

# Valuation and New Economy Firms

by

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## **Abstract**

In this paper, I present a framework to evaluate Internet / New Economy businesses. That framework is used to help discuss why valuations were so high at the end of 1999 and why they have declined so precipitously since then. I also discuss the implications of the rise and fall of valuations. I then consider the effects of the large swings in market valuation / sentiment on individual companies. Finally, I speculate on the likely very positive long-term real effects of the Internet / New Economy.

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## *1. Introduction*

Unlike many of the speakers at this conference, my research does not focus on asset pricing movements and puzzles. So why am I here talking? I am both a finance professor and the faculty director of my school's entrepreneurship program. In my capacity as a researcher, I have studied venture capitalists and the micro-foundations of business-to-business (B2B) e-commerce. As a teacher and advisor, I have experienced the ups and downs of many New Economy companies. This talk, then, is based on both my research and on my experiences.

The talk is motivated by the fact that in 1999 and early 2000, the valuations of Internet-related companies reached levels that were extraordinary by most standards. For example, Ofek and Richardson (2001) show that in the aggregate, Internet firms traded at roughly 35 times revenue at the end of 1999. In the two years since then, those valuations have declined precipitously. In this paper, I attempt to explain these patterns and discuss the effects those patterns have had.

The paper proceeds as follows. Section 2 presents a framework that I use to evaluate New Economy businesses. Section 3 applies the framework to discuss why valuations might have been so high and to understand why they are now so low. This section also includes a discussion of the implications of the rise and fall of valuations. Section 4 discusses the effects of those changes in market valuation / sentiment on individual companies. Section 5 presents my opinion of what the long-term real effects of the Internet / New Economy are likely to be.

2. *A framework for thinking about the New Economy*<sup>1</sup>

The framework begins with a key question: Does the New Economy / Internet do things that the old economy -- phone, fax, EDI -- cannot? Or in other words, does the New Economy / Internet reduce transaction costs relative to the old economy?

The key effect of the Internet and other New Economy innovations is to change the costs (and benefits) of transacting. There are five ways that the Internet potentially changes transaction costs: (1) changes / improves processes; (2) changes the nature of the marketplace; (3) changes decisions; (4) changes the degree of information incompleteness / asymmetry; and (5) changes the ability to commit. The choice between an Internet-based transaction or marketplace and a physical one comes down to the relative transaction costs of the two alternatives.

Changes in processes. The Internet can improve efficiencies by reducing the costs involved in an existing business process. Such an improvement may take place in two basic forms. First, it may simply reduce the cost of an activity already being conducted, as when a transaction that is currently conducted by phone or fax is automated. Second, the Internet provides an opportunity to redesign the existing process.

Changes in the marketplace. The Internet can reduce transaction costs by making a marketplace more efficient. These reduced transaction costs or, equivalently, marketplace benefits come in some of the following forms. First, the Internet potentially reduces a buyer's cost of finding a product or a supplier because it is less expensive to search for products and compare prices over the Internet than it is to read catalogs and make phone calls. Conversely,

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<sup>1</sup> This section uses the framework described in more detail in Garicano and Kaplan (2001).

sellers can reach more potential customers at lower cost. As a result, buyers will find sellers they might not have otherwise found. EBay is an example of this on the consumer side.

Second, the Internet potentially provides buyers with better information about product characteristics (including prices and availability) because it is less expensive to obtain.

Third, the Internet potentially provides better information about buyers and sellers. This is particularly relevant in the area of credit.

On the other hand, conducting the transaction over the Internet may also increase these transaction costs, due to the buyers' inability to physically inspect the merchandise object of the exchange. This may be the case when buyers need to match their needs for objects based precisely on a characteristic that requires physical inspection.

Changes in decisions (or indirect effects of transaction cost reductions). Clearly, any reduction in transaction costs results in direct economic gains through a reduction in the cost of undertaking these transactions. It is possible, however, that other indirect benefits also will arise. For example, better information about future demand might allow a seller to improve its demand forecasts, and use that information to change its production decisions to better match demand. Similarly, the New Economy and Internet benefits may lead to changes in organizational form. If the Internet is able to produce important decreases in the costs of carrying out transactions in the market, the transaction costs economizing paradigm leads us to predict that fewer transactions will be undertaken inside firms and more will be undertaken in the market / outsourced.

Changes in informational incompleteness and asymmetries. Buyers and sellers typically do not have the same information about a particular transaction. As a result, one party (or both) may be at a disadvantage to the other in evaluating the desirability of a transaction. The Internet

potentially changes the informational positions of buyers and sellers. For example, to the extent that physically observing the merchandise to evaluate its condition is valuable to the buyer, some of that information is lost through the conduct of the transaction through an electronic format. This loss of information about the object of the exchange may translate into an efficiency loss if adverse selection worsens in virtual transactions.

Changes in the ability to commit. The Internet has the potential to increase or decrease the ability of buyers and sellers to commit to transactions. First, by standardizing processes and by leaving an electronic trail, the Internet has the potential to increase the ability to commit (and, therefore, reduce the costs of imperfect commitment). Alternatively, a buyer may avoid intermediary fees by viewing the product over the Internet, but contacting the seller directly.

After applying the framework, it should be possible to understand the effect of a new technology or process on transaction costs. If the technology does reduce transaction costs, it is potentially viable / valuable. The question then becomes who will capture the reduction in transaction costs. If the technology is unique or difficult to imitate, the innovator should be able to capture some of the improvements and become valuable. On the other hand, if the technology can be easily imitated by competitors, the customers will capture most of the benefits.

### 3. *Why were valuations so high / now so low?*

It is well-known that publicly-traded Internet firms achieved levels that were extraordinary by most standards. For example, Ofek and Richardson (2001) show that in the aggregate, Internet firms traded at roughly 35 times revenue at the end of 1999. If those firms had achieved industry-average net income margins at the time, they would have had price-earnings (P/E) ratios of 605. Ofek and Richardson (2001) also estimate the growth rates that

would have been required to justify such high P/E ratios and find that such rates are extremely high by historical standards. Cooper et al. (2001) find that firms that announce name changes to include “dotcom” experience abnormal returns of 74% over this period.

In the two years since the end of 1999, Internet valuations have declined precipitously. From February 2000 to December 2000, Ofek and Richardson report that the value of these firms declined by an average of 80%. That decline has continued in the subsequent months.

In this section, I discuss what the market appears to have believed when Internet valuations peaked. I then use the framework of the previous section to discuss why those beliefs turned out to be so wrong. I distinguish between Internet businesses focused on the consumer – business to consumer or B2C – and those focused on other businesses – business to business or B2B.

### *3.1 Valuations so high:*

#### *3.1.1. B2C*

Valuations of B2C businesses were based on extremely aggressive growth assumptions. They also were based on non-financial performance measures like web traffic. Demers and Lev (2000), Hand (2000), Rajgopal et al. (2000), Trueman et al. (2001), and particularly, Jorion and Talmor (2001) present evidence that valuations were based on web traffic and gross profit, short-term growth.

The rational story here is that investors believed that B2Cs would grow significantly and would transform traffic into revenues and profits. Negative margins would somehow turn positive. There also was an implicit assumption that competition would be weak, possibly because of network effects.

### *3.1.2 B2B*

Valuations of B2B e-commerce were similarly based on very aggressive growth assumptions. One B2B e-commerce firm, Chemdex, attained a market capitalization of \$11 billion with \$2 million of true revenues. Rajgopal et al. (2000) also find that B2B valuations related to alliances, acquisitions, customer acquisition, but not to earnings.

The rational story for these companies is that investors assumed that (1) the businesses delivered large reductions in transaction costs; (2) business customers would adopt quickly, i.e., a large volume of activity would move to the internet; (3) competition would be slow and network effects would emerge; and (4) the B2Bs would be able to capture a meaningful portion of transaction cost savings.

### *3.1.3 Other*

Other areas that also obtained extremely high valuations included internet consulting businesses – Lante, Viant, etc. – and internet infrastructure companies – Kana, Vignette, WebMethods, etc. One might also add telecommunications infrastructure companies – Global Crossing, Qwest, etc. The rational story for these companies is similar to that for the B2B companies.

## *3.2 Why are they so low now?*

Why have the valuations of Internet companies decline so precipitously since March 2000? Clearly, the market's expectations of growth have declined a great deal. Demers and Lev (2001), Keating et al (2001), Jorion and Talmor (2001) also tend to find that financial

measures of performance – revenue and cash flow – are more important while non-financial measures like traffic are less important. Ofek and Richardson (2001) argue that part of the reason for the decline was an increase in the number of selling shareholders driven by expiring lock-up agreements. In this section, I present some additional thoughts concerning the downward revisions in growth expectations for B2C and B2B companies.

### *3.2.1 B2C*

The market greatly reduced its expectations of (some combination of) future growth, of the extent to which traffic could be transformed into revenues, the ability to take advantage of network effects, and the extent of competition. Even for successes like Amazon and Yahoo, the stock prices in March of 2002 were 13% and 8% of their peak valuations. Is the change in the market's expectations for B2C companies surprising?

It is worth considering the framework from section 2. Many B2C companies are simply improved catalogs. Such businesses reduce transaction costs for individual consumers –the Internet can make it easier to find items (like books) and easier to order them (books and stocks) – and for the cataloger – order taking and order fulfillment are less costly. However, this is not an earth shattering change. The introduction of catalogs brought with them transaction cost reductions, but not extraordinary valuations. Catalogs (and brokerage firms) also regularly face competition. It is hard to imagine a rational story for such high B2C valuations for e-commerce companies.

Portals like Yahoo also have seen their valuations decline substantially. They, too, have been unable to attain the growth expected of them nor have they been very successful in

converting traffic into revenue. It is not clear how much portals reduce transaction costs. It also is clear that portals face competition.

One exception is a company like eBay. eBay does provide a service that is not available offline. It also benefits from network effects because it connects many buyers to many sellers. Sellers know they are more likely to find buyers at eBay. That attracts more sellers. Buyers know they are more likely to find sellers at eBay. This attracts more buyers. Buyers and sellers are less likely to make good matches through other companies. As more buyers and sellers use eBay, the advantage of eBay over other companies increases.<sup>2</sup> Consistent with this, eBay's value has only declined by slightly more than 50% of its peak value.

### 3.2.2 B2B

As with B2C companies, the market greatly reduced its expectations of (some combination of) the effect of B2B on the extent of transaction cost reductions, the ability to capture those reductions, the speed of adoption, the extent of network effects, and the extent to which competition would be weak. Is the change in the market's expectations for B2B companies surprising?

The extent of the decline in B2B was more of a surprise to me. It was not surprising to see some decline. It was surprising to see a large fraction of these companies fail. Based on the framework, it was more plausible that B2B companies reduced transaction costs substantially. B2B business models also were more likely (than B2C models) to rely on business models that utilized network effects, matching many buyers to many sellers in the way that eBay did.

What went wrong? In some markets, companies have obtained transaction cost reductions, but B2B companies have not been able to capture much of this reduction because of

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<sup>2</sup> See Sawhney and Kaplan (1999).

competition. This is arguably true in the procurement area where the a number of companies have been able to provide software and procurement processes that are not largely differentiated from each other. Network effects have not materialized in those markets.

There also was a belief in a number of markets that B2B companies would be able to charge a percentage of the transaction value, rather than a fixed transaction fee. This reflected a misunderstanding of the nature of the transaction cost savings. In many cases, the transaction cost savings is a fixed amount – time spent punching in data – rather than a percentage of the transaction value.

Finally, in some markets, companies just have not adopted the new technologies. This occurred for two reasons. First, some companies, particularly suppliers, were not interested in using internet marketplaces because they did not want to put an intermediary between their customers and themselves. Second, companies have been able to use the Internet without having to commit. I.e., it is possible to use the internet to get price information, but then go to traditional suppliers for execution.

### *3.2.3 Other*

Internet consulting and infrastructure companies all suffered from a combination of demand that failed to materialize and excessive competition. Most of these companies have declined substantially in value and many have failed. Is this surprising?

In the case of internet consulting, the declines seem unsurprising and the high valuations were particularly strange. It was difficult to understand how those businesses would scale quickly enough to sustain their market capitalizations.

### 3.3 *Did sophisticated investors “know” prices were too high?*

Answering whether people knew prices were too high is, of course, very difficult. Ofek and Richardson present evidence and argue that the decline in Internet stocks is related to short sales constraints and the expiration of IPO lock-ups. They argue that the rise and fall of Internet stocks can be explained by an initial relative oversupply of optimistic investors who drove prices up followed by the arrival of more pessimistic investors – insiders – who drove prices down.

The Ofek and Richardson story suggests that sophisticated investors – like venture capitalists – believed a bubble existed. While this story is plausible, there are some pieces of evidence that are not consistent with this explanation.

At the same time that venture capitalists were some of the insiders who sold shares after lock-ups expired, the venture capitalists also were sharply increasing the amount of money they raised and the pace of their investments in new Internet and technology related start-ups. Figure 1 shows the large increase in funds committed to VC funds while figure 2 shows the huge increase in investments by VCs in 1999 and 2000. Much of this investment went into New Economy investments. Hendershott (2001) documents a similar pattern for pure Internet investments.

Presumably the VCs who made these investments believed that the investments would be profitable on average. To believe the investments would be profitable, many VCs must have believed that many of the companies they invested in would be viable and valuable. In other words, such a large increase in investment seems inconsistent with a pessimistic view of the New Economy companies.

Furthermore, the VCs received most of their capital commitments from large institutional investors – pension funds, endowments, etc – who also must have been optimistic about these investments.

One might argue that the VCs and institutional investors made these investments with the expectation of flipping their private investments to irrational public investors. This argument, however, would require the VCs to have believed that stock prices would remain irrationally high for at least two years. I.e., even under optimistic conditions, it still would take that time for the VC to invest in an early stage company, take it public, wait for the lock-up period to end, and then sell the shares. This argument also runs into difficulty in that it assumes that the investors in public securities would be irrational. Yet, a substantial number of investors in public securities were the same institutions who invested in the VC funds.

Figure 3 sheds some light on this. Figure 3 presents a time series of VC-backed IPOs and first VC round investments (based on data from Venture Economics). First VC round investments provide a measure of the number of new companies backed by VCs. VC-backed IPOs provide a measure of the number of VC companies that succeed.<sup>3</sup> Figure 3 shows that it was reasonable for VCs to assume there would be 200 to 250 VC-backed IPOs per year. At the same time, figure 3 shows an incredible increase in VC funded first rounds in 1999 and, particularly, 2000. The large increase in VC investments without a concomitant increase in the number of IPOs is certainly consistent with VCs and institutional investors believing that stock prices would remain high.

Figure 3 does leave us with a bit of a paradox. The huge increase in number of companies funded suggests that competition would be a huge problem. Yet it is difficult to

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<sup>3</sup> The IPO measure is not perfect in that it does not include successful investments that are exited by acquisition. Nevertheless, the patterns in figure 3 are very suggestive.

justify the high valuations in 1999 and early 2000 without assuming that competition would be modest.

Another relevant observation is the high profile investments by buyout investors in telecommunications companies. Forstmann Little, Hicks Muse, and KKR, among others, invested and have subsequently lost billions of dollars in such companies. These sophisticated buyout investors must have believed that the investments had a positive expected value at the time.

I draw the following conclusion from these observations. Insiders and sophisticated investors – like VCs and some buyout investors – may have believed that many of their individual stocks were overvalued when Internet valuations were high. As a result, they sold shares. At the same, however, those same investors believed that the New Economy companies were viable entities and that there were opportunities to create more New Economy companies. Furthermore, some of these sophisticated investors believed that some of these companies were undervalued – particularly the buyout investors who invested in telecommunications.

### *3.4 Summary*

To summarize, investors clearly made mistakes in overvaluing Internet and New Economy companies in 1999 and 2000. The mistakes seem hardest to explain in B2C investments and in consulting services. It seems likely that investors underestimated the extent of competition in all areas.

At the same time, many sophisticated investors behaved as if they believed that Internet and New Economy companies would be much more successful than they have been.

4. *What effects do the changes in market sentiment have on individual companies?*

Here, I am going to talk from my experience advising start-ups and talking to venture capitalists. While this section can be viewed as idiosyncratic to that experience, my sense from talking to others and reading the popular press is that this section is representative. I am fortunate to have Mohan as a discussant. He has at least as much experience as I, and, I hope he will corroborate what I say.

As noted above, in 1999 and early 2000, the stock market appeared to value many New Economy companies as a function of revenues or even potential without much regard for profitability / cash flow. Companies went public at an earlier stage in their life cycles than ever before. This changed substantially in the spring of 2000.

In the second half of 2000 and the first half of 2001, the stock market soured on these companies and valuations declined substantially. The market appeared to have resumed valuing companies on cash flows.

The market conditions did have an effect on the companies I was in contact with. Before mid-2000, the private, VC funded companies tended to push for additional revenues at the expense of profitability / cash flow. After mid-2000, as stock market values declined, those companies became increasingly focused on cash flows. It is worth stressing, however, that even before mid-2000, the companies and their investors expected to achieve positive cash flows at some future point and believed that those expectations would be borne out.

5. *What are the real effects of the internet / new economy likely to be?*

We have seen a boom and then a bust in New Economy / technology valuations. Stock market investors obtained terrific returns and then horrific ones. In April 2002, the S&P 500

stands at roughly 1100 while the NASDAQ Composite rests at roughly 1750. These are the same levels these indices registered in early 1998. In other words, the stock market has roughly stood still (ignoring modest dividends) overall in the last four years. The results in Hendershott (2001) suggest that the overall return on investment in Internet companies also was roughly breakeven.

The question, then, is whether the investments in the New Economy and technology had a similar negligible effect on the overall economy. It is here that the real effects on the economy need not be the same as the effects on the stock market. It is my sense that the information technology, the Internet, and other related technology have generated and will continue to generate substantial improvements in productivity. The favorable productivity numbers since the mid-1990s and continuing in the recent downturn certainly are consistent with this.

The Internet and low cost telecommunication costs allow companies to substantially alter many of the processes by which they do business. For example, New Economy technology allows large reductions in transaction costs in areas like procurement, accounts payable, and human resources. Many of these are labor intensive functions that can be outsourced or automated. Consistent with this, an increasing number of companies move tasks and processes like data entry, simple programming, and call center services from the United States to India and other lower wage countries. Much of this would not be possible without the New Economy investments and technologies.

General Electric (GE) provides an interesting example. In the late 1990s, Jack Welch challenged his employees to move everything they could to the Internet. They found that while they could not move transactions so quickly to the Internet, they found could move a large number of internal and support processes. And they could do so with “simple Web application

[software] supported by email.”<sup>4</sup> GE expects that transactions will gradually move to the Internet as software evolves and other companies move more toward the Internet. GE also expects to develop Web-based customer systems that monitor how GE equipment is performing and, therefore, improve the performance of that equipment.

I have not attempted to estimate the overall or macro implications of all this. Casual empiricism suggests that there are still a large number of existing processes for which New Economy technology can reduce transaction costs substantially. The implementation of these transaction cost reductions will be gradual as they require some up front investment and adjustment costs.

It is possible, therefore, that the New Economy technology can generate strong productivity increases at the same time that the companies and technologies that enable them do not earn much profit and the corporations that implement them do not earn much additional profit. Competition and the ability to copy drive profits down for the enablers. Competition among the companies that implement the improvements drives prices down for end users. In the end, the end users / consumer benefit as measured by the productivity increases despite the fact that the stock market does not.

## 6. *Summary and conclusions*

In this paper, I have presented a framework to evaluate Internet / New Economy businesses. The framework focuses on changes in transaction costs.

I used that framework to help discuss why Internet valuations were so high at the end of 1999 and why they have declined so precipitously since then. High valuations were fueled by

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<sup>4</sup> The quote and the information and this paragraph are taken from the Wall Street Journal, May 8, 2001, p. A1.

beliefs that B2Cs would grow significantly and would transform traffic into revenues and profits while B2B's and infrastructure companies would deliver larger reductions in transaction costs. In both areas, there also was an implicit assumption that competition would be weak, possibly because of network effects. Valuations fell as the market began to realize that those beliefs and assumptions would not be validated.

I then discuss the implications of the rise and fall of valuations. It is simplistic to argue that smart, informed individuals took advantage of naïve public investors. Sophisticated and previously successful venture capital and buyout investors behaved as if they believed that Internet and New Economy companies would be much more successful than they have been.

I then consider the effects of the large swings in market valuation / sentiment on individual companies. The market conditions clearly had a large effect on company actions. Before mid-2000, the private, VC funded companies tended to push for additional revenues at the expense of profitability / cash flow. After mid-2000, as stock market values declined, those companies became increasingly focused on cash flows.

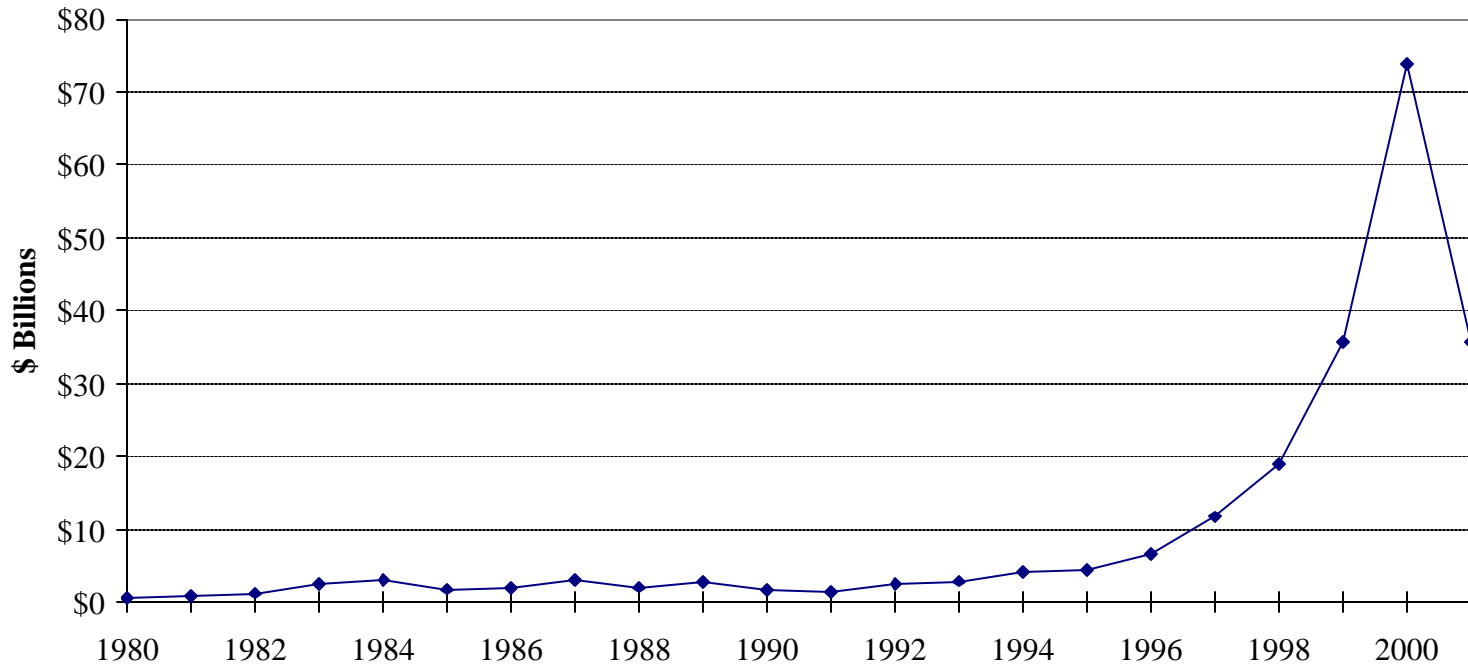
Finally, I speculate on the long-term real effects of the Internet / New Economy. I think it is likely that the information technology, the Internet, and other related technology have generated and will continue to generate substantial improvements in productivity. The favorable productivity numbers since the mid-1990s and continuing in the recent downturn certainly are consistent with this. It is more ambiguous whether those productivity improvements will contribute to increased corporate profits and favorable stock market performance or, instead, be captured by end users and consumers.

## References

- Demers and Lev, 2000, A rude awakening: Internet shakeout in 2000, Working paper, NYU.
- Garicano, Luis and Steven Kaplan, 2001, "The Effects of Business-to-Business E-Commerce on Transaction Costs," *Journal of Industrial Economics*
- Hand, 2000, "The role of economic fundamentals, web traffic, and supply and demand in the pricing of U.S. Internet stocks," Working paper, University of North Carolina..
- Hendershott, Robert, 2001, "Net Value: Wealth Creation (and Destruction) during the Internet Boom, " Working Paper, Leavey School, Santa Clara University.
- Jorion and Talmor, 2001, "Value relevance of financial and non-financial information in emerging industries...", Working paper, UC-Irvine.
- Ofek, Eli and Matthew Richardson, 2001, "Dotcom mania: The rise and fall of internet stock prices," NBER Working Paper #8630.
- Rajgopal S., S. Kotha, and M. Venkatachalam, 2000, "The relevance of web traffic for Internet stock prices," Working paper, University of Washington.
- Sawhney, Mohan and Steven Kaplan, 1999, "Let's Get Vertical," *Business 2.0*, September.
- Trueman, B., M.H. Wong, and X. Zhang, 2001, "The eyeballs have it: Searching for the value in Internet stocks," Working paper, UC-Berkeley.

Figure 1

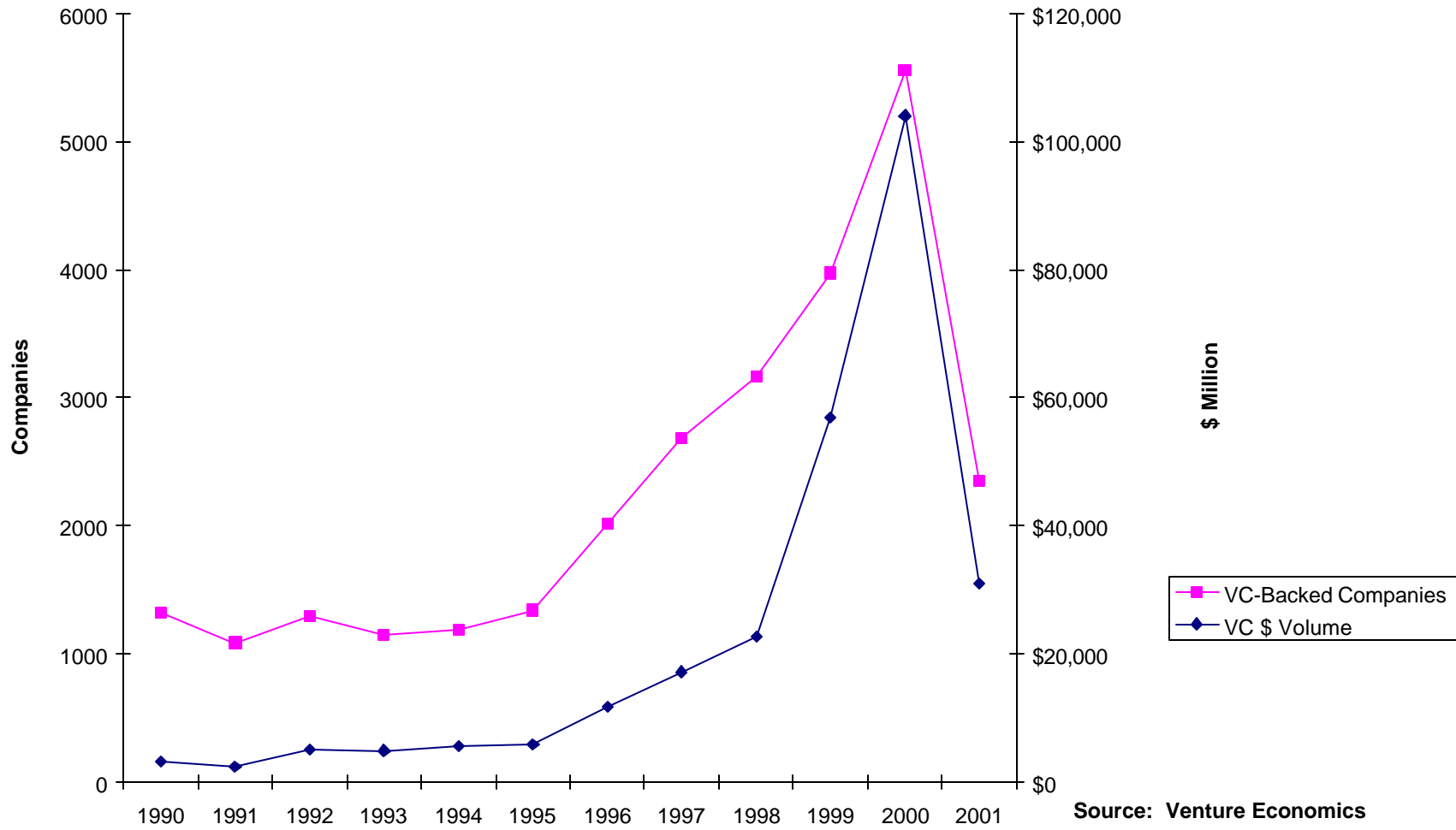
**Fundraising by venture capital partnerships 1980 - 2001**  
**(in \$ billions)**



Source: Private Equity Analyst

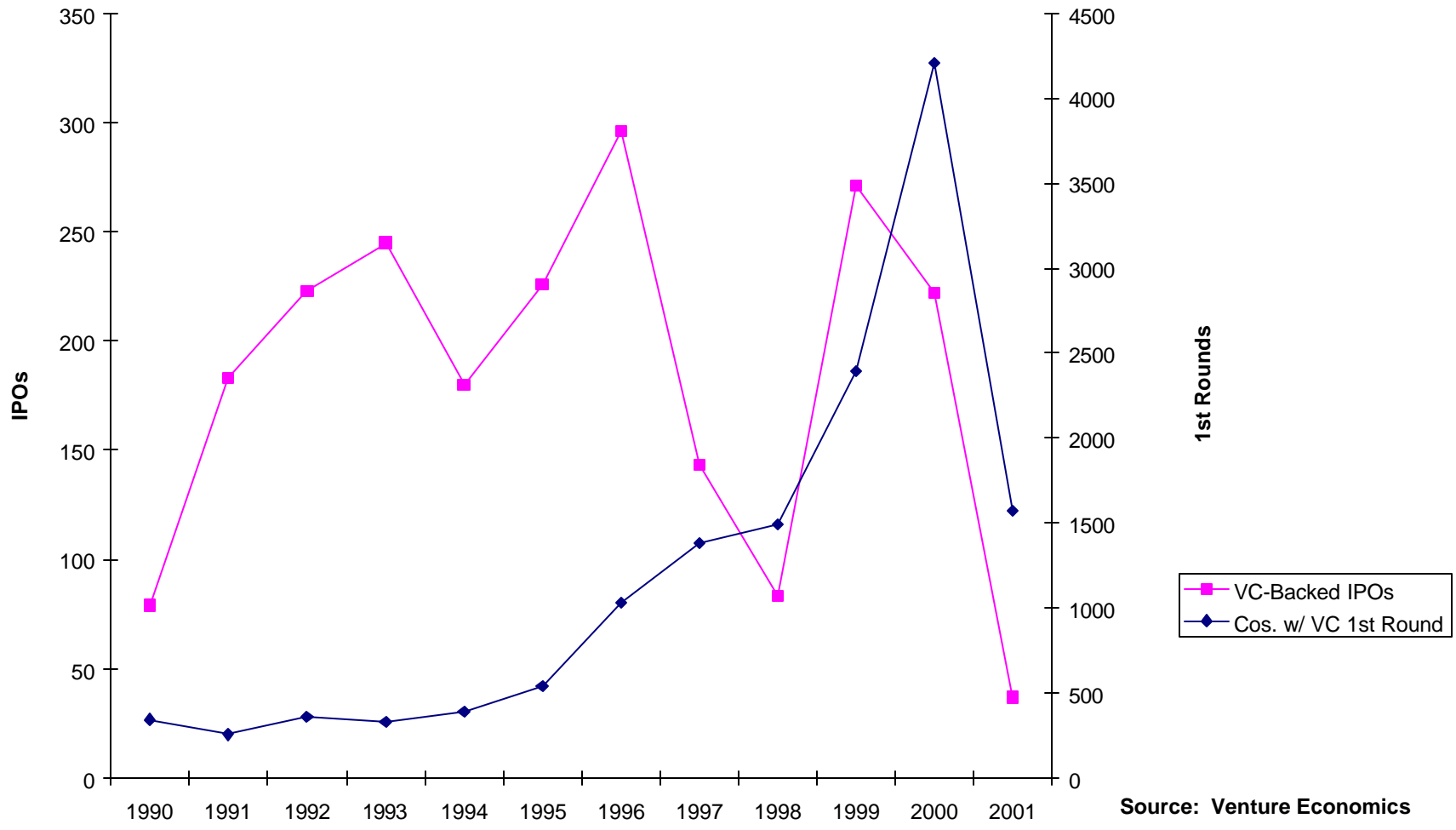
# Figure 2

## Venture Capital Financing 1990 - 2001



**Figure 3**

**VC 1st Rounds Versus VC-Backed IPOs**



Source: Venture Economics