is widely believed that the best GPs in venture capital consistently outperform other GPs. This observation explains the strong

preference of LPs to invest in top quartile funds or GPs. Some LPs have taken this preference a step farther and believe that it does not make sense to invest in venture capital at all unless they can invest in top quartile, or even top decile, funds.

Consistent with wide differences in performance, Kaplan and Schoar find large differences between the bottom and top quartiles. Funds in the top quartile have PMEs of 1.11 and above while those in the bottom quartile have PMEs of 0.67 and below. They also find strong evidence of persistence. Subsequent fund performance is significantly related to previous fund performance for the same GPs. They also find a strongly significant relationship between the performance of funds that are two apart (e.g., funds III and V) and even three apart. This is important because those funds are less likely to have investments in common.<sup>10</sup>

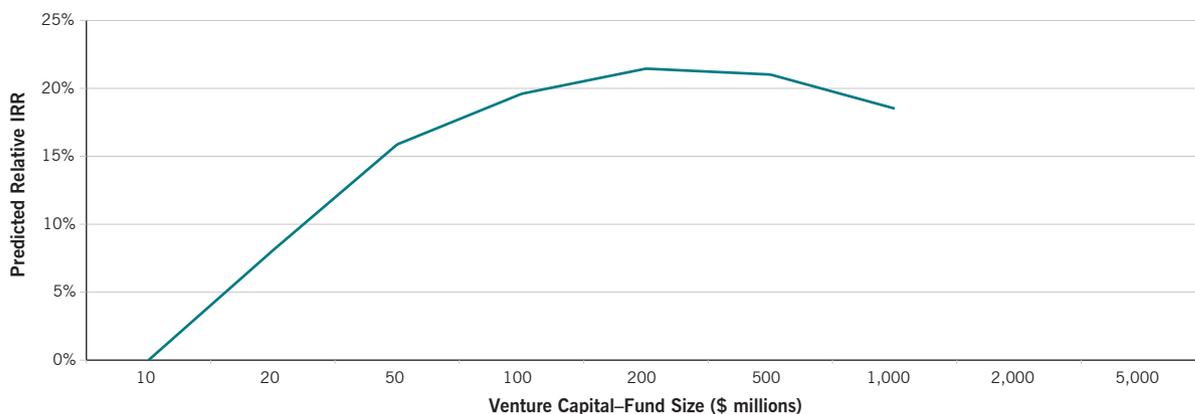
What’s more, this persistence of returns among venture capitalists is notably different from findings for other asset classes. Similar studies of mutual funds find no evidence of persistence among top performers. Studies of hedge funds have mixed results, but generally find limited evidence of persistence.

There are three other important comments to make about persistence:

First, persistence is not concentrated in the top decile. When Kaplan and Schoar divided funds into performance terciles (thirds), they found that funds in the top tercile typically had PME’s above 1, indicating outperformance of the public stock market net of fees. As with the overall persistence result, funds in the top tercile were significantly more likely to repeat in the top tercile than funds in the middle or bottom tercile.

10. More recent papers that have revisited this question with updated data sets have found similar results.

Figure 10 Looking at Venture Funds and Returns



Source: Lerner, Leamon and Hardyman, 2011.

Second, although there is strong statistical evidence of persistence in venture capital, it is by no means guaranteed. If subsequent performance were random, roughly 33% of top tercile funds should repeat in the top tercile. If subsequent performance were completely persistent, 100% of top tercile funds would repeat in the top tercile. Kaplan and Schoar find the true level of persistence is 50%.

Third and last, fund size is the enemy of persistence. GPs with funds that have produced high returns tend to get larger (while GPs of funds with poor returns either get smaller or are unable to raise additional funds). Kaplan and Schoar find that, for funds raised by the same GP, a 50% increase in fund size is associated with roughly a 0.07 decline in PME, which translates into a 1.5% to 2% decline in a fund's IRR.

Moreover, for all GPs, there appears to be a tradeoff between size and returns. In their recent study of the relation of fund size to IRRs, Lerner et al. (2011), as shown in Figure 10, find that better GPs get larger, which is accompanied by increases returns *for a while*. But at a fund size of roughly \$200 million, the negative effect of size kicks in and performance stops increasing with size. At fund sizes greater than \$500 million, performance clearly begins to decline.

Overall, then, we think the persistence results have two implications. First, the top-decile funds are not the only consistent outperformers. Persistence is evident in the returns of even the top third of VCs. Second, even though persistence exists, outperformance is not guaranteed. Top quartile and top decile GPs do have bad funds, particularly after they have raised a lot of capital.

### Fundraising and Future Performance

The last question of interest is the relation of fundraising and performance. It turns out that not only is individual GP

fund-raising related to performance, but so is overall industry fundraising. When performance is strong, LPs commit more capital to venture capital.

In turn, fundraising has an effect on future venture capital performance, but not in a good way. When more capital is committed to or invested in venture capital, vintage year returns suffer. As a result, venture capital has a self-correcting mechanism: a period of poor returns leads to decreased inflows, which in turn leads to a recovery in returns. Thus, there has historically been a strong element of “mean reversion” in venture returns.

To explore these relationships, we again used regression analysis. This time, we attempted to predict vintage year returns using the amount of capital committed to venture capital. To better capture the amount of capital available, we used capital committed in the same vintage year and the previous vintage year. To make different time periods comparable, we measured capital committed as a fraction of the total beginning of year stock market value.

When running regressions that use average vintage year returns reported by Venture Economics and Cambridge Associates, we came up with the following two relationships:

Venture Economics:  

$$\text{IRR} = 18\% - 28.1 \times \text{Capital Committed last two years as \% of market.}$$
 [12.1]

Cambridge Associates:  

$$\text{IRR} = 24\% - 41.1 \times \text{Capital Committed last two years as \% of market.}$$
 [15.7]

Both of these results are strongly statistically significant. Figure 11 shows these relationships graphically.

Figure 11 VC Vintage Year Returns vs. Fundraising

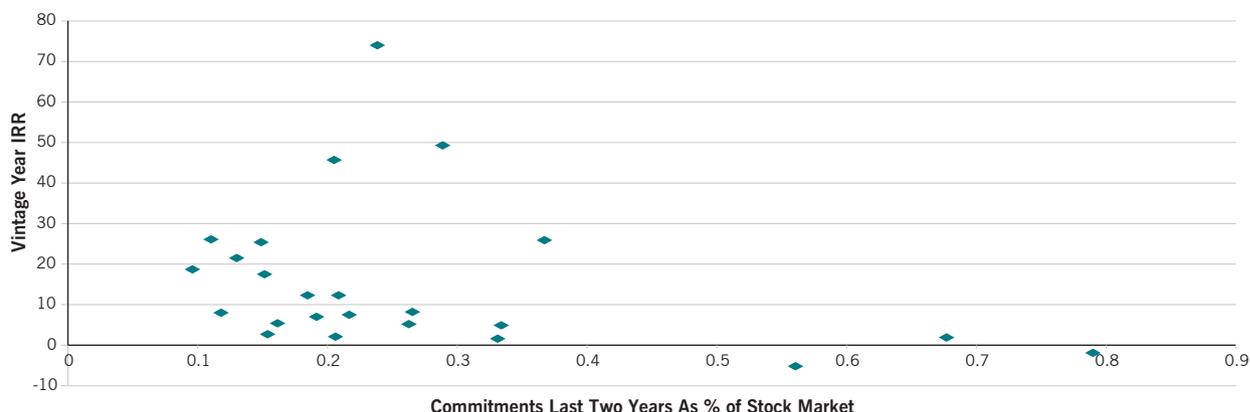
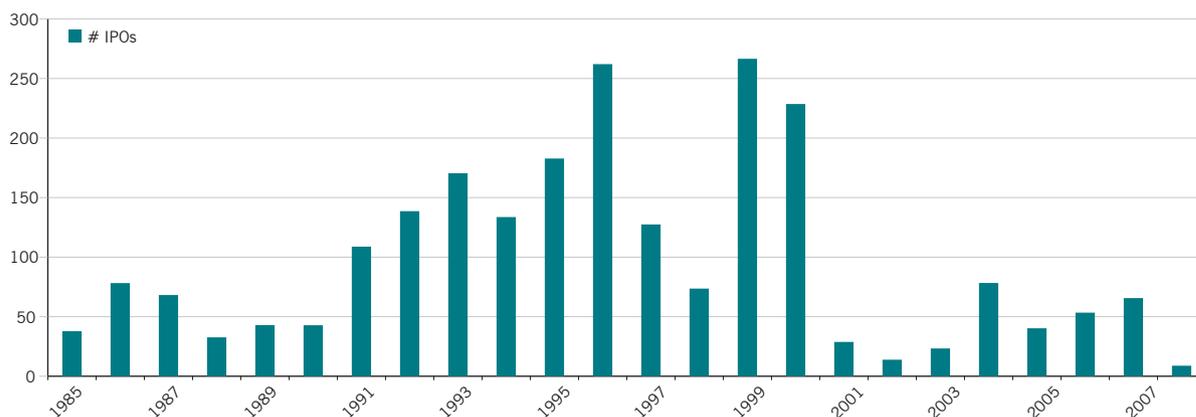


Figure 12 VC-Backed IPOs by Year 1985–2008



Source: Jay Ritter

Moreover, when we repeated the analysis using capital invested in venture capital companies instead of capital committed, we obtained similar results:

Venture Economics:

$$\text{IRR} = 18\% - 24.4 \times \text{Capital Invested last two years as \% of market.} \\ [9.5]$$

Cambridge Associates: |

$$\text{IRR} = 26\% - 36.4 \times \text{Capital Invested last two years as \% of market.} \\ [12.7]$$

In sum, there is a strong negative correlation between VC returns and the preceding years' capital commitments and investments. And if, as appears to be the case, we are now in a period of general disillusionment with the venture capital

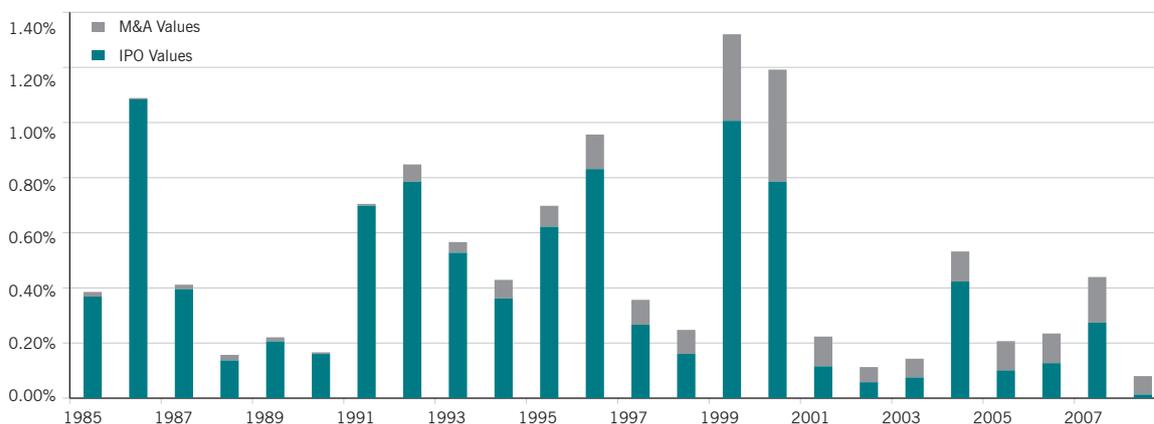
industry, with many investors thinking of terminating their commitments to this asset class, this is actually good news for venture investors who continue to invest. To the extent that the past is a guide to the future, the reduced inflows are likely to translate into higher venture returns.

### Looking Forward

The previous sections describe the past and present of venture capital. The more pressing question is what will happen going forward. In particular, is the traditional venture capital model broken?

One of the reasons that some believe the VC model is broken is concern about the increased difficulty of taking companies public. Figure 12, which shows the number of venture backed IPOs in the U.S. from 1985 to 2008, suggests there may be good reason for such concern. In

Figure 13 **IPO and M&A Exit Values to Market Cap**



all but one year during the 1990s, there were over 100 VC-backed IPOs. In five of the ten years, there were more than 150. Then, in the recession/bear market of 2001 to 2003, the number of VC-backed IPOs dropped below 50 each year. But this was not unusual for a down market; a similar pattern had occurred in the recession/bear market from 1989 to 1991.

What was unusual and unexpected was the small number of VC-backed IPOs from 2004 to 2007, averaging only slightly more than 50 per year, despite the robust stock market over that period and despite the large number of companies that had received VC funding over the previous five to ten years. It is not yet clear why there were so few IPOs. Some blame the increased costs imposed on companies by the Sarbanes-Oxley legislation. Some blame increased litigation risk and the concomitant increase in directors' and officers' and other insurance. Some blame inattention from investment banks that were able to make more money from other activities. And some blame the scarcity on the fact that too many similar companies were funded during the dotcom boom, competing so fiercely that consumers received most of the benefits.<sup>11</sup>

But it's important to keep in mind that an IPO is not the only way for a VC to exit an investment. VCs also exit by selling their portfolio companies. Nevertheless, as shown in Figure 13, the increase in M&A exits did not offset the decline in IPOs.

### Is the VC Model Broken?

What does all this mean for the U.S. venture capital model? Is it broken? Does it need to be appreciably smaller? Does it need to be appreciably different?

We are skeptical of claims that the VC model is broken or needs to be radically changed. As our historical analyses indicated, the level of commitments to and the investment pace of the U.S. VC industry since 2002 have both been consistent with the historic averages. At the same time, the returns to VC funds appear to have been roughly equal to those of the overall stock market. This does not suggest to us that there is too much money in U.S. VC, nor does it indicate to us that the VC model is broken. Instead it appears to represent the more or less natural evolution of a relatively competitive market.

In fact, given the unusual and unexplained paucity of IPOs (and overall exits) between 2004 and 2007, we suspect there is more upside than downside for the VC vintages of 2001 to 2007. According to informal sources, Sarbanes-Oxley is likely less costly and more manageable than it was in 2005 and 2006. There are more boutique investment banks with incentives to market IPOs. And, as we mentioned earlier, recent reports suggest that there is now a larger pipeline of IPO candidates.

### What Will Happen in the Next Several Years?

As we write this, commitments to U.S. VC partnerships appear to be historically low in 2009. In 2009, the Private Equity Analyst reported commitments of about \$13 billion to U.S. VC funds. Compared to the value of the stock market at the beginning of 2009, commitments are only 0.111% versus the historical average of 0.138%. Measured relative to the stock market at the end of the year, the 2009 commitments are even lower, at 0.086%, as compared to the historical average of 0.125%. All indications are that commitments are likely to continue to be low into 2010 and, possibly beyond.

11. See Weild and Kim (2009) for a discussion of some of these and other potential explanations.

Based on the historical relationship between commitments and performance, the low level of commitments suggests that returns to the 2009 and 2010 vintage years are likely to be relatively strong.

And there are other grounds for optimism about VC. The most compelling is the transformation of the U.S. corporate research and development system. The central corporate R&D laboratory was a dominant feature of the innovation landscape in the U.S. for most of the 20th century. While the concept of the centralized laboratory originated in the German chemical industry, U.S. corporations had adopted it with enthusiasm by the 1950s. These campus-like facilities employed many thousands of researchers, many of whom were free to pursue fundamental science with little direct commercial applicability. Among the best-known were Bell Laboratories (with 11 Nobel Laureates) and IBM Central Research (with 5).

Beginning in the early 1990s, however, American corporations began fundamentally rethinking the role of these centralized research facilities.<sup>12</sup> Reflecting both a perception of disappointing commercial returns and intensified competitive pressures, U.S. companies undertook a variety of changes to these facilities. Notable among them were paring the size of central research facilities in favor of divisional laboratories and relying much more heavily on what has been termed “open innovation”—that is, alliances with and acquisitions of smaller firms.

To economists, however, these changes are not surprising. Observers such as Michael Jensen have contrasted the incentives within corporate research facilities unfavorably with those offered by venture capitalists. Jensen suggests that had higher-powered incentives been offered, some of the poor performance of research-intensive firms would have been avoided.<sup>13</sup> And consistent with this argument, Kortum and Lerner (2000) find that venture-backed firms are approximately three times as efficient in generating innovations as corporate research.

This transformation suggests that the demand for venture-backed firms is likely to increase in the medium and longer term. The model of growing companies for full or partial acquisition by larger firms—which has been standard practice for many years in the computer networking business, for instance—is likely to be a growing segment of the venture activity in the years to come. And given the fact that corporate research spending, both in the U.S. and

globally, is many times the magnitude of venture capital investment, the size of the opportunity is likely to be substantial.

## Conclusion

The U.S. VC model has been enormously successful over the last 30 years. During that time, the U.S. VC industry has consistently received commitments and invested at a pace of roughly 0.15% of the value of the overall U.S. stock market. Of course, there has been some variation in commitments and investments around that mean—a variation that can be traced in large part to the recent returns of the industry. As a general rule, higher returns have typically attracted more capital from LPs. But the greater capital has put downward pressure on returns, which in turn has resulted in smaller capital commitments. And as less capital has predictably led to increased returns, we have seen another increase in capital commitments and investment—and hence the beginnings of a new cycle.

We see little that makes us believe that the VC model has changed or is broken. As far as we can tell, we are now leaving a period with slightly above average capital and average to slightly below average returns for a period of well below average capital. We would not be surprised to see this followed, perhaps quickly, by a period of above-average returns.

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12. See, for example, the discussions in Rosenbloom and Spencer (1996) and Chesbrough (2003).

13. Jensen (1993).

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**Journal of Applied Corporate Finance** (ISSN 1078-1196 [print], ISSN 1745-6622 [online]) is published quarterly, on behalf of Morgan Stanley by Wiley Subscription Services, Inc., a Wiley Company, 111 River St., Hoboken, NJ 07030-5774. Postmaster: Send all address changes to JOURNAL OF APPLIED CORPORATE FINANCE Journal Customer Services, John Wiley & Sons Inc., 350 Main St., Malden, MA 02148-5020.

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