

Does Angel Participation Matter?

An Analysis of Early Venture Financing

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Abstract

We examine the role of angel investors in early venture financing using a new sample of 182 Series A preferred stock rounds. Our sample includes deals where angels invest on their own and those where they co-invest with venture capitalists (VCs), as well as VC-only deals. We find that angels invest on their own in younger and smaller firms, where the founder retains more ownership. Control rights in these deals are also more entrepreneur-friendly. However, these firms are as likely as the VC-backed firms to have successful liquidity events, and more likely to survive, though many of the surviving firms are inactive, indicating that angels may have little incentive or limited ability to liquidate such firms. In contrast, when deals are large, we find that companies that obtain Series A financing entirely from VCs have better outcomes than those in which VCs and angels co-invest. One interpretation is that larger deal size adds power to VC syndicates, and these powerful syndicates might attempt to block other investors from higher quality deals, resulting in adverse selection for angels in larger mixed deals. Alternatively, experienced founders and VCs may prefer VC-only deals given the increased complexity of including angels, and given that angels might free ride on VCs' managerial effort and expertise.

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I Introduction

Private equity investments of individuals (business angels) are believed to represent the lion’s share of investments in de-novo startups.¹ Yet, due to the paucity of data on angel financing (Fenn and Liang 1998; Prowse 1998), the nature of angels’ investments in startups has largely been characterized based on survey evidence (Freear, Sohl, and Wetzel 2002). For instance, the conventional wisdom is that angels tend to invest in early-stage deals, hold common stock, and exert influence through social networks rather than imposing formal control rights.

We provide several new insights on angel investing by analyzing a unique sample of stock purchase agreements and other legal documents pertaining to 182 “Series A” private equity deals. Our data are derived from the electronic records of the now defunct law firm Brobeck, Phleger & Harrison (Brobeck). One important characteristic of these data is the considerable variation in the extent of angel and VC participation, ranging from all-angel to all-VC financings.² Analyzing this stage of venture financing allows us to understand how angels participate in deals when founders have a meaningful choice between both investor types. This allows us to identify new relationships between investor composition, deal terms, and outcomes.

The prevailing belief that angels simultaneously invest in very early stage deals but demand fewer controls over their investments is intriguing considering that investments in small private firms are beset by problems of information asymmetry and misaligned incentives. For example, the literature on venture capital financing has documented the use of complex contractual instruments (Gompers 1997; Kaplan and Stromberg 2003), as well as staging (Gompers 1995), as ways to mitigate these problems. However, similar contractual and staging arrangements are believed to be absent from angel deals (Wong 2002).

We find that this belief does not properly characterize Series A financings. In Series A rounds, angels almost always take preferred shares, often alongside VC investors. However, when angels invest either on their own or together with VCs, we find more entrepreneur-friendly cash flow and control rights, such as weaker liquidation preferences and redemption rights. Most of the angels investing in Series A rounds do not own common shares prior to

¹Extrapolating from the Survey of Small Business Finance, Fenn and Liang (1998) find that for every one firm that raises a venture capital investment, six raise an angel investment. Similarly, they note that approximately one-third of firms that go public were funded by venture capitalists, and two-thirds by angels and conservatively conclude that there are at least double the amount of angel investments as compared to venture capital investments.

²This is a key distinction between our work and Wong (2002), who conditions on angel participation in a deal. Analyses of private equity investment returns by Cochrane (2005), Hall and Woodward (2006), Hochberg, Ljungqvist, and Lu (2007), Kaplan and Schoar (2005), Ljungqvist and Richardson (2003) and Moskowitz and Vissing-Jorgensen (2002) are based generally on investments by VCs or holdings of small privately-held businesses.

the Series A financing, and hence they are likely drawn from a different pool of individuals. These features are similar to the differentiation seen amongst VCs who invest in different venture stages. When angels invest on their own, and fully finance a Series A round, the companies tend to be smaller and younger, and the founders retain greater ownership. This suggests that some founders might strategically eschew VC investors in order to retain greater control.

We analyze the outcome of firms represented in our sample. Amongst smaller deals, which include angel-only, VC-only and mixed deals, we find that angel-only deals have the lowest incidence of failure, and a similar number of successful liquidations as measured by Mergers and IPOs. However, many of the surviving (non-failed) angel-only firms appear to be less active, which suggests that angels either have limited ability or little incentive to liquidate them. This supports the notion that VCs are more likely to shut down marginally performing firms, perhaps because the opportunity cost of their continuing involvement in such deals is higher than angels (Jovanovic and Szentes 2007). The fact that companies with angel-only Series A deals are equally likely to experience liquidity events in our rather short time frame, despite the younger age of the firms and the greater patience of the angels, suggests that these angels are successful investors. Also, founders do not appear to limit their own success by avoiding VC investors, at least for the deals represented in our database.

Among larger deals, which in most cases involve either VCs investing alone, or VCs investing alongside angels, we find that firms for which VCs invest alone are significantly more successful. We also find that VCs investing on their own have higher prestige than those co-investing with angels, based on a number of measures including age, size, successful exits, and centrality (Piskorski and Anand 2007). However, VCs participating in Brobeck deals in general are much more prestigious than other VCs found in Venture Economics. Despite some observed prestige differences within our sample, we do not find any evidence that a certification effect (Megginson and Weiss (1991) and Brav and Gompers (1997)) explains our finding that VC-only deals perform better than mixed-investor deals. Rather, the high quality of VCs found in our overall sample suggests that virtually all VCs in our sample are experienced enough to locate and invest in high quality deals. One interpretation is that larger deal size adds power to VC syndicates, and these powerful syndicates might attempt to block other investors from higher quality deals, resulting in adverse selection for angels in larger mixed deals. An alternative explanation is that experienced founders and VCs prefer clean VC-only deals given the complexity and potential litigation risk introduced by angel participation, and the potential difficulty in funding future rounds. Experienced VCs who also participate in managing the firm (Gompers and Lerner 2000, Ch. 8, Hellman and Puri 2002) might also want to prevent angels from free riding on their expertise and efforts, which might further explain why VC-only deals are more successful.

We present numerous other new findings regarding the participation of angels in early venture financing. In the next section, we describe our data sources. In Section II, we provide some preliminary statistics regarding investor composition and deal size. Sections III-V provide results on firm, investor and deal characteristics, respectively. In Section VI, we focus on the relationship between investor composition and outcome. Section VII concludes the paper.

II Data Sources

Our data are derived from the electronic records of the now defunct law firm Brobeck, Phleger & Harrison (Brobeck). Brobeck had a rich history spanning more than seventy-five years of successful practice and the failure of the giant firm is a signature event in the history of American legal practice (Kostal 2003; Murphy, Dillman, and Johnston 2005). Founded in San Francisco in 1926, Brobeck served corporate clients in California and the western United States. In 1980, the firm opened a satellite office in Palo Alto from which it developed one of the largest law practices representing technology startups in Silicon Valley and elsewhere (it subsequently opened offices in Austin and the east coast). The Internet boom of the late 1990s led the firm to pursue a “Big Bet, Big Debt” growth strategy that relied upon rapid growth to support increased infrastructure costs. However, when the technology boom quickly reversed, a self-reinforcing cycle of defections and falling revenues pitched the firm into a “death spiral,” with lease obligations and other fixed costs soaring as a percentage of revenue. The firm decided to cease operations in February 2003, and seven months later creditors forced the liquidating firm to seek bankruptcy protection.³

In partnership with the National Digital Information Infrastructure Preservation Program of the Library of Congress and assisted by a blue-ribbon advisory council and a team of legal and technical experts, one of the authors has focused on preserving a subset of the digital records of the failed firm. On August 9, 2006, Judge Dennis Montali of the United States Bankruptcy Court, Northern District of California, San Francisco Division, recognized the historic value of these materials and authorized the creation of a *Closed Archive* allowing a significant fraction of these records to be saved. The Court Order specified that the Brobeck Closed Archive will be established under the direction of the Library of Congress and directed the Closed Archive to maintain the confidentiality of the digital records while allowing social science research to proceed using an access model substantially similar to that employed by the U.S. Bureau of the Census.

The present work is the result of an experimental project designed to test the feasibility of

³Since the firm announced its intention to close, many articles in the legal and business press have looked at the specific reasons for the failure. Kostal (2003) is the most readable account, but the perspective of the bankruptcy trustee is also highly relevant (Murphy et al. 2005).

conducting social science under the proposed user model. According to the court-approved methodology, access is restricted to archivists and scholars who have signed strict non-disclosure agreements. Access takes place in an on-site, non-networked, institutional setting, and only for specific, enumerated purposes that, among other restrictions, protects the anonymity of investors. Only aggregated or redacted data are allowed to leave the secure area. This solution balances the need to safeguard legal confidentiality while still supporting approved scholarly access.

Brobeck represented both new ventures and investors. Permission was granted to analyze documents related to first round (Series A) investments. To identify a research sample, an initial query was performed on a subset of the Brobeck digital corpus. The subset consisted of approximately 3.7 million digital records which included word processing documents, spreadsheets, and other electronic miscellany. We focus on six categories of Brobeck representations (matters) that had usable electronic documents concerning relevant deals for the purposes of this study.⁴ We identify 182 Series A funding rounds with sufficiently complete electronic records and an indication of deal closure. The earliest deal occurs in 1993 and the latest deal in 2002. We carefully examine Stock Purchase Agreements, Capitalization Tables, incorporation documents as well as other documents providing relevant information, for instance those pertaining to common stock seed rounds that may have preceded Series A rounds.

For each firm in our sample, we collect complete histories and outcomes based on public sources including Lexis-Nexis, Hoovers, SEC-filings, the Internet Archive (archive.org), and Thomson Financial’s Venture Economics. In particular, we have a record of each firm’s internet presence (from 1996 to present) as well as a complete record of every press-release and article about the firm in the popular press. This allows us to identify liquidations, bankruptcies, mergers, IPOs, and major company milestones such as strategic alliances, product releases, and subsequent VC investments in the firms.

III Investor Composition and Deal Size

Our sample is unique in that we focus on deals where entrepreneurs have a meaningful choice between both angels and VCs, and we have access to documents that allow us to identify the contribution each investor type makes along many dimensions. Since the source of the data is a law firm that represents both investors and companies, our sample does not favor

⁴Each matter was categorized and also contained a short description of the nature of that particular legal representation. The categories for which there were some matters with the words “Series A” in their descriptions were (with the matter counts shown in parenthesis): "Venture Finance/Company Side" (429), "Venture Financing/Investor Side" (264), "Venture Fund Formation" (133), "Other Financing" (109), "General Business and Technology" (79), and "General Corporate Representation" (44).

deals with a VC presence, as is the case when databases are constructed from VC firms as in Kaplan and Stromberg (2003). We classify investors into several categories as outlined below to provide descriptive information, and for our analysis that follows, we aggregate them into three major categories – founders, VCs, and angels.

Founders are identified using a two stage process. First, founders are often explicitly identified in the records. When founders are not explicitly identified, but common shareholders are, we identify founders using the following three step rule: (1) the largest common shareholder is identified as a founder and (2) any other shareholder holding at least 30% as many shares as the largest common shareholder is also identified as a founder, and (3) any common shareholder holding the position of president or CEO is also identified as a founder. Founders ubiquitously hold common shares. For the 165 companies in our sample for which we have founder data, there were a total of 458 founders, leading to an average of 2.78 founders per company, and a range of 1 founder (for 56 companies) up to a maximum of 22 founders in one company (only four companies have more than 8 founders).

We identify venture capitalists primarily by cross-referencing investor names with investors appearing in the Venture Economics database, but we also label as VCs investors with names sharing a common word root with the term “venture”.⁵ This category includes VC arms of banks and corporations which are included in Venture Economics. In addition, there are five professional angel investment groups in our sample along the lines of “Band of Angels”. Although angels are the main source of capital for these groups, we put them into the VC category given that their investment process closely resembles that of VCs. In total, there were 482 different VCs that participated in 150 of the 182 deals in our sample.

There is considerable variation in the literature and in practice regarding the exact definition of angel investors. We label as angels all investors who are not otherwise classified as founders or VCs according to the definitions above. This category, which consists of 2,528 different investors across 144 of our 182 sample firms, is predominantly composed of individuals, who invest either directly in their name, or through trusts and other investment vehicles, such as companies set up by individuals for investment purposes.⁶ Although we cannot accurately identify friends and family, we note that investors with the same name or ethnic origin as founders appear to represent a relatively small proportion of the angels

⁵There were a few occasions where investors had the word “venture” in their names but were not in Venture Economics and were not venture capital organizations in the institutional sense we refer to here. In each such case, their investment sizes were under \$50,000 and the entities could not be found on the World Wide Web. These small investment organizations are often set up for estate planning purposes. We classified these investors as angels.

⁶Wong (2002) formally defines angels as those that are “accredited investors” according to SEC Regulation D, Rule 501. Rule 501 states that accredited investors must have a net worth of over \$1M or annual income of over \$200,000. While most angels in our sample are accredited investors, we do find occasional unaccredited investors participating in deals.

and the overall angel investment in our sample.⁷ We also include as angels universities, governments, and other non-VC entities, including Brobeck itself. Since some of the investors we categorize as angels may be viewed as belonging to distinct classes that should be separated from the stereotypical individual angel investors, we later conduct robustness tests to ensure that these non-individual investors do not have a significant impact on any of our key results, and we find that our results are indeed robust. We provide much more detailed information on both the angels and VCs in our sample in Section V.

Figure 1 shows the distribution of investor composition for deals in our sample. The histogram in the top panel shows the share of investors who are angels. Thirty-two of our deals (18% of the 182 deals) rely solely on angel investments, 38 (21% of the total) have only venture capital investment, and the other 112 deals (61% of total) draw on both angel and VC investment, with a reasonably uniform distribution of the mix between the two groups of investors.

Note, however, that the bottom panel of Figure 1, which is based on dollars invested rather than number of investors, indicates that venture capitalists systematically invest more money. This suggests that deals involving VC investments are larger, which is indeed the case. Figure 2 shows the distribution of deal size, i.e. dollars invested in Series A deals, for three investor composition categories: angel-only, mixed, and VC-only deals. Angel-only deals are predominantly smaller deals, with a median of \$1.12 million, relative to the overall median of \$3.5 million for our whole sample of Series A deals. Mixed deals tend to be somewhat larger (median of \$4.49 million) than VC-only deals (median of \$3.53 million). While there are numerous VC-only and mixed deals with investment size below the overall sample median, only 3 of the 32 angel-only deals have investment size larger than the sample median. These general characteristics of our data suggest that there are five subsamples of our overall data that deserve closer scrutiny, as they may indicate distinctly different deal types in each category: three subsamples based on investor composition (angel-only, VC-only, and mixed deals), and two subsamples sorted on size (large and small deals).

IV Firm Characteristics

Table I reports means (standard deviations in parentheses) for numerous characteristics of the 182 firms in our overall sample, as well as across the five subsamples. We assess the representativeness of our overall sample by comparing the characteristics of our firms against those of 9,901 US-based firms with a first recorded investment occurring between 1993 and 2002 (our sample period) for firms founded between 1967 and 2002 (reflecting founding dates

⁷Some researchers such as Fenn and Liang (1998) specifically exclude family and friends from their definition of angels. Our general definition of angels, however, is intended to capture investors who are not professional managers of venture capital.

in our sample) that are recorded in the Thomson Financial Venture Economics database. We exclude deals labeled as buyout, acquisition, other or unknown. Out of the 182 deals in our sample, 111 also appear in the Venture Economics database (but without the full information to which we have access). We weight statistics based on the Venture Economics sample to reflect the (below described) over-representation of recent deals in our sample.

From Panel A, one can see that our sample has a locational bias consistent with Brobeck's geographical footprint, with a much higher concentration of deals associated with firms based in California (53% vs 36%) and Texas (21% vs 6.0%). In the "other states" category, 7% of the Brobeck firms are from Colorado, 8% are from the Northeast Corridor (Pennsylvania, New York and New England), and the remaining 11% are scattered in the Midwest, South, Mid-Atlantic, and Washington State, while over 20% of the Venture Economics deals are from the Northeast Corridor and only 2% are from Colorado. However, there are no statistically significant differences in location across the two size subsamples and the three investor composition subsamples.

We use the Venture Economic Industrial Classifications (VEIC) to identify industries, and classify the 71 deals from our sample that were not also in Venture Economics using information from the Brobeck corpus and the World Wide Web. We classify 73% of our sample firms as Information Technology firms, as compared to 76% for the Venture Economics firms. Another 12% of our sample firms are Medical/Health/Life Science companies versus 13% of the Venture Economics firms. The remainder of our firms are either non-high technology or unclassified. Overall, our sample firms are quite representative in terms of the concentration in technology and life science industries found for new ventures tracked by Venture Economics. Furthermore, there are no significant differences in industry classification across the size and investor composition subsamples.

In Panel B of Table I, we show that our sample over-represents deals from the most recent subperiod of our study. We do not weight the subperiod statistics from Venture Economics. Half of our Series A rounds occurred after March 2000 (when the Nasdaq index began its precipitous drop), as compared to 35% for the subset of Venture Economics firms we examine (with a comparable proportion during the boom period of 1998 to 2000). This may reflect a deliberate surge in Brobeck's business from 2000 to 2002, or alternatively, an increasing reliance on electronic record keeping. Note also that smaller deals are more concentrated in the earlier periods, which likely reflects the propensity to favor larger deals over time (in part due to the fact that deal size is in nominal dollars). However, we do not find any significant increasing or decreasing trends in the occurrence of angel-only or VC-only deals over time.

With respect to deal size, the mean investment size for Series A deals in our sample is \$6.14 Million, which is statistically smaller than the mean of \$7.15 Million for the Venture

Economics firms. While not shown in the table, key percentiles of the deal size distribution for the Brobeck firms (and Venture Economics firms in parenthesis) are: 25th percentile is \$1.49 Million (\$1.5 Million); median is \$3.50 million (\$3.89 Million); and 75th percentile is \$6.96 Million (\$8.0 Million), so there is a marked similarity between the low end of the distribution of deal size within our sample relative to the Venture Economics sample, but the right tail of the Venture Economics sample is longer. As was also shown in Figure 2, angel-only deals are much smaller than mixed deals. There is no statistically significant size difference between VC-only and mixed deals.⁸ Because we also have information regarding the fraction of each firm that is sold at the time of the Series A deal, we also can report that the average post-money valuation of firms in our sample is \$14.9 million, as compared to \$24.4 million in Venture Economics. This number is also smaller for angel only deals (\$6.1 million) versus either VC only or mixed deals (roughly 16.5 million for both groups).

In terms of age, our sample is overwhelmingly composed of firms that are true start-ups with very recent incorporation dates. The average age is 1.62 years (we can only identify incorporation dates for 79% of the firms in our sample). In contrast, firms experiencing Series A rounds in Venture Economics over the same time period have an average age of 3.14 (97% of firms have available data). Hence, it appears that Brobeck represented firms were somewhat less mature than Venture Economics firms. In the Venture Economics sample deal size and valuations are correlated with firm age, hence the difference in ages in the samples is consistent with the differences in deal size and post-money valuations. We also find that angel-only Series A deals occur even closer to the incorporation date, which is further consistent with their smaller size. The fact that Venture Economics does not track angel-only deals may also explain the higher average age for the Venture Economics firms relative to the firms in our sample.

Our sample is thus quite representative relative to firms with Series A deals in the Venture Economics database in terms of industry, but there are also some systematic differences with regards to timing, size, age and location. Biases associated with sample selection could affect our results if, for example, there are systematic differences in control rights between the East and West coasts, as suggested by Gupta (2000), or changes in the structure of deals following the peak in new technology venture creation in 2000. We thus control for firm characteristics in the multivariate regressions we present later, both to ensure that the unique characteristics of our sample do not drive any of our results, as well as to see whether the cross-sectional variation in these characteristics within our sample are systematically related to the structure of deals and company success.

Panel B of Table I also shows three additional firm characteristics for which there are

⁸In our sample, the mean investment by an angel is \$174,000, while the median investment size is \$27,100, thus representing a highly skewed distribution which reflects the diverse set of investors captured in our angel category.

no comparable Venture Economics statistics. We find that most firms did not achieve milestones prior to funding, with only 13% having products and 10% being involved in strategic alliances. These findings are consistent with the young age of our firms, and we find that the comparatively younger angel-only firms have even fewer strategic alliances. Finally, for the firms in our sample, Brobeck represented the company 62% of the time, almost twice as often as they represented one or more of the investors for the deals in our sample (and this is relatively consistent across our subsamples).

V Investor Characteristics

We now provide more detailed information regarding the investors and investor composition of our deals. Panel A of Table II shows statistics regarding the pre-Series A ownership distribution. We obtain this information from the Series A capitalization tables, but the archive also contains explicit information describing a pre-Series A financing using common shares in about a quarter of the cases (as shown in the last row of Panel A). Not surprisingly, founders retain most of the ownership of the company (approximately 90%) prior to the infusion of significant capital in the Series A round, with statistically insignificant differences in founder ownership across subsamples. As we report earlier, there are on average 2.78 founders per firm, but Panel A shows that smaller firms and firms that have only angel investors in the Series A round have fewer founders on average. Perhaps smaller scale firms require fewer principals to achieve the firm’s objectives, but it could also be that companies with fewer founders are unable to attract the same level as capital as firms with deeper management teams. As expected, the pre-Series A investment largely comes from angels (7.6% compared to 10.5% non-founder ownership overall), although there is some VC ownership of pre-Series A common shares. Deals with pre-Series A VC ownership are most common in the sample of deals that subsequently have a VC-only Series A round.⁹ Apparently some VCs find it attractive to enter in an early seed round, despite holding common shares with weak control rights. This might be done to provide more direct access to favorable investments in subsequent, more exclusive, financing rounds.

Panel B of Table II provides information related to the Series A round investors. The first two rows summarize key statistics reflected previously in Figures 1 and 2, most prominently that only 3 of the 91 large deals are angel-only deals, while 29 of the 91 small deals do not involve any VCs. This might reflect that VCs seek economies of scale in their investment

⁹All of the ownership percentages reported are based on shares issued in the seed and Series A round, rather than fully diluted shares that take into account warrants and options outstanding. To ensure that dilution does not have an impact on our regression results reported below, we account for the existence of options and warrants, and for their dilutive effect (e.g., on the fraction of ownership sold in a Series A round), and find that our results are robust to these controls.

and monitoring activities and thus are less likely to invest in smaller companies. However, it could also be that founders who are able to grow their firms more slowly and wish to minimize ownership dilution will seek out angel investors instead of VCs. Since angels have tighter budget constraints than VCs, angel-only deals will be smaller.

In terms of percentage ownership, founders sell off on average almost half of their firm (46.2%) to investors during the Series A round, and somewhat more in larger deals (56.2%). Founders rarely invest money in their own firms in a Series A round (less than .1% of the total investment). In mixed deals, 23.4% of the investment comes from angels, and the balance from VCs. Finally, Panel B shows that, on average, 12.8 angels invest in angel-only deals, 4.8 VCs invest in VC-only deals, and a total of 14.5 investors participate in mixed-deals. Since angels typically do not have as much capital as VC firms, more angel investors are needed to fund an angel-only round. Mixed deals are larger, and thus should be expected to have more investors. We also find that smaller deals have fewer investors than larger deals, which is also to be expected.

Additional investor characteristics are shown in Panel C of Table II. The post-money ownership figures follow from the pre-Series A and Series-A ownership fractions of the different investors, together with the fraction of the company sold in the Series A round. Founders retain majority ownership of their company following the Series-A round only in angel-only deals and small deals. Of course, as we shall see later, this does not necessarily translate into retaining full control of the firms given that founders hold common shares while outside investors predominantly hold preferred shares with more powerful control rights, including board seats.

We find that only 9.3% of angels investing in Series A deals had previously invested in the same companies, though this proportion is twice as high for angel-only deals. It is even more uncommon to see the same VCs participating in both pre-Series A and Series-A rounds for a given company (7.1% on average). Panel C also shows that Brobeck invested in approximately one quarter of the deals it handled (either in common or preferred shares), and more so in the larger deals.

Finally, in Panel D, we examine proximity measures based on the zip code of investors relative to the zip codes of the corporate headquarters. We use an automated Mapquest query (we only observe zip codes for investors from 136 of the sample firms). We find that investors were generally in similar geographic locales as the firms they invested in: 60% were within 3 hours of driving time from the firms they invested in, and 18% were within the same zip code. Investors are closer to the firm in smaller deals, and most likely to be in the same zip code for angel-only deals.¹⁰

¹⁰We also consider (unreported) probit models examining the likelihood that a given deal will be angel-only and VC-only financed given its other characteristics, and we confirm the univariate results reported above.

Given the restrictions we face in the use of our data, there is limited additional information that we can provide to better characterize the angels in our sample. For instance, we are unable to conduct searches that would provide additional information regarding angels’ backgrounds (education, and technical and managerial experience), their prior investment experience, their age and wealth, and their relationships to the founders, and other angels and VCs that invest with them in the deals. The only information we can provide that is less aggregated is a summary of angel types, which we show in Figure 3. Approximately 70% of investors clearly appear as individuals in the records documenting the Series A rounds. We believe that most of the 10% of investors that are categorized as “small company” are also individuals, investing through corporate vehicles for tax and estate-planning purposes. Together, these two categories make up over 80% of the dollars invested by angels in the mixed and angel only Series A deals, and even a larger fraction in the angel-only deals. “Companies” and “others” (which include universities, non-profits, and governments) play relatively minor roles relative to individual investors. Note also that while Brobeck invested in a quarter of the deals, their overall stake (dollar weighted participation) in these companies was very small.

Since most of the VCs investing in Brobeck deals are included in the Venture Economics database, we can provide a more in-depth comparison of the VCs that invest in the 150 Brobeck deals involving VCs relative to the other VCs tracked by Venture Economics. Table III documents various attributes of these VC firms, and highlights any differences between VCs investing in small versus large deals, or in VC-only versus mixed deals. All data, except the centrality measures, are obtained from the Venture Economics database.¹¹ For each private equity fund that invested in one of our sample deals, we aggregate the fund-level information to the VC firm level (and identify this as a “Brobeck VC Firm”). For the universe of Venture Economics VC firms, we exclude firms whose last investment occurred prior to 1993 or whose first investment occurred after 2002 (i.e. outside of our sample period), which yields 5,585 “Non-Brobeck” VC firms.

Panel A of Table III shows that VCs participating in Brobeck deals are more likely to manage US-based funds, in particular California-based funds. They are also more likely to manage early stage funds, but not seed stage funds. In addition, these private equity managers are more likely to manage VC funds and less likely to manage buyout funds. Private equity firms investing in VC-only deals are more likely to manage US funds and with slightly less of an early stage VC focus, as compared to those investing in mixed deals in our sample (while VCs in small and large deals are fairly similar across all these dimensions). We find that Brobeck PE firms are older, and particularly those investing in

¹¹We thank Mikołaj Jan Piskorski for sharing centrality measures based on Venture Economics data. Piskorski and Anand (2007) calculate eigenvector centrality (Bonacich 1972) through 1999. We matched the 1999 centrality measures to VC firms in our sample.

VC-only deals.¹²

Because age is likely related to long-term success as well as greater VC experience, it appears that VC firms investing in Brobeck deals have higher prestige. Panel B of Table III includes other variables that may proxy for prestige. For example, we find that VC firms that invest in Brobeck deals have a higher incidence of IPOs and Mergers across all of the companies they invested in through all of their funds. We also find that Brobeck PE firms have raised more venture funds, have managed more capital (per fund and overall), and have a higher centrality measure. While VCs participating in large vs small Brobeck deals do not differ across these dimensions, those investing in VC-only deals in our sample have higher success through liquidity events, more funds under management, and more total capital raised than those in mixed deals. Overall, this suggests that VC firms investing in Brobeck deals, and particularly in deals where there are no angels, appear to have high prestige. This is consistent with our belief that Brobeck’s reputation allowed it to attract higher quality clients – both more prominent VCs, as well as higher quality firms associated with these investments.

VI Deal Characteristics

We turn now to specifics about deal structure, including the types of securities issued and the terms involved. With three exceptions, preferred stock was sold in all Series A rounds in our sample. Table IV shows that warrants were also sold in 15% of the rounds, and more so in the smaller deals (20%). Employee option plans were set up in 69% of the rounds, and were more prevalent in the large deals (80% of the time) than in the small deals (only 57% of the time), perhaps due to the need to attract a larger and more disperse talent pool for these larger firms. Interestingly, we observe multiple within-round closings in 45% of the deals. This phenomenon, in which investors purchase more shares of the company at identical terms over a period of time, is referred to by Kaplan and Stromberg (2003) as “ex-ante staging”, and appears to be much less prevalent for VC-only deals. This might be due to the tighter control held by the few VC investors in these deals, and the deeper pockets of these VCs, allowing them to commit to immediate funding along with tighter terms. This might also lead to a more easily structured subsequent Series B round as soon as it is required and merited.¹³ (When VC-only deals do have multiple closings, the time from the first to the second closing is somewhat longer, but not statistically significantly

¹²We have also conducted a multivariate analysis predicting whether a PE firm becomes affiliated with a Brobeck Series A deal, and this analysis yields similar conclusions to those indicated by the univariate statistics.

¹³Although this phenomenon is interesting, we can report that the presence of multiple closings correlates little with outcomes.

so). We find that the average time between first and second closings is 154 days, though it is much longer (198 days on average) for large deals.

One of the interesting facets of our data is that we are able to observe the number of hours billed by attorneys for each deal. Panel A of Table IV shows that the Series A deals resulted in an average of 169 billed hours per deal. We find that larger deals lead to more billed hours, as do mixed deals (and VC-only deals) relative to angel-only deals. Since one might not expect that the mere scale of a deal should be related to the amount of legal work, we surmise that the higher billed hours of larger deals may reflect that these deals are more likely to involve VCs, who may demand more complex contract terms and be more persistent in negotiating the terms of the deal.

To explore this issue further, we perform (unreported) multivariate regressions of (the log of) billed hours against a number of factors that might contribute to the complexity of the deal, such as investor composition, number of investors, fraction of the firm sold, presence of warrants and option plans, number of closings, and time, industry and location dummies. We do find evidence that including warrants and having multiple closings leads to a higher number of billed hours, as does the presence of VCs in the deal, consistent with the notion that more complex and/or contentious deals lead to higher billed hours.¹⁴ However, we also find that size continues to be significant even after controlling for these factors, at least within the subsample of larger firms. This suggests that there may be some other determinants of complexity that are also related to size, perhaps including greater potential reputation capital and legal risk for larger companies (otherwise, there are less benign explanations for why larger clients are associated with higher billed hours).

In Panel B of Table IV, we summarize the rights associated with the Series A preferred stock based on a review of the securities purchase agreements for all the firms in our sample. Gompers (1997) and Kaplan and Stromberg (2003) document that preferred stock is typically differentiated from common stock through superior cashflow rights, voting rights, board representation, liquidation rights, redemption rights, and anti-dilution provisions. Moreover, investment deals are often supplemented by a requirement that the founder's stock be subject to vesting requirements. Consistent with these existing studies, we find substantial variation in the existence and extent of cash flow and control rights, particularly liquidation preferences, redemption rights, cumulative dividend rights, and seats on the board of directors.¹⁵

We classify board seats as being assigned to common shareholders using a two step

¹⁴We also find that financing rounds for California firms have more billed hours, as do small deals conducted after 1998. Smaller firms which sell larger fractions of their firms have lower billed hours, perhaps due to the presence of some less experienced entrepreneurs who give away larger stakes of their company while not negotiating as aggressively on deal terms.

¹⁵Practitioners classify these terms as investor friendly, entrepreneur friendly or neutral (Wilmerding 2003).

procedure. First, in many cases, the documents identified which board seats were to be designated by common shareholders or Series A shareholders. Second, for cases in which seat ownership was not specified by share class, but individuals were, we used a fuzzy name matching algorithm to link specific board members to specific investors. As shown in Table IV, common and preferred shareholders have roughly the same representation (46% versus 54%) on the boards of companies across our whole sample. Not surprisingly, firms with VC-only and mixed Series A deals have more preferred board seats, as do larger deals, likely due to the larger size and higher concentration of VC participation in those deals.

Turning to cashflow rights, preferred shareholders sometimes have stronger residual cashflow claims in the form of cumulative dividend rights as opposed to regular dividend rights. With regular dividends, an annual payment, often a percentage of investment (generally 8%), is paid conditional on a positive shareholder vote. With cumulative dividend rights, this amount accumulates each year. The cumulative dividend clause is included in relatively few Series A deals (approximately 9% of our deals), and never appears when the deal has only angel investors. Cumulative dividends are seen as an investor-friendly term, and provide a strong incentive for the firm to accelerate to a successful exit event. We find that the term is most prevalent in VC-only deals, consistent with the notion that VCs are less patient investors and that they can exert stronger influence on deal terms when they invest on their own.

The variable *Liquidation* is a dummy variable indicating whether preferred shareholders have special liquidation cashflow rights going beyond their initial investment. A value of zero indicates that, after preferred shareholders receive their initial investment, all remaining proceeds upon liquidation go to common shareholders. The dummy variable *Cap on Common*, which takes a value of one for only two deals, indicates that common liquidation amounts are capped. When the *Liquidation* dummy takes a value of one, preferred shareholders have cashflow rights beyond their initial investment, and in all cases but two, they share these additional cashflows equally with common shareholders (in the two cases, all remaining proceeds go to preferred shareholders up to a specified cap). The mean liquidation dummy of 0.42 indicates that 42% of our sample deals provided strong liquidation rights to Series A investors. The dummy variable *Cap on Preferred*'s mean of 0.47 indicates that 47% of these stricter deals also had an upper limit on the amount that can be paid to preferred shareholders. Because many preferred liquidation rights are capped, it is important to note that when the company value upon liquidation is sufficiently high, preferred stockholders waive their liquidation rights, and convert their stock to common. Note that the liquidation preference specified in angel-only deals is much less favorable towards the investors, indicating that while angels enjoy some benefits of ownership of preferred, rather than common, shares, their control rights are still relatively weak.

Finally, we find that preferred shareholders have the right to redeem their shares at will in about one quarter of our deals, typically after a period of time and usually conditional on a Series A majority or super-majority vote. Such a right would be invoked when a firm is not performing well, and is considered to be an investor-friendly term. Once again, angels investing on their own appear to be more supportive of the founders, and seldom demand such a redemption right in their stock purchase agreements.

Given that Kaplan and Stromberg (2003) (KS) examine cashflow and control rights for a similar number of deals, but from a different source and an earlier time period, it is useful to provide a quick comparison of the terms of our respective deals. Our samples differ in other important respects. Our data represent 182 series A investments in 182 portfolio firms made by 342 distinct venture capital firms. In contrast, KS analyze 213 investments (of which 98 are series A) in 119 portfolio firms made by 14 VC firms and their affiliates (KS do not report the total number of distinct VCs who invested in the deals in their sample). While they do not distinguish between pure-VC and mixed deals, KS find that non-VCs own, on average, a 20% (non-diluted) stake in investment targets following series A rounds, which compares to the 16% for mixed deals in our sample. In general, the deals in our sample involve weaker control right provisions.¹⁶ For example, we find that only 8.8% of deals involve cumulative dividend rights, which is considerably below the frequency of 43.8% in KS. We also find that 23.6% of our deals have redemption features, compared to 78.7% reported in KS. (Interestingly, KS reported that 12.9% could redeem shares at fair market value, which is only slightly lower than the 16.4% in our sample). Finally, we find that 85% of our deals include anti-dilution provisions, with the weighted average method used in 92% of those cases, similar to the 95% of deals in KS that include anti-dilution protection, and the 78% of them that use the weighted average method.¹⁷ The differences between our respective samples likely reflect the stage of the deals we analyze, and the presence of angel-only deals in our sample.¹⁸

Table V reports the results of probit models predicting the likelihood of investor-friendly liquidation rights and redemption privileges. Table VI reports the results of a probit model predicting the occurrence of cumulative dividend rights, and an OLS model predicting the fraction of board seats allocated to common shareholders. All independent variables are

¹⁶It is difficult to compare the success rates of two samples, as KS do not report outcomes as hazards which would allow comparison of the likelihood of a given outcome.

¹⁷We do not focus on anti-dilution provisions in our study given that there is little cross-sectional variation across the deals.

¹⁸Gompers (1997) notes certain characteristics of his sample of fifty VC private placement agreements. These appear consistent with our sample. For instance, 51.4% of board seats are controlled by venture investors, which is slightly more than the 49.3% we find for the mixed deals in our sample, and slightly less than the 57.2% we find for VC-only deals. However, redemption rights are found in 68% of the deals in Gompers' sample, which is more in line with KS than with our sample, again likely reflecting that their sample includes more later-stage rounds.

standardized (except dummy variables), and we report marginal effects for all probit models in order to give our reported coefficients simple economic interpretations (how much one standard deviation of a given variable impacts the dependent variable).

Table V and Table VI both illustrate that angel investors are associated with more founder friendly deal terms. In particular, angel-only status implies a 31% lower likelihood of having strong liquidation privileges for Series A investors, and a 20% reduced likelihood of having redemption features. In contrast, a larger VC share of the Series A round is associated with a higher likelihood of both liquidation and redemption rights. These results are highly significant at the 1% or 5% level. Both liquidation rights and redemption rights, when in place, grant valuable rights to Series A investors generally at the cost of common shareholders including the founder. The negative relationship between angel investors and Series A control rights is consistent with a founder preference for angels over VC investors.

Table V also shows that strict liquidation privileges became 39% more likely following the collapse of the internet bubble (March 2000), especially for larger firms (a stunning 61% more likely). This supports the notion that start-up financing became more stringent as investors were less willing to invest in risky firms following these events. Interestingly, deals in which Brobeck invested had stronger liquidation rights, suggesting that they either encouraged terms that were more investor-friendly, or they were more likely to invest when terms appeared to be more favorable to investors. Redemption rights appear to be less frequent in deals involving Californian companies.

Table VI shows that investor composition is generally unrelated to whether or not cumulative dividends are specified in the securities purchase agreement. However, we find that investors in firms that previously announced product releases (i.e., mature firms) are roughly 17% more likely to seek cumulative dividend rights. This finding is consistent with dividends only being relevant when firms generate positive cashflows, as the ultimate use of the cash received from future sales is material only when sales actually exist.

We find some evidence, significant at the 10% level for the whole sample, and almost significant for smaller firms, that angel-only financings cede 17% to 20% greater board control to common shareholders. The table also shows, intuitively, that common shareholders receive greater board control (roughly 11% more per standard deviation) when a smaller fraction of the firm is being sold. Biotechnology firms are associated with 24% to 27% more board control for common shareholders, especially for smaller deals. This might be due to the more knowledge-intensive nature of this business.

VII Outcomes

In Table VII, we provide some descriptive statistics regarding the outcomes of the 182 firms in our sample as compared to 9,902 firms in Venture Economics that recorded an initial financing during the comparable 1993-2002 time period. We further condition the Venture Economics comparison sample on US-based venture capital investment targets founded after 1967 with the first investment not labeled as buyout, acquisition, other or unknown. Outcome variables of the Venture Economics sample are as reported in that database, but weighted to reflect the distribution of deal origination dates in the Brobeck sample. We identify Mergers and IPOs in our sample through archival sources such as press releases, as does Venture Economics for their universe of firms.¹⁹ Survival for our firms is defined as the firm still being an ongoing private concern, and an independent company, as of March 2008. This status is based on the web and other public sources. “Active” survival means that the firm also issued at least one press release (in Lexis/Nexis) between January 2005 and March 2008 (surviving firms are otherwise classified as “inactive”).²⁰ Failure for firms in our sample indicates that the firm is not surviving and did not experience a positive liquidity event. Outcome variables for the Venture Economics sample are as reported in that database. Since firm failure is often a silent event, only liquidity events are reported reliably in Venture Economics. Finally, we use Venture Economics to identify which of our firms received a subsequent round of financing involving at least one VC investor.

The success of the firms in our sample is as good, and in the case of mergers better, than that of the Venture Economics firms. In our sample, 31% experience a successful liquidity event (Merger or IPO), 28% are ongoing surviving firms, and the remaining 41% are failures. The only statistically significant difference between the figures shown in Table VII for our sample and the Venture Economics data is that the incidence of Mergers for our sample is approximately 50% higher (26%) than that for the Venture Economics firms (17%). Looking across the different subsamples in Table VII, there are a number of statistically significant differences in failure (larger and angel-only companies have lower incidences of failure) and in survival (angel-only are more likely to survive, though some of this is explained by a higher incidence of “inactive” survival). We will shortly examine these differences more carefully through multivariate regressions.

Finally, note that roughly half of the firms in our sample and three-quarters of those in

¹⁹Since we are unable to accurately value companies that have been acquired or continue as private companies, we cannot ascertain investors returns. Thus, we focus on determining the success of the companies in terms of survival and profitable exits, rather than measuring the magnitude of investment returns.

²⁰We also examine how recently websites were updated (using archive.org). While it is possible that some firms may wish to “fly under the radar” by not making press releases and not keeping an updated website, we expect that this is unlikely given that visibility has a positive effect on the ability to raise capital in private and public markets.

the Venture Economics have a subsequent financing round documented in Venture Economics (and thus involving at least one VC), but for angel-only firms, the fraction is much lower. Since it is known that the majority of companies having an IPO do not have VC backing, it is possible that many of the firms in our sample with angel-only Series A rounds simply continue to eschew VC financing over time. However, in unreported multivariate probit regressions, we find that while the incidence of future VC-backed financing is negatively related to angel-only Series A financing, the relationship is not statistically significant upon controlling for other factors. We find that the incidence of future VC financing is higher when the fraction sold at the time of the Series A round is higher (potentially indicating a more capital intensive business), the firm is older at the time of the Series A round, there are no product releases before the Series A round (suggesting perhaps that the firm is not able to self-finance quite as quickly), and the firm is not in the IT industry.

Our first multivariate regression test is based on simple probit models, where the dependent variable is one for Merger/IPO firms, or for Surviving firms (includes active and inactive survival, and Merger/IPO firms). Table VIII displays the marginal effects for probit models for the full sample as well as the large and small deal subsamples. We find that firms with angel-only financed Series A deals are 36% more likely to survive relative to other firms, and 50% more likely to survive among the smaller deals (both at the 1% significance level).²¹

In Table IX, we report results based on an ordered probit model in which we assume that a liquidity event is better than survival, which in turn is preferable to failure. We are unable to present marginal effects here as this model has more than one outcome level. Hence, although significance levels for the ordered probit model are relevant, the coefficients do not have a straightforward interpretation. In the first ordered probit specification, we find that firms with angel-only backed deals are more likely to outperform. However, it is important to note that if VCs are more likely to shut down marginally performing firms, then the survival of angel backed firms and VC backed firms may not be strictly comparable (Jovanovic and Szentes 2007). Hence, as an alternative test, we use an activity adjusted outcome variable where “inactive” survival was reclassified as failure rather than survival. In this case, firms with angel-only deals are no more likely to outperform deals with VC-backing. This holds true for the small deal subsample as well. In contrast, the strong link

²¹We conduct many robustness checks to ensure that our categorization of investors (e.g. for angel investment groups, corporations, and Brobeck itself) does not affect our results, and it does not. In addition, we examine the impact of using cutoffs other than 100% when categorizing deals as angel-only or VC-only to see whether our results depend on the strict purity investor identification. Since the lowest VC share in the mixed deal group is 26.3%, there are no “near angel-only deals”. In contrast, there are a number of mixed deals that have relatively minor angel participation (“near VC-only deals”); for instance, there are 62 deals that have at least 95% VC share Series A participation, which is dramatically larger than the 38 that are pure VC-only deals. Hence, there is some clustering near the VC-only extreme. In examining robustness to these less stringent definitions of “VC-only”, we find only minor effects to our results.

between firms with VC-only financing and positive outcomes holds up for the whole sample as well as for the large deal subsample. This holds true regardless of whether inactive firms are reclassified as failures.

In sum, our results suggest that firms with VC-only Series A financing outperform those with mixed investor composition. We also find that companies with angel-only Series A financing are not less successful than the other companies in our sample. There are several possible explanations for the success of VC-only financed firms in Series A deals. First, based on the popular certification rationale for the superior performance of VC backed IPOs (Megginson and Weiss 1991), one might surmise that the somewhat stronger reputation of VCs involved in VC-only deals relative to those in mixed deals might explain our result. To examine this hypothesis more directly, we examine (in unreported regressions) whether the prestige of the VCs investing in a company is significantly positively related to outcome, and whether the VC-only variable is no longer significant once prestige is controlled for.²² Neither of these predictions are supported, thus lending no support to the certification explanation.

To better understand the role of certification in our sample, it is very important to note that the difference in prestige between VCs investing in VC-only and mixed deals is rather small relative to the very large difference in prestige between VCs investing in Brobeck deals relative to the non-Brobeck VCs in Venture Economics (as shown in Table III). Thus, the VCs in our sample are broadly prestigious and should be expected to carefully allocate their funds under management: when they perceive a good deal, they should invest more and use the power of their prestigious syndicate to keep angels out of the deal; in contrast, they should invest less in companies in which they have lower confidence, and companies seeking to completely fund their Series A rounds must then obtain angel financing. Thus, the weaker performance of companies with mixed deals relative to those with VC-only deals might reflect that angels face some adverse selection in Series A financings when strong VC syndicates are present.

A possible third explanation for the superior performance of VC-only deals, which is motivated by discussions with practicing attorneys, is that more experienced founders and VCs may deliberately exclude angels from deals as they can complicate negotiations, and potentially increase the risk of future litigation. Angel participation in the Series A round could also increase the complexity of future rounds. Finally, VCs who increase the probability of company success through active management may want to prevent angels from free-riding on their costly managerial efforts.

²²We use a variety of different prestige variables constructed from the statistics in Table III, as well as an index based on these measures. The VC prestige for a deal is based on a dollar weighted average or an equal weighted average of the prestige scores for the VCs investing in each of the 150 firms' Series A deals in which there is non-zero VC investment.

VIII Conclusion

This experimental project stemming from the proposed Brobeck archive provides a unique opportunity to better understand the role of angels in financing startups. Two unique features of our sample allow us to explore differences between VCs and angels on the margin in an environment where both are competitive financing choices. First, our sample’s investor mix has a wide distribution ranging from angel-only deals to VC-only deals. Second, entrepreneurs in these deals have a meaningful choice between both investor types. This allows us to identify the relationship between investor composition, deal terms, and outcomes.

We find that angel participation results in more entrepreneur-friendly deal terms. When angels invest on their own, the companies do not have fewer liquidity events than when VCs invest in deals. Angel only deals are more likely to survive, though many surviving firms are inactive. This suggests that angels are less likely to liquidate firms than VCs. These results are material for smaller deals, where angel only financing is feasible. When deals are larger, and VC participation is necessary, then angel participation is associated with lower success. One interpretation is that larger deal size adds power to VC syndicates, and these powerful syndicates might attempt to block other investors from higher quality deals, resulting in adverse selection for angels in larger mixed deals. This result might also be due to experienced VCs and founders preferring cleaner deals that avoid potential agency problems, and other complexities due to angel involvement. Furthermore, VCs who expect to be more involved in a company’s management might also wish to exclude angels who would otherwise free ride on their efforts.

Overall, our paper presents numerous findings that provide much insight into how angels invest in new ventures. Some key findings run contrary to conventional beliefs about angel investors. Although some of our findings might be specific to Series A deals, and to companies of higher quality (given Brobeck’s involvement and the high prestige of the VCs in our samples), our results should help to broaden our understanding of how angels participate in new venture financing, and will hopefully motivate future research of angel investments.

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Figure 1: **Angel share of deals by number of investors and dollars.**

The figure depicts how deals vary in their investor composition. Top panel: frequency of different investor compositions (angels and VCs), unweighted by investment amounts. Bottom panel: frequency of different investor compositions weighted by dollars invested. Both graphs are based on the entire sample (182 firms).

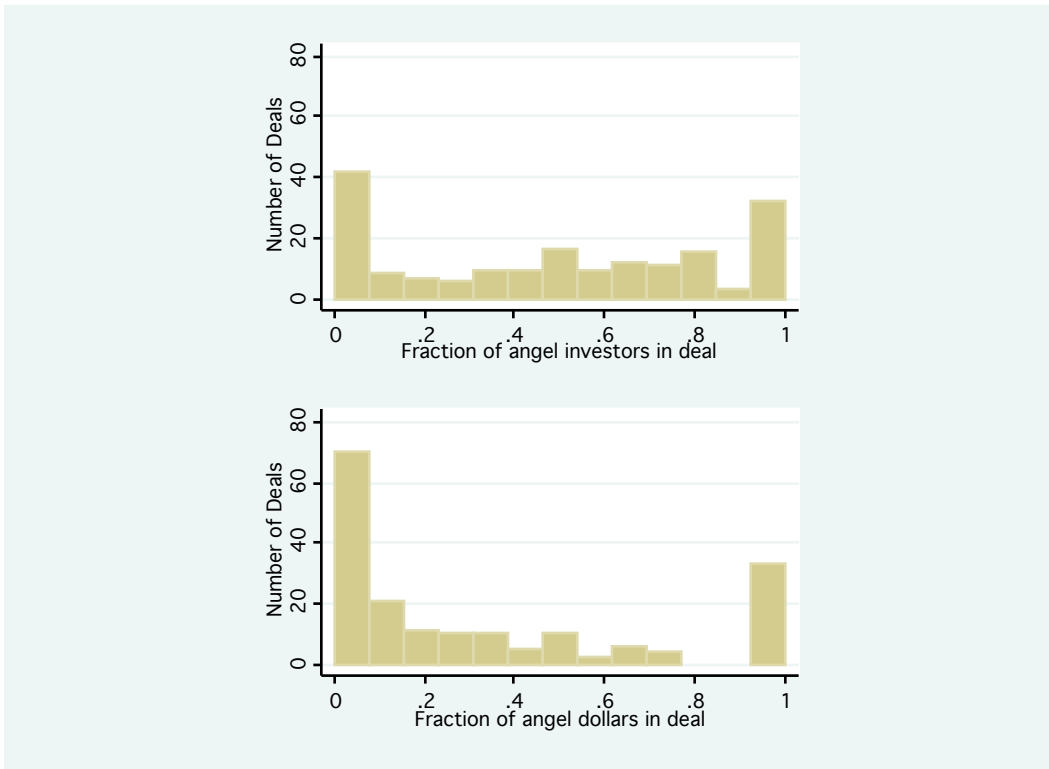


Figure 2: Investment size distribution by investor composition

The figure depicts the distribution of investment size for 33 deals where only angels participated (angel-only deals), 111 deals where both angels and VCs participated (mixed deals) and 38 deals in which only VCs participated (VC-only deals). The size of the deal is measured in millions of dollars. The distribution of the 20th, 40th, 60th, 80th and 90th percentiles are noted by 20, 40, 60, 80 and 90 respectively. The number of deals of magnitude above or below the 50th percentile of all deals for each of the investor composition groups appears to either side of the vertical line in the middle of the figure.

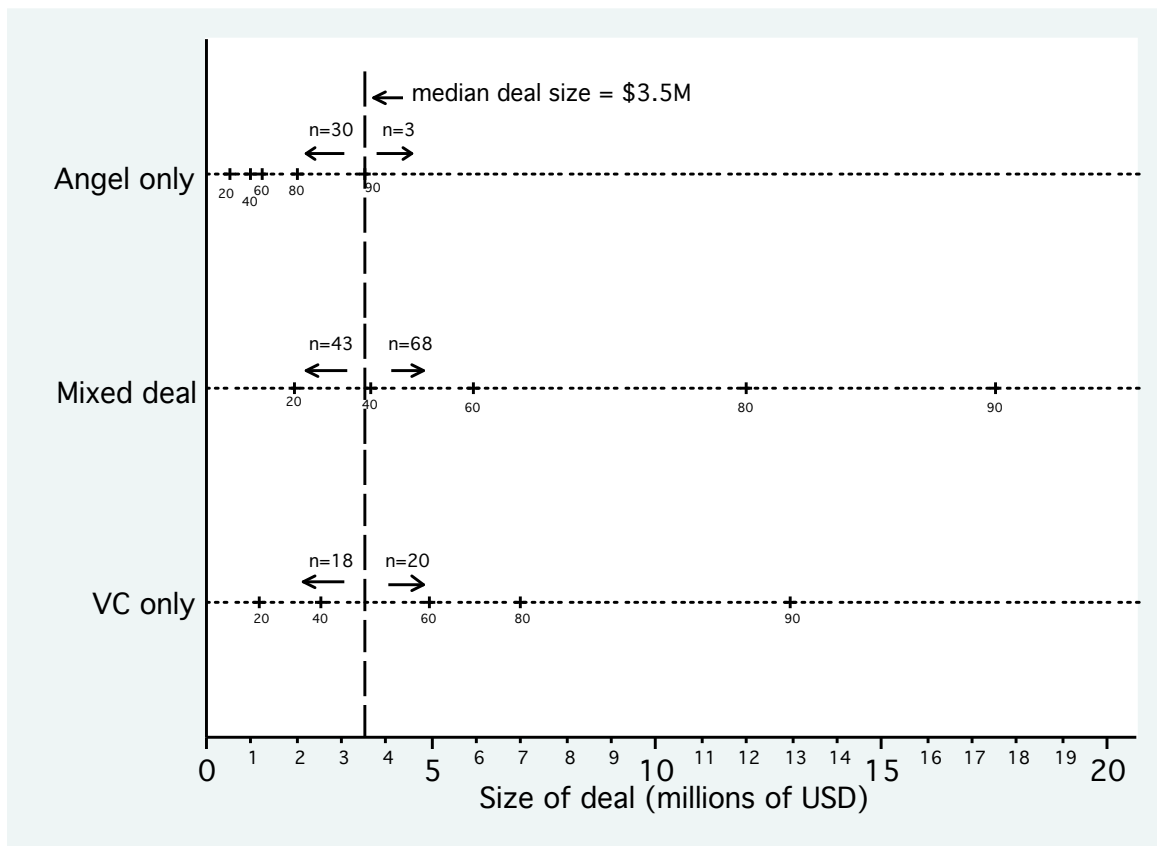


Figure 3: **Composition of Angels**

The figure depicts the average frequency of angel investor types using a deal weighted average (over all deals having at least one angel, angel only deals, and mixed deals) and a dollar weighted average over all deals having at least one angel. A person is an individual. A company is an investor that is incorporated. A small company is an investor that is not incorporated, for example, investors containing the suffixes LLC, LLP or LTD. Angels categorized as others include universities, non-profit organizations, government, and institutions. Unknown are ambiguous investors that we were not able to classify.

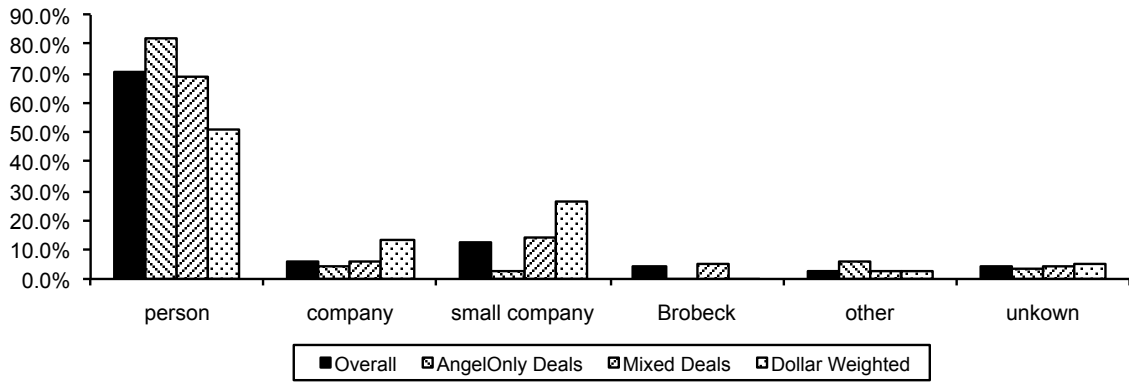


Table I: Summary Statistics for Firms in Sample

The table displays mean characteristics with standard deviations in parentheses. Period dummies reflect date of first closing. Demographics and basic deal information are in Panels A and B. Firm industry classifications are based upon Thomson Financial Venture Economic's proprietary industrial codes (VEIC). *IT Firm* indicates an information technology firm. *Medical/Bio-Tech Firm* indicates firms classified as "Medical/Health/Life Sciences". For deals that did not appear in Venture Economics, classifications were determined according to Brobeck records and public archival sources. State dummies are based on location of headquarters. *Size* (and its natural log *Log Size*) and *Post-Money Valuation* are measured based on investment dollars. *Firm Age* is the number of years between the firm's founding date and the date its Series A preferred stock issue closes (computed as number of days divided by 365.25). *Strategic Alliance* and *Product Release* indicate whether the firm issued a press release describing an alliance or product prior to the observed round. *Company matter* takes the value of 1 if Brobeck did not label the representation "Venture Financing/Investor Side".

The Venture Economics sample includes US-based private equity investment targets founded after 1967 with the first investment between 1993 and 2002. Private Equity disbursements labeled as buyout, acquisition, other or unknown were eliminated. Statistics of the Venture Economics sample are weighted to reflect the distribution of deal origination dates in the Brobeck sample, period dummies notwithstanding.

Variable	All Deals		Small Deals		Large Deals		Angel Only Deals		VC Only Deals		Mixed Deals		Venture Economics Deals	
Panel A: Demographics														
California Dummy	0.529 (0.50)	0.587 (0.49)	0.479 (0.50)	0.565 (0.50)	0.423 (0.50)	0.552 (0.50)	0.360 (0.48) ^a							
Texas Dummy	0.206 (0.40)	0.190 (0.39)	0.219 (0.41)	0.217 (0.42)	0.231 (0.43)	0.195 (0.39)	0.060 (0.24) ^a							
Other States Dummy	0.265 (0.44)	0.222 (0.41)	0.301 (0.46)	0.217 (0.42)	0.346 (0.48)	0.253 (0.43)	0.581 (0.49) ^a							
IT Industry	0.731 (0.44)	0.670 (0.47) ^b	0.791 (0.40) ^b	0.750 (0.44)	0.658 (0.48)	0.750 (0.43)	0.757 (0.43)							
Medical/Bio-Tech Industry	0.115 (0.32)	0.121 (0.32)	0.110 (0.31)	0.156 (0.36)	0.158 (0.37)	0.089 (0.28)	0.127 (0.33)							
Panel B: Firm Characteristics at time of Series A financing														
Pre 1998 Dummy	0.165 (0.37)	0.231 (0.42) ^a	0.099 (0.30) ^a	0.156 (0.36)	0.211 (0.41)	0.152 (0.36)	0.272 (0.44) ^a							
1998 to 3/2000 Dummy	0.341 (0.47)	0.429 (0.49) ^a	0.253 (0.43) ^a	0.406 (0.49)	0.289 (0.46)	0.339 (0.47)	0.384 (0.49)							
Post 3/2000 Dummy	0.495 (0.50)	0.341 (0.47) ^a	0.648 (0.48) ^a	0.438 (0.50)	0.500 (0.50)	0.509 (0.50)	0.345 (0.48) ^a							
Size (Series A Millions)	6.139 (7.92)	1.554 (0.90) ^a	10.72 (9.11) ^a	1.633 (1.53) ^a	5.756 (8.93)	7.556 (8.19)	7.15 (12.15) ^{b,*}							
Log Deal Size	14.98 (1.20)	14.02 (0.77) ^a	15.94 (0.66) ^a	13.94 (0.87) ^a	14.98 (1.07)	15.27 (1.16)	15.08 (1.22) [*]							
Post Money Valuation (Millions)	14.90 (22.9)	4.951 (3.27) ^a	24.86 (29.1) ^a	6.07 (4.64) ^a	16.15 (23.8)	17.00 (25.2)	24.4 (42.1) ^{a,†}							
Firm Age (years)	1.623 (3.96)	1.560 (4.65)	1.674 (3.34)	0.790 (1.13) ^b	1.831 (3.60)	1.702 (4.39)	3.14 (4.7) ^{a,‡}							
% Missing Age Data	0.209 (0.40)	0.297 (0.45) ^a	0.121 (0.32) ^a	0.469 (0.50) ^a	0.158 (0.37)	0.152 (0.36)	0.032 (0.18) ^a							
Strategic Alliance	0.104 (0.30)	0.066 (0.25) ^b	0.143 (0.35) ^b	0.031 (0.17) ^a	0.105 (0.31)	0.125 (0.33)								
Product Release	0.126 (0.33)	0.110 (0.31)	0.143 (0.35)	0.125 (0.33)	0.158 (0.37)	0.116 (0.32)								
Company Matter	0.621 (0.48)	0.648 (0.48)	0.593 (0.49)	0.719 (0.45)	0.500 (0.50)	0.634 (0.48)								
# Firms in Group	182	91	91	32	38	112	9901							

* a, b, and c denote significant differences in means at the 1%, 5%, and 10% levels, respectively. The footnotes depicted in columns 2 and 3 are based on tests of differences in means across small versus large firms (column 2 vs 3). The footnotes depicted in column 4 (angel only) are based on tests of angel only deals versus mixed deals (column 4 vs column 6). The footnotes depicted in column 5 (VC only) are based on tests of VC only deals versus mixed deals (column 4 vs column 6). * 9.345 observations; † 3,791 observations; ‡ 9498 Observations

Table II: Summary Statistics for Investors

The table displays mean characteristics with standard deviations in parentheses. Pre Series A investor characteristics are in Panel A. *Pre Series A Founder, angel, and VC Ownership* break down the components of initial ownership in the company. *Pre Series A Common Round?* is a dummy variable that is one if a pre Series A financing based on common stock is observed.

Series A investor characteristics are in Panel B. *Angel Only (VC only)* are dummy variables equal to one if all investors in the deal are angels (VC firms). *Fraction Sold* shows the percentage of the company sold to investors in the Series A round. *Founder Series A, Angel Series A* and *VC Series A* break down ownership within the Series A round. *# Investors* is a count of investors in the deal. Repeat investments by the same investor (generally across multiple closings) are counted as a single investor (*Log # Investors* is the natural log).

Other investor variables are shown in Panel C. *Final Angel Ownership, Final Founder Ownership*, and *Final VC Ownership* represent the respective ownership shares post-money (before any subsequent dilution from options). *Repeat Angel Flag* takes the value of 1 if an angel who invested prior to the Series A also invested in the Series A round. The *Brokeck Investor Dummy* is one if Brobeck invested in the given firm (either common or preferred shares). *% Investors Within 3 Hours* is the share of investors (unweighted by dollars invested) who are within three hours driving distance. Distance is measured from zip-code center to zip-code center using an automated Mapquest query. *% Investors in Same Zip Code* is the share of investors (unweighted by dollars invested) in the same zip code.

Variable	All		Small		Large		Angel Only		VC Only		Mixed	
	Deals	Deals	Deals	Deals	Deals	Deals	Deals	Deals	Deals	Deals	Deals	
Panel A: Pre Series A Investor Characteristics												
Pre Series A Founder Ownership	0.895 (0.21)		0.902 (0.16)		0.888 (0.26)		0.927 (0.12)		0.832 (0.35)		0.907 (0.17)	
Pre Series A Angel Ownership	0.076 (0.15)		0.076 (0.14)		0.076 (0.16)		0.066 (0.10)		0.091 (0.20)		0.074 (0.14)	
Pre Series A VC Ownership	0.029 (0.10)		0.022 (0.08)		0.036 (0.12)		0.007 (0.04)		0.077 (0.19) ^b		0.018 (0.06)	
Number of Founders	2.775 (2.46)		2.374 (1.54) ^a		3.176 (3.08) ^a		1.969 (1.06) ^a		2.895 (3.64)		2.964 (2.22)	
% with Founder Data	0.907 (0.29)		0.890 (0.31)		0.923 (0.26)		0.844 (0.36)		0.921 (0.27)		0.920 (0.27)	
Pre Series A Common Round	0.253 (0.43)		0.286 (0.45)		0.220 (0.41)		0.219 (0.42)		0.263 (0.44)		0.259 (0.44)	
Panel B: Series A Investor Characteristics												
Angel Only	0.176 (0.38)		0.319 (0.46) ^a		0.033 (0.18) ^a		1.000 (0.00)		0.000 (0.00)		0.000 (0.00)	
VC Only	0.209 (0.40)		0.198 (0.40)		0.220 (0.41)		0.000 (0.00)		1.000 (0.00)		0.000 (0.00)	
Fraction Sold	0.462 (0.22)		0.363 (0.15) ^a		0.560 (0.23) ^a		0.303 (0.16) ^a		0.443 (0.24)		0.513 (0.21)	
% Angel Series A	0.319 (0.36)		0.464 (0.40) ^a		0.174 (0.24) ^a		0.996 (0.01) ^a		0.000 (0.00) ^a		0.234 (0.21)	
% Founder Series A	0.001 (0.00)		0.002 (0.01)		0.001 (0.00)		0.004 (0.01)		0.000 (0.00) ^a		0.001 (0.00)	
% VC Series A	0.679 (0.36)		0.533 (0.41) ^a		0.825 (0.24) ^a		0.000 (0.00) ^a		1.000 (0.00) ^a		0.764 (0.21)	
# Investors	12.12 (13.4)		10.80 (14.4)		13.45 (12.3)		12.81 (20.7)		4.763 (5.62) ^a		14.42 (11.9)	
Log # Investors	1.994 (1.06)		1.762 (1.15) ^a		2.227 (0.92) ^a		1.711 (1.30) ^a		1.044 (0.99) ^a		2.398 (0.73)	
Repeat Angel Flag	0.093 (0.29)		0.121 (0.32)		0.066 (0.25)		0.188 (0.39)		0.000 (0.00) ^a		0.098 (0.29)	
Repeat VC Flag	0.071 (0.25)		0.055 (0.22)		0.088 (0.28)		0.000 (0.00) ^a		0.105 (0.31)		0.080 (0.27)	
Brokeck Investor Dummy	0.236 (0.42)		0.165 (0.37) ^a		0.308 (0.46) ^a		0.063 (0.24) ^a		0.079 (0.27) ^a		0.339 (0.47)	
% Investors within 3 Hours	0.604 (0.36)		0.657 (0.35)		0.558 (0.37)		0.649 (0.35)		0.514 (0.47)		0.619 (0.32)	
% Investors in Same Zip Code	0.179 (0.30)		0.248 (0.36) ^a		0.120 (0.23) ^a		0.302 (0.39) ^a		0.272 (0.40) ^b		0.119 (0.22)	
Panel C: Other Characteristics												
Final Angel Ownership	0.173 (0.17)		0.206 (0.18) ^a		0.139 (0.16) ^a		0.377 (0.20) ^a		0.039 (0.09) ^a		0.160 (0.13)	
Final Founder Ownership	0.462 (0.23)		0.560 (0.18) ^a		0.363 (0.23) ^a		0.615 (0.20) ^a		0.442 (0.26)		0.425 (0.21)	
Final VC Ownership	0.366 (0.27)		0.233 (0.22) ^a		0.498 (0.26) ^a		0.007 (0.04) ^a		0.520 (0.28) ^a		0.416 (0.22)	
# Firms in Group	182	91	91	32	38	112						

* a, b, and c denote significant differences in means at the 1%, 5%, and 10% levels, respectively. The footnotes depicted in columns 2 and 3 are based on tests of differences in means across small versus large firms (column 2 vs 3). The footnotes depicted in column 4 (angel only) are based on tests of angel only deals versus mixed deals (column 4 vs column 6). The footnotes depicted in column 5 (VC only) are based on tests of VC only deals versus mixed deals (column 4 vs column 6).

Table III: Summary Statistics for VC Firms in Sample

The table displays mean characteristics with standard deviations in parentheses. The sample includes all private equity firms who made investments between 1/1/1993 and 12/31/2002 that are included in the Thomson Financial Venture Economics database. The statistics include the histories of these private equity firms, including funds that were managed outside the 1993-2002 time frame. Statistics are reported by whether the firm was represented in the Brobeck Sample (columns 1 and 2), conditional on inclusion whether the firm was associated with a small or large deal (columns 3 and 4) and whether the firm was associated with a VC only or mixed deal (columns 5 and 5). All fund statistics are aggregated at the VC firm level. # *funds under firm management* is the number of funds ever managed under the private equity firm's management. *Ln(total capital raised)* is the natural log of the total capital (in millions of US dollars) raised by these funds. *Ln(fund size, \$M)* is the mean capital raised for each fund under a private equity firm's management. *First investment year* is the first year that firm invested. *Share of funds hq in northern CA* and *Share of funds hq in US* represent the share of funds under the private equity firm's management that report headquarters in northern California and the United States respectively. *Share of VC funds* and *Firm's share of buyout funds* represent the share of funds under the VC firm's management reporting that they are venture capital or buyout funds. *Share of funds with Seed Stage Focus* and *Share of funds with Early Stage Focus* represent the share of funds under the firm's management that report a focus on seed stage deals or early stage deals. *Share of funds not reporting round company investment levels* is the share of the firm's funds for which company investment data are missing. *Ln(average company investment by fund, \$M)* is the natural log of the fund's mean total company investment in millions of USD, averaged over all funds under a given firm's management. *Share of funds not reporting minimum investment* is the firm's share of funds for whom minimum investment data is missing. *Ln(minimum round investment by fund, \$M)* is the natural log of the minimum round investment, averaged over funds under a firm's management. *Ln(minimum company investment by fund, \$M)* is the natural log of the minimum company investment, averaged over funds under a firm's management. *Age* is measured relative to 2002. *IPO rate*, and *merger rate* are the share of the VC's investment targets that reach the mutually exclusive categories IPO or merged/acquired, respectively. Rates are calculated as the share of investment targets to in these outcome categories, as reported in Venture Economics. *Centrality* is eigenvector centrality (Bonacich 1972).

	Brobeck VC firms	Non-Brobeck VC firms	Small deal VCs	Large Deal VCs	VCs in mixed deals	VC in VC only deals
# funds under firm management	7.658 (6.84)	2.040 (2.18) ^a	7.073 (6.23)	7.858 (7.04)	7.178 (6.74)	9.358 (6.95) ^a
Log total capital raised /'000\$M	5.300 (2.91)	2.482 (2.57) ^a	4.980 (2.82)	5.410 (2.94)	5.137 (2.82)	5.877 (3.17) ^b
Share of funds reporting capital raised	0.867 (0.34)	0.620 (0.49) ^a	0.854 (0.35)	0.872 (0.33)	0.870 (0.34)	0.858 (0.35)
Log fund size, '000\$M	3.924 (2.05)	2.191 (2.24) ^a	3.713 (1.94)	3.996 (2.08)	3.841 (2.01)	4.220 (2.17)
Panel B: Other VC Characteristics						
Share of funds hq in northern CA	0.414 (0.49)	0.095 (0.29) ^a	0.403 (0.48)	0.418 (0.49)	0.410 (0.49)	0.428 (0.49)
Share of funds hq in US	0.909 (0.29)	0.639 (0.48) ^a	0.916 (0.28)	0.906 (0.29)	0.891 (0.31)	0.972 (0.17) ^a
Share of funds w/ Seed Stage Focus	0.038 (0.13)	0.061 (0.23) ^a	0.022 (0.10)	0.044 (0.14) ^c	0.043 (0.15)	0.021 (0.05) ^b
Share of funds w/ Early Stage Focus	0.417 (0.40)	0.223 (0.39) ^a	0.417 (0.38)	0.417 (0.40)	0.443 (0.40)	0.326 (0.37) ^a
Share of VC funds	0.935 (0.20)	0.818 (0.37) ^a	0.927 (0.22)	0.938 (0.19)	0.945 (0.20)	0.901 (0.21) ^c
Share of buyout funds	0.035 (0.15)	0.118 (0.31) ^a	0.056 (0.20)	0.029 (0.12)	0.031 (0.14)	0.053 (0.15)
Age	13.137 (8.13)	7.041 (6.43) ^a	13.350 (7.97)	13.064 (8.19)	12.431 (8.21)	15.64 (7.31) ^a
IPO rate	0.150 (0.13)	0.118 (0.21) ^a	0.154 (0.16)	0.149 (0.13)	0.141 (0.13)	0.182 (0.13) ^a
Merger rate	0.313 (0.17)	0.221 (0.27) ^a	0.322 (0.20)	0.310 (0.16)	0.303 (0.18)	0.347 (0.14) ^a
Centrality	0.074 (0.14)	0.002 (0.02) ^a	0.105 (0.19)	0.063 (0.12) ^b	0.065 (0.14)	0.106 (0.16) ^b
Observations	482	5585	123	359	376	106

* a, b, and c denote significant differences in means at the 1%, 5%, and 10% levels, respectively. These are based on tests of differences in means across Non-Brobeck VC firms and Brobeck VC firms (footnotes displayed in column 2) VCs affiliated with small versus large deals (displayed in column 4), and VCs affiliated with VC-only deals versus mixed deals (displayed in column 6).

Table IV: Summary Statistics for Deals

The table displays mean characteristics with standard deviations in parentheses. *Warrants Dummy* is one if warrants were issued in the Series A Financing. *Options Dummy* is one if an option plan was set up concurrent with the Series A Financing. *# closings* is the number of separate executed closings under the Series A terms (*Multiple Closings* indicates more than one). *Average Days to Second Closing* is the days between the first and second closings. All preceding variables are taken from the electronic record of the closing documents in the Brobeck corpus. *Billed Hours* reflects the total billed hours associated with Brobeck's representation of either the company or its investors in the deal.

Control rights in Panel B and terms are extracted from closing documents from the Brobeck Corpus. *VC BOD seats* and *Common BOD Seats* are the share of board seats held by VCs and common share holders respectively. (from the "voting rights agreement", or when specific parties are named, by cross-referencing with investors). *Cumulative Dividend Flag* is a dummy equal to one if preferred shareholders have a right to dividends that accumulate over the time of their investment. *Liquidation* is a dummy equal to one when preferred shareholders have liquidation rights exceeding the value of their initial investment. *Cap on Preferred* is a dummy equal to one if preferred stock liquidation rights are capped at a multiple of the initial investment. *Cap on Common* is a dummy equal to one if common stock liquidation rights are capped at a multiple of the investment. *Redeemable Flag* is a dummy equal to one when preferred shareholders can demand that the firm repurchase their shares. *Time to 1st Redemption* is a dummy equal to one if preferred stockholders' redemption rights are time-delayed. % Series A Req. to Vote is the percentage of Series A shareholders required to invoke a redemption.

Variable	All Deals	Small Deals	Large Deals	Angel Only Deals	VC Only Deals	Mixed Deals
Panel A: Deal Characteristics						
Warrants Dummy	0.154 (0.36)	0.198 (0.40) ^b	0.110 (0.31) ^b	0.250 (0.44)	0.079 (0.27)	0.152 (0.36)
Options Dummy	0.687 (0.46)	0.571 (0.49) ^a	0.802 (0.40) ^a	0.594 (0.49)	0.658 (0.48)	0.723 (0.44)
# Closings	1.769 (1.19)	1.736 (1.29)	1.802 (1.09)	1.750 (1.36)	1.553 (1.40)	1.848 (1.05)
Multiple Closings Flag	0.445 (0.49)	0.407 (0.49)	0.484 (0.50)	0.375 (0.49)	0.237 (0.43) ^a	0.536 (0.50)
Average Days to Second Closing	153.4 (157)	103.7 (89.4) ^a	197.9 (190) ^a	138.2 (93.5)	232.9 (149)	144.5 (166)
Billed Hours	169.0 (115)	147.3 (103) ^a	190.7 (123) ^a	109.1 (70.9) ^a	185.4 (155)	180.6 (105)
Log Billed Hours	4.878 (0.82)	4.737 (0.85) ^a	5.017 (0.76) ^a	4.488 (0.78) ^a	4.901 (0.88)	4.977 (0.78)
Panel B: Control Rights						
% Common BOD Seats	0.460 (0.33)	0.576 (0.33) ^a	0.355 (0.29) ^a	0.675 (0.31) ^a	0.522 (0.39) ^b	0.392 (0.29)
Cumulative Dividend Flag	0.088 (0.28)	0.044 (0.20) ^a	0.132 (0.34) ^a	0.000 (0.00) ^a	0.158 (0.37)	0.089 (0.28)
Remaining	0.418 (0.49)	0.374 (0.48)	0.462 (0.50)	0.125 (0.33) ^a	0.579 (0.50)	0.446 (0.49)
Cap on Preferred	0.474 (0.50)	0.441 (0.50)	0.500 (0.50)	0.500 (0.57)	0.364 (0.49)	0.520 (0.50)
Cap on Common	0.019 (0.13)	0.035 (0.18)	0.000 (0.00)	0.000 (0.00)	0.000 (0.00)	0.032 (0.17)
Redeemable Flag	0.236 (0.42)	0.209 (0.40)	0.264 (0.44)	0.031 (0.17) ^a	0.368 (0.48)	0.250 (0.43)
Time to 1st Redemption	0.225 (0.41)	0.209 (0.40)	0.242 (0.43)	0.031 (0.17) ^a	0.368 (0.48)	0.232 (0.42)
% Series A Req. to Vote	57.55 (8.40)	57.12 (8.54)	57.87 (8.52)	50.00 (0.00)	54.16 (7.53) ^a	59.96 (8.35)
# Firms in Group	182	91	91	32	38	112

* a, b, and c denote significant differences in means at the 1%, 5%, and 10% levels, respectively. The footnotes depicted in columns 2 and 3 are based on tests of differences in means across small versus large firms (column 2 vs 3). The footnotes depicted in column 4 (angel only) are based on tests of angel only deals versus mixed deals (column 4 vs column 6). The footnotes depicted in column 5 (VC only) are based on tests of VC only deals versus mixed deals (column 4 vs column 6).

Table V: Control Rights (Liquidation and Redemption)

The table displays Probit model marginal effects with robust t -statistics in parenthesis. We report results for the small and large deal subsamples as noted in the table header (small and large deals have below and above median deal size, respectively). All independent variables (except dummy variables) are standardized to clarify exposition. The dependent variable in the first two models (displayed in the first two columns) is a dummy variable indicating whether the liquidation preference of the Series A stock favors the Series A investors relative to common stockholders. In the event of a liquidation, a value of one indicates that all proceeds go to Series A shareholders up to a multiple of the initial Series A investment. A value of zero indicates that Series A liquidation privileges are limited to the initial investment. The dependent variable in the second two models (displayed in the last two columns) is a dummy variable identifying whether the Series A shares are redeemable (ie they can be returned to the firm in exchange for cash). The independent variables include an angel-only dummy, a VC-only dummy, a cross term multiplying the VC-only dummy by Log Size (the logarithm of the total dollar proceeds raised by Series A stock investors), and % VC dollars. The angel-only dummy is one if none of the Series A stock investors are identified as venture capital firms. The VC-only dummy is one if all of the Series A stock investors are identified as VC firms. % VC dollars is equal to the total dollar investments in Series A stock made by VC firms divided by the total dollars invested in Series A stock by all investors. The additional independent variables include additional investor characteristics, firm characteristics, industry dummies, and time dummies, and are described in Tables I to IV.

Independent Variables	<i>All Deals</i>			<i>Small Deals</i>			<i>Large Deals</i>		
	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	
	Dep. Var.= Liquidation	Dep. Var.= Redemption	Dep. Var.= Liquidation	Dep. Var.= Redemption	Dep. Var.= Liquidation	Dep. Var.= Liquidation	Dep. Var.= Redemption	Dep. Var.= Redemption	
Angel Only	-0.31 (-2.29) ^b	-0.20 (-2.29) ^b	-0.31 (-2.26) ^b	-0.03 (-2.29) ^b					
VC Only	0.33 (2.53) ^b	0.16 (1.61)	0.22 (1.15)	0.00 (0.54)	0.63 (4.13) ^a	0.34 (2.12) ^b			
Pre Series A Angel Ownership	-0.12 (-2.30) ^b	-0.05 (-1.54)	-0.02 (-0.37)	0.00 (1.43)	-0.33 (-3.34) ^a	-0.17 (-3.73) ^a			
Fraction Sold	-0.01 (-0.20)	-0.01 (-0.23)	0.09 (0.88)	0.00 (-0.57)	-0.08 (-1.06)	0.00 (-0.01)			
Log Deal Size	-0.12 (-2.35) ^b	-0.02 (-0.44)	-0.18 (-2.18) ^b	0.01 (3.56) ^a	-0.30 (-2.43) ^b	0.03 (0.35)			
Log # Investors	0.07 (1.21)	0.00 (0.00)	-0.04 (-0.52)	-0.01 (-2.65) ^a	0.28 (2.46) ^b	0.12 (2.05) ^b			
Log One Plus Firm Age	0.11 (2.51) ^b	0.05 (1.63)	0.15 (2.20) ^b	0.00 (0.82)	0.14 (2.01) ^b	0.08 (1.75) ^c			
Log Number of Founders	0.07 (1.51)	0.01 (0.23)	0.23 (3.51) ^a	0.00 (-1.25)	-0.06 (-0.78)	0.02 (0.49)			
Pre Series A Common Round	0.09 (0.94)	0.02 (0.23)	0.01 (0.06)	0.02 (1.85) ^c	0.19 (1.21)	-0.06 (-0.58)			
Strategic Alliance	0.21 (1.33)	0.19 (1.57)	0.22 (1.15)	0.00 (-0.91)	0.59 (2.64) ^a	0.68 (3.50) ^a			
Product Release	0.17 (1.08)	0.06 (0.59)	0.46 (2.39) ^b	0.02 (1.45)	-0.16 (-0.64)	-0.14 (-1.08)			
Brockbeck Investor Dummy	0.26 (2.44) ^b	0.15 (1.83) ^c	0.23 (1.19)	0.81 (4.71) ^a	0.26 (1.63)	-0.02 (-0.20)			
IT Industry	-0.32 (-2.77) ^a	-0.14 (-1.57)	-0.33 (-2.05) ^b	-0.05 (-2.99) ^a	-0.52 (-2.87) ^a	-0.25 (-1.33)			
Medical/Bio-Tech Industry	-0.04 (-0.24)	0.03 (0.27)	-0.20 (-1.25)	0.63 (3.30) ^a	0.02 (0.06)	-0.19 (-1.63)			
1998 to 3/2000 Dummy	0.28 (1.90) ^c	0.25 (2.25) ^b	0.32 (1.69) ^c	0.00 (0.04)	0.47 (1.97) ^b	0.47 (1.83) ^c			
Post 3/2000 Dummy	0.39 (2.83) ^a	0.14 (1.40)	0.26 (1.34)	0.00 (0.63)	0.61 (3.27) ^a	0.24 (1.48)			
California Dummy	0.07 (0.74)	-0.15 (-2.44) ^b	0.18 (1.01)	-0.01 (-2.58) ^a	0.11 (0.70)	-0.11 (-1.26)			
Missing Location Data	-0.04 (-0.35)	-0.19 (-3.19) ^a	0.22 (1.45)	-0.02 (-4.29) ^a	-0.29 (-1.68) ^c	-0.21 (-3.18) ^a			
Observations	182	182	91	91	91	91			

* a, b, and c denote significant differences from zero at the 1%, 5%, and 10% levels, respectively.

Table VI: Control Rights (Cumulative Dividends and Common BOD Seats)

The table displays Probit model marginal effects and OLS model coefficients with robust t -statistics in parenthesis. We report results for the small and large deal subsamples as noted in the table header (small and large deals have below and above median deal size, respectively). All independent variables (except dummy variables) are standardized to clarify exposition. The dependent variable in the first two models (displayed in the first two columns) is a dummy variable indicating whether the Series A stockholders have cumulative dividend rights. The dependent variable in the second two models (displayed in the last two columns) is the fraction of board seats that are allocated to common shareholders (board of directors data is only available for 147 firms). The independent variables include an angel-only dummy, a VC-only dummy, a cross term multiplying the VC-only dummy by Log Size (the logarithm of the total dollar proceeds raised by Series A stock investors), and % VC dollars. The angel-only dummy is one if none of the Series A stock investors are identified as venture capital firms. The VC-only dummy is one if all of the Series A stock investors are identified as VC firms. % VC dollars is equal to the total dollar investments in Series A stock made by VC firms divided by the total dollars invested in Series A stock by all investors. The additional independent variables include additional investor characteristics, firm characteristics, industry dummies, and time dummies, and are described in Tables I to IV.

Independent Variables	<i>All Deals</i>				<i>Small Deals</i>				<i>Large Deals</i>			
	Probit Model		OLS Model		Probit Model		OLS Model		Probit Model		OLS Model	
	Dep. Var.=	Cumulative	Dep. Var.=	Common Seats	Dep. Var.=	Cumulative	Dep. Var.=	Common Seats	Dep. Var.=	Cumulative	Dep. Var.=	Common Seats
Angel Only	-0.05 (-1.00)		0.17 (1.78) ^c		-0.04 (-0.79)		0.20 (1.63)		0.06 (0.59)		-0.06 (-0.74)	
VC Only	0.03 (0.50)		0.05 (0.73)		0.04 (0.55)		0.18 (1.24)		-0.03 (-0.75)		0.10 (3.15) ^a	
Pre Series A Angel Ownership	0.00 (0.11)		0.05 (1.82) ^c		0.05 (1.24)		0.03 (0.59)		-0.03 (-0.57)		-0.05 (-1.24)	
Fraction Sold	-0.02 (-0.46)		-0.11 (-3.05) ^a		-0.01 (-0.42)		-0.11 (-1.25)		0.03 (0.37)		0.05 (0.89)	
Log Deal Size	0.03 (1.04)		-0.02 (-0.50)		0.05 (1.77) ^c		0.04 (0.52)		-0.03 (-0.55)		-0.05 (-1.22)	
Log # Investors	-0.03 (-1.05)		0.00 (0.02)		-0.04 (-1.46)		0.06 (0.87)		0.10 (1.75) ^c		0.04 (1.08)	
Log One Plus Firm Age	0.07 (2.38) ^b		-0.02 (-0.68)		0.07 (2.02) ^b		-0.07 (-1.33)		0.04 (0.96)		0.08 (2.80) ^a	
Log Number of Founders	0.02 (0.79)		0.06 (2.58) ^a		-0.02 (-1.00)		0.05 (1.22)		0.01 (0.17)		-0.01 (-0.16)	
Pre Series A Common Round	0.03 (0.75)		0.05 (1.01)		0.06 (1.10)		0.09 (1.13)		0.21 (1.27)		0.26 (2.43) ^b	
Strategic Alliance	0.02 (0.21)		-0.02 (-0.15)		-0.13 (-1.41)		-0.25 (-1.37)		-0.04 (-0.23)		-0.08 (-0.60)	
Product Release	0.13 (1.27)		0.15 (1.64)		0.12 (1.11)		0.08 (0.69)		-0.06 (-0.56)		0.04 (0.55)	
Brobeck Investor Dummy	-0.05 (-0.93)		-0.01 (-0.21)		0.00 (0.04)		-0.13 (-1.09)		0.01 (0.04)		-0.06 (-0.59)	
IT Industry	-0.01 (-0.17)		0.05 (0.73)		0.00 (-0.06)		0.12 (1.22)		-0.06 (-0.43)		0.11 (0.90)	
Medical/Bio-Tech Industry	-0.04 (-0.53)		0.24 (2.43) ^b		-0.01 (-0.16)		0.27 (1.71) ^c		0.07 (0.70)		0.03 (0.25)	
1998 to 3/2000 Dummy	0.10 (2.14) ^b		0.08 (1.01)		0.12 (2.45) ^b		0.05 (0.42)		0.18 (1.89) ^c		-0.10 (-0.99)	
Post 3/2000 Dummy	0.09 (2.01) ^b		-0.01 (-0.07)		0.01 (0.25)		0.04 (0.36)		-0.06 (-0.54)		-0.05 (-0.78)	
California Dummy	-0.06 (-1.13)		-0.06 (-0.95)		-0.03 (-0.54)		-0.02 (-0.16)		-0.12 (-1.40)		-0.04 (-0.48)	
Missing Location Data	-0.12 (-2.27) ^b		0.01 (0.15)		-0.10 (-1.64)		0.06 (0.52)					
Observations	182		147		91		70		91		77	

* a, b, and c denote significant differences from zero at the 1%, 5%, and 10% levels, respectively.

Table VII: Summary Statistics of outcomes for Firms in Sample

The table displays mean characteristics for various dummy variables associated with firm outcomes. Dummy variables indicating outcomes are shown in Panel C. *Survival* is one if the firm was conducting business as either an independent entity or as part of a larger firm in March 2008 (from World Wide Web presence and archival sources). Active (inactive) survival is one if the firm additionally issued (did not issue) at least one press release since January 2005. *Merger or IPO* is one if a liquidity event occurred either as a merger or as an IPO (from archival sources, primarily press releases). Firms are tagged as failed if they are not surviving and did not experience a liquidity event. *Ex post VC Financing* is one if the firm secures later financing (after Series A) from venture capital firms as reported by Venture Economics. The Venture Economics sample includes US-based venture capital investment targets founded after 1967 with the first investment between 1993 and 2002. Private Equity disbursements labeled as buyout, acquisition, other or unknown were eliminated. Outcome variables of the Venture Economics sample are as reported in that database, but weighted to reflect the distribution of deal origination dates in the Brobeck sample.

Variable	All Deals				Small Deals		Large Deals		Angel Only Deals		VC Only Deals		Mixed Deals		Venture Economics Deals	
IPO	0.044	0.022	0.066	0.031	0.105	0.027	0.057									
Merger	0.264	0.231	0.297	0.188	0.316	0.268	0.171 ^a									
Survival	0.280	0.264	0.297	0.500 ^a	0.211	0.241										
Active Survival	0.187	0.154	0.220	0.250	0.184	0.170										
Inactive Survival	0.093	0.110	0.077	0.250 ^a	0.026	0.071										
Failure	0.412	0.484 ^a	0.341 ^a	0.281 ^b	0.368	0.464										
Ex post VC financing	0.489	0.429	0.549	0.281 ^a	0.474	0.554	0.726 ^a									
# Firms in Group	182	91	91	32	38	112	9,902									

* a, b, and c denote significant differences in means at the 1%, 5%, and 10% levels, respectively. The footnotes depicted in columns 2 and 3 are based on tests of differences in means across small versus large firms (column 2 vs 3). The footnotes depicted in column 4 (angel only) are based on tests of angel only deals versus mixed deals (column 4 vs column 6). The footnotes depicted in column 5 (VC only) are based on tests of VC only deals versus mixed deals (column 4 vs column 6).

Table VIII: Outcomes versus deal characteristics

The table displays Probit model marginal effects, with robust t -statistics in parenthesis. All independent variables (except dummy variables) are standardized to clarify exposition. The dependent variable in the first probit model (columns one, three, five) is a dummy variable indicating whether the firm experienced a merger or IPO by July 2007. The second model's (columns two, four, six) is a dummy variable indicating whether the firm is still a going concern as of July 2007. More specifically, firms that went public, firms that were acquired, and firms that have a visible web presence are all assigned a value of one. The independent variables include an angel-only dummy and a VC-only dummy. The angel-only dummy is one if none of the Series A stock investors are identified as venture capital firms. The VC-only dummy is one if all of the Series A stock investors are identified as VC firms. The additional independent variables include other deal characteristics, investor characteristics, firm characteristics, industry dummies, and time dummies, and are described in Tables I to IV.

Independent Variables	All Deals			Small Deals			Large Deals		
	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	Probit Model	
	Dep. Var.= Merger/IPO	Dep. Var.= Survival	Dep. Var.= Merger/IPO	Dep. Var.= Survival	Dep. Var.= Merger/IPO	Dep. Var.= Survival	Dep. Var.= Merger/IPO	Dep. Var.= Survival	
Angel Only	-0.02 (-0.20)	0.36 (3.46) ^a	-0.03 (-0.23)	0.50 (2.96) ^a	0.43 (2.36) ^b	0.18 (1.33)	0.43 (2.36) ^b	0.18 (1.33)	
VC Only	0.16 (1.47)	0.19 (1.71) ^c	-0.04 (-0.25)	0.20 (0.93)	0.20 (1.80) ^c	0.17 (1.55)	0.20 (1.80) ^c	0.17 (1.55)	
Log Deal Size	0.12 (2.41) ^b	0.18 (3.35) ^a	0.03 (0.40)	0.33 (2.71) ^a	-0.06 (-0.93)	-0.06 (-0.91)	-0.06 (-0.93)	-0.06 (-0.91)	
Fraction Sold	-0.09 (-2.05) ^b	-0.05 (-0.99)	-0.17 (-2.37) ^b	-0.07 (-0.59)	-0.02 (-0.21)	-0.04 (-0.48)	-0.02 (-0.21)	-0.04 (-0.48)	
Log # Investors	0.00 (0.03)	0.08 (1.47)	0.01 (0.19)	0.16 (1.60)	-0.31 (-1.99) ^b	-0.48 (-2.03) ^b	-0.31 (-1.99) ^b	-0.48 (-2.03) ^b	
Strategic Alliance	-0.12 (-1.14)	-0.43 (-2.91) ^a	-0.08 (-0.54)	-0.58 (-3.14) ^a	0.56 (2.36) ^b	0.34 (1.87) ^c	0.56 (2.36) ^b	0.34 (1.87) ^c	
Product Release	0.12 (0.91)	0.25 (1.82) ^c	-0.03 (-0.23)	0.20 (0.84)	-0.01 (-0.17)	0.01 (0.15)	-0.01 (-0.17)	0.01 (0.15)	
1-Year Nasdaq	-0.01 (-0.35)	0.00 (-0.10)	-0.06 (-1.29)	-0.11 (-1.47)	0.04 (0.61)	0.04 (0.62)	0.04 (0.61)	0.04 (0.62)	
Log One Plus Firm Age	0.05 (1.49)	0.11 (2.19) ^b	0.06 (1.55)	0.24 (2.44) ^b	-0.05 (-0.91)	0.00 (-0.04)	-0.05 (-0.91)	0.00 (-0.04)	
Log Number of Founders	-0.01 (-0.15)	-0.01 (-0.14)	0.01 (0.18)	-0.06 (-0.75)	0.21 (1.51)	0.03 (0.25)	0.21 (1.51)	0.03 (0.25)	
Pre Series A Common Round	0.03 (0.35)	0.00 (-0.01)	0.01 (0.07)	-0.05 (-0.27)	0.01 (0.07)	0.02 (0.13)	0.01 (0.07)	0.02 (0.13)	
Brobeck Investor Dummy	-0.06 (-0.69)	-0.21 (-1.92) ^c	-0.14 (-1.12)	-0.40 (-2.34) ^b	-0.08 (-0.34)	0.17 (0.85)	-0.08 (-0.34)	0.17 (0.85)	
IT Industry	-0.07 (-0.68)	-0.14 (-1.16)	-0.17 (-1.38)	-0.34 (-2.10) ^b	-0.37 (-1.78) ^c	0.23 (1.13)	-0.37 (-1.78) ^c	0.23 (1.13)	
Medical/Bio-Tech Industry	-0.21 (-1.79) ^c	-0.06 (-0.35)	-0.11 (-0.82)	-0.21 (-0.91)	0.21 (0.88)	0.02 (0.11)	0.21 (0.88)	0.02 (0.11)	
1998 to 3/2000 Dummy	-0.11 (-1.00)	-0.09 (-0.65)	-0.15 (-1.32)	-0.21 (-1.17)	-0.02 (-0.12)	0.14 (0.77)	-0.02 (-0.12)	0.14 (0.77)	
Post 3/2000 Dummy	-0.22 (-2.03) ^b	0.05 (0.38)	-0.29 (-2.32) ^b	-0.06 (-0.28)	0.38 (2.75) ^a	0.13 (1.13)	-0.02 (-0.12)	0.13 (1.13)	
California Dummy	0.21 (2.42) ^b	0.23 (2.32) ^b	0.02 (0.18)	0.22 (1.17)	-0.21 (-1.44)	-0.01 (-0.05)	0.38 (2.75) ^a	0.13 (1.13)	
Missing Location Data	-0.11 (-1.25)	-0.04 (-0.43)	-0.07 (-0.57)	-0.08 (-0.47)	91	91	-0.21 (-1.44)	-0.01 (-0.05)	
Observations	182	182	91	91	91	91	91	91	

* a, b, and c denote significant differences from zero at the 1%, 5%, and 10% levels, respectively.

Table IX: Outcomes versus deal characteristics, ordered probit regressions

The table displays ordered probit model coefficients with robust t -statistics in parenthesis. We report models for the small and large deal subsamples as noted in the table header (small and large deals have below and above median deal size, respectively). All independent variables (except dummy variables) are standardized to clarify exposition. The dependent variable in the first models (columns one, three, five) is an ordered variable taking three possible values: 3 if IPO or acquisition, 2 if firm is a going concern but did not experience an IPO or an acquisition, and 1 for other firms (assumed to be failed firms). The second model, which is “activity adjusted” (columns two, four, six) reclassifies surviving firms that did not issue any press releases from January 2005 through March 2008 as failures. The independent variables include an angel-only dummy and a VC-only dummy. The angel-only dummy is one if none of the Series A stock investors are identified as venture capital firms. The VC-only dummy is one if all of the Series A stock investors are identified as VC firms. The additional independent variables include other deal characteristics, investor characteristics, firm characteristics, industry dummies, and time dummies, and are described in Tables I to IV.

Independent Variables	<i>All Deals</i>				<i>Small Deals</i>				<i>Large Deals</i>						
	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model	Ordered Probit Model		
	Dep. Var.=	Outcome (3 states)	(Activity Adj.)	Dep. Var.=	Outcome (3 states)	(Activity Adj.)	Dep. Var.=	Outcome (3 states)	(Activity Adj.)	Dep. Var.=	Outcome (3 states)	(Activity Adj.)	Dep. Var.=	Outcome (3 states)	(Activity Adj.)
Angel Only	0.47 (1.80) ^c	0.17 (0.57)		0.52 (1.51)			0.20 (0.56)			0.88 (2.52) ^b			1.11 (3.12) ^a		
VC Only	0.51 (1.91) ^c	0.52 (2.00) ^b		0.23 (0.52)			0.11 (0.24)			0.51 (2.03) ^b			0.49 (1.82) ^c		
Log Deal Size	0.43 (3.47) ^a	0.43 (3.39) ^a		0.32 (1.34)			0.40 (1.59)			-0.22 (-1.56)			-0.21 (-1.44)		
Fraction Sold	-0.21 (-1.79) ^c	-0.25 (-2.14) ^b		-0.35 (-1.56)			-0.51 (-2.15) ^b			-0.06 (-0.32)			0.05 (0.27)		
Log # Investors	0.11 (1.01)	0.12 (1.04)		0.20 (1.20)			0.21 (1.20)			-1.38 (-2.18) ^b			-1.19 (-1.95) ^c		
Strategic Alliance	-0.71 (-2.09) ^b	-0.55 (-1.59)		-0.95 (-1.71) ^c			-0.81 (-1.50)			1.49 (2.16) ^b			1.40 (2.10) ^b		
Product Release	0.43 (1.31)	0.32 (0.92)		0.06 (0.15)			-0.26 (-0.58)			0.00 (0.00)			-0.03 (-0.19)		
1-Year Nasdaq	-0.04 (-0.42)	-0.04 (-0.40)		-0.27 (-1.61)			-0.25 (-1.44)			0.13 (0.94)			0.15 (1.12)		
Log One Plus Firm Age	0.22 (2.26) ^b	0.20 (2.06) ^b		0.30 (2.09) ^b			0.31 (2.13) ^b			-0.12 (-0.97)			-0.20 (-1.45)		
Log Number of Founders	-0.03 (-0.34)	-0.06 (-0.62)		-0.01 (-0.03)			-0.01 (-0.05)			0.47 (1.43)			0.56 (1.62)		
Pre Series A Common Round	0.11 (0.46)	0.16 (0.67)		-0.09 (-0.23)			0.04 (0.09)			-0.01 (-0.03)			0.09 (0.26)		
Brobeck Investor Dummy	-0.35 (-1.48)	-0.33 (-1.32)		-0.73 (-1.74) ^c			-1.10 (-1.93) ^c			0.23 (0.37)			0.24 (0.37)		
IT Industry	-0.23 (-0.81)	-0.17 (-0.59)		-0.61 (-1.56)			-0.53 (-1.37)			-0.09 (-0.14)			0.11 (0.16)		
Medical/Bio-Tech Industry	-0.40 (-1.16)	-0.29 (-0.81)		-0.56 (-1.25)			-0.51 (-1.03)			0.37 (0.66)			0.34 (0.63)		
1998 to 3/2000 Dummy	-0.25 (-0.78)	-0.44 (-1.35)		-0.53 (-1.34)			-0.75 (-1.85) ^c			0.26 (0.54)			0.18 (0.39)		
Post 3/2000 Dummy	-0.28 (-0.87)	-0.43 (-1.39)		-0.82 (-1.73) ^c			-1.01 (-2.12) ^b			0.69 (2.14) ^b			0.57 (1.73) ^c		
California Dummy	0.54 (2.45) ^b	0.37 (1.66) ^c		0.15 (0.36)			-0.23 (-0.52)			-0.12 (-0.38)			-0.42 (-1.23)		
Missing Location Data	-0.21 (-0.87)	-0.38 (-1.52)		-0.36 (-0.86)			-0.50 (-1.18)			91			91		
Observations	182	182		91			91			91			91		

* a, b, and c denote significant differences from zero at the 1%, 5%, and 10% levels, respectively.