

The private equity market in the USA: Lessons from volatility

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Abstract

Since the nadir of the early nineties the angel and venture capital markets began a rapid recovery followed by a marked decline. These recent market gyrations offer insights into the private equity industry. During the rise angel and venture capital investments soared, accompanied by rising deal valuations. 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. However, unsustainable trends inevitably return to normalcy and these changes have resulted in a restructuring of the market. Angels are reasserting their fundamental role as the major source of seed capital for high growth entrepreneurial ventures. This paper examines the rise and the downturn in the private equity market, and identifies some of the causes for each. Current and future market trends are also identified.

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Introduction

The private equity market in the United States experienced much volatility over the last decade and a half, marked by an expansionary period bookmarked by two sharp contractions. Such volatility offers researchers a unique opportunity to view this market through a critical lens. Taking a market perspective, the interplay of the angel and venture capital market, and their respective reactions to the market's expansion and contraction, provide insights to the nature and structure of these sources of high risk equity capital.

General studies on the characteristics, or ABC's (attitudes, behaviors and characteristics), of angels have offered a foundation for understanding the angel community. Research has examined the latent, or potential investor (Freear, Sohl and Wetzel 1994) and characterized the angel as an entrepreneur (Politis and Landstrom 2002). In addition, the value-added quality of angel investors, based on their prior experience as entrepreneurs, have been identified (Mason and Harrison 1994) as has the long term nature of the investment horizon (Sohl 1999). With these characteristic identification studies serving as a foundation, recent research has focused on various specific dimensions of the angel and venture capital market segment. The research on the investment decision, from the viewpoint of venture capitalists (Van Osnabrugge 1998; Zacharakis and Meyer 1995, 1996), business angels (Van Osnabrugge 1998, 2000; Mason and Harrison 1996) and women entrepreneurs (Amatucci and Sohl 2003), have provided insights on the process of investing. An analysis of the stages of this decision

process (Linde, et al. 2000; Feeney, et al. 1999; Van Osnabrugge 1998; Tyebjee and Bruno 1984) has resulted in a taxonomy of the critical points in the investment decision making. These critical points, or stages, include both the pre-investment stage (Mason and Harrison 2002a; Kolodinsky, Osteryoung, and Anthony 2000; Feeney, Haines, and Riding 1999), and the post investment relationship (Kelly and Hay 2001; Higashide and Birley 1998; Sapienza and Korsgaard 1995). Deal structure, with respect to the terms and conditions of angel and venture capital deals (Sohl and Arenson-Perkins 2001) and the theoretical context and implications of deal terms (Kelly and Hay 2000; Landström, Manigart, Mason and Sapienza, 1998) have also been analyzed. With respect to outcomes, some previous research has identified expected outcomes of angel investments, including projected exit horizons, methods of exit and expected rates of returns (Tymes and Krasner 1983; Mason and Harrison 1994). Recent research has begun to focus on the actual rates of return of informal venture capital investments (Mason and Harrison 2002b) and have concluded that trade sales are the primary harvest and that approximately a quarter of sampled investments have an internal rate of return in excess of 50%. As a further refinement on the angel market, several country studies have been undertaken, including Japan (Tashiro 1999), Singapore (Hindle and Lee 2002), Sweden (Landstrom 1993), Finland (Lumme et al. 1998), Australia (Hindle and Wenban 1999), and Norway (Reitan and Sørheim 2000).

Clearly, the research has added much to the understanding of various components of the angel market. However, research from the inclusive, market based perspective, analyzed during volatile periods, has not been directly addressed, although the need for such research has been noted (de Noble 2001).

This paper analyzes the angel market from a boarder perspective: as a private equity market experiencing many changes in a relatively short period of time. In essence, the volatility of the private equity market throughout the 1990's and 2000 offers a good opportunity to further knowledge and understanding of the private equity financing sector of the economy. There is evidence that private equity contributed significantly to the long period of economic growth in the 1990s in the United States (Progressive Policy Institute 1999; Milken Institute 1999). Yet, after a period of marked increase, followed by a rather dramatic fall, less is known about the private equity market in this expansionary/decline period. This paper attempts to further knowledge and understanding of the private equity market, especially the role of angels, during market cycles. Specifically, the paper examines the rise and the downturn in the private equity market, and identifies some of the causes for each. Current and future market trends are also identified.

Market trends: the rise to 2000

As early as 1996 the angel and venture capital markets began a recovery which was 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 (Van Osnabrugge and Robinson, 2000). 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 reasonable profit.

[Insert figure 1 about here]

From this relatively quiet and little noticed beginning, angel and venture capital investments began a steady expansion. As figure 1 indicates, total venture capital investments increased nearly 15 fold in six years, from \$6.3 billion in 1995 to \$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 an extremely rapid rise in deal valuations. Valuations increased, 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 (Sohl 1999). For the first time since the study of angels was initiated, venture capital investments in the USA exceeded, 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, complementary.

[Insert table 1 about here]

A classic angel and venture capital boom was in the making. As the dollar volume of the industry grew in size, as shown in table 1, 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 a rapid rate. Between 1996 and 1998 there were a total of 4 billion-dollar venture capital funds (individual venture capital funds with total funds raised exceeding \$1 billion) in existence. In 1999 there were nine billion-dollar funds, and by 2000 there were 19 such funds. These nineteen 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 and the increasing competition for deals, the pressure to make the investments increased and the time devoted to due diligence decreased. Due diligence became an after-thought and anecdotes 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 of 165% (National Venture Capital Association 2002). 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 (Sohl and Sommer 2002).

The decline

Unsustainable trends inevitably return to normalcy. Unfortunately, after market excesses, the return to normalcy is often severe. In 1997, there was one Silicon Valley initial public offering per week, which minted close to 65 millionaires per day. By 2001, Silicon Valley was experiencing 4,000 job losses per month, adding 135 individuals to the ranks of the unemployed every day. The local unemployment rate, 1.3% in 2001, had risen to 6.6% a year later, the highest in seven years. Close to eighty-five

bankruptcies have been filed on a daily basis during 2001. Venture capital returns, for the twelve months ending December 2001, declined to minus 27.8% (National Venture Capital Association 2002). These negative returns signified the first ever twelve month negative return for the venture capital industry. 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. A further case in point is the Silicon Valley Fastest 50, the 50 fastest growing firms in Silicon Valley. As of the close of 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.

Although the dot-com implosion began in 2000, it continued and by some measures even intensified in 2001. Through the end of 2001, according to the Webmergers.com tracking service, 516 Internet companies had shut down since the beginning of the year, compared with 225 in 2000. The toll in 2001 included such e-commerce names as 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, closed in July,

after racking up \$830 million in losses (Norr 2001).

The fall 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 never succeeded. 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, largely because it had to write off a staggering \$2.2 billion worth of components it had purchased, then found it had no use for. 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 suddenly dried up.

In July, Sun Microsystems logged its first quarterly loss in 12 years. 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 increased in anticipation of burgeoning demand, declined rapidly. 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 with the suspension of service to 760,000 AT&T subscribers and announced that it would shut down in February (Norr 2001).

[Insert figure 2 about here]

The venture capital industry has indeed reacted to this new reality. Quarterly investments by venture capital funds have (figure 2) decreased steadily from the high of \$26.2 billion in Q1, 2000, to the current rate of \$5.7 billion at the close of the second quarter of 2002 (PricewaterhouseCoopers/ Venture Economics/ National Venture Capital Association 2002). This retrenchment represents over a 400% drop in investment dollars over the last seven quarters. In Q2, 2002 the number of deals dropped to 819, a level not seen since the 787 deals completed in Q3, 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. The monikers angel or venture

capitalists appeared often in the media, terms that only recently were confined to the purview of academics and a relatively small handful of industry observers and participants. Many of these new entrants had garnered their wealth from public equity deal making, rather than in the private equity markets or the more traditional angel route of the cashed-out entrepreneur. Public equity experience in isolation does not traditionally provide the necessary background for investing in the private equity market, for two notable reasons. First, the lack of a secondary market in private equity investments 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 \$500 million became the norm (National Venture Capital Association 2000). 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 (Sohl 1999). 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.

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 expectations of unrealistic of capital gain multiples. Even in good times, good companies fail. This, coupled with the proliferation of the designer companies, brought many promising ventures down with the falling market.

The current market

The current market for early stage equity capital is signified by a back to basics mentality and a recognition of the importance of angel core values. These angel core values include patient, value-added investing, on a regional basis and usually provided by 5-7 angels investing as a group (Sohl 1999). Angels are reasserting their fundamental role as the major source of seed capital for high growth entrepreneurial ventures. Figure 3 summarizes the current and near term future of the private equity market. At the inception, or 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).

[Insert figure 3 about here]

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 (Sohl and Sommer 2002). 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 (Sohl 1999). 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 (Sohl and Sommer 2002).

[Insert table 2 about here]

In contrast 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 2).

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 continued in 1997 and 1998 with 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 \$35.6 billion invested in 4,006 deals. Average investment increased to \$8.9 million per deal, further cementing this trend to later stage and larger deals 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 was \$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. At the close of 2001, average deal size has receded to approximately \$9.3 million, still above levels as recent as 1999.

The funding gap: capital and information

During the market volatility throughout the 1990s and 2000, and in the current market, a persistent funding gap has existed and a new gap has emerged. The initial funding gap exists in the seed and start-up stage of entrepreneurial ventures, while the second gap is in the follow-on rounds of early stage funding. Throughout the time period studied in this paper, the movement of the venture capital industry to larger and later stage deals, and the continued focus of the angel market in the seed and start-up stage, contributed, in part, these funding gaps. It appears that two market inefficiencies, capital and information, contribute to the existence of these funding gaps.

To understand the contribution of the inherent market inefficiency to the funding gaps, note that 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 USA, the private equity market does not meet this standard of efficiency. The high tech market has many 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 entrepreneur. One need look no further than the superior technological

advancements of the past that have failed to achieve successful commercialization and market penetration: some of the more well known examples are 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, and the Visicalc spreadsheet; 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. 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. 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 3), 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 to venture fund investors. It is in this seed and start-up stage that is the prime angel territory. Research indicates that angel investors provide close to 80% of the seed and start-up capital for high tech entrepreneurial ventures (Sohl, Van Osnabrugge and Robinson 2000). 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 \$1.7 billion in 238 deals, which represents 1.7% of the total capital invested and 3.4% of the total deals. In 2001, these amounts were \$843 million (2.3% of total capital) in 183 deals (4.7% 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% (PricewaterhouseCoopers/ Venture Economics/ National Venture Capital Association 2002). If the goal is public policy initiatives to spurn the commercialization of innovation in the USA, 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 USA's 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 (Cerullo and Sommer, 2002; Payne and Macarty, 2002; May 2002). 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 abandoned, and although angel net worth is down, so are deal valuations, by about the same percentage. Realistic projections and realistic deal prices of early stage high tech innovations are becoming more common. 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. It appears that

investment dollars are now being used as they should, to develop high risk technologies with a reasonable chance of success. Cash flow is now being used as it should, for moving innovations from the laboratory to the marketplace. While layoffs in the high tech sector are common, 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 are both 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 (Chang, Shipp and Wang, 2002). 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 USA 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 (Sohl, Van Osnabrugge and Robinson 2000). 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 USA as the world innovation leader.

The road ahead may be littered with mines, but the history of business in the USA 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 nations will be well positioned to compete in the world's innovation economy.

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table 1

VC Industry Size

| 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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table 2

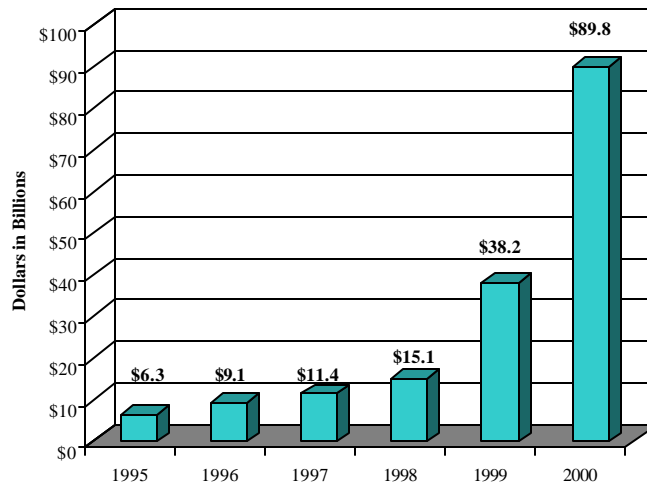
Venture Capital Funds

| 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 |
| 2001 | \$36.5 billion | 3,928 | \$9.3 million |
| Q1,2 – 2002 | \$12.1 billion | 1,645 | \$7.4 million |

Source: PricewaterhouseCoopers MoneyTree Survey in partnership with VentureOne

figure 1

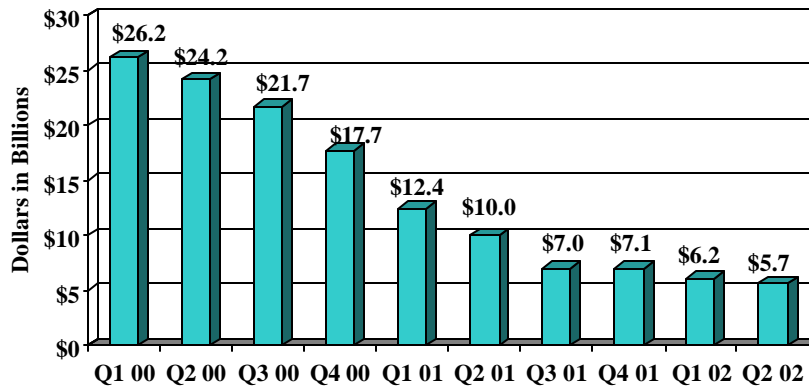
National Venture Capital Investments 1995-2000



Source: PricewaterhouseCoopers MoneyTree Survey in partnership with VentureOne

figure 2

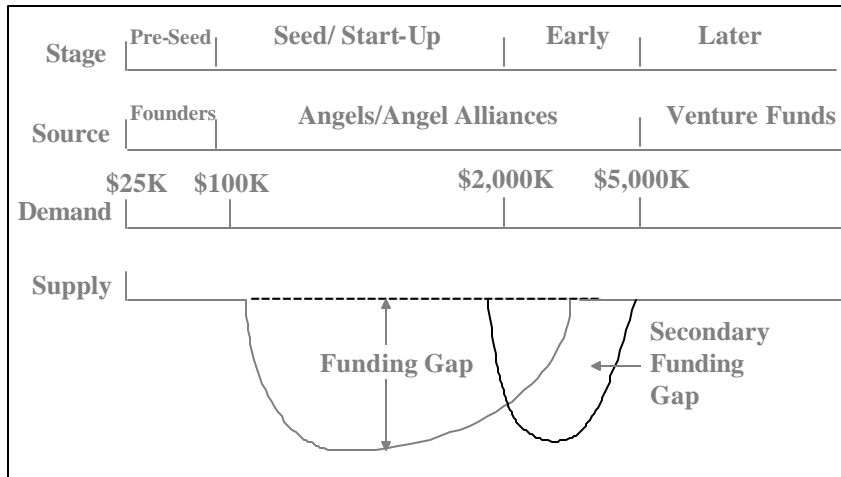
National Venture Capital Investments
2000-2002
(billions)



Source: PricewaterhouseCoopers MoneyTree Survey in partnership with VentureOne

figure 3

Equity Capital for Entrepreneurs



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