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The US Angel and Venture Capital Market: Recent Trends and Developments

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It has been the best of times, it has been the worst of times - a time of opportunity and a time of contraction. In ten years the total investments of the venture capital industry increased by 8 times and the number of venture capital funds increased threefold. Total private equity investments from business angels increased substantially during the period, surpassing those of their venture capital counterparts. In ten years an entire industry sector was spawned, with revenues topping \$9 billion. The venture capital industry invested close to \$400 million in 43 ventures in one hot sector and in two years \$270 million was invested in 51 rounds of financing. During this same two year period 21 initial and secondary public offerings of stock by 12 companies raised over \$800 million. Price/earnings ratios exceeded 50 and the market capitalization for this one sector was over \$5 billion. The decade has been touted as an age of technological entrepreneurship by leading academics and the business press.

If these facts and figures sound familiar, they should, since most were garnered from industry statistics and academic articles covering the ten year period of 1977 to 1986. In one twelve month period, from 1976 to 1977, total venture capital invested rose from \$49 million to \$209 million, reaching a peak of \$4.6 billion in 1986. The number of venture capital firms increased from 225 to 674, the threefold increase noted above. During this same time period total annual business angel investments were estimated at \$10 billion in close to 30,000 start-ups at the peak. The hot sector that was the recipient of much of these investments was the emerging hard (“Winchester”) disk drive industry. The growth of the new industry was exceptional, with total annual revenues at \$9 billion in 1983. The explosive growth attracted entrepreneurs and their angel and venture capital investors. These start-ups developed and manufactured hard disk drives for use by computer system manufacturers who did not have the means or the desire to build hard disk drives themselves. A buoyant stock market for high tech IPOs enabled angels and venture capital investors to realize spectacular returns. These returns attracted new angels and venture capital investors, and as the availability of money increased, so did the pressure to find more hard drive deals to invest in (Bygrave et al 2000). Unfortunately, the industry suffered a near collapse within 12 months, when industry income fell by 98% and the market capitalization of the 12 leading public disk drive manufacturers fell to \$1.4 billion by the end of 1984. Likewise, public equity returns for these companies fell by 73%. Fierce competition for market share among the 70 disk drive manufacturers drove down profit margins. Public investors saw the value of their hard drive stock decline, which was exacerbated by a drop in the stock prices on many high tech companies in late 1983 and 1984 (Bygrave et al 2000). Over time, the disk drive became a commodity with low profit margins dictated by the end users and assemblers and the market experienced fierce competition.

The disk drive industry, originally viewed as nirvana by angels and venture capitalists, turned out to be a nightmare. The post mortem for those tumultuous times included many sobering observations. The supply side of the early stage equity market became overheated, with large increases in investable capital that had to be put to work in private equity deals, especially in deals in the disk drive and related high technology sector. This supply side was manifest in two dimensions: the proliferation of new venture capital funds and angels and the size of the individual venture capital funds themselves increased. These two factors in concert tended to have a multiplier, rather than a balancing, effect. The large funds become unwieldy and bidding among angels and venture capitalists drove up valuations and subsequent deals prices. As the

average deal size increased the venture capital industry sought safety in later stage and larger deals, which in turn contributed to a growing capital gap for start-up capital. While angels provide this start-up capital, high valuations added to the inefficiency of this early stage market. While fund sizes increased, so did the number of funds. With the addition of these new funds, experienced venture capitalists were in short supply. The new managers had to quickly learn to navigate the mine fields of private equity deals, and unfortunately in many cases the mines won.

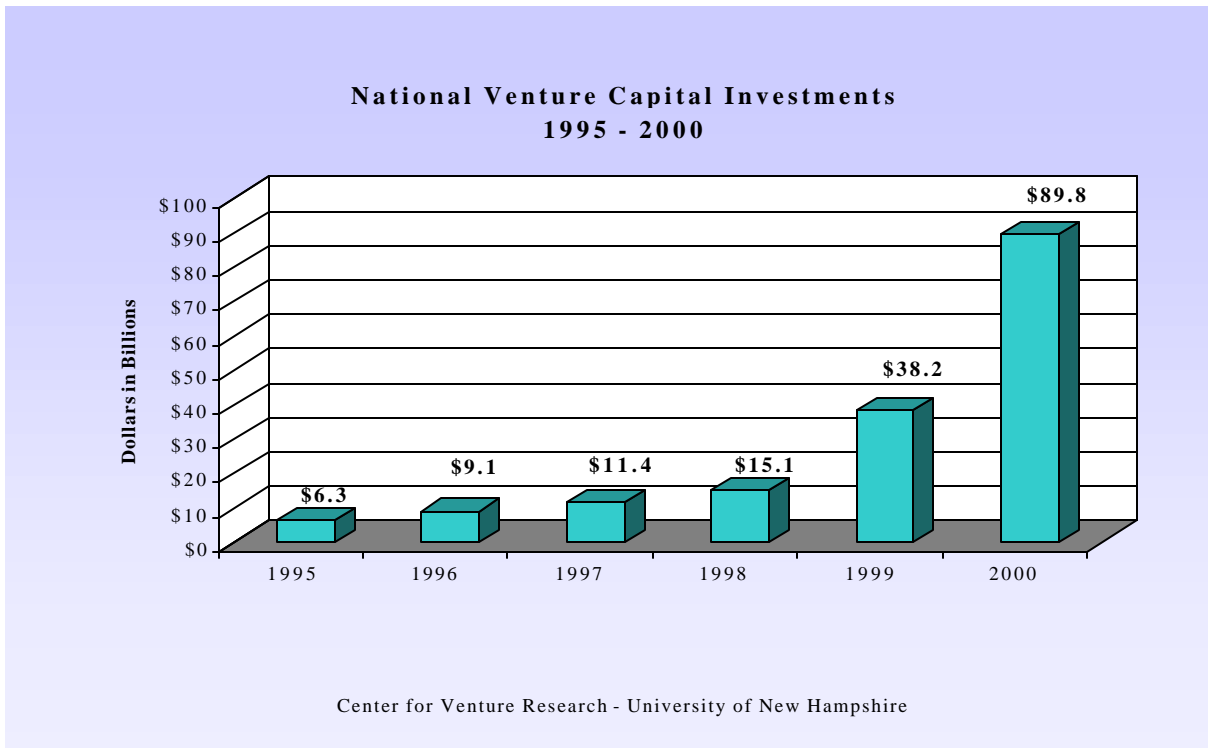
Subsequent to 1986 the private equity industry experienced an accelerated contraction. By 1990 the total dollars invested by venture capital firms declined to \$1.1 billion, less than one quarter of the size of the market during the peak years of 1985 and 1986. By 1990, approximately 1900 ventures received venture capital investment, a number that would drop perilously close to 1000 by 1994. The Angel market experienced a decline during this same time period (1986 to 1990), but not as severe as that in the venture capital industry. It appears that the Angel market experienced less of the sharp increase during the expansionary stage, and as such, the fall was less pronounced than their venture capital counterparts. Angels were operating quietly, as a relatively unknown entity, until the seminal paper published in 1983 by William Wetzel (Wetzel 1983) that recognized their unique contributions to the financing of high growth entrepreneurial ventures. The 1983 paper also marked the emergence of the study of Angels as an academic field and began the search to uncover the ABC's (attitudes, behavior and characteristics) and these critical seed investors.

#### Fast Forward Ten Years

Since the nadir of the early nineties, the private equity market has risen to new heights and these recent market gyrations offer yet more insights into the long and winding road of the private equity industry. As early as 1996 the angel and venture capital markets began a recovery with a vengeance, marked by a rapid rise, rather than the more measured growth that is sustainable. The rudimentary beginnings of this new advance was in evidence in 1994 when Jeff Bezos and a few employees created a web site and database in Bezos' Bellevue, Washington garage. Since the market was still recovering and learning from the past excesses, Bezos' experience in the search for early stage equity capital was realistic. He went looking for capital from venture capital firms but their response became a familiar one: good idea but, well, maybe later when the company grows. After being introduced to some private investors, he succeeded in raising \$1.2 million from a dozen Angels. A later round of \$8 million was provided from professional venture capital funds. With an IPO market beginning to demonstrate its affection for high tech dot.coms, in May, 1997 the company, Amazon.com, the internet bookseller, went public and provided the private equity investors and the entrepreneurs with a handsome profit.

From this relatively quiet and little noticed beginning, angel and venture capital investments soared. Total venture capital investments increased nearly 15 fold in six years (Figure 1), from a mere \$6.3 billion in 1995, to an unworldly \$90 billion in 2000. The number of deals funded by the venture capital industry increased less rapidly, from 1,128 deals in 1995 to 5,485 in 2000, a five fold increase, or one-third of the increase in the dollars invested. The result of this mismatch of dollars invested and number of deals indicated the near astronomical rise in deal valuations.

Figure 1



Valuations soared, with entrepreneurs asking, and surprisingly receiving, ever increasing amounts of equity capital. During this same time period, angel investments rose to approximately \$40 billion annually in close to 50,000 ventures, provided by over 400,000 active angels on an annual basis. For the first time since the study of angels was initiated, venture capital investments exceed, in total dollars, the amount of angel investments, although the number of deals remained larger in the angel market. Isolated incidents of angels and venture capitalists competing for deals were observed, but the markets still remained, to a large extent, complimentary.

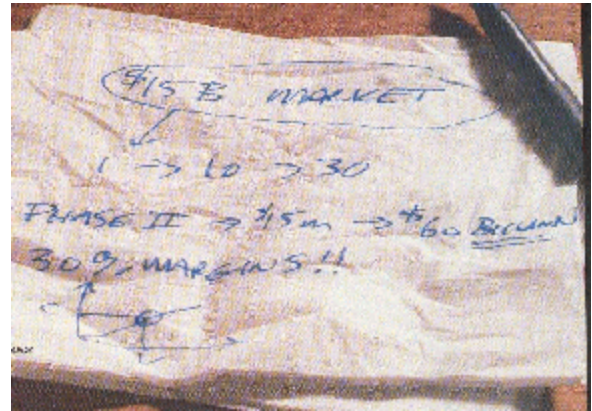
A classic angel and venture capital boom was in the making. As the dollar volume of the industry grew in size, the number of venture capital firms increased accordingly. The number of venture capital firms rose from 458 in 1996 to over 1000 in 2000. In keeping pace with the increase volume in the market, the number of venture capitalists and angels more than doubled from 1996 to 2000. More notably, the size of individual venture capital funds grew at an alarming rate. Between 1996 and 1998 there were a total of 4 billion dollar venture capital funds (venture capital funds with total funds raised exceeding \$1 billion) in existence. In 1999 the number of billion dollar funds was 9, and by 2000 there were 19 such funds. These nineteen

| Year | # of VC Firms | # of VC |
|------|---------------|---------|
| 1996 | 458           | 3,584   |
| 1997 | 528           | 3,912   |
| 1998 | 610           | 4,253   |
| 1999 | 779           | 5,480   |
| 2000 | 1,010         | 7,051   |

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funds in 2000 alone exceeded the entire investments of the venture capital industry in 1994, 1995 and 1996 combined. Exacerbating the effect of these large and unwieldy funds was a marked decrease in the time to conduct due diligence.

Spurred on by the hot IPO market, investors began to view due diligence as a necessary evil, and as competition for deals increased, so did the pressure to make the investments. The boom was on and one needed to conclude the deal in a robust fashion. Due diligence became an after thought and antidotes of due diligence completed in less than ten days began to appear. The year 2000 closed with three venture-backed companies going public during the month of December, raising \$167.4 million. That brought the total number of venture-backed initial public offerings for the year 2000 to 238 and the total raised to \$22.9 billion. In comparison, there were 22 initial public offerings in December of 1999, raising \$2 billion. The number of venture-backed IPOs during the entire year of 1999 was 263, raising \$20.5 billion. The average issue size of the deals in 2000 was \$96 million, an \$18 million increase from the \$78 million average in 1999 (Venture Capital 2001).



Investment returns for venture capital funds rode the market upswing. One year average performance for venture funding was 38% in 1996. More realistic returns of 31% and 20% followed in 1997 and 1998. However, 1999 saw one year performance returns skyrocket to 165%. Admittedly, one year performance measures for funds with a ten year life are not the best measure of investment performance, but they do give a good indication of market trends as they are occurring, rather than at the close of a ten year cycle. By the first half of 2000, one year returns fell to 42%. However, even these 42% returns are not sustainable, given the twenty year average returns of 24%. During this same time period, angel returns hovered in the 20-40% range, more in line with the pre market surge returns of the angel segment. However, angel investment suddenly became in vogue, and some not-ready-for-prime-time individuals entered the market in search of rapid returns.

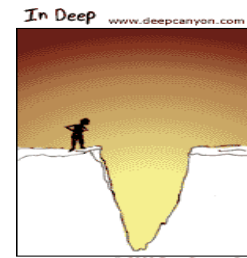
### Now the Carnage

Since the law of gravity has not been repealed, even in the early stage equity financing of high growth ventures, unsustainable trends inevitably return to normalcy. Unfortunately, after such lofty behavior, the return to normalcy often seems a harsh penalty. A few cases in point. In 1997, there was one Silicon Valley initial public offering per week, which minted close to 65 millionaires per day. By 2001, Silicon Valley is experiencing 4,000 job losses per month, adding 135 individuals to the ranks of the unemployed every day. The local unemployment rate, an enviable 1.3% a year ago, now stands at a lofty 6.6%, the highest in seven years. Close to eighty-five bankruptcies have been filed on a daily basis. Venture capital returns, for the twelve months ending June, 2001, declined to minus 18.27%. These negative returns signified the first ever twelve month negative return for the venture capital industry. Conservative estimates for 2001 indicate a minus 20% return for the year. Cash flow has become critical and finding angel

and venture capital dollars to maintain companies with a reasonable chance of success is acute. Many venture capital firms are using funds to bridge portfolio companies, rather than adding new firms to their portfolios. But as many industry observers note, while the goal of these investments is to provide a bridge, many fear that they may indeed be building a pier to deeper water. A further case in point is the examination of the Silicon Valley Fastest 50, the darlings of the high growth industry. As of the close of the third quarter, 2001, forty-nine out of the fastest 50 have lost value, with the majority experiencing market cap declines of 80%. Number 1 on the SV 50 list is Transmeta, the maker of the Crusoe chip. In November, 2000, Transmeta was valued at \$17 billion, selling at \$50 per share. At that point, the early seed stage investors in Transmeta were enjoying a 5,400% return on their original investments. By the third quarter, 2001, Transmeta's valuation has declined to \$215 million at \$1.60 per share.

When Transmeta was still a private company, venture capital investors, including Sony, Compaq, AOL and Vulcan Ventures, among others, closed a round of private equity at a \$6-10 per share valuation. At the current valuation, AOL alone, with an original investment of \$17 million at a \$10 per share valuation, is experiencing a \$14 million loss in this one deal.

## The Funding Gap



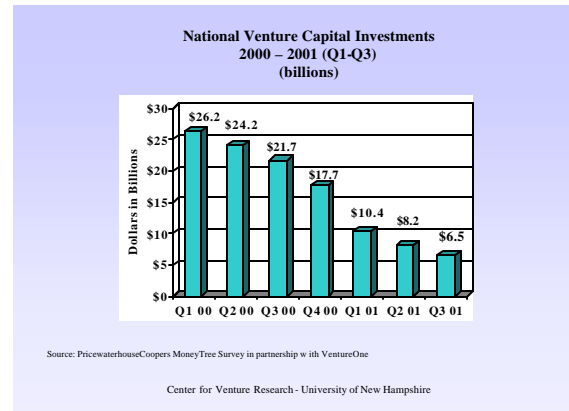
I can't believe how much money it takes to fill that thing!

Although the dot-com implosion began in 2000, it continued and by some measures even intensified this year. Through November 2001, according to the Webmergers.com tracking service, 516 Internet companies had shut down since the beginning of the year, compared with a mere 225 in all of 2000. This year's toll included two of the original poster children for e-commerce, EToys and Webvan. Shares in EToys, once the largest online toy outlet, fell from a peak of \$84.25 in October 1999 to just 9 cents in March, when the company, unable to find new funding, finally declared them worthless and shut its site. Webvan, the Foster City company that tried to persuade Americans to give up the grocery store in favor of online ordering, finally ran out of gas in July, after racking up \$830 million in losses (Norr 2001).

The carnage has not been restricted to the dot.coms. Many analysts once argued, in part by analogy to the success of Gold Rush-era merchants such as Levi Strauss, Leland Stanford and Sam Brannan, that companies providing equipment, bandwidth and services for the Internet were bound to prosper even if many dot.coms, like most Forty-Niners, never struck gold. But 2001 disproved that analogy, at least for the short term. Networking-equipment giant Cisco suffered its first quarterly loss in 11 years as a public company because it had to write off a staggering \$2.2 billion worth of components it had purchased, then found it had no use for. Another San Jose behemoth, JDS Uniphase, had to cut more than half its workers and write off almost \$50 billion for "impaired goodwill" after demand for its fiber-optic communications gear, once seemingly insatiable, suddenly dried up. In July, Sun Microsystems logged its first quarterly loss in 12 years. Three months later, it posted another loss, more than twice as large this time, as revenue plunged 43 percent year over year. Exodus Communications, the best-known specialist in the new field of Web hosting, was forced into Chapter 11 bankruptcy protection, then began selling off its assets. A whole series of broadband Internet access providers, whose valuations had

soared in anticipation of burgeoning demand, crashed and burned. Among DSL providers, NorthPoint Communications abruptly shut down, and rivals Covad and Rhythms entered Chapter 11. High-speed wireless pioneer Metricom also went bankrupt and ended up selling its billion-dollar Ricochet network for \$8.25 million. And ExciteAtHome, the company that created the cable-access business and accounted for 40 percent of all broadband subscribers, went through a prolonged agony that culminated this month, when it cut off service to 760,000 AT&T subscribers and announced that it would shut down for good in February (Norr 2001).

The venture capital industry has indeed reacted to this new reality. Quarterly investments by venture capital funds have decreased steadily from the high of \$26.2 billion in Q1, 2000, to the current rate of \$6.5 billion at the close of the third quarter of 2001. This retrenchment represents a 400% drop in investment dollars over the last seven quarters. In Q3, 2001 the number of deals dropped to 601, a level not seen since the 606 deals completed in Q4, 1997. At the same time, the venture capital industry has close to \$45 billion in funds that must be put to work in private equity investments. While angel investments have declined somewhat from the peak year of 2000, these individual investors have the luxury to stop investing, rather than having a pool of capital that must be invested in private equity.



## The Post-mortem

While the cause of the downturn in the angel and venture capital market has many facets, a few notable factors can be discerned. First, the proliferation of new venture capital funds, and the new fund managers required by the industry, added a layer of inexperience in a market filled with uncertainty. Also, these new participants had never witnessed a downturn in the industry and often lacked the foresight to realize that such downturns are distinct possibilities. It became in-vogue to call oneself an angel or venture capitalists, terms that only recently were confined to the purview of academics and a relatively handful of industry observers and participants. Many of these new entrants had garnered their wealth from public equity deal making, rather than cutting their teeth in the private equity markets or the more traditional angel route of the cashed-out entrepreneur. Public equity experience in isolation does not traditionally fare well in the vagaries of the private equity market, for two notable reasons. First, illiquidity, the ever present hidden trap in entrepreneurial deals due to the absence of a secondary market, dictates cash resolve and an understanding of the complementarity of the angel and venture capital markets. Even if the investment is experiencing high growth and a solid foundation, the liquidity event is often dictated by exogenous factors including later round investors and exit strategies, rather than the need for the investor to exit the investment. Second, prediction of future financial performance is confounded in the early stage equity market with the absence of any reasonable financial history with which to base forecasts, and the lack of audited financials. Thus, both illiquidity and the lack of financial data and a layer of uncertainty, even for the seasoned

investor, often presents insurmountable hurdles for the novice.

A second contributing factor to the downturn is that as new money flowed into venture capital funds, individual fund sizes in excess of \$100 million became the norm. These large funds lacked the “strike force” mentality of the traditionally smaller, and more nimble funds, funds that were able to focus on an industry sector that they knew best. With the increase in funds and fund sizes, pressure to put these monies to work forced many general partners into sectors with which they had little experience. Also, with the larger funds and the increase in the number of deals, the value-added dimension of venture investing became less pronounced, with many venture capitalists stretched thin across several portfolio companies.

Third, as companies rushed to second rounds of private equity financing, in part due to the increased availability of this capital, the value-added start-up business experience of angel investors became discounted. Research has indicated that business experience provided by angels is considered by the majority of entrepreneurs just as important as the capital provided by angels. Typically, an angel’s influence wanes as the company progresses to venture capital backed later rounds. In the normal sequence, the start-up experience of the angel is not deemed as critical as in the early stages of development. Unfortunately, these were not normal times. These young companies, still in the critical start-up phase of development and in acute need of angel advice, progressed quickly to later venture capital backed rounds, whether they were appropriate or not for their stage of development. Thus, the angels value-added was diminished through the rapid influx of new investors, at precisely the time that the entrepreneur and management team needed this valuable advice.

Fourth, along with the shorter time between external equity rounds, the entire time line from start-up to exit was abbreviated. Gone was the patient investing that was the hallmark of the angel market. The rush to take advantage of a red hot IPO market drove many investors, angels and venture capitalists alike, and entrepreneurs to build “designer” companies fashioned for an exit, rather than building a solid company. One need look no further for an example than the ill-fated Pets.com. Lacking a clear business model and a path to profitability, many of the brightest and well educated MBAs brought into the venture as the management team lack the foresight to recognize the inherent flaws in the underlying business model. It was only too late when these bright minds realized that they had put their MBA to work in running a pet store, and nothing else.

Lastly, the inherent high failure rate in high growth ventures was overlooked by many novice and experienced investors. The mantra “invest what you can afford to lose” was often replaced by dreams of capital gain multiples never before witnessed. Even in good times, good companies fail. This, coupled with the proliferation of the designer companies, brought many promising ventures down with the falling tide.

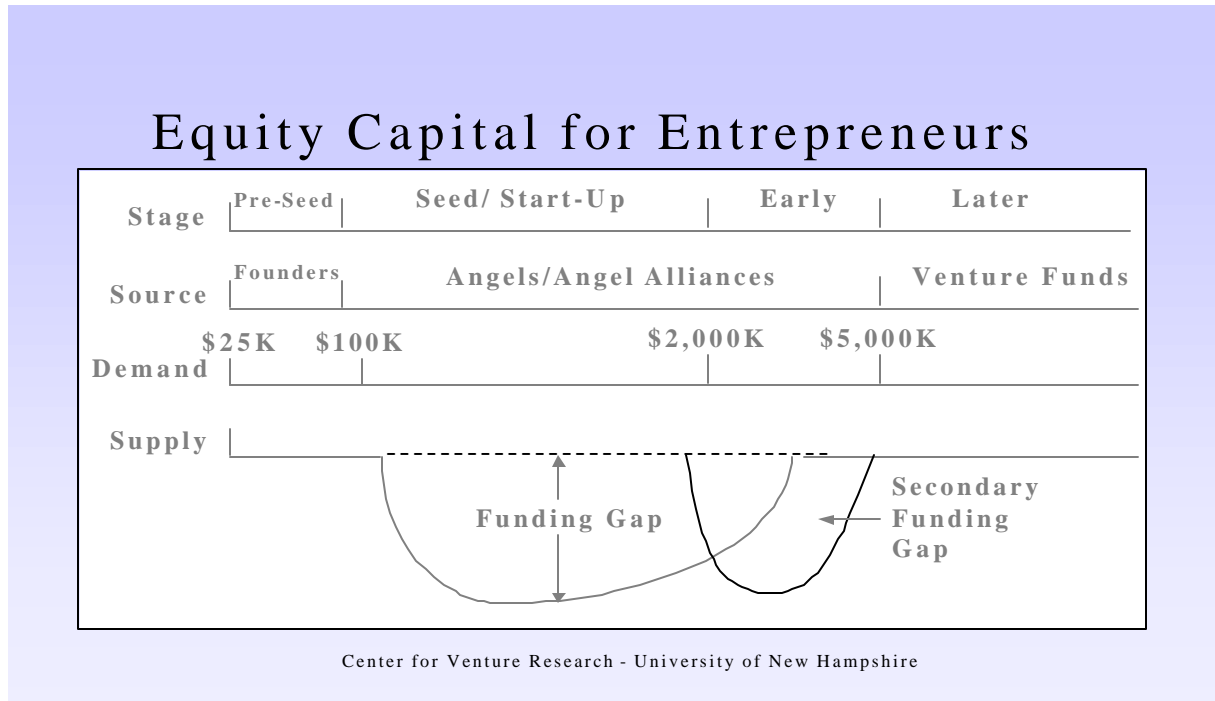
### The Current Market

If three phrases could describe the current market for early-stage equity capital they would be: back to basics; back to constructing a business model; and angel core values prevail. In general,



the carnage has resulted in the needed culling of the forest. Angels are reasserting their fundamental role as the major source of seed capital for high growth entrepreneurial ventures. Patient investing is back in vogue, both by choice and by the dictates of the market. Figure 2 summarizes the current and near term future of the private equity market. At the inception, or

Figure 2



pre-seed stage, the venture is owner/inventor financed through a variety of bootstrapping methods. In this context bootstrapping is defined as creative methods of acquiring the use of resources without raising equity from traditional sources. Bootstrapping methods entail both a reduction in expenses and acquisition of capital. Capital requirements are small at this stage and as such bootstrapping presents a viable growth strategy for the short term (Freear, Sohl and Wetzel 1995). As the venture begins to develop, but is still in the pre-seed stage of growth, friends and families tend to be the source of small pools of capital. At this stage, more often than not, these are poorly structured deals typically entered into without a great deal of due diligence. If this financing is not overburdened with terms and conditions that may impinge on professional equity capital at a later stage, these sources are useful to begin product development, but are not considered to be classic investment capital (Sohl 1999).

As the entrepreneurial venture grows, so does the appetite for cash, even in the measured growth of the post 2001 market. In the current conditions, a realistic need for growth capital is essential. At this point, the seed and start-up phase, private investors are the major source of external equity capital. This relatively invisible source is the oldest and largest segment of the venture capital industry and is made up of individuals that are self-made millionaires, typically with substantial business and entrepreneurial experience. While many investors that entered during the recent upswing have now exited the angel market, the size of the market appears to be

settling at a level substantially higher than before the current surge, but lower than the apex of the recent surge. While estimates of the scale of this informal venture capital market are difficult to ascertain with any degree of certainty, a conservative estimate suggests that between 300,000 and 350,000 angels are investing approximately \$30 billion every year in close to fifty thousand ventures. All indications are that the size of the informal market is stabilizing around this scale for the near future. Estimates suggest that the number of latent or potential self-made, private investors exceeds the number of active investors by a factor of five to one. The typical angel deal is an early-stage round (seed or start-up) in the \$100 thousand to \$2 million range, raised from six or eight investors.

In compliment to the angel population, institutional venture capital funds, the visible segment of the private equity market, invest primarily in later-stage and larger deals. This move to later stage represents a systemic, rather than a reactionary trend, and is evident over the last decade. There are approximately 1000 venture capital funds, and this number will likely decrease slightly in the near future as funds mature and are not replaced on a one to one basis. These funds currently manage about \$175 billion in investments. Venture capital funds invest between \$30 and \$35 billion annually in entrepreneurial ventures and bankroll less than 3,000 companies per year. In addition, many of these financings are for ventures already in their portfolios. A typical round of financing from a venture capital fund is a later-stage deal in the \$10 to \$15 million range, with average size of rounds steadily increasing (Table 1). In 1994 the institutional venture capital industry invested \$2.7 billion in about 1000 companies and in 1995, \$3.8 billion in 1128 companies, or about \$3.4 million per deal. In 1996 a large increase in total investment dollars was not matched with a proportional increase in the number of firms, with \$10.1 billion invested in 2163 companies or \$4.6 million per deal. This trend continues in 1997 and 1998 with

Table 1

| Venture Capital Funds |                |       |                |
|-----------------------|----------------|-------|----------------|
| Year                  | Total          | Deals | per Deal       |
| 1994                  | \$2.7 billion  | 1,000 | \$2.7 million  |
| 1995                  | \$3.8 billion  | 1,128 | \$3.4 million  |
| 1996                  | \$10.1 billion | 2,163 | \$4.6 million  |
| 1997                  | \$12.2 billion | 2,706 | \$4.5 million  |
| 1998                  | \$16.0 billion | 2,692 | \$6.0 million  |
| 1999                  | \$35.6 billion | 4,006 | \$8.9 million  |
| 2000                  | \$89.8 billion | 5,485 | \$16.4 million |
| q1-q3 2001            | \$25.4 billion | 2,110 | \$12.1 million |

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investment dollars increasing at a more rapid rate than the number of investments. In 1999, an exponential growth in the venture capital industry was beginning to take hold. 1999 saw total venture capital investments reach unheard of heights, with \$35.6 billion invested in 4,006 deals. Average investment soared to \$8.9 million per deal, further cementing this march to later stage and larger deals trend that began in the early 1990s. In 2000, total dollars invested more than doubled, to close to \$100 billion, while the number of deals rose a mere 36% to 5,485 deals. Average deal size checked in at \$16.4 million for the year. Clearly, the high valuations, as noted previously, and the move to later stage, contributed to this ballooning of the average deal size. Through three quarters of 2001, average deals size has receded to approximately \$12.1 million, still above levels as recent as 1999.

### The Funding Gap: Capital and Information

Financial theory is predicated on the assumption of efficient capital markets where there exists fully informed buyers and sellers and low transaction costs. Under this assumption all relevant information about sources of funds and investment opportunities is available to all buyers and sellers of capital. For the established firm, financial markets supply a complete variety of financing instruments, with these markets being relatively accessible and the owner/manager is left to decide the optimum mix of a financial structure based on the cost of capital. For the high growth entrepreneurial firm, this supply assumption may not hold, causing systematic market mismatches at particular stages of development of the fast growth firm (Brophy 1997). These market imperfections, prevalent in the informal venture capital market, lead to two types of market inefficiencies, collectively referred to as the funding gap.

The first market inefficiency is a capital gap between the needs of early stage ventures and the suppliers of early stage capital. High growth ventures need patient, value added equity capital to fuel growth. Under efficient market conditions capital flows from the suppliers of this capital, angels and venture capital funds, unimpeded to the demand side, the high tech entrepreneurs. In the United States, the private equity market does not meet this standard of efficiency, not by a long shot. The high tech market is littered with promising entrepreneurial ventures that do not receive the critical seed, start-up and/or early stage capital necessary to move promising technology from the laboratory to the marketplace. In most cases the cost to successfully commercialize a high tech innovation is at least ten times the cost of the original research, costs often overlooked by the zealous entrepreneur with the next greatest technology. One need look no further than the superior technological advancements of the past that have failed to achieve successful commercialization and market penetration: the Tucker automobile, which in the 1940's introduced the padded dash board, disk brakes and safety glass; the Betamax with its superior technology over the VHS; the Visicalc spreadsheet; are some of the more well known examples. There are numerous others that did not even reach the collective consciousness beyond the scientific community.

The second, and equally important, type of market inefficiency contributing to the funding gap is the information gap. The existence of private investors and indications that capital is available, but quality deal flow is lacking (Mason and Harrison 1994; Sohl 1999), tend to mitigate the

influence of the capital gap at certain stages of the development of the high tech entrepreneurial venture. Imagine two steel balls in a box car, bouncing around as the train moves along, one being the entrepreneur, the other the angel investor. Without any impetus to attract, the odds of these two objects meeting is minimal. Much the same occurs in the seed and start-up equity markets. An efficient market implies an open and timely flow of reliable information concerning financing sources and investment opportunities. In the informal venture capital market, with the suppliers of capital seeking a degree of anonymity, often in conflict with the need to maintain quality deal flow, information flows very inefficiently. An entrepreneur's search for equity capital is often a time consuming process, resulting in missed market opportunities and unsuccessful avenues. Likewise, as investors seek a balance between quality deal flow and the desire to maintain a reasonable degree of anonymity, promising technologies are often overlooked or prematurely discarded.

This capital and information inefficiency results in two substantial funding gaps in the private equity market. The first gap occurs primarily in the seed and start-up financing stage (see Figure 2), and is the result of both capital and information inefficiencies. The gap ranges from \$100,000 at the low end, the point at which the money raised from friends and families and bootstrapping runs out, to the \$2 million range on the high end, the time when the venture would historically become attractive enough to catch the eye of venture fund investors. It is in this seed and start-up stage that is the prime angel territory. Research indicates that angels investors provide close to 80% of the seed and start-up capital for high tech entrepreneurial ventures (Sohl, Van Osnabrugge and Robinson 2001). Further evidence of the critical role of angels in financing high growth venture is provided by the lack of attention afforded to this seed and start-up stage by the venture capital industry. In 2000, venture capital seed and start-up investments amounted to a mere \$2.2 billion in 382 deals, which represents 2.4% of the total capital invested and 6.8% of the total deals. In the first three quarters of 2001, these amounts are \$319 million (1.25% of total capital) in 71 deals (3.3% of total deals). This lack of interest in seed and start-up investments is not a recent phenomena. Since 1995, the percentage of venture capital deals in the seed and start-up stage has never exceeded 10% and the total dollars invested have never risen above 5%. If the goal is public policy initiatives to spurn the commercialization of innovation in the United States, one needs to look no further than initiatives directed at the angel investor.

As recently as 1998 a new funding gap has emerged in the United States' equity markets (Sohl, 1999). This secondary market gap occurs in the early stage of equity financing. As the venture capital industry has progressed to larger and later stage financing, and the informal market has remained active below the \$2 million threshold, an ensuing capital gap in the \$2 to \$5 million range has developed. The funding gap is more of a capital gap than the capital/information gap in the seed and start-up stage, and it has been steadily increasing. These larger capital requirements, still considered early stage deals, have spawned a new hybrid of angel financing - the angel alliance. These alliances represent relatively large groups of business angels willing to fund some second round, early stage deals. In addition, some of the capital requirements in this secondary gap have been met through co-investment between private investors and early stage financing entities. However, both the angel alliances and the co-investment strategies do not appear to be sufficiently satisfying the early stage equity capital needs of the high growth sector.

As such, high tech companies fortunate enough to secure seed and start-up financing still face formidable hurdles as their equity requirements progress to the \$2-\$5 million range. Of course, without seed and start-up capital, many of these high tech ventures do not even get past their initial stages of development.

## The Road Ahead

Unsustainable expectations have been discarded to the trash heap of an overheated market. Angel net worth is down, but so are deal valuations, by about the same percentage. Realistic projections and realistic deal prices of early stage high tech innovations are in. Angel core values are back in vogue. Angels are beginning to once again assert their role as value-added, patient investors in entrepreneurial ventures. Angels continue to invest close to home with the new found ability to find good deals within a half days travel time. Both entrepreneurs and investors are now striving to build companies with real value and sustainable growth opportunities, rather than the designer companies of the past that were built as exit strategies. The mantra “the A management team with the B idea, rather than the reverse” is now a common phrase. Investment dollars are now being used as they should, to develop high risk technologies with a reasonable chance of success. Cash flow, once an afterthought given the easy access to fast money, is now more important than your mother. And the cash is being used as it should, for moving innovations from the laboratory to the marketplace. While layoffs in the high tech sector are now as common as the IPO mania of yesterday, the increased skilled labor supply offers hope. Many high tech advances and leading high tech companies are spawned during economic down cycles, when talented labor is available at reasonable prices. Entrepreneurship and angel investing is alive and well, and quite active.

The role of government in the private equity market is now as important as ever. There are several government initiatives to enhance the development of high tech ventures, including the SBIR program, Small Business Investment Corporations and the Advanced Technology Program. Each of these programs offers unique assistance to, and facilitation of, the development of high growth entrepreneurial ventures. Of particular note as an active player in the early stage market is the Advanced Technology Program (ATP). The ATP offers a vital component in the critical seed and start-up stage of a technology's development, similar in many ways to the role of the angel investor. By providing patient, early stage capital for high risk innovations, the ATP enables the technology innovation process through the adoption of a long term view of research and development. In essence, the ATP provides the impetus for the development of high risk technologies along three dimensions. First, with direct financial support through its program of cost sharing for high tech start-ups, the ATP provides critical funds that in many cases may not be available, even from the angel market. Second, ATP support can, in many instances, be viewed as a form of downside risk protection for the angel investor. The availability of ATP funds as a form of leverage for the angel investor provides a form of cost, and more importantly, risk sharing for the angel investor. While a deal has much upside potential, the angel may have insufficient resources to completely fund the project or deem the risks too high given the level of capital that can be committed. With the ATP viewed as a form of co-investor, the ATP funds in concert with angel capital can bring the funding to a level that permits the accelerated development necessary to be at the forefront of emerging

markets. Third, the ATP's rigorous peer-review system of independent evaluation assists the angel in the due diligence process. While angels largely conduct their own due diligence, assistance in vetting the deal through the use of independent sources is viewed as an asset, in much the same way as angels often seek the support of other investors to vet a deal.

In tomorrow's seed and start-up market, the role of programs such as the ATP are needed more than ever. However, just as programs such as ATP assists in the funding of start-ups, there is an acute need for support for research on the early stage equity funding market for high growth ventures. Like the funding gaps that exist in the equity market for high tech ventures, substantial knowledge gaps exist in our understanding of this critical market.

Active and potential private investors have unique characteristics and requirements. Uncovering incentives to bring this capital to bear on the myriad of entrepreneurial activity sweeping the United States is a major challenge. To this end, and to better understand the current private investor market, longitudinal studies need to be undertaken. While surveys represent a cross sectional "snap shot" of the market and have been the primary vehicle for knowledge generation in angel research to date, these surveys need to be supplemented with longitudinal research. Two key areas of longitudinal research are currently lacking in the study of angels. First, direct research on the market activity of angels, conducted at quarterly intervals, will offer valuable insights on market trends. In this case, the individual angel, or angel group, would be the unit of study. Such information would be garnered from portals through which angels enter and participate in the early stage market, and individual angels. A portal may best be categorized by the predominant mechanism for bringing together entrepreneurs seeking capital and business angels searching for investment opportunities. These portals collectively form the informal venture capital market. Data on yield rates, valuations, size of investment, sector information and co-investment strategies will reveal pertinent information on the inner workings of the seed and start-up equity market.

Second, research on actual angel investment origination and conclusion is acutely missing from the current knowledge base. In this vein, the investment, as opposed to the angel, is the unit of study. Through the tracking of the angel investment from the point of introduction, data on the terms and conditions of the deal, subsequent external funding rounds, the synergy between the angel and venture capital funded deal, actual return rates and exit strategies, and the identification of both the successes and failures, with each possessing valuable market information, can be understood.

With a reasonable set of longitudinal data on angels and their investments, critical early stage market trends can be identified and analyzed. This timely data would be used as a basis to strengthen existing government programs to enhance the development of high tech ventures and to offer insights into potential public policy initiatives. Programs such as the ATP would be in the position to fully leverage their funding of high risk technology in the angel market with current data and access to the investors that are a critical part of the market focus of ATP funded projects. The two longitudinal studies outlined above will not only increase the understanding of the early stage equity market, but also serve to educate both the entrepreneur/innovator and the angel investor. In recent surveys, angels and entrepreneurs indicate a critical need for access to

accurate and timely market information and for assistance in some of the technical aspects of private equity investments. These technical aspects include research-based conclusions on conducting due diligence, negotiating deals, screening investments and pricing and structuring deals. Since angels and entrepreneurs often operate alone, the need for reliable information on market trends and deal structure is even more acute than in the information overload atmosphere of the public equity markets. In essence, with solid data collected consistently over time, programs and policies can take a proactive role in facilitating the equity financing of high tech ventures. Critical questions on the angel market remain, whose answers will help provide timely information to guide the formulation of public policy initiatives directed at the vital role of the early stage equity market in the continuation and strengthening of the position of the United States as the world's innovation leader.

The road ahead may be littered with mines, but the history of business in the United States is the history of equity financing. For high tech entrepreneurs/innovators, business history and the stock market pay tribute to the entrepreneurs and investors who stuck it out. In the two decades of research on informal venture capital much has been learned. The vital role played by business angels is being recognized, but their know-how and their capital are still largely untapped entrepreneurial resources. The private investor market is still largely misunderstood, inefficient, and under-researched. The more we learn about business angels, the more research questions arise. However, by applying academic rigor to an applied area of study, the research will continue to make progress and provide valuable information to entrepreneurs, investors and public policy makers. While the day when every deserving innovation will have access to private equity, and investors will have a reasonable flow of quality investment opportunities, is not close at hand, sustainable additions to the understanding of the seed/start-up equity market is a goal within reach. It is through this knowledge acquisition that the nation will be well positioned to lead the world's innovation economy.

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