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# Effect of Corporate Venture Capitalism on the Post-IPO Performance of Companies

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# **Effect of Corporate Venture Capitalism on the Post-IPO Performance of Companies**

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**Abstract:** There is substantial evidence that Corporate Venture Capitalists (CVCs) backing provides value to companies. This study aims to find what the benefits provided by CVCs are to public companies after they have gone through their initial public offerings (IPOs) and have begun trading on the stock market. Matched by CVC backing, Tobin q, leverage ratio, research and development (R&D) ratio, size of market capitalization, and the sector in which the firm operates, over a given period of time, this study explores whether or not CVCs add value to companies. Additionally, this study analyzes the success companies backed by CVCs. The findings were that (a) firms backed by at least one CVC had a high chance of succeeding over firms that were not backed by CVCs and (b) CVC backing destroys value in a firm.

**Key words:** Data panel, IPO performance, Corporate venture capitalist, Value, Initial public offering, Success

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## **Introduction**

**T**his research will provide the reader with an understanding of the relationship between CVC backing and the success of firms backed by them, as well as the value lost by their relationship. There were two separate tests carried out in this research project: (a) the success of companies backed by CVC(s) and (b) the value lost when firms were backed by CVC(s). The measure of value was the company's Tobin q, and the measure of success was a blend of different scenarios. For a company to be considered a success it had to be trading above \$5 USD or that it had been acquired by another firm. If it became defunct in five years after IPO or was not trading above \$5 USD, it was considered to not have succeeded.

The main results and conclusions reached in this analysis were as follows. First, this study demonstrates the ability of CVCs to help the firm they back succeed. The majority of companies measured that were backed by CVCs went on to trade at above \$5 USD levels or get acquired by other firms. The success rate of firms when backed by CVCs is very far above the mean. Second, the study also showed that CVC backing is related to lower Tobin's q, which means that value is destroyed – not created when a CVC decided to help back a firm.

## **Literary Review**

As new private firms take on the world stage, so much of their future growth depends on the value they create. However, most newly declared public companies decline in stock price shortly after their initial public offering. There may be a variety of reasons for this

phenomenon; therefore many different variables are looked at in the following literary reviews before arriving at corporate venture capitalists being a true untested variable.

In Chemmanur and Karthik (2011) IPO valuation is primarily determined by underwriter participation. Reputed underwriter firms matter more than just their certification, as well as their various participants in the market. They are more likely to underprice than less reputed firms because they want their investors to make bigger profits and leads to greater participation from them. Due to the heterogeneity of investors (due to the asymmetry of information) the late investors usually ignore IPO fundamentals and buy into stock even if all they see is a lot of demand from early investors, unknowing if they are buying less valued stock now. Also, underwriting leads to higher valuations in the secondary market. The study used empirical analysis to base its findings.

From Zheng and Stangeland (2005), Analysts usually renew estimates after they are made on a company if they were not vastly underpriced. When growth is based on sales and EBITDA, retention of investors prior to IPO vs. after, as well as underpricing conveys information. However, if growth is based on EPS of IPO, forecasting of long term growth don't hold true to analyst estimates. However, from Heterogeneous beliefs, the estimate renewal only happens for the less reputed underwriting firms, which absolves them of error when they underpriced stocks perform better. It is not that analysts made the wrong models; it is that they expect all underwriters to underprice, and when underwriters don't, their models do not work.

In Chemmanur (1993), it is found that underwriting a company generates a lot of publicity and induces investors to research them. Another reason for underpricing is that there

is a positive relationship between less underpricing and cost of valuation, so an underwriting firm has less incentive to do more accurate valuations. Also, understanding amounts to insiders inducing information production to get more accurate valuations in the secondary market. The level of underpricing amounts to the optimal degree of new information production; investors want a price run-up in the secondary market, and a lower price means more investors, which leads to increased demand and higher prices for their shares. This study was done by building models and testing them. This agrees with the above findings that underwriting firms want to underprice to increase their institutional investors' profits.

From Chemmanur and Paeglis (2004) concludes that firms with better and more reputed managers have larger IPO offer sizes and that reputed underwriters are connected to firms with high quality management. The expense incurred while underwriting is inverse to the quality of management the IPO firm has. The differences in management quality account for the varied performances of long term stock return and operating performance. A better reputed management team attracts more institutional investors because they are able to select better projects that have higher Net Present Values, which means they are of a better quality, and thus they receive a better IPO offer. The first day IPO is set by the most optimistic investor and institutional firms are less likely to be overoptimistic in general, so having an institutional investor leads to a smaller spread of price in the long run.

From Maya (2004), it is found that firms subjected only to technological uncertainty can be predicted using the Creative Destructive process. Such a thing includes the development of a patent and applies to growth companies that need to innovate drastically. The technological race depends on the amount of research and development a firm does and its

efficiency in the work of R&D. The valuation of a firm is equal to the sum of its project value and the value of real options the other projects of the firm. The CDA process gives a higher valuation than the traditional methods such as NPV which needs to account for previously ongoing projects as well. The Monte Carlo method was used to test the base cases.

The researcher in Mohanram (2004) studied the Book to Market (B2M) effect to predict winners and losers in the Separating Winners from Losers among low Book to Market. The research applied financial statement analysis to sample low B2M stocks and found that growth oriented fundamental strategy to evaluate the companies is able to strongly predict differences between future winners and losers. His models apply to fast growth as well as high tech firms. It is also found that historical earnings and growth variability in B2M effect is caused by mispricing.

It is found in Dor (2003) that IPOs with the highest institutional ownerships outperform others by up to 12% a year. It also established that the institutional investors are momentum traders who enjoy higher profits when market sentiments are high. The study was limited to hot markets. For further research, it is asked whether institutional investors differ in behavior according to their different categories.

Finally, in Dong and Michel (2011), it is established that barring a market bubble, IPO investors underestimate the growth of the industry which leads to better long run performance for firms in high-growth industries. It is also found that industry growth is the most significant driver of long run IPO performance among all factors - even underwriter quality measures and offer proceeds. For further study, it asks if further investigation of industry growth prospects may provide insights into other aspects of the IPO process.

All the above literature review previous to the measurement criteria establishes that there are many factors to company performance after IPO including the process itself. One direction to take this into is to measure the effects of CVCs on company performance. Due to the unconformable nature of numbers that companies have before IPO, it is more beneficial to use public data filed with the SEC. No paper has yet analyzed the negative impact of CVC on post-IPO firm performance using the value metric Tobin's  $q$  verses. Therefore, this research aims to do a study of company performance using measures that are valid but have not yet been applied to such a problem. First, a list of objective measures by which to define a success factor for a company needs to be established. This is not to be a single factor but multiple elements, whereby their combination determines a company's success or failure. Before moving forward, more research needs to be done regarding corporate venture capitalists and what the researching community has to say about them. The following literary review documents the research available regarding CVCs and their impact.

The research in Jain and Kini (1995) applies a statistical model and cross-section regression analysis to show that firms backed by VCs perform better post issue than non-VC backed firms. The research also shows that the market perceives the firm as being of a higher value and rewards it with a higher IPO. Non VC backed firms include MBOs and LBOs. Past successful VC backed IPOs include Apple Computers, Intel, Federal Express, Lotus Development, Microsoft, and Genentech. The firms tend to do better in the IPO process and receive better valuations. One possible reason the study provides is that because the VCs are highly specialized and usually only invest in young, high risk, entrepreneurial companies with unpredictable CFs, they tend to be active investors and help in managing the company by taking a place on the Board of Directors as well as other high equity positions.



In Bharadwa (2000), the research studies the performance effects of IT on a firm. It mentions that successfully launched IT programs were deployed in American Airlines, Merrill-Lynch, Frito-Lays, Wal-Mart, and Amoco. It takes a resource based view in that the resources and skills a firm has are firm specific, rare, and difficult to imitate. It tests using theoretical links and statistical tests, then empirically examines the data. It finds that IT related resources / capabilities serve as possible sources of sustainable competitive advantage when adhering to the RBV model. The research defines IT capability as the ability to move and use IT based resources in combination with other resources and capabilities of the firm. Things such as tangible IT infrastructure, human IT resources, and intangible IT enabled resources (know how, corporate reputation, environmental orientation) fall under IT capabilities. The study also says that there is a lot of complexity associated with developing firm wide IT capabilities. Also that firms that have higher income ratios where IT is not a cost focus perform better than a firm that only uses it for general operating activities.

In Chemmanur and Loutskina (2008), among the points discussed include investing in very young and risky firms with unproven technology to gain an edge in the market, signaling the real value of a firm to different market participants; IVCs to co-invest pre-IPO, key market players by giving them access to the equity market earlier than the public; and to IPO investors allowing the firm to achieve a higher market valuation than the firm would have received if they only had IVC backers. Their method of testing involved probit analysis of investment rounds and the creation of dummy variables. They conclude that CVC backed firms outperform IVC backed firms and that they have a higher success rate of IPO.

## Hypothesis

There are two main hypotheses formed regarding the performance of firms that are backed by at least one CVC. When CVCs and Non-CVCs invest in firms, they do more than just invest capital – they also become responsible for helping the company grow and succeed. This has implications towards more than an IPO, but also post IPO performance. A successful company would be trading above a penny stock – defined as stock price above \$5 USD, or it would have been acquired by another company because they see they value in what it is the new firm is creating. Success will be defined as Post IPO price of \$5 USD or acquisition. Thus:

***H1:*** *CVC backing on average has positive correlation to firms trading above \$5 USD post-IPO or being acquired by another firm.*

The above hypothesis may out come out to be untrue, in which case there may either be no correlation between CVC backed companies and success or it may have a negative relationship:

***H1<sub>0</sub>:*** *CVC backing on average does not have positive correlation, or has a negative correlation to firms trading above \$5 USD post IPO or being acquired by another firm.*

The above hypotheses dealt with one aspect of this research. The second aspect takes into account value creation, and the effect CVCs have on the value created by companies they invest in. This is measured by the Tobin's q of the firm, thus:

***H2:*** CVC backing of a firm on average has a positive correlation to higher Tobin's *q* ratios.

Once again, the above hypothesis may or may not come out to be untrue, in which case there may either be no correlation between CVC backed companies and their Tobin's *q*, or it may have a negative relationship:

***H2<sub>0</sub>:*** CVC backing on average does not have a positive correlation, or has a negative correlation to higher Tobin's *q* ratios.

## **Data & Sample**

In order to test the hypotheses, a quantitative approach was used. First, a list of all companies that received funding in the USA between the years of 2003 to 2005 was gathered for a total of 178 companies. Then a list of all the backers of the companies was put together. Once that data was gathered, each source of capital was individually analyzed to categorize into CVC and Non-CVC. Once the sources of funding were recognized and recorded, the list of IPO companies was sorted into having at least one CVC source of funding, and having no CVC source of funding. The majority of the first half of the research timeline was spent in the above steps. Sources of data included LexisNexis as well as other online publications. The next step in the data and sampling process involved much trial and error to find the COMPUSTAT database ticker symbol for each company, as the database used its own system of ticker symbols for many of the companies. The fields of data downloaded included the date the data was gathered by COMPUSTAT, company assets, common equity, total liabilities, revenues, research and development expense, and total market value. After adjusting for the

sample for only companies that went public in between 2003 to 2005, and those companies for which there was at least some data available in COMPUSTAT, the list of companies was down to 20. At this point, hundreds of missing data points needed to be manually looked up and entered by using past SEC filings to calculating many of the numbers and ratios.

## **Dependent Variables**

The choice of measurement to control for firm performance is Tobin's  $q$ . To show the validity of this measurement technique, consider the following. In Bharadwaj et al. (1999), the ratio is used to explain how a firm's IT resources and capabilities determine its future viability. His study is done theoretically and empirically. Tobin's  $q$  is a financial market based forward looking measure of firm performance to examine the association between IT Investments and firm  $q$  values, after controlling for a variety of industry factors and firm specific values. Tobin's  $q$  is the capital market value of a firm over its replacement value of its assets which can also be measured as such:  $(MVE+PS+DEBT)/(TA)$  where MVE is the close price of share at end of firm's financial year times the number of common shares it has outstanding; PS is the liquidity value of the firm's outstanding preferred stock; DEBT is the current liabilities less current assets added with the book value of inventories and the Long Term Debt; TA is the book value of total assets. There have been questions for appropriate measure of firm profitability in the past. Most people used return on equity, return on assets, or return on sales as proxies for the discount rate. However they are flawed in this role because they are not forward looking, not adjusted for risk, distorted by temporary disequilibrium effects, tax laws, accounting conventions, and insensitive to time lags necessary for realizing potential of capital investments. The authors divided the study of whether IT investments affect a firm's  $q$  using

three categories of variables: IT capabilities, value of the other firm specific assets and industry specific variables. They used Chung and Pruitt's method to calculate q for this study, and it is the dependent variable in this study. The key independent variable in this study is the IT spending ratio of the firm; the dollar value invested at time t to the sum of its sales in time t. They found that due to the rapid changes in IT, investments in IT tend to depreciate quickly.

Since there were two models, there were two separate dependent variables. The first variable being success and the second one being the Tobin's q. Success was a dummy variable created that signified that the company was doing well 5 years after its IPO or had been acquired by then. It was then regressed with the independent variables for each company. The Tobin's q was my measure of value being generated by the companies backed by CVCs. The price data was acquired from yahoo finance using its historical price tool. The Tobin's q was calculated from the data downloaded from COMPUSTAT. Here, the Tobin's q is not actually being measured, but regressed with its dependent variables for each company.

## **Independent Variables**

The independent variables were the same for each model, except that the success model was run without Tobin's q and was a LOGIT function in STATA, while the Tobin's q model was run without the success variable and was run using REGRESS. The independent variables were downloaded from COMPUSTAT, as well as subjectively created for the dummy variables.

***Corporate Venture Capitalist backed.*** This variable takes on the value 1 if the company is backed by CVCs. If the company is not backed by at least 1 CVC, this variable takes on the value of 0.

***Technology sector.*** This variable takes on the value of 1 if the company is in the technology sector. It takes on the value 0 if it is not. This was done manually with data from [www.finviz.com](http://www.finviz.com) and [www.seekingalpha.com](http://www.seekingalpha.com). The majority of the companies measured were a part of this sector. Therefore, it is interesting to see if that holds weight when measuring success and value creation.

***Healthcare sector.*** This variable takes on the value of 1 if the company is in the technology sector. It takes on the value 0 if it is not. This was done manually with data from [www.finviz.com](http://www.finviz.com) and [www.seekingalpha.com](http://www.seekingalpha.com). A big portion of the companies measured were a part of this sector. Therefore, it is interesting to see if that holds weight when measuring success and value creation.

***Size.*** This variable measures how big the company is based on its assets. The size of a company can be a big predictor on its future growth as well as its performance over time. This should have different results based on sector, as a healthcare company may not have as much assets as a technology company if it is focused on research, whereas a technology company may have to buy whole hosts of servers.

***Leverage ratio.*** This variable measures the ability of the company to meet its financial obligations and can be used to tell how the company has been growing or plans to grow. Here,

each company's total outstanding debt was divided by its shareholder equity. The lower leverage ratio the better, but it should close to 1. This varies by industry.

***Research and Development Intensity.*** This variable measure the rate at which the company is willing to research. This is calculated by dividing the research and development expense by its revenue. The more a company is willing to invest in research and development the higher its potential for future success. Again, this varies by industry.

## **Control Variables**

To control the regression analysis of IPO performance, only companies that went public between the years of 2003 to 2005 were researched. Also, when doing regression analysis, data points of more than five years for companies were filtered out. There was no filtering for the data points of companies that had less than five years of data, as doing so would have skewed the results to discount companies that become defunct or were acquired earlier than five years after IPO.

## **Method of Analysis**

This study relied on the use of the data panel methodology throughout the analysis, and the calculation of Tobin q as the firm's market capitalization over the firm's average total assets. The data panel technique was used to observe the relationship between Tobin's q and CVCs, as well as success and CVCs. All the data was loaded into the STATA data editor and robust clustered by year. The ROBUST command was used because there are some bugs in STATA regarding data panels which can be discounted for by running ROBUST The

command for the regression of Tobin's q is "regress tobinq cvc leverage rdintensity size technology healthcare, robust cluster (year)." The command for the logistic regression of success was "logit succeed cvc leverage rdintensity size technology healthcare, robust cluster (year)." This ran linear regressions and logistical regressions respectively, by year of data collected, and no more than five years' worth of data.

## Results

The following table is the regression for Tobin's q.

Linear regression

Number of Observations	80				Prob>F	0
Number of Clusters (year)	8				R-squared	0.1411
F(6,7)	739.51				Root MSE	1.8578
Tobinq	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
CVC	-0.687056	0.3116486	-2.20	0.063	-1.423988	0.0498754
Leverage	-0.219686	0.3619495	-0.61	0.563	-1.075561	0.6361886
rdintensity	0.004802	0.0023983	2.00	0.085	-0.000869	0.0104728
size	-0.232724	0.2914420	-0.80	0.451	-0.921875	0.4564266
technology	-0.671520	0.2544751	-2.64	0.033	-1.273258	-0.0697820
healthcare	0.239672	0.4596893	0.52	0.618	-0.847321	1.3266640
_cons	3.600918	1.4294320	2.52	0.040	0.220847	6.9809880

The t-stat of CVC relating to Tobin's q is the main conclusion to be drawn here. As can be seen, it is -2.2. What it means is that H2 can be rejected and H2<sub>0</sub> accepted. However, not only that, but because of the surprising result, an alternate hypothesis can be made:

**H2<sub>A</sub>:** *CVC backing of a firm on average has a negative correlation to higher Tobin's q ratios.*



The cause for this may be the fact that many corporate venture capitalists buy a seat on the board of directors with controlling interest of these companies in return for providing investment. They also tend to focus more on the numbers side of things rather than the product being developed. This distracts the founders and core team from focusing on improving their product improvement cycle, and instead become caught up in hiring new personnel and other administrative tasks. It may also be due to the fact that by the time a corporate venture capitalist has been on the board of directors for six months, they end up firing all of the founders of the company. The new people who come in may not have the well-being of the company in mind as much as the previous group and this can cause a high turnover rate.

The following table is the logistic regression for success.

Logistic regression

Number of Observations	80				Pseudo R2	0.4665
Wald chi2(6)	461.9				Log pseudolikelihood	-26.913664
Prob>chi2	0				Std error adjusted for 8 clusters in year	
Succeed	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
cvc	1.600100	0.5767885	2.77	0.006	0.4696155	2.730585
leverage	-0.189355	0.6368918	-0.30	0.766	-1.4376400	1.058930
rdintensity	0.005343	0.0014189	3.77	0.000	0.0025618	0.008124
size	1.673655	0.3282808	5.10	0.000	1.0302360	2.317073
technology	-1.655963	0.4114016	-4.03	0.000	-2.4622950	-0.849630
healthcare	-2.841203	0.4168683	-6.82	0.000	-3.6582500	-2.024157
_cons	-5.250142	1.4056700	-3.73	0.000	-8.0052040	-2.495079

The z-score of success relating to the coefficient for CVC backing is the conclusion to be drawn here. The value of the z-score is 2.77, well above the 99% confidence level, which is significant at alpha less than 0.01. Thus we can reject  $H_{10}$  and conclude that there is a positive relation between CVC backing of firms and their success. *CVC backing on average does lead*

*firms to be trading above \$5 USD post-IPO or being acquired by another firm.* This may be due to the fact that many of the CVCs are well connected in circles that matter to a company wanting to go public. They are able to leverage their positions to achieve a high valuation during IPO due the name of the corporate venture capitalist being attached to theirs. This also leads them to find new sources of funding, as others see that the CVC sees value in the new company, and therefore believe it may be worth investing in. Also, the CVCs have been through the same process themselves and know exactly what needs to be done to have the company be successful – be it acquisition or otherwise. Sometimes, it is the CVC themselves doing the acquisition, which lends credence to the high z-score.

## **Implications of Results**

Looking at the chart for the Tobin's q linear regression, other factors to take note of are the research and development (R&D) intensity and the technology sector. The high t-stat between Tobin's q and R&D intensity, it is safe to say that the more a company is willing to invest in R&D, the more value it will create. This makes sense since only through R&D do new breakthroughs come about and value is generated. Otherwise, the business stagnates and gets left behind by other companies who are willing to take risks and do research. Regarding the low t-stat of companies in the technology sector; it may be that even though their total market values are quite high, they also have a lot of assets due to the need for full time data servers, and other expensive tools and machinery, which brings down their Tobin's q by a lot.

Regarding the chart for the success variable's logistic regression, there are strong z-scores in R&D intensity, size, technology, and healthcare. The high R&D score accentuates the finding in the chart for the Tobin's q regression; to create value as well as to be successful, it is

important to invest in R&D. The size variable also has a very high z-score, which makes sense – the more assets that a company has, the more attractive it is for acquisition purposes. Technology and healthcare sectors have extremely low z-score. One reason for this may be that although many varieties of companies go public, most of them are in the technology or healthcare sectors. However, due to the nature of the business, many of these companies do not survive and become defunct. The extremely negative z-scores may just be due to the fact that there are more companies in those sectors than the rest, and inevitably many fail and bring down the z-scores for those sectors. Low z-scores could also be due an artifact of correlation among the “independent variables”. . Since \_cons, health and tech are all quite significantly negative there is that possibility.

A factor to consider is that CVCs invest in start-ups mostly for strategic reasons, rather than for profitability. For example, Intel invests in start-up that may use Intel’s processors in their products. The point of investing may not be that the company becomes successful, but rather that it develops and improves on the existing technology and takes it in new directions. Having CVC backing increases the survivability, as CVCs need the companies to focus on alive; however, that focus can also end up destroying value.

The above results both agree and disagree with what is considered a fact by many; CVC backing leads to value creation and helps companies succeed. In actuality, having a CVC back a company almost always leads to value destruction. However, due to the high number of firms that become public due to CVCs, many people may consider this a necessary evil and rationalize away the value they may have been able to create with the hope of being able to go public. This has disturbing implications for future start-ups. Should they give up on their core

business only to become caught up in the day to day tasks instead? Also, as the CVCs are corporations themselves, should they not realize the negative influence they have on their portfolio companies and think about where they themselves would be if they had such investors when they were just getting started?

## **Limitations, Future Research Opportunities, Dissemination**

The one limitation of the study was the fact that it was constrained to companies only from the years 2003 to 2005. During this time, most companies that received CVC backing fell in the technology and healthcare sectors. If continued, the plan is to widen the study to the number of years to between the years 2000 and 2006. This will allow for a broader range of sectors and still allow for observation of data up to five years – until 2011, which is reported in 2012. Also, the low z-scores that are occurring may be examined in the extended research. If the same trends as found above hold across the board, then the dissemination of results shall be in a financial publication relevant to the research.

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