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Corporate Venture Capital and Its Effects on Company Valuation - An Analysis of the Additions of CVC Arms

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Abstract:

This paper examines the stock price reaction to the addition of corporate venture capital arms to publicly traded companies. Referencing venture capital resources, corporate press release announcements of the addition of CVC arms were hand collected. I calculate the cumulative abnormal returns (CARs) surrounding press release announcement dates and find immediate stock market reactions, positively increasing stock prices compared to the overall market. I further perform placebo event studies at random dates and with direct competitors using the same announcement dates and find no significant results. These findings suggest that corporate venture capital increases company valuation and that financial markets positively value corporate venture capital arms.

Keywords: Venture Capital, Corporate Venture Capital, Corporate Finance, Corporate Investment, Empirical Finance, VC, CVC

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1. INTRODUCTION

The venture capital industry is infamous for being difficult for individuals outside the industry to view its inner workings, due to the confidential nature of the work conducted and the private investments made. Academics have especially had difficulty trying to research the field due to the lack of available data. Although difficult to obtain data, the industry merits the need for strong academic research. Venture Capital (VC) firms provide capital to young firms that may be considered too risky for traditional modes of financing due to their uncertainty. To compensate for this, VC firms make equity-based investments, expecting significant returns. Over the past three decades, the industry has expanded rapidly and has become an important part of the entrepreneurial ecosystem and spurring important technological advances.

According to preliminary research, Strebulaev and Gornall (2015) found that venture-backed companies made up roughly 42% of all U.S. public companies founded after 1974, contributing to 59% of total taxes, 61% of total net income, 63% of total market capitalization, and 85% of total R&D expenditure. Further, research conducted by the National Venture Capital Association (NVCA) found that 24% of all IPOs in between 2004-2019 were in fact venture-backed.[1] From 2010 to 2020, $779 billion of venture capital was also invested in the U.S., with an average of 5,665 deals every year.[2] Although difficult to research, these results show the importance of venture capital to the broader economy and validate the importance to push forward research to better understand the industry and add to the greater body of literature.

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[1] NVCA (2020). *NVCA 2020 Yearbook* (p. 34, Rep.). San Francisco, CA: National Venture Capital Association. https://nvca.org/wp-content/uploads/2020/03/NVCA-2020-Yearbook.pdf

[2] Insights MoneyTree (2020). *MoneyTree Report Q4 2020* (p. 5, Rep.). PwC/CB Insights MoneyTree. https://www.pwc.com/us/en/moneytree-report/assets/pwc-moneytree-2020-q4.pdf

Corporate Venture Capital (CVC) arms of publicly traded companies present a unique opportunity to better understand the broader VC industry through the use of readily accessible financial data, but also present the opportunity for future areas of research to compare CVC firms to the traditional VC industry. Different from traditional VC firms, CVC arms are housed within corporations by either being an internal department of the company or owned as a separate subsidiary. Corporations will often deploy a CVC arm primarily for either strategic or financial reasons.

A major reason for a CVC arm is to improve the company's research and development efforts. Kortum and Lerner (2000) find that venture capital is three to four times more powerful than corporate research and development. Instead of running the risk of developing technology internally, firms may find it to be more advantageous to look externally and invest in small, focused companies to perform the work.

Having a CVC arm also allows companies to continually evaluate new technological developments and potential competition. The traditional VC firm will review hundreds, if not thousands, of investments a year and will slowly narrow their pipeline to a handful of investments that reach fruition. Having an internal CVC arm allows corporations to continually learn of emerging market trends and ensure that the larger company avoids disruptive innovation.

Finally, CVC arms can help fuel a corporation's M&A and business development activity. Benson and Ziedonis (2010) find that one of every five startups purchased by 61 top corporate investors from 1987 through 2003 were in fact the acquirer's own venture portfolio companies. Further, Bradley and Sundaram (2006) find that acquisitions of non-public entities generated an aggregate gain of $222 billion in between 1990 and 2000, whereas the acquisitions of public targets generated an aggregate loss of $110 billion in a sample set of 12,476 acquisitions. Startups present an attractive option for acquisitions, because the companies are small enough to integrate easily, have not gathered significant assets that may be inapplicable to the acquirer, and are generally focused on emerging market trends.

Although there are several reasons for why a corporation may want to add a venture capital arm to its operations, a question to ask is how do financial markets view companies when they add a CVC arm? Because of the potential strategic and financial benefits aforementioned, do investors view CVC firms as value-creating or does the taking on of additional risk lead to value-destruction? This paper seeks to answer these questions and add to the growing body of VC and CVC literature.

This paper analyzes the cumulative abnormal returns (CARs) surrounding press release announcement dates of the addition of corporate venture capital arms to understand how CVC arms affect companies' stock market valuation. The hypothesis set forth in this paper is that the announcement of the creation of CVC firms positively affect public companies' stock market prices, thus increasing company valuation, and is viewed favorably by financial markets. The rest of the paper is as follows: Section 2 describes the data used throughout the study, Section 3 presents the empirical research methods and results, and Section 4 offers concluding remarks.

2. DATA DESCRIPTION

Data were hand collected by referencing corporate venture capital firms listed in PitchBook founded since the year 2000. Utilizing search engines, 23 publicly available corporate press releases documenting their announcement dates were gathered. Additional articles were found, which could have increased the overall sample size, however this paper restricts its sample to only official press releases released by companies. Table 1 lists all public companies analyzed in this paper, listing the public company's name, its associated corporate venture capital arm, ticker, and sector.

Following Table 1, Table 2 reports statistics that summarize the 23 sample companies with CVC announcement dates. Included in the table are the following statistics: *MktCap* as the market capitalization measured in thousands, and is calculated by multiplying the firm's closing stock price by its total shares outstanding. *Price* as the closing stock price of each firm on the day of the CVC firm announcement. *Volatility* as a measure of range-based volatility as discussed in Alizadeh et al. (2002) and is calculated as the difference between the natural log of the highest price and the natural log of the lowest price during a particular year. *Share Turnover* as the ratio of trading volume scaled by shares outstanding for each firm. *Spread* as the difference between the bid and ask price of each stock (i.e. bid-ask spread), scaled by the midpoint average. *Exchange* as a dummy variable equaling one if the stock is listed on the NASDAQ stock exchange - zero if it is listed on the NYSE stock exchange. *D/E* as the debt-to-equity ratio measured as the amount of (annual) total liabilities scaled by (annual) total equity. *Book to Market* as the ratio of the book value of the firm at the announcement date to the market value of the firm. *Revenue* as the annual revenue of the company, measured in thousands. *Asset Turnover* as the ratio of total sales to total assets of the firm. *Current Ratio* as the ratio of current assets to current liabilities of the firm.

MktCap, *Exchange*, *D/E*, *Book to Market*, *Revenue*, *Asset Turnover*, and *Current Ratio* are derived from annual data gathered from Standard & Poor's Compustat financial database. *Price*, *Volatility*, *Share Turnover*, and *Spread* are derived from daily data from the Center for Research in Security Prices (CRSP).

As seen in Table 2, the average firm had a market capitalization of $57 billion, closing price of $162.68, volatility of 0.12, share turnover of 2.18, bid-ask spread of 0.00027, debt-to-equity ratio of 2.10, book-to-market ratio of 0.0003, annual revenue of $29 billion, asset turnover of 0.69, and current ratio of 2.04. Of the 23 companies, roughly 60% are NASDAQ-listed companies, while 40% are NYSE-listed.

Like Table 1, Table 3 lists public competitor companies, which are used in Section 3.2 for placebo testing and later in Section 3.3 for a linear regression model. Table 4 reports the summary statistics for the 23 direct competitor companies without CVC announcement dates. As seen in the table, the average firm had a market capitalization of $62 billion, closing price of $84.51, volatility of 0.03, share turnover of 12.69, bid-ask spread of 0.0029, debt-to-equity ratio of 2.52, book-to-market ratio of 0.0005, annual revenue of $43 billion, asset turnover of 0.92, and a current ratio of 1.82. Of the 23 companies, roughly 26% are NASDAQ listed companies, while 74% are NYSE-listed.

3. EMPIRICAL TESTS

3.1 Cumulative Abnormal Returns event studies

To understand what effect the announcements of CVC arm additions have to companies' valuation, this paper observes the cumulative abnormal returns (CARs) of various event windows surrounding the announcement dates of the 23 sample companies in Table 1. CARs are derived from a market model estimated during a defined pre-event period. The market model is specified in the following way:

$$(1)\quad R_{i,t} = \alpha + \beta Rm_t + \varepsilon_{i,t}$$

R is the return for stock i on day t and Rm is either the CRSP equally-weighted or value-weighted index on day t. The α and β parameters are estimated using a pre-event period ending 46 days before each event date, with a maximum of 255 days and minimum of 3 days of market returns. Utilizing the market model during the pre-event period, I estimate the following model for expected return for stock i on day t:

$$(2)\ \ E[R_{i,t}] = \hat{\alpha} + \hat{\beta} \times Rm_t$$

Afterwards, I calculate the "abnormal return" (AR) by taking the difference between the actual return for stock i on day t and the expected return:

$$(3)\ \ AR_{i,t} = R_{i,t} - E[R_{i,t}]$$

Summing all firm-specific abnormal returns, I obtain the "cumulative" abnormal returns for each time window listed in Table 3, illustrated by the following equation:

$$(4)\ CAR^{i}_{t,T} = \sum_{t=1}^{T} AR_t$$

In Table 5, six event windows were used in both the equally-weighted (Panel A) and value-weighted (Panel B) panels. The event windows are listed in parentheses notation with negative values illustrating days before the event date, zero being the event date, and positive values illustrating days after the event date. For instance, the event window (-1,-1) indicates the day before the CVC arm announcement; (0,0) indicates the day of the announcement; (-1,1) indicates the day before, through the day after the announcement; (0,1) indicates the day of the announcement through the day after; (0,5) indicates the announcement date through the fifth day after the event; and (0,10) indicates the announcement date through the tenth day after the event. These six event windows were also used in additional tables that will be discussed later in the paper.

To determine the effect of CVC arm addition announcements on company valuation, Columns [1] and [2] in Table 5 are the most illustrative. In Panel A, Column [1] is the day before the announcement date and the mean CARs for the 23 sample stocks is 0.37% (t-statistic = 1.014), however there is no statistical evidence that this value is significantly different from zero. Column

[2] is the day of the announcement date and the mean CARs for the 23 sample stocks is 0.99% (t-statistic = 3.183), almost a full percentage above the CRSP equally-weighted market index return, being statistically significant at the 0.001 level, indicating that the CVC announcement dates had an immediate impact on stock prices, increasing the company valuation.

Column [3] illustrates the day before and the day after the announcement date and the mean CARs for the event window is 2.37% (t-statistic = 4.108), the strongest of all windows and is again statistically significant at the 0.001 level.

Columns [4], [5], and [6] are used to illustrate the longer-term effects of the CVC announcement dates. Column [4] is the event window between the announcement date and the day after, resulting in a mean CARs of 1.78% (t-statistic = 3.692), significant at the 0.001 level. Column [5] is five days after the announcement date and Column [6] is ten days after the announcement date, and the mean CARs are 1.30% (t-statistic = 2.969) and 2.05% (t-statistic = 2.945), respectively, statistically significant at the 0.01 level, indicating that the CVC announcement date had a relatively long-term effect on the 23 stocks' company valuation, when compared to the overall market.

For robustness, Panel B of Table 5 uses the same market model as illustrated in equation (1), however, a value-weighted market index is used when estimating CARs . Similar CAR results are seen across all event windows, with consistent significant levels. Column [1], the day before the CVC announcement date, results in a mean CARs of 0.30% (t-statistic = 0.522) and the value is again statistically insignificant. Column [2], the day of the announcement date, provides a mean CARs of 1.04% (t-statistic = 3.446) and is statistically significant at the 0.001 level.

For further robustness, an additional event study was performed, utilizing the Fama-French model to estimate the cumulative abnormal returns of the 23 CVC announcement dates with results listed in Table 6. The Fama-French model is specified in the following way:

$$(5)\ R_{i,t} = \alpha + \beta_1 Rm_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$$

R is the return for stock i on day t and Rm is again either the CRSP equally-weighted or value-weighted index on day t. SMB is the small minus large market capitalization risk factor to control for company size and HML is the high minus low book-to-market risk factor to control for either value or growth stocks. The α and β parameters are estimated using a pre-event period. Utilizing the Fama-French model during the pre-event period, I estimate the following model to calculate the expected return for stock i on day t:

$$(6)\ E\left[R_{i,t}\right] = \hat{\alpha} + \widehat{\beta_1} \times Rm_t + \widehat{\beta_2} \times SMB_t + \widehat{\beta_3} \times HML_t$$

Similar to Table 5, I calculate the abnormal return by taking the difference between the actual return for stock i on day t and the expected return as illustrated in equation (3) and sum all firm-specific abnormal returns to obtain the cumulative abnormal returns as illustrated in equation (4).

Consistent with the cross-sectional event study in Table 5, all columns for Table 6 but Column [1] are statistically significant, with the majority of the mean CARs from both panels being higher than the values from Table 5. Column [1], the day before the announcement date, resulted in 0.37% (t-statistic = 0.670) and 0.26% (t-statistic = 0.371) mean CARs for Panel A and Panel B, respectively, both being statistically insignificant. Column [2], the day of the announcement date, resulted in 1.13% (t-statistic = 3.494) and 1.09% (t-statistic = 3.652) mean CARs for Panel A and Panel B, respectively, both being statistically significant at the 0.001 level.

These results further support the hypothesis that the addition of CVC arms positively influence companies' stock prices, and thus their market valuation.

3.2 Placebo tests

Alternative to the hypothesis above, it would be expected that companies without CVC arm announcements would not have any significant changes to their stock prices. Results in the previous subsection could be explained by other spurious reasons. To evaluate this possibility, 23 direct competitors to the companies listed in Table 1 were gathered and are listed in Table 3. Table 4 replicates Table 2 and reports statistics that summarize the 23 sample competitors.

Using these 23 competitor companies, a similar cross-sectional event study to Table 5 was conducted to observe the CARs surrounding the same CVC announcement dates as the companies listed in Table 1. If the results in the previous subsection are indeed spurious, then CARs of competitors should also be positive and significant. The results of this event study are found in Table 7, using the same event windows found in Table 5. As expected, all event windows' mean CARs are statistically insignificant. Column [1] of Panel A, the day before Table 1's CVC announcement dates, resulted in a mean CARs of -0.38% (t-statistic = -0.024) and Column [2], the day of Table 1's CVC announcement dates, resulted in a -0.27% mean CARs (t-statistic = -0.201). These results further support the hypothesis that the announcement of CVC arm additions positively influence companies' stock prices and the absence of such announcements, as shown in Table 7, should have no effect on a company's stock price.

To provide further robustness, an additional cross-sectional placebo event study was conducted using the sample of original companies listed in Table 1. In Table 8, randomized dates were generated to calculate daily mean CARs to compare to the results found in Table 5 Column [2]. Randomized dates for each of the 23 companies were generated 10 times for both Panel A and

Panel B. Of the 20 results from both panels, three out of the 10 CARs in Panel A and four out of the 10 CARs in Panel B were statistically significant at the 0.05 level. However, the majority of the resulting mean CARs were statistically insignificant. The average of the 10 tests for Panel A resulted in a -0.14% mean CARs (average t-statistic = -0.915) and the average of the 10 tests for Panel B resulted in a -0.16% mean CARs (average t-statistic = -1.099), both being statistically and economically insignificant. These results show that there is little probability that the results found in Table 5 would be statistically significant at random, especially at the 0.001 level, further supporting the hypothesis that announcements of CVC arm additions positively influence companies' stock prices.

3.3 OLS Linear Regression Model

To better understand what is driving the positive CARs surrounding the CVC arm announcement dates, a linear regression model was created to isolate various effects and control for multiple factors. Table 9 reports results of several variations of the following regression model:

$$(6)\quad CAR(0,0) = \alpha + \beta_1\ CVC_i + \beta_2\ ln(ShareTurn)_{i,t} + \beta_3\ ln(MktCap)_{i,t} + \beta_4\ ln(Spread)_{i,t} + \beta_5\ ln(D/E)_{i,t} + \beta_6\ ln(B/M)_{i,t} + \varepsilon_{i,t}$$

The dependent variable in this regression is the CARs of the CVC arm announcement dates. Included in the analysis are the 23 companies that announced CVC arm additions and the 23 direct competitors without CVC arm announcements, making a total of 46 CARs, or 46 observations. *CVC* is a dummy variable equaling one or zero, being one if the company announced a CVC arm addition – zero if the firm is a CVC firm competitor. *ln*(*ShareTurn)* is the natural log of share turnover and is the ratio of trading volume, scaled by shares outstanding for each firm. *ln*(*MktCap)* is the natural log of the market capitalization of the given stock. *ln(Spread)* is the natural log of the bid-ask spread, scaled by the midpoint average. *ln(D/E)* is the natural log of the debt-to-equity ratio, measured as total liabilities scaled by total equity. *ln(B/M)* is the natural log of the company's total equity scaled by the total market capitalization, or the book-to-market ratio.

Column [1] of Table 9 is a simple linear regression, only including *CVC* as an independent variable. The regression results in a positive coefficient, 0.0127 (t-statistic = 2.32) , which is statistically significant at the 0.05 level. This indicates that companies that announced CVC arm additions experienced positive 1.27% CARs greater than competitors that did not announce CVC arm additions.

Columns [2] through [6] individually add additional control variables to *CVC* to identify which other variables have significant impact on cumulative abnormal returns. Columns [2] and [3] indicate that share turnover and company market capitalization do not significantly affect whether or not a company experiences significant cumulative abnormal returns. Column [4] includes company stock *Spread*, which has a negative coefficient of -0.025 (t-statistic = -4.08). This shows a strong relationship between a stock's spread and its CARs and that as spread increases, CARs decrease. This intuitively makes sense, because as the spread widens, this would make the stock more illiquid and could decrease the stock price to compensate. Column [5] includes company Debt-to-Equity ratio, which has a positive coefficient of 0.006 (t-statistic = 2.11). This shows that as a company increases its debt or decreases its equity, it can expect a higher CAR when announcing a CVC arm addition. Column [6] includes the company Book-to-Market ratio, which has a negative coefficient of -0.008 (t-statistic = -2.82), indicating that as the equity book value increases or market capitalization decreases, companies can expect a decrease in CARs. This variable is important to include in the model, because it captures potential effects of market capitalization that were not captured in Column [2]. After individually including all variables, as illustrated in Columns [2] through [6], the dummy variable *CVC* remains statistically significant in each instance and remains positive.

Column [7] of Table 9 includes all of the aforementioned variables and is the full representation of model (6). After including all other control variables together, the variable *CVC* is still statistically significant with a positive coefficient of 0.0139 (t-statistic = 2.57), being significant at the 0.01 level. This model results in a R-squared of 0.50 and an adjusted R-squared of 0.42, explaining 42% of the variation of the data set. These results further support the hypothesis that announcements of CVC arm additions positively influence company stock prices, while controlling for multiple factors, and add to the results found in sections 3.1 and 3.2.

All specifications of the model use robust standard errors to account for possible heteroskedasticity. Further, Variance Inflation Factor (VIF) testing was conducted to ensure no multicollinearity issues.

4. CONCLUSION

In this study, I find strong evidence supporting the hypothesis that the announcement of CVC arms positively influence stock market prices of the parent company. These findings are important for several reasons. First, it helps us understand how the broader financial market perceives venture capital. Second, it provides context for company executives to ensure they are aligned in their purpose to maximize shareholder value when considering CVC arm additions.

Results show that before the announcement date of CVC firms, the companies involved in the cross-sectional event study did not experience significant returns, however, the day of the CVC announcement dates, the event study resulted in a 0.99% equally-weighted CAR (t-statistic =

3.183) and 1.04% value-weighted CAR (t-statistic = 3.446), both significant at the 0.001 level. The day after yielded a 1.78% equally-weighted CAR (t-statistic = 3.692) and 1.97% value-weighted CAR (t-statistic = 3.598), both again significant at the 0.001 level. To ensure robustness, a Fama-French model event study was also conducted, which yielded even stronger CARs, with similar significance levels.

Additionally, the study demonstrates alternative placebo testing to compare the initial results to (i) competing firms on the actual CVC event dates, and (ii) the sample CVC firms on randomized event dates. Results from the placebo tests do not find statistically significant CARs on the actual event dates for competitor companies, illustrating that there were likely no industry or economic timing factors. The tests also show that while some of the randomized event dates generate some statistically significant CARs for companies announcing CVC additions, the magnitude is much lower and is often negative instead of positive.

The analysis concludes with a multilinear regression model combining both the CVC arm announcement firms and the direct competitor firms to observe if there were any other factors contributing to the CARs on the announcement date. *CVC* is included as a dummy variable to indicate which companies announced a CVC arm addition to understand what effect the announcement had, when controlling for other factors. Other variables included are share turnover, market capitalization, bid-ask spread, debt-to-equity ratio, and book-to-market ratio. After controlling for these factors, I find that *CVC* produces a coefficient of 0.0139 (t-statistic = 2.57), which is statistically significant at the 0.01 level. This indicates that companies that announced a CVC arm addition experienced on average 1.39% greater CARs than competitor companies that did not announce a CVC arm addition.

These findings contribute to the broader literature and provide important context as corporate venture capital continues to grow. Additional areas of research of corporate venture capital could be to compare how traditional VC compares to CVC and determining the long term strategic and financial benefits of CVC arms to public companies.

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APPENDIX

Table 1 - Companies announcing CVC arm additions

Company Name	CVC Firm	Ticker	Sector
	[1]	[2]	[3]
Honeywell	Honeywell Ventures	HON	Industrial Conglomerate
Workday	Workday Ventures	WDAY	Software
Concur	Concur Perfect Trip Fund	CNQR	Software
Kraft Heinz Co	Evolv Ventures	KHC	Packaged Foods
Kellogg Co	Eighteen94 Capital	K	Packaged Foods
General Mills Inc	301 Inc	GIS	Packaged Foods
UnitedHealth Group	Optum Ventures	UNH	Healthcare
Mellanox	Mellanox Capital	MLNX	Communication Equipment
Ryder	RyderVentures	R	Rental & Leasing Services
Symantec	Symantec Ventures	SYMC	Software
KLA Tencor Corp	KT Venture Group	KLAC	Semiconductors
Cigna Corp	Cigna Ventures	CI	Healthcare
Qualcomm Inc	Qualcomm Ventures	QCOM	Semiconductors
Tyson Foods Inc	Tyson Ventures	TSN	Packaged Foods
DaVita Inc	DaVita Ventures	DVA	Healthcare
Jones Lang LaSalle Inc	JLL Spark	JLL	Real Estate
Amazon.Com Inc	Amazon Alexa Fund	AMZN	Internet Retail
Intuitive Surgical Inc	Intuitive Ventures	ISRG	Healthcare
JetBlue Airways Corp	JetBlue Technology Ventures	JBLU	Airlines
Alphabet Inc	Gradient Ventures	GOOGL	Internet Content & Information
Nasdaq Inc	Nasdaq Ventures	NDAQ	Financial Services
Amgen Inc	Amgen Ventures	AMGN	Healthcare
Allegion PLC	Allegion Ventures	ALLE	Security & Protection Services

Table 2 – Summary Statistics

The table reports statistics that describe the sample of the 23 public firms collected from the collected press releases. MktCap is market capitalization for each firm in each year, measured in thousands. Price is the closing stock price of each firm on the day of the CVC firm announcement. Volatility is a measure of range-based volatility discussed in Alizadeh et al. (2002) and is calculated as the difference between the natural log of the highest price and the natural log of the lowest price during a particular year. Share Turnover is the ratio of trading volume scaled by shares outstanding for each firm. Spread is the bid-ask spread, scaled by the midpoint average. D/E is the debt-to-equity ratio measured as the amount of (annual) total liabilities scaled by (annual) total equity. Book to Market is the ratio of the book value of the firm at the announcement date to the market value of the firm. Revenue is the annual revenue of the company, measured in thousands. Asset Turnover is the ratio of total sales to total assets of the firm. Current Ratio is the ratio of current assets to current liabilities of the firm.

	Mean	Standard Dev.	25th Percentile	Median	75th Percentile
	[1]	[2]	[3]	[4]	[5]
MktCap	57,208,997	77,128,813	7,591,033	18,745,204	65,726,102
Price	162.68	225.68	56.54	80.96	127.08
Volatility	0.12	0.08	0.07	0.09	0.12
Share Turnover	2.18	1.94	1.20	1.50	2.34
Spread	0.00027	0.00087	0.00012	0.00029	0.00048
Exchange	0.6	0.5	0.0	1.0	1.0
D/E	2.10	1.82	0.57	1.67	3.16
Book to Market	0.0003	0.0003	0.0001	0.0003	0.0005
Revenue	29,121,000	48,487	3,591	8,420	31,575
Asset Turnover	0.69	0.41	0.38	0.65	0.85
Current Ratio	2.04	1.79	0.91	1.27	2.13

Table 3 - Competitors

CVC Company Name	Competitor Name	Ticker	Sector
	[1]	[2]	[3]
Honeywell	Johnson Controls	JCI	Industrial Conglomerate
Workday	SAP	SAP	Software
Concur	Intuit	INTU	Software
Kraft Heinz Co	Mondelez International	MDLZ	Packaged Foods
Kellogg Co	General Mills	GIS	Packaged Foods
General Mills Inc	Kellog	K	Packaged Foods
UnitedHealth Group	Anthem	ANTM	Healthcare
Mellanox	Broadcom	AVGO	Communication Equipment
Ryder	XPO Logistics	XPO	Rental & Leasing Services
Symantec	Palo Alto Networks	PANW	Software
KLA Tencor Corp	Applied Materials	AMAT	Semiconductors
Cigna Corp	Molina Healthcare	MOH	Healthcare
Qualcomm Inc	Advanced Micro Devices	AMD	Semiconductors
Tyson Foods Inc	Hormel Foods Corp	HRL	Packaged Foods
DaVita Inc	HCA Healthcare	HCA	Healthcare
Jones Lang LaSalle Inc	CBRE Group	CBRE	Real Estate
Amazon.Com Inc	Walmart	WMT	Retail
Intuitive Surgical Inc	Medtronic	MDT	Healthcare
JetBlue Airways Corp	Delta	DAL	Airlines
Alphabet Inc	Microsoft	MSFT	Internet Content & Information
Nasdaq Inc	MarketAxess	MKTX	Financial Services
Amgen Inc	Eli Lilly	LLY	Healthcare
Allegion PLC	Stanley Black & Decker	SWK	Security & Protection Services

Table 4 – Competitor Summary Statistics

The table reports statistics that describe the sample of the 23 competitor public firms to the companies listed in Table 1. MktCap is market capitalization for each firm in each year, measured in thousands. Price is the closing stock price of each firm on the day of the CVC firm announcement. Volatility is a measure of range-based volatility discussed in Alizadeh et al. (2002) and is calculated as the difference between the natural log of the highest price and the natural log of the lowest price during a particular year. Share Turnover is the ratio of trading volume scaled by shares outstanding for each firm in each year. D/E is the debt-to-equity ratio measured as the amount of (annual) total liabilities scaled by (annual) total equity. Book to Market is the ratio of the book value of the firm at the announcement date to the market value of the firm. Revenue is the annual revenue of the company, measured in thousands. Asset Turnover is the ratio of total sales to total assets of the firm. Current Ratio is the ratio of current assets to current liabilities of the firm.

	Mean	Standard Dev.	25^{th} Percentile	Median	75^{th} Percentile
	[1]	[2]	[3]	[4]	[5]
MktCap	62,487,024	115,912,548	11,552,083	25,461,367	48,116,019
Price	84.51	52.22	45.38	69.99	105.84
Volatility	0.0301	0.0337	0.0126	0.0185	0.0310
Share Turnover	12.69	17.24	3.86	5.87	11.09
Spread	0.0029	0.0125	0.0001	0.0002	0.0004
Exchange	0.26	0.45	0.00	0.00	0.50
D/E	2.52	3.17	0.80	1.48	2.85
Book to Market	0.00053	0.00125	0.00016	0.00025	0.00037
Revenue	43,892,000	98,865	9,544	16,252	29,543
Asset Turnover	0.92	0.59	0.53	0.77	1.05
Current Ratio	1.82	1.57	1.04	1.52	2.03

Table 5 – Cross-Sectional Event Study – CARs Surrounding CVC arm additions

Cumulative abnormal returns (CARs) are from a market model estimated during the pre-event period. The market model is specified in the following way:

$$R_{i,t} = \alpha + \beta Rm_t + \varepsilon_{i,t}$$

Where R is the return for stock i on day t and Rm is the CRSP value-weighted index on day t. After estimating the market model during the pre-event period, I obtain estimates for ε, which is the firm-specific return, or the "abnormal" return. I then sum these abnormal returns for various time windows surrounding the addition dates of corporate venture capital arms. T-statistics, which determine whether or not CARs are significantly different from zero, are reported in parentheses. *, **, and *** denote statistical significance at the 0.05, 0.01, and 0.001 levels, respectively.

Panel A - Equally-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	0.59%	0.99%***	2.37%***	1.78%***	1.30%**	2.05%**
Precision Weighted CAAR	0.25%	0.99%	2.00%	1.75%	1.67%	2.50%
T-statistic	(1.014)	(3.183)	(4.108)	(3.692)	(2.969)	(2.945)
N	23	23	23	23	23	23

Panel B - Value-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	0.30%	1.04%***	1.97%***	1.67%***	0.88%**	1.94%**
Precision Weighted CAAR	0.12%	0.96%	1.72%	1.59%	1.29%	2.27%
T-statistic	(0.522)	(3.446)	(4.022)	(3.598)	(2.405)	(2.621)
N	23	23	23	23	23	23

Table 6 – Fama-French Event Study – CARs Surrounding CVC firm additions

Cumulative abnormal returns (CARs) are from the Fama-French model estimated during the pre-event period. The Fama-French model is specified in the following way:

$$R_{i,t} = \alpha + \beta_1 Rm_t + \beta_2 SMB_t + \beta_3 HML_t + \varepsilon_{i,t}$$

Where R is the return for stock i on day t and Rm is the CRSP value-weighted index on day t, SMB is the small minus large market capitalization risk factor to control for company size on day t, and HML is the high minus low book-to-market risk factor to control for either value or growth stocks on day t. After estimating the market model during the pre-event period, I obtain estimates for ε, which is the firm-specific return, or the "abnormal" return. I then sum these abnormal returns for various time windows surrounding the addition dates of corporate venture capital arms. T-statistics, which determine whether or not CARs are significantly different from zero, are reported in parentheses. *, **, and *** denote statistical significance at the 0.05, 0.01, and 0.001 levels, respectively.

Panel A - Equally-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	0.37%	1.13%***	2.24%***	1.87%***	0.88%**	2.30%**
Precision Weighted CAAR	0.15%	0.97%	1.86%	1.70%	1.28%	2.35%
T-statistic	(0.670)	(3.494)	(4.148)	(3.618)	(2.412)	(2.945)
N	23	23	23	23	23	23

Panel B - Value-Weighted

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	0.26%	1.09%***	2.00%***	1.75%***	0.79%*	1.86%**
Precision Weighted CAAR	0.08%	0.95%	1.66%	1.57%	1.11%	2.05%
T-statistic	(0.371)	(3.652)	(3.913)	(3.458)	(2.136)	(2.392)
N	23	23	23	23	23	23

Table 7 – Competitor Cross-Sectional Tests – Placebo CARs Surrounding CVC arm addition dates

Cumulative abnormal returns (CARs) are from a market model estimated during the pre-event period. The market model is specified in the following way:

$$R_{i,t} = \alpha + \beta Rm_t + \varepsilon_{i,t}$$

Where R is the return for stock i on day t and Rm is the CRSP value-weighted index on day t. After estimating the market model during the pre-event period, I obtain estimates for ε, which is the firm-specific return, or the "abnormal" return. I then sum these abnormal returns for various time windows surrounding the addition dates of corporate venture capital arms. T-statistics, which determine whether or not CARs are significantly different from zero, are reported in parentheses. *, **, and *** denote statistical significance at the 0.05, 0.01, and 0.001 levels, respectively.

Panel A - Equally-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	-0.38%	-0.27%	-0.36%	0.02%	0.73%	1.12%
Precision Weighted CAAR	-0.02%	-0.07%	0.07%	0.10%	0.45%	0.75%
T-statistic	(-0.024)	(-0.201)	(0.087)	(0.195)	(0.850)	(0.920)
N	23	23	23	23	23	23

Panel B - Value-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]
	CAR(-1,-1)	CAR(0,0)	CAR(-1,1)	CAR(0,1)	CAR(0,5)	CAR(0,10)
Mean CARs	-0.58%	-0.27%	-0.74%	-0.16%	0.35%	1.00%
Precision Weighted CAAR	-0.09%	-0.13%	-0.12%	-0.01%	0.17%	0.72%
T-statistic	(-0.141)	(-0.416)	(-0.158)	(-0.030)	(0.342)	(0.872)
N	23	23	23	23	23	23

Table 8 – Placebo Cross-Sectional Tests – CARs surrounding randomized dates

Cumulative abnormal returns (CARs) are from a market model estimated during the pre-event period. The market model is specified in the following way:

$$R_{i,t} = \alpha + \beta Rm_t + \varepsilon_{i,t}$$

Where R is the return for stock i on day t and Rm is either the CRSP equally-weighted or value-weighted index on day t, by panel respectively. After estimating the market model during the pre-event period, I obtain estimates for ε, which is the firm-specific return, or the "abnormal" return. I then sum these abnormal returns for various time windows surrounding the addition dates of corporate venture capital arms. T-statistics, which determine whether or not CARs are significantly different from zero, are reported in parentheses. *, **, and *** denote statistical significance at the 0.05, 0.01, and 0.001 levels, respectively.

Panel A - Equally-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	**Average**
	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	**CAR(0,0)**
Mean CARs	-0.22%*	0.40%	-0.56%	-0.19%	-0.66%*	-0.42%	-0.16%	0.10%	0.48%*	-0.20%	-0.14%
Precision Weighted CAAR	-0.39%	0.25%	-0.60%	-0.23%	-0.43%	-0.47%	-0.16%	0.04%	0.39%	-0.02%	-0.16%
T-statistic	(-1.744)	(0.956)	(-0.828)	(-0.436)	(-1.677)	(-0.818)	(-0.503)	(0.178)	(1.939)	(-0.070)	(-0.915)
N	23	23	23	23	23	23	23	23	23	23	23

Panel B - Value-Weighted Index

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	**Average**
	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	CAR(0,0)	**CAR(0,0)**
Mean CARs	-0.26%*	0.61%*	-0.61%	-0.27%	-0.74%*	-0.43%	-0.24%	-0.03%	0.52%*	-0.19%	-0.16%
Precision Weighted CAAR	-0.34%	0.45%	-0.66%	-0.28%	-0.53%	-0.40%	-0.24%	0.02%	0.40%	0.01%	-0.16%
T-statistic	(-1.657)	(1.969)	(-0.894)	(-0.551)	(-2.211)	(-0.766)	(-0.768)	(0.126)	(1.998)	(0.049)	(-1.099)
N	23	23	23	23	23	23	23	23	23	23	23

Table 9 – OLS Regressions: CARs modeling with CVC Firms and Competitors

$CAR(0,0)_{i,t} = \beta_0 + \beta_1 CVC_i + \beta_2 ln(ShareTurn)_{i,t} + \beta_3 ln(MktCap)_{i,t} + \beta_4 ln(Spread)_{i,t} + \beta_5 ln(D/E)_{i,t} + \beta_6 ln(B/M)_{i,t} + e_{i,t}$

CVC is a dummy variable equaling one or zero, being one if the company announced a CVC arm addition - zero if not. ln(ShareTurn) is the natural log of share turnover and is the ratio of trading volume, scaled by shares outstanding for each firm. ln(MktCap) is the natural log of the market capitalization of the given stock. ln(Spread) is the natural log of the bid-ask spread, scaled by the midpoint average. ln(D/E) is the natural log of the debt-to-equity ratio, measured as total liabilities scaled by total equity. ln(B/M) is the natural log of the company's total equity scaled by the total market capitalization, or the book-to-market ratio. MktCap, D/E, and B/M, were derived from annual data from Compustat and ShareTurn and Spread were derived from daily CRSP data. I report t-statistics (in parentheses) from robust standard errors. $, *, **, and *** denote statistical significance at the 0.10, 0.05, 0.01, and 0.001 levels, respectively.

	[1]	[2]	[3]	[4]	[5]	[6]	**[7]**
CVC	0.0127*	0.009$	0.0130*	0.009*	0.0140**	0.0125*	0.0139**
	(2.32)	(1.49)	(2.37)	(2.03)	(2.69)	(2.48)	(2.57)
ln(ShareTurn)		-0.003					0.002
		(-0.53)					(0.77)
ln(MktCap)			0.002				-0.000
			(0.74)				(-0.15)
ln(Spread)				-0.025***			-0.023***
				(-4.08)			(-4.35)
ln(D/E)					0.006*		0.004$
					(2.11)		(1.88)
ln(B/M)						-0.008**	-0.006**
						(-2.82)	(-2.80)
R^2	0.10	0.12	0.12	0.36	0.21	0.23	0.50
Adj. R^2							0.42
Robust SEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	46	46	46	46	46	46	46