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Private Equity Investment in High Growth Companies: Selection & Performance

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by

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Abstract

Over the years, private equity buyout funds (PEs) have become increasingly interested in investing in high growth entrepreneurial firms, which has traditionally been an investment territory of venture capital funds (VCs). There is a dearth of study on how PEs invest and perform in the so-called "growth equity" space. The purpose of this research paper is to fill this void in the extant literature by comparing the characteristics of investments by PEs to those by VCs in entrepreneurial companies between January 1990 and December 2014. My research finds that both investment round size and company valuation are larger when PEs are among active round investors. Surprisingly, companies with private equity participation are less likely to exit successfully, however they are more likely to exit via IPO given successful exit.

I. Introduction

While private equity can take on many different meanings, most often the term is used to refer to traditional private equity buyout funds (PEs). Since the onset of the second private equity wave in the early 1990s, PEs and VCs have experienced significant growth and played a role of increasing importance in the global capital markets. In 1991, new private equity transactions were $10 billion but by the beginning of 2006 they had reached $500 billion. In the U.S. alone, the number of transactions almost doubled between 2000 and 2005, while the value rose four times (Acharya, V. V., Franks, J., & Servaes, H. 2007).

While both PEs and VCs make investments in companies not traded on a public exchange, they differ in their respective investment objectives, styles, and territories. Over the years, however, these differences between PE and VC investments have become somewhat blurred. One such example is that there has been an increasing interest of PEs in high growth entrepreneurial companies, which overlaps with investments that have traditionally been made by VCs. Using a sample of investments in entrepreneurial companies made between January 1990 and December 2014, this paper compares the investment characteristics of PEs and VCs in the growth equity space by looking at differences in investment round size and company valuation when there is PE participation to when PE participation is non-existent. The second part of this paper evaluates investment performance of PEs and VCs by analyzing the probability of successful exit, measured through IPO or M&A under the same circumstances.

II. Literature Review

A. Trends in the Growth Equity Market

      In the last decade, there has been a massive shift from early stage investors and away from traditional buyout funds in the private equity industry which has resulted in the emergence of growth equity (ACGCapital, 2013). As defined by the National Venture Capital Association, growth equity investments are made in companies that have rapidly growing revenues, positive cash flow and often have no prior institutional investment. As the investment time horizon for venture-backed companies has grown, so too has the need for continued financing of these emerging growth companies in the longer run-up to their exits. PEs are increasingly interested in investing in these founder-owned private companies with high growth potential (Evans, 2013). Since the start of 2008, growth equity investments have totaled $12.4 billion across 616 deals with the industry mix being very similar to that of VCs. In 2013, 40% and 5% of growth equity deals and funding went to the Internet and healthcare sectors, respectively (CB Insights 2013).

B. Private Equity vs. Venture Capital Investments

      Traditionally, the types of companies, investment styles, and capital structure of PEs investments are very different from those of VCs. For instance, PEs typically invest across all industries, almost always buy 100% of later-stage mature companies and use a combination of equity and debt in their investments. They also make many fewer, but much larger investments than do VCs. Returns by PEs are usually dependent on financial leverage. On the other hand, VCs focus on technology companies, acquire a minority stake (less than 50%) in early-stage (sometimes pre-revenue) companies and use only equity in their investments. They typically

many more investments and returns are dependent on future revenue growth and profitability of the companies in which they invest.

C. Performance and Preferred Exit Method

Previous literature has studied the performance of private equity investments by looking at the probability of successful exit from these investments. Private equity investments are long term in nature and are exited after several years either through an initial public offering, trade sale, or secondary sale to other private equity funds. In evaluating the probability of a successful exit for private equity investments made between 1980 and 2000, Sarin, Das and Jagannathan (2002) find that the probability of exit through an IPO is roughly 20-25% and an exit via acquisition to be 10-20%. The probability of successful exit from private equity investments is also higher for firms in the high-tech, biotech, and medical sectors. Since that time, Strömberg (2008) instead shows an increase in exit of private equity investments through sales to other buyout funds, known as secondary buyouts, and a decreased number of exits through IPOs. The most common exit route is through trade sales to another corporation, roughly 24% of investments are exited through secondary buyouts, and IPOs account for only 13% of exits. In the venture capital space, Arif Khursed studies the exit behavior of venture capital firms from 1990 and 2006 and finds IPO to be the preferred exit route, followed by trade sales and other exit routes. Barry (1994) also shows that IPO is the most profitable exit route for venture capital companies.

While the differences between investments traditionally made by PEs and VCs are well-known, the differences between these investments in the growth equity space have been less

studied. This paper will attempt to fill this void and identify some of those differences, with a focus on investment size, company valuation, and exit performance.

III. Hypotheses

Based on the nature and investment style of buyout funds, it is expected that both investment size and company valuations will be higher in investments where PE funds participate. These relationships are expected to be even more likely in investments where PE funds act as the lead investor. With regards to exit, similar results are expected. PEs participation and having a PE as the lead investor is expected to increase the likelihood of successful exit.

H_{1N}: With PEs participation, investment size and valuations will not be larger than without PEs participation.

H_{1A}: With PEs participation, investment size and valuations will be larger than without PEs participation.

H_{2N}: PEs participation will not increase the likelihood of investment exit, either through IPO or trade sales.

H_{2A}: PEs participation will increase the likelihood of investment exit, either through IPO or trade sales.

IV. Empirical Analysis

A. Data and Sample

We obtain data on U.S. private equity and venture capital investments in entrepreneurial companies between 1990 and 2014 from Thompson Financial's VentureXpert. The database

consists of 285,248 investor round-level observations and includes many characteristics of those investments, including investee company name, industry, and stage at investment round, as well as other characteristics such as round level, equity investment amount, investor fund name, and investor fund type. Exhibits 1-4 summarize characteristics of private equity and venture capital investments over the time horizon, and include aggregate equity funding by PEs and VCs, equity funding by year, % of funding by company stage, and % of funding by company industry, respectively.

The data also include post-investment characteristics of investee companies, including variables that represent exit through IPO or trade sales. Because the focus of this paper is on the characteristics of investments by buyout funds in entrepreneurial companies, the first data screen eliminates any investment observations made by funds other than those characterized as either buyout, general private equity, other private equity, or venture capital. For the analyses we refer to the collective group of buyout funds, general private equity funds, and other private equity funds as PEs. The second screen on the data is run on fund investor type to include only investments made by funds characterized as independent private partnerships. Other fund types (e.g. investment banks, fund of funds, endowment, pension, and corporate ventures) are excluded to remove any potential effects that investor type may have on the analyses. After screening, the population was reduced to 164,683 investor round observations. The investor round observations are then consolidated into round level data. During the consolidation process, a new variable, *With PE*, is generated to indicate whether or not a private equity fund participated in that specific round of funding. For a given round of funding, the variable is assigned a value of 1 if one or more private equity funds participate and a value of 0 if there is no private equity fund participation. An additional dummy variable, *PE Lead,* is also generated and assumes a value of

1 if a private equity fund acts as the lead investor or value 0 if there is no private equity participation or they are not the lead investor, with the lead being the investor that makes the largest investment in the round. After running the above mentioned screens and consolidating the data to the round level, 76,465 total investment rounds remain which will be used in the analyses. The final sample includes 29,752 investee companies, of which 1,283 successfully exited through IPO and 5,245 exited successfully through trade sales.

B. Summary Statistics

Table 1 provides summary statistics on the 76,465 financing rounds and compares key characteristics of rounds when there is PE participation to rounds when there is no PE participation. Of the total financing rounds, 10,544 rounds include PE participation and 6,469 are led by a PE. This relates to the financing of 6,598 investee companies. A greater percentage of financing rounds with PE participation occur at the expansion (47.3%) and later stage (22.3%) than without PE participation. With regards to industry, more financing rounds occur in companies operating in the non-high technology industry (23.4%), compared to only 12.7% when there is no PE participation. Average round size and the average number of investors in a given round are each larger when PEs participate. Investments are also more geographically diverse, with approximately 67.3% of investment rounds occurring in firms located outside of California.

C. Regression Analysis

Ordinary Least Squares Regressions

In analyzing round size and company valuations of PE investments, four linear regressions are run at the investment round level. Variables are described in Appendix A. In the

linear regressions, *Ln (Round Size)* and *Ln (Valuation)* are the dependent variables and *With PE* is the independent variable of interest. In addition to controlling for company stage, company industry, the number of investors, and the investment year, the regressions are also run with PE Lead as the independent variable to test for robustness.

$$Ln\left(Round\ Size\right) = \ \propto\ +\ \beta_1 * \textbf{With PE} + \ \beta_2 *\ \text{Control Variables} \tag{1}$$

$$Ln\left(Valuation\right) = \ \propto\ +\ \beta_1 * \textbf{with PE} + \ \beta_2 *\ \text{Control Variables} \tag{2}$$

$$Ln\left(Round\ Size\right) = \ \propto\ +\ \beta_1 * \textbf{PE Lead} + \ \beta_2 *\ \text{Control Variables} \tag{3}$$

$$Ln\left(Valuation\right) = \ \propto\ +\ \beta_1 * \textbf{PE Lead} + \ \beta_2 *\ \text{Control Variables} \tag{4}$$

In Table 2, Panel A shows the results of regressions 1 and 2 and Panel B shows the results of regressions 3 and 4. The correlation coefficients of PE participation with round size and company valuation are .4595 and .2666, respectively and significant at the 1% level. The coefficients of PE as the lead investor to round size and company valuation are .5584 and .3289, respectively and again statistically significant. The results are also economically significant. On average, round size is approximately $1.58 million and $1.75 million larger with PE participation and when PE leads, respectively. Also, average company valuation is approximately $1.31 million larger with PE participation and $1.39 million larger when a PE leads the round.

Probit Regressions

To analyze the performance of PE investments, four probit regressions are run. Similar to the linear regressions above, *With PE* and *PE Lead* are the independent variables of interest.

$$Successful\ Exit = \ \propto\ +\ \beta_1 * \textbf{With PE} + \ \beta_2 *\ \text{Control Variables} \tag{5}$$

$$IPO = \propto + \beta_1 * \textbf{\textit{With PE}} + \beta_2 * \text{Control Variables} \tag{6}$$

$$Successful\ Exit = \propto + \beta_1 * \textbf{\textit{PE Lead}} + \beta_2 * \text{Control Variables} \tag{7}$$

$$IPO = \propto + \beta_1 * \textbf{\textit{PE Lead}} + \beta_2 * \text{Control Variables} \tag{8}$$

Tables 3 shows the results of the probit regressions on successful company exit and IPO. Panel A shows the results of regressions 5 and 6 and Panel B shows the results of regressions 7 and 8. With regards to exit performance, we surprisingly see a significant negative correlation of -.1356 between successful exit and PEs participation. However, while a negative correlation of -.1127 is observed when a private equity fund leads a given round, correlation is not as strong. These results are opposite of the expected outcome, and companies are actually less likely to exit when a private equity fund participates. However, when looking at successful exits, slight positive correlations exist between exiting through IPO and private equity fund participation and PE as the lead investor. The corresponding coefficients in these two analyses are .1031 and .0666. Companies are more likely to exit via IPO than trade sales when there is PE participation or when a PE leads the investment round. Recall the sample includes 29,752 companies, of which 6,528 exited successfully. Approximately 80.3% of these exits occur through trade sales, with the remaining companies exiting through IPO, consistent with Strömberg's (2008) post-2000 exit conclusions, that more PEs exit through trade sales and secondary buyouts as opposed to IPO.

V. Conclusion

While PEs have historically had very different investment strategies and styles from VCs, recent trends show that more and more PEs are becoming interested in investing in entrepreneurial companies. While past literature has studied the differences in investments by

private equity buyout funds and venture capital funds separately, little academic research has been done on private equity investments in the growth equity space. This paper shows some characteristics of PE investments, as well as their performance, in what has traditionally been VC territory.

This paper analyzes 76,465 private equity and venture capital investment rounds in entrepreneurial companies between 1990 and 2014 and shows that investment round size as well as company valuation at the time of the investment are positively correlated with PE participation. These relationships are even stronger when the PE fund that participates acts as the lead investor. With regards to exit, the sample shows that the probability of exiting through either IPO or trade sales is approximately 21.9% which is fairly consistent with previous literature. However, the paper finds that while successful exit is less likely when a PE participates or leads, companies are more likely to exit through IPO, as opposed to trade sales, when PE participation is present. A possible explanation for this may be the higher company valuation with active PE participation, therefore reducing the feasibility of a potential trade sale, and forcing the company to go public in order to achieve the higher valuation.

References

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Exhibits 1-4: PE Investments in High Growth Companies

Exhibits 1-4 show trends of PE investments in high growth companies over the data sample period (1990-2014). Exhibits include aggregate equity funding, number of investee companies, time series of funding by year, and percent of funding by company stage and industry.
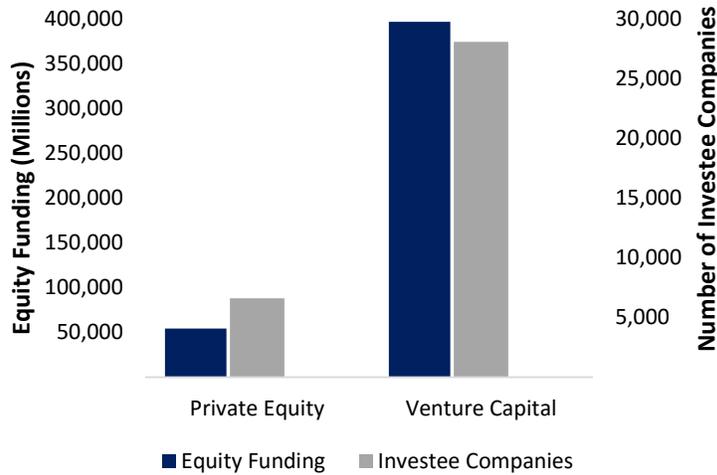
Exhibit 1: Funding by Investor Type
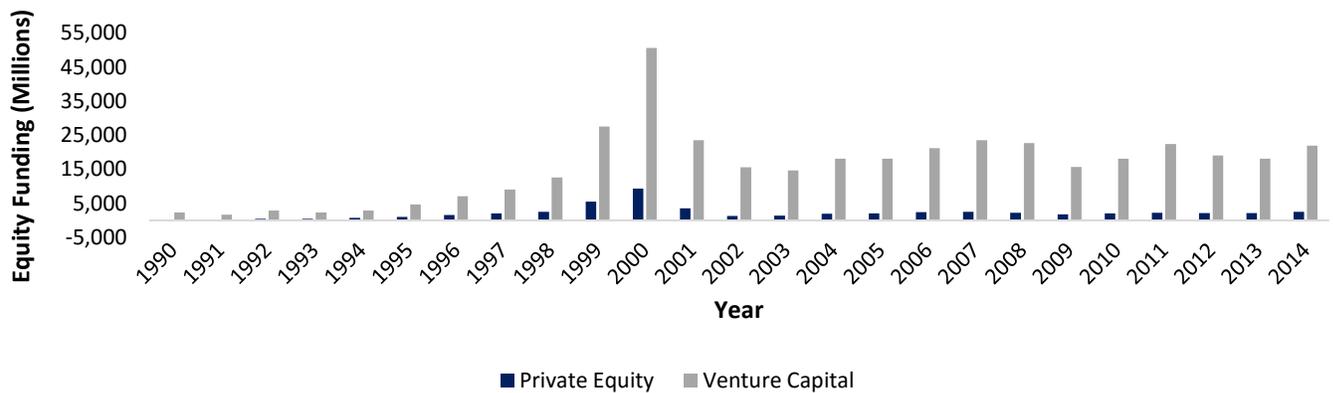

Exhibit 2: Equity Funding by Year
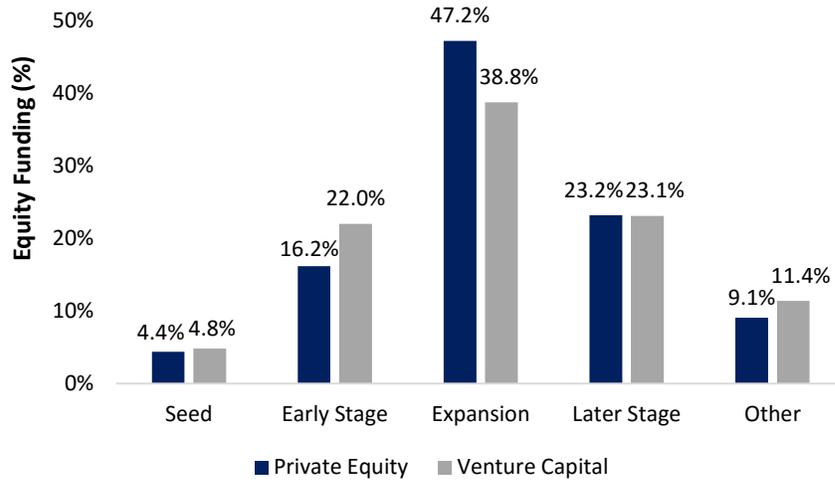
Exhibit 3: Funding by Company Stage

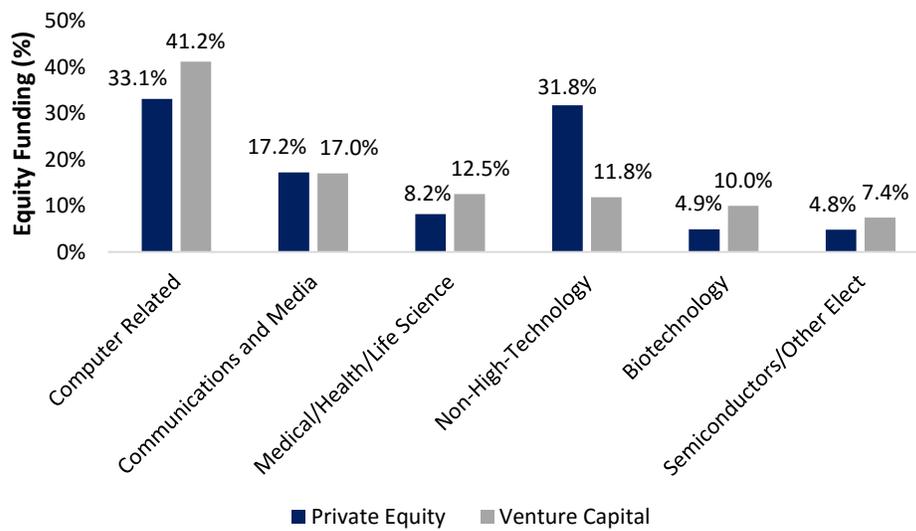**Exhibit 4: Funding by Company Industry**

Table 1 – Sample Characteristics of Private Equity Investments from 1990 to 2014

Our sample consists of 76,465 financing rounds in high growth companies made by private equity funds and venture capital funds between 1990 and 2014. The table compares all financing rounds that include PE participation to rounds in which there is no PE participation. Investment characteristics include the number of investee companies, company stage, company industry, average investment round size, average number of investors, and exits through IPO and trade sales. Significance is marked with * at 10%, ** at 5%, and *** at 1%.

All data is at the round level	With PE Participation	Without PE Participation	P-Value
Number of Investee Companies	6,598	26,748	
Company Stage			
Seed	9.8%	90.2%	***
Early Stage	10.5%	89.5%	***
Expansion	18.6%	81.4%	***
Later Stage	17.1%	82.9%	***
Other	3.7%	96.3%	***
Industry			
Computer Related	12.3%	87.7%	***
Biotechnology	9.1%	90.9%	***
Communications and Media	15.8%	84.2%	***
Non-High-Technology	22.8%	77.2%	***
Medical/Health/Life Science	10.8%	89.2%	***
Semiconductors/Other Elect	12.1%	87.9%	***
Average Round Size (USD Mil)	$15.96	$8.30	***
Average Number of Investors	2.8	2.1	***
Investment Location			
California	11.5%	88.5%	***
Non-California	15.3%	84.7%	***
Investment Exits			
IPO	13.1%	86.9%	***
M&A	13.8%	86.2%	***
Average Days to Exit	1,334.2	1,258.5	**

Table 2 – Round Size and Valuation: With PE Participation vs. Without PE Participation

This table shows the results pertaining to round size and company valuation in financing rounds with PEs participation. Panel A describes regressions 1 & 2 where *With PE* acts as the independent variable, and Panel B describes regressions 3 & 4 where *PE Lead* acts as the independent variable. Regressions with *Ln (Valuation)* as dependent variable exclude observations in which company valuation data was unavailable. In each specification we control for company stage, company industry, number of investors, and investment year. Variable definitions can be found in Appendix A. Significance is marked with * at 10%, ** at 5%, and *** at 1%.

Panel A:

Dependant Variable:	(1) Ln (Round Size)	(2) Ln (Valuation)
With PE	0.4595***	0.2666***
	(0.0000)	(0.0000)
Ln (# of Investors)	1.0239***	0.4110***
	(0.0000)	(0.0000)
Seed Stage	-0.6285***	-1.8040***
	(0.0000)	(0.0000)
Early Stage	-0.2595***	-1.2516***
	(0.0000)	(0.0000)
Expansion	-0.0044	-0.4748***
	(0.8150)	(0.0000)
Later Stage	-0.0274	-0.1652***
	(0.1820)	(0.0000)
Biotechnology	0.0203	0.1255***
	(0.3670)	(0.0000)
Computer Related	-0.1855***	-0.0265
	(0.0000)	(0.3370)
Communications and Media	-0.0318	0.2272***
	(0.1010)	(0.0000)
Medical/Health/Life Science	-0.1355***	-0.0723**
	(0.0000)	(0.0240)
Semiconductors	-0.1670***	0.1326***
	(0.0000)	(0.0000)
California	0.2259***	0.1489***
	(0.0000)	(0.0000)
Constant	-0.7188***	2.6930***
	(0.0000)	(0.0000)
Observations	76,162	17,902
Adjusted R-Squared	0.2985	0.3952

Panel B:

Dependant Variable:	(3) Ln (Round Size)	(4) Ln (Valuation)
PE Lead	0.5584***	0.3289***
	(0.0000)	(0.0000)
Ln (# of Investors)	1.0764***	0.4487***
	(0.0000)	(0.0000)
Seed Stage	-0.6216***	-1.7987***
	(0.0000)	(0.0000)
Early Stage	-0.2543***	-1.2461***
	(0.0000)	(0.0000)
Expansion	0.0022	-0.4668***
	(0.9070)	(0.0000)
Later Stage	-0.0194	-0.1573***
	(0.3430)	(0.0000)
Biotechnology	0.0219	0.1242***
	(0.3310)	(0.0000)
Computer Related	-0.1815***	-0.0282
	(0.0000)	(0.3090)
Communications and Media	-0.0282	0.2256***
	(0.1460)	(0.0000)
Medical/Health/Life Science	-0.1355***	-0.0771**
	(0.0000)	(0.0160)
Semiconductors	-0.1629***	0.1281***
	(0.0000)	(0.0010)
California	0.2240***	0.1457***
	(0.0000)	(0.0000)
Constant	-0.7494***	2.6599***
	(0.0000)	(0.0000)
Observations	76,162	17,902
Adjusted R-Squared	0.2984	0.3944

Table 3 – Company Successful: With PE Participation vs. Without PE Participation

This table shows probit regressions pertaining to company exits when PEs participate. Panel A describes regressions 5 & 6 where *With PE* acts as the independent variable, and Panel B describes regressions 7 & 8 where *PE Lead* acts as the independent variable. In each specification we control for company stage, company industry, number of investors, and investment year. Also added is variable *PE-VC Syndication*. Variable definitions can be found in Appendix A. Significance is marked with * at 10%, ** at 5%, and *** at 1%.

Panel A:

Dependant Variable:	(5) Successful Exit	(6) IPO
With PE	-0.1356***	0.1031***
	(0.0000)	(0.0080)
Seed Stage	0.0250	-0.4828***
	(0.2940)	(0.0000)
Early Stage	0.0935***	-0.3982***
	(0.0000)	(0.0000)
Expansion	0.1870***	-0.1684***
	(0.0000)	(0.0000)
Later Stage	0.3056***	0.0739**
	(0.0000)	(0.0130)
Biotechnology	0.5395***	0.9623***
	(0.0000)	(0.0000)
Computer Related	0.5414***	0.2403***
	(0.0000)	(0.0000)
Communications and Media	0.5164***	0.3871***
	(0.0000)	(0.0000)
Medical/Health/Life Science	0.3817***	0.4693***
	(0.0000)	(0.0000)
Semiconductors	0.4870***	0.3604***
	(0.0000)	(0.0000)
California	0.0610***	0.2029***
	(0.0000)	(0.0000)
Ln (# of Investors)	0.1723***	0.1615***
	(0.0000)	(0.0000)
PE-VC Syndication	0.0988***	-0.0284
	(0.0010)	(0.5470)
Constant	-1.1425***	-1.4166***
	(0.0000)	(0.0000)
Observations	76,465	76,465
Psuedo R-Squared	0.0658	0.1448

Panel B:

Dependant Variable:	(7) Successful Exit	(8) IPO
PE Lead	-0.1127***	0.0666**
	(0.0000)	(0.0340)
Seed Stage	0.0242	-0.4810***
	(0.3090)	(0.0000)
Early Stage	0.0927***	-0.3963***
	(0.0000)	(0.0000)
Expansion	0.1858***	-0.1657***
	(0.0000)	(0.0000)
Later Stage	0.3048***	0.0761**
	(0.0000)	(0.0100)
Biotechnology	0.5413***	0.9588***
	(0.0000)	(0.0000)
Computer Related	0.5430***	0.2369***
	(0.0000)	(0.0000)
Communications and Media	0.5180***	0.3844***
	(0.0000)	(0.0000)
Medical/Health/Life Science	0.3834***	0.4660***
	(0.0000)	(0.0000)
Semiconductors	0.4886***	0.3572***
	(0.0000)	(0.0000)
California	0.0614***	0.2023***
	(0.0000)	(0.0000)
Ln (# of Investors)	0.1719***	0.1604***
	(0.0000)	(0.0000)
PE-VC Syndication	0.0064	0.0486
	(0.7510)	(0.1060)
Constant	-1.1433***	-1.4143***
	(0.0000)	(0.0000)
Observations	76,465	76,465
Psuedo R-Squared	0.0659	0.1447

Appendix A: Variable Definitions

Variables	Definitions
Ln (Round Size)	The natural logarithm of total dollar amount for a financing round.
Ln (Valuation)	The natural log of the company dollar valuation for a financing round.
With PE	A variable which is equal to 1 if at least one private equity fund participates in the financing round, and 0 otherwise.
PE Lead	A variable which is equal to 1 if the lead investor is a private equity fund, and 0 otherwise.
Ln (# of Investors)	The natural logarithm of the number of investor's in a round of financing.
PE-VC Syndication	A variable which is equal to 1 if both a private equity and venture capital fund participate in the financing round, and 0 otherwise.
Seed Stage	A dummy variable which is equal to 1 if the financing occurs within a company currently in seed stage, and 0 otherwise.
Early Stage	A dummy variable which is equal to 1 if the financing occurs within a company currently in early stage, and 0 otherwise.
Expansion	A dummy variable which is equal to 1 if the financing occurs within a company currently in expansion stage, and 0 otherwise.
Later Stage	A dummy variable which is equal to 1 if the financing occurs within a company currently in later stage, and 0 otherwise.
Biotechnology	A dummy variable which is equal to 1 if the company operates in the biotechnology industry, and 0 otherwise.
Computer Related	A dummy variable which is equal to 1 if the company operates in the computer-related industry, and 0 otherwise.
Communications and Media	A dummy variable which is equal to 1 if the company operates in the communications or media industry, and 0 otherwise.
Medical/Health/Life Science	A dummy variable which is equal to 1 if the company operates in the medical, health, or life science industry, and 0 otherwise.
Semiconductors	A dummy variable which is equal to 1 if the company operates in the semiconductor industry, and 0 otherwise.
California	A dummy variable which is equal to 1 if the company being financed is located in California, and 0 otherwise.