**Stranger Knows Best:**

**CVC Investor and Third-Party Acquirers**

**Abstract**

Although the literature has theoretically pointed out both the financial and strategic implications associated with corporate venture capital (CVC) acquisitions, empirical research on this topic remains limited.  Our study attempts to advance the understanding of this phenomenon by examining the market reactions to CVC acquisitions when different acquirers are involved (CVC investor acquirer vs. third-party acquirers).  Specifically, we find the market reacts more positively to CVC acquisitions by third-party acquirers than by CVC investors. Furthermore, the findings show that the relationship between acquirer in-house R&D and market reactions to CVC acquisitions is moderated by whether CVC investors are the major investor *pre* acquisition.

**INTRODUCTION**

Corporate venture capital (CVC) involves direct equity investment by established corporations (CVC investors) in external privately held entrepreneurial companies (portfolio companies). CVC investments have been flourishing in the US and globally in the past few decades making corporate investors an important player in the venture capital market. Since 1995 to 2008 when the financial crisis occurred, corporate investors invested more than $44.8 billion into approximately 9,811 deals, accounting for 17.9 percent of the total deals and 10.3 percent of the total dollars invested in the U.S. venture capital market[[1]](#footnote-1). After the financial crisis, CVC activity began to rise again. From 2010 to 2015, CVC investments in the US have increased at an average rate of 33.3% annually1. For the first three quarters of 2016 (the latest available statistics), corporate investors invested $26.12 billion in CVC activity, which has exceeded the annual CVC investments in 20141.

Accordingly, growing attention is been given to CVC activity in the academic literature of both finance and management fields (e.g., Benson & Ziedonis, 2010; Dushnitsky & Lenox, 2005; Sahaym, Steensma, & Barden, 2010; Schildt, Maula, & Keil, 2005; Wadhwa et al., 2016). Management literature, in general, view CVC activity as a distinct dimension of corporate entrepreneurship (Zahra, 1995) that could provide corporate investors with a window over new technologies through equity investments in entrepreneurial companies, which in turn, may stimulate corporate investors’ in-house technological innovation (Chesbrough, 2002; Covin & Miles, 1999; Dushnitsky & Lenox, 2005; Sahaym, et al., 2010; Schildt, et al., 2005). In addition, CVC activities may leverage the corporate investors’ existing technologies by stimulating demand and/or promoting the formation of de facto standards (Keil, 2000). The strategic benefits of CVC activity imply that such investments would generate growth options for the corporate investors (Hurry, et al., 1992; Yang, et al., 2014). For example, corporations can use CVC investments to build options to acquire portfolio companies if their technologies are proved strategically valuable. In principle, such toehold position will offer corporate investors an access to knowledge of their portfolio companies, and help them reduce asymmetric information and mitigate the “winner’s curse” of overpayment in the subsequent acquisition events (Thaler, 1988). However, the evidence from the finance literature is the opposite. Benson and Ziedonis (2010) find that takeovers of portfolio companies generate negative abnormal returns to shareholders of acquisitive corporate investors while the same acquirers typically earn positive abnormal returns when acquiring non-portfolio entrepreneurial companies.

In addition, statistics has shown that more than often, portfolio companies are acquired by non-investors, rather than their CVC investors[[2]](#footnote-2). On one hand, acquisitions by third-party acquirers may take place when CVC investors have proved through their toehold positions that new technologies/products developed by the portfolio companies are not strategically important and then decide to abandon the option of acquisition. In this case, they would like to obtain financial returns from selling equity ownership to a third party. On the other hand, acquisitions of portfolio companies by non-investors may be a result of CVC investors’ failure to exercise their option to acquire. CVC investors may lose the bidding war when there are multiple bidders. Or they may fail to recognize the strategic importance of the portfolio company and make the wrong decision to abandon the option to acquire. In either of these cases, giving up the option to acquire portfolio companies that corporate investors should have acquired presents a strategic loss to the latter. Sometimes, it may even make CVC investors disadvantaged in the competition when portfolio companies are acquired by their major competitors.

Thus, it is necessary to further investigate how corporate investors should exercise or abandon the options to acquire their portfolio companies so that they could fully utilize desired strategic benefits. To investigate the research question, we compile a sample of 1,375 acquisitions of CVC portfolio companies (private companies) by US public acquirers during 1980-2014 based on multiple data sources including VentureXpert, SDC M&A, Compustat and Lexus Nexus news search. Of the acquirers, 131 (9.5 %) are original CVC investors while 1,244 (90.5%) are non-investor acquirers. We find that the market in general reacts more positively to CVC acquisitions by third-party acquirers than by CVC investors. We then investigate the impacts of acquirer’s in-house R&D on market reactions. The findings suggest that such impacts differ between CVC investor acquirers and third-party acquirers. Furthermore, the impacts are also moderated by CVC investor’s major investor status pre acquisitions.

This paper makes primary contributions to the emerging body of research on CVC acquisitions. Prior studies, except for Benson and Ziedonis (2010), largely view acquisitions of portfolio companies as exit strategies that could generate financial returns to corporate investors (Yang, at al., 2009), and pay less attention to the potential strategic impacts associated with portfolio company takeover events. Consistent with Benson and Ziedonis (2010) who find market reactions are more positive to CVC investors’ non-CVC acquisitions than their CVC acquisitions, our study finds out that the market seems to welcome CVC acquisitions by third-party acquirers rather than CVC investors themselves, which suggest reevaluating such acquisition events from both financial and strategic perspectives under different conditions. Our empirical results provide evidence that under different pre acquisitions conditions—acquirer’s in-house R&D level and CVC major investor status, market reactions vary.

In the following section, we first provide an overview of CVC activity in the past decades and briefly discuss the literature of CVC investments. Furthermore, we elaborate the proposed relationships between corporate investors’ minor investor status and the market reactions to acquisitions of their portfolio companies. Next, we describe our research methodology, including data sources, measures, and analysis. In the final section, we summarize our results and conclude with the major findings and potential managerial implications.

**THEORY AND HYPOTHESES**

Both academic research and industry surveys indicate that CVC investments pursue strategic objectives as well as financial returns for the corporate investors (*e.g*., Block & MacMillan, 1993). In general, extant studies in management regard CVC as one manifestation of corporate entrepreneurship (Zahra, 1995) that helps companies to rejuvenate or redefine organizations, markets, or industries for the purpose of creating or sustaining competitive advantages (Covin & Miles, 1999). In particular, CVC activities are viewed as an effective means that can help to update corporate investors’ knowledge base, stimulate technology innovation, help identify technological discontinuity, increase technological diversification, and eventually create values (e.g. [Asel, at al, 2015](#_ENREF_1); Dushnitsky & Lenox, 2005, 2005b; Maula, et al., 2013; Lee & Kang, 2015; Wadhwa, et al., 2016; Yang, et al., 2014). The pursuit of strategic objectives has prompted the literature to view CVC activity as option investments that create growth value for corporate investors (Dushnitsky & Lenox, 2006; Maula, 2001) because it opens a window to new technologies and provide learning opportunities (e.g. Dushnitsky & Lenox, 2005; Maula et al., 2013; Schildt et al., 2005; Yang, et al., 2009) for future development. Indeed, real option theory suggests that firms could use small initial investments to general options for future big investment decisions (Folta, 1998). It is particular important for firms to develop or acquire new technologies in the early stage as these early-stage technologies are notoriously difficult to value due to high technological and market uncertainty (Van de Vrande & Vanhaverbeke, 2012). These initial investments in new technology may take the form of CVC investments (Benson & Ziedomis, 2009; Van de Vrande et al., 2006). Through CVC investments, CVC investors take the first step in acquiring more information to deal with the uncertainties related to the technology and market opportunities (Guler, 2007). When the uncertainties are reduced to an acceptable level, CVC investors could take follow-on steps to exercise these options, and acquiring portfolio companies has been considered as such an option exercising action (Tong & Li, 2010).

Although the acquisition of portfolio companies is of strategic importance and financial consequence to CVC investors, its impacts appears to be under researched in the literature. Much of the research in both management and finance fields has assumed that the acquisition of a portfolio company would generate financial returns to equity investors, thereby being an indicator of good investment performance. But it may not be the case for CVC investors. Indeed, Benson and Ziedonis (2010) provide empirical evidence that takeovers of portfolio companies destroy value for shareholders of the acquisitive CVC investors when compared to CVC investors’ acquisitions of non-portfolio companies. On the other hand, the majority of acquisitions take place between portfolio companies and non-investor third parties, but little is known about how this kind of acquisitions. Thus, it is questionable to just simply assume any acquisitions are good liquidity events without discerning the strategic consequences to corporate investors, and the question of how to manage acquisitions of portfolio companies deserves further investigations in CVC activity.

**CVC Investor Acquirer vs. Third-party Acquirer – Market Reaction**

As mentioned, researchers have pointed out that corporations can use CVC investments to build options including acquiring portfolio companies (Tong & Li, 2011). In principle, preexisting ties established through CVC investments could provide corporate investors with an access to knowledge of their portfolio companies. These learning initial investments will educate CVC investors about the potential of new technologies and help them select acquisition targets (option exercising). When the CVC investor decides to acquire a portfolio company, the knowledge obtained through the preexisting ties will also reduce asymmetric information and help them overpayments in the subsequent acquisitions (Thaler, 1988).

However, research dependence theory suggests that power imbalance between firms acts as an obstacle to mergers and acquisitions because mergers and acquisitions will internalize the less powerful firm into the operations of more powerful firm, thereby reducing the latter’s power advantage in the relationship (Casciaro & Piskorski, 2005). CVC investors and their portfolio companies present typical examples of such imbalanced power relationships. CVC investors’ acquisition of their own portfolio companies reduces uncertainty for the portfolio companies (less powerful) by granting them stable access to the resources on which they are dependent (i.e., capital, marketing support, etc.). However, CVC investor acquirers may lose part or all of their discretion over the allocation of critical resources to the less powerful party, and/or . Indeed, empirical studies have shown that such a preexisting investment relation may not benefit corporate investors and capital market may react negatively to such events (Benson and Ziedonis, 2010).

On the contrary, third-party acquirers don’t have such constraints embedded in the preexisting investment ties. Although they may not have access to obtaining inside information on target companies and be subject to adverse selection due to asymmetric information, they could benefit by acquiring portfolio companies backed by CVC investors because CVC investors could add more value to portfolio companies compared to independent VCs. For example, Studart and his colleagues (1999) find that biotech startups with prominent corporate investors launch IPOs more quickly and with higher valuations than those without such ties. Maula and Murray (2002) add similar evidence from the IT sectors on the higher market valuations of CVC-backed startups than those financed by independent venture capitals alone. Park and Steensma (2012) find that CVC funding is particularly beneficial for new ventures to go IPOs when they require specialized complementary assets.

Thus, we propose:

*H1. Market reactions are more positive to acquisitions by third-party acquirers than by CVC investor acquirer.*

**CVC investor Acquirer In-House R&D and Its Major Investor Status**

Benson and Ziedonis’ analysis reveals that CVC program structure (dedicated fund or not) influences acquisition performance because managers from different CVC programs vary in their abilities to manage CVC investments and to make decisions on acquiring (or not acquiring) their portfolio companies. This finding implies that the negative abnormal returns may be still rooted in corporate investors’ failure to overcome asymmetric information, and some factors may have impacts on a corporate investor’s ability to mitigate asymmetric information such as its in-house R&D activity and whether the CVC investor is the major investor.

In house R&D activity and CVC are two major ways for developing new technologies (Sahaym, et al., 2010). The relationship between these two approaches has been studied in the literature for a long time. On one hand, CVC may substitute for internal R&D because it offers CVC investors access to new technologies developed by entrepreneurial companies, which may lead to negative market reactions to CVC acquisitions. On the other hand, in house R&D can generate knowledge and thus enhance the corporate investor’s ability to recognize the value of the technologies and identify potential acquisition targets, thereby helping CVC investors general more shareholder values when the acquisition takes place.

The literature has revealed several mechanisms that facilitate the corporate investor’s knowledge access and transfer in CVC activity (*e.g.,* Dushnitsky & Lenox 2005, 2006; Dushnitsky & Shaver, 2009), including pre-investment due-diligence process (Dushnitsky & Lenox, 2005), post-investment board seats/observation rights (Bottazzi, DaRin, & Hellmann, 2004; Dushnitsky & Lenox, 2005, 2006; Hill, Maula, & Birkinshaw, 2009), onsite visits/monitoring (Bottazzi *et al.*, 2004), and formation of liaisons between in-house divisions and portfolio companies (Dushnitsky & Lenox, 2006). When a CVC investor is a major investor in its portfolio company, it is more likely to have obtained sufficient information as needed through these mechanisms to reduce asymmetric information problem in the acquisition process then when a CVC investor is not a major investor. In addition, as a major investor, CVC investor has committed a lot of resources into new technologies developed by its portfolio company, and the market would be more likely to view such CVC investments as substitute to in-house R&D. Under this condition a high level of internal R&D activity may be unnecessary or redundant with new technological assets CVC investor would obtain through the acquisition. Thus, the market may react negatively to such acquisition announcement.

On the other hand, the positive impact of in-house R&D on market reaction may become significant when CVC investor is not a major investor. When a CVC investor is not a major investor, such small investment tie with portfolio companies may not help it obtain information as needed if they are not the major investor. With minor investor status, some of the mechanisms mentioned above will become unavailable to corporate investors such as board seats/observation rights. In addition, with minor equity stake, CVC managers will be less motivated to regularly visit portfolio companies or extensively monitor/coach portfolio companies, and in turn, they will be less likely to learn about portfolio company’s new markets, the general trajectory of knowledge development in specific scientific or technological domains that includes new frontiers and dead ends, general insights about new or existing technologies, and potential competitors or collaborators and so on. Thus, they may miss critical information to evaluate portfolio companies as potential acquisition targets. Moreover, CVC relationships are also associated with misappropriation concerns (Maula et al, 2009). The potential of misappropriation is “especially critical for new firms because their intellectual property is more easily appropriated than are the resources of established firms, such as manufacturing facilities” (Katila, Rosenberger, & Eisenhardt, 2008: 297). The misappropriation concerns can become severe when corporate investors take a minor equity position that portfolio companies view as a signal of corporate investor’s lack of long-term commitment. The lack of trust would urge portfolio companies to take defensive mechanisms preventing corporate investors from the access to core technologies and strategic information (Katila et al, 2008). Some of the information gaps could be overcome if the CVC investor has strong in-house R&D that could generate knowledge and thus enhance the corporate investor’s ability to recognize the value of the technologies and identify potential acquisition targets.

Based on the above argument, we propose:

H2: *Major investor status of a corporate investor will moderate the relationship between CVC investor’s in-house R&D intensity and market reaction to the acquisition announcement. That is, when CVC investor is the major investor, such a relationship is negative; when CVC investor is not the major investor, the relationship becomes positive.*

**Third-party Acquirer In-House R&D and CVC Major Investor Status**

As the statistics exhibits, the majority of portfolio companies are acquired by non-investors, rather than their CVC investors. In general, without the preexisting investment ties, third-party acquirers face more severe asymmetric information issues in the acquisition process compared to CVC investors who has such pre-acquisition relationships. But if third-party acquirers have strong in-house R&D that could generate knowledge to mitigate the problem of asymmetric information, and through in-house R&D, third-party acquirer may develop the ability to properly evaluate the value of new technologies and avoid overpayment.

However, when a third-party acquirer faces a major CVC investor in the acquisition, such positive in-house R&D effects may not be significant. The major investor status helps CVC investors imitate information asymmetry through mechanisms discussed earlier, so that they would have sufficient information to evaluate portfolio companies and . In addition, the existence of CVC major investor status is typically established through multiple investment rounds and it is very likely that corporate investors have recouped strategic benefits through the investment relationship over time. In addition, CVC backed portfolio companies receive not only financial resources, but also the unique opportunity to access corporate investors’ complimentary knowledge assets related to R&D, marketing, management etc. (e.g. Gompers & Lerner, 1998; Maula & Murray, 2002). Indeed, CVC backed portfolio companies are typically valued higher than those only backed by VCs. Thus, the third-party acquirer would need to pay premiums for the acquisition especially when a CVC investor leads the negotiation as major investor.

On the contrary, when corporate investors act as minor investors, they will be more likely to mistakenly abandon the option to acquire portfolio companies that they should have done because they may not have sufficient information to discern good acquisition targets from bad ones. In addition, the minor investor status also leave corporate investors little power in the decision making process regarding by whom and how the portfolio company will be acquired. They may lose the opportunity when facing multiple bidders. Under this condition, the impact of third-party acquirer’s in-house R&D would become significant. Thus, we propose:

 Thus, we propose:

H3: *Major investor status of a corporate investor will moderate the relationship between third acquirer’s in-house R&D intensity and market reaction to the acquisition announcement. That is, when CVC investor is not the major investor, the positive relationship will become stronger than when CVC investor is the major investor.*

**METHODS**

**Sample Construction and Summary Statistics**

We started our sample from Thomson-Reuters’s VentureXpert section of its SDC database. VentureXpert contains round-by-round funding information on CVC and venture capital investment in mostly private firms. In this manuscript, we use the term CVC companies and targets interchangeably to denote the receiver of these CVC investment funds. We limited our sample period to the 1980-2014 period because the number of acquisitions of CVC companies is quite negligible in the earlier years. There are 15,989 unique companies in the VentureXpert sample for this period each having multiple investors and funding rounds. We narrowed our sample to the companies for which VentuerXpert listed the status as “merged”, “acquired” or “in process of merger or acquisition”. Our sample, therefore, does not include companies that exited the VentureXpert database through IPO and were later acquired. There were 4,425 companies that were either acquired or were in the process of being acquired and of these 3,542 were companies based in the United States. We limited our sample to US companies.

In the next step, we matched our sample of US acquired (or in process of acquisition) companies to the SDC’s merger and acquisition sample. We narrowed the SDC’s M&A database to acquisitions done during the 1980-2014 period by the US public acquirers. This resulted in 151,647 merger and acquisition records. We then matched the target names, city, and state to our CVC sample. We needed to augment this match through manual matching because of many reasons including: the CVC target had changed its name by the time acquisition occurred, the name was listed in very different styles in the two databases, or some of the information needed to reliably reconcile the records between the two databases was missing. We searched through Lexus Nexus, Bloomberg, the websites of possible acquirers, and Google to complete and verify our matching process. This effort resulted in a match of 1,613 companies in the CVC sample as targets in our SDC sample. Of these 1,613 targets, 142 were acquired by corporations which were also their CVC investors.

In the next step, we located identifiers for the acquirers in Standard & Poor’s COMPUSTAT and the Center for Research in Security Prices’ CRSP databases to retrieve information needed to calculate cumulative abnormal returns and control variables around the merger announcement date. Some of the acquirers’ common stock was listed on the OTC market or the firms were private even though SDC listed them as public. Even when we were able to identify an acquirer on both the CRSP and COMPUSTAT databases, some information needed for our analysis was missing. For example, for some firms there were not enough trading days prior to the merger announcement to calculate CARs or information on total assets or EBITDA was missing for the fiscal year prior to the merger year. By excluding observations for those merger years, we obtained a sample of 1,382 M&A events for which CARs could be calculated. Of these, 1,250 acquisitions were made by corporations that had no CVC relationship with the targets (CVC companies) and 132 were acquisitions of CVC companies by one of their own CVC investor firms. Some of these acquirers did not have information available on COMPUSTAT to calculate all control variables leaving us with a sample of 131 acquisitions by CVC investors of their portfolio companies and 1,244 acquisitions by third-party acquirers for the multivariate analysis.

The breakdown of our sample by merger year is given in Table 1 and shown graphically in Figure 1. Acquisitions by all acquirers peaked during the equity market boom of 1996-2000. Acquisitions by third-party or non-CVC investors appear to have recovered quite close to their boom-period peak during the monetary easing of the first decade of this century but the tendency to acquire CVC investees by their corporate investors appears to have permanently dropped to a much lower level compared to its peak in the late nineties and early two-thousands.

*Insert Table 1 and Figure 1 about here*

We list some major characteristics of the CVC companies (targets) in our sample in Table 2. The amount of CVC and venture capital investment in these companies does not capture the full valuation of these firms. Still, one can indirectly infer from funding information for these companies that compared to public targets in M&A transactions, these are relative quite small firms. The average amount invested in a target by their CVC investors is only $38.47 million for companies acquired by their own CVC investors and $57.46 million for companies acquired by third-party or non-CVC corporations. A casual comparison of the summary statistics in Panel A and Panel B of Table 2 highlights some subtle differences between the companies acquired by their own CVC investors versus those acquired by the third-party acquirers. The targets of CVC investors get acquired sooner in their CVC lifecycle. The total amount of money invested in them by corporate investors is smaller and they participate in fewer investing rounds. But the average amount raised per round, both from the CVC corporations and venture capitalists, is slightly lower ($10.35 million versus $11.89 million). The median values for each of the variables related to funding amounts are quite different from their mean values indicating the presence of a few dramatically more successful fund-raisers in both samples.

*Insert Table 2 about Here*

The overall difference in financial profiles of CVC investor acquirers versus third-party acquirers can be seen from Table 3. This information is from the fiscal year before the year of acquisition. In general, the acquirers of their own CVC companies are more mature firms. This is in line with the general profile of a CVC investor. Compared to the third-party acquirers, these firms have a higher asset base, leverage and market value of equity but have lower sales growth. The third-party acquirers are younger firms and some firms with a significantly negative cash flow have pushed the mean in the negative territory even when the median is healthy and positive for this group. The third-party acquires also appear to be spending substantially less on in-house R&D as evidenced by their R&D intensity (R&D expenditure per employee).

*Insert Table 3 about Here*

**Construction of Variables**

***Dependent variable***

Our main measure to capture the effect of CVC investment in relation to the acquisition decision is Cumulative Abnormal Returns (CARs) around the merger announcement. All of our acquisitions have status of completed in the SDC sample, and we also exclude the events with public targets. To estimate the cumulative abnormal returns (CAR) upon announcement of acquisitions by both CVC investor acquirers and third-party acquirers, we employ a standard event study method. Acquisition dates were collected from SDC Merger & Acquisition database, and verified through Lexus Nexus and Internet news search. Consistent with prior studies (e.g., Benson & Ziedonis, 2010), the CARS are calculated using the Center for Research in Security Prices’ CRSP value-weighted index based on a 3-day event window (-1, 1) and a 255-day estimation period ending on day -46.

***Independent Variables***

*R&D Intensity*

We measure R&D intensity similar to Benson and Ziedonis (2010) as R&D expense divided by the number of employees both from COMPUSTAT. This gives R&D intensity as millions of dollars spent per employee. Since this number is quite large relative to our dependent variable CAR(-1,+1), we further scale it by dividing it by 100 before using it in the regression analysis which converts it into tens of millions of R&D dollars spent per employee. The role of internal R&D in merger and acquisition decisions has been studied at length including Higgins and Rodriquez (2006). It is also an important factor in CVC investment decisions as outlined in Dushintsky and Lenox (2005).

*CVC Major Investor Status*

For each CVC-investor firm in our sample, we construct a measure of proportion of funds invested as the amount of fund invested by the firm divided by the total known amount invested in the portfolio company (target). Before eliminating data on foreign and private CVC investors for our sample targets, we create a variable that retains the largest percentage for any firm’s investment in the target relative to the total funds invested in that target. From this information, we construct an indicator variable *CVC Major Investor* which is equal to one if the target has a corporate investor that put in 20% (the percentage of firm investment contribution at the 75 percentile) or more investment of all the CVC and venture capital investment in it. In other words, this variable is one when one of the CVC investor for this target can be categorized as a CVC Major Investor.

***Control Variables***

Since our sample consists of acquisitions of private targets, SDC does not list many of the deal related details in its database for these events. After the Sarbanes-Oxley act of 2002, the requirements to report details of private-target acquisitions have increased but approximately 40% of our sample falls in the period before this change. In line with similar studies dealing with private targets, our analysis does not include deal-related controls. This is a clear limitation of this study, but it is inherent to this area of research. Therefore, apart from two measures (target age and relatedness) and the year fixed-effects, all of our control variables are constructed from information belonging to the acquirers for the fiscal year prior to the year of acquisition.

*Log of total assets*

According to Moeller, et al. (2004) the size of the acquiring firm is related to merger returns. They find that abnormal returns around merger announcement for smaller firms are higher regardless of whether the target is public or private. Size is also considered a relevant measure for the CVC investment decision. According to Dushintsky and Lenox (2005), larger firms are more likely to engage in both internal R&D and CVC investment. We control for the size of the acquirer through log of book value total assets from COMPUSTAT.

*Tobin’s Q*

We construct Tobin’s Q as market to book value of assets using COMPUSTAT data where the market value of assets is the book value of assets minus the book value of equity plus the market value of equity. Tobin’s Q proxies growth opportunities. Lang, Stulz, and Walking (1989) show that acquirers with low Tobin’s Q benefit more from than those with high Tobin’s Q. The same can be said of CVC investment. Firms with low growth opportunities internally need to look for growth elsewhere and an acquisition provides them with such an opportunity.

*Relatedness*

Makri, et al. (2010) explain the role of relatedness in merger transactions in detail in their study. They point out that the evidence on the effect of relatedness of knowledge for mergers and acquisitions is contradictory. In general, M&A literature points to better performance of horizontal mergers. In order to construct our measure of relatively closer relatedness between the target and acquirer/investor corporations, we obtain the SIC code information from COMPUSTAT’s historical SIC code in the fiscal year prior to the merger year for investor/acquirers. For the targets, we obtain the SIC codes from the VentureXpert database. If that information is missing, we fill it using the target SIC code in the SDC M&A record where available. We are still left with some missing values in each group and we treat those records as such. An indicator variable called Related is created with the value of 1 if both the investors/acquirers and respective targets have the same 2-digit SIC; zero otherwise. Among CVC-acquirers, 59 out of 132 corporations are related to their targets through this measure. Of the third-party acquirers 637 out of 1,250 acquired a closely related target.

*Target Age*

Ransbotham and Mitra (2010) show a negative effect of target age on acquirer value. We construct this measure using information from three sources. If the founding date for the target company was given on VentureXpert, we use the difference between merger announcement date lagged one year and the founding date to obtain target age in years one year prior to the merger announcement date. If the founding date is missing in VentureXpert, we use the founding date of target from the SDC M&A database. In a small number of cases, this information is missing in both databases in which case we proxy the first investing round date for the founding year of the target.

*In-IT*

In a cross-sectional study, controlling for industry effects is quite standard. In our case, as evidenced by Table 4, our sample can broadly be divided into two categories: belonging to information technology field or not. We, therefore, control for industry effects through an indicator variable In-IT which is equal to one if the acquirer/investor corporation has these SIC codes: 737, 357, 367, 481, 484, 366, 381, or 382; and zero otherwise (Benson and Ziedonis, 2010)

**EMPIRICAL RESULTS**

**Market reactions to acquisitions of portfolio companies**

The event study results are shown in Table 4. The estimated CAR is 0.64% on average for the sample of third party acquirers and -0.15% for the sample of CVC investor acquirers. The mean difference between the two groups is significantly different from zero (p<0.05). This finding is in support of our first hypothesis.

*Insert Table 4 about here*

The results of event study from univariate analyses must be interpreted with caution. A natural concern is that the market reaction may reflect updated investor expectations about the acquirer’s value for reasons that are not related to the acquisition deal (Benson & Ziedonis, 2010). As discussed earlier, numerous factors can affect the stock market reaction to acquisition announcements including characteristics of acquirers, targets, and deals. Thus, we further investigate whether the difference in CARs with the pooled sample of both CVC investor acquirers and third-party acquirers. Table 5 reports the OLS regression results regarding market reactions to announcements for acquisitions by CVC corporate investors and third-party acquirers. All the regression models are controlled for year fixed effects. The results show that whether the acquirer is CVC investor of target company is negatively related to the CARs at the significance level of 0.05 after controlling other factors. This multivariate analysis provides additional evidence in support of H1.

*Insert Table 5 about here*

**Impacts of Acquirer In-house R&D and Major Investor Status on Market Reactions**

Models 1-3 in Table 6 reports the panel regression results regarding market reactions to announcements for acquisitions by CVC investors; specifically, we examine a moderator impact of CVC investor acquirer’s major investor status on the relationship between CVC investor’s in-house R&D and market reactions to the announcement of acquisition as Hypothesis 2 proposes. All the regression models are controlled for year fixed effects. To test the interactive impact, we first add R&D intensity with all the controls in the regression model (Column 1), then introduce the CVC major status indicator (Column 2), and finally include the interaction item between R&D intensity and CVC major status indicator (Column 3). The direct impacts of R&D intensity are negative (b=-0.0049) and significant at p< 0.1 (Column 1) and p<0.05 (Column 2), which shows that in general the market reacts negatively when a CVC investor acquires its portfolio company and also conducts a high level of in-house R&D activity. Column 3 in Table 6 presents the regression results examining the moderation effects of CVC investor acquirer’s major investor status. The coefficient of the interaction item between major investor status and acquirer’s R&D intensity is negative (b=-0.0167, p<0.01), a finding in support of the negative moderation effects. Also, we create an interactive plot to further virtualize the moderation effect. Figure 2 shows that the relationship between CVC investor acquirer’s in-house R&D and CARs is negative when CVC investor is a major investor in the target portfolio company, and the relationship becomes positive when CVC investor is not a major investor. This finding is consistent with our Hypothesis 2.

Models 4-6 in Table 6 reports the panel regression results regarding market reactions to announcements for acquisitions by third-party acquirers. Using these models, we specifically examine a moderator impact of whether there is a major CVC investor on the relationship between third-party acquirer’s in-house R&D and market reactions to the announcement of acquisition as Hypothesis 3 proposes. All the regression models are controlled for year fixed effects. We follow the same steps as testing Hypothesis 2. That is, we first add R&D intensity with all the controls in the regression model (Column 4), then introduce the CVC major status indicator (Column 5), and finally include the interaction item between R&D intensity and CVC major status indicator (Column 6). Different from the direct impacts of CVC investor acquirer’s RD intensity, that of third-party acquirers is positive (b=0.0070) and significant at p< 0.05 (Columns 4 and 5). Column 6 in Table 6 presents the regression results examining the moderation effects of whether there is one CVC major investor *pre* acquisition. The coefficient of the interaction item between CVC major investor status and third-party acquirer’s R&D intensity is negative (b=-0.0109, p<0.01). Same as before, we create an interactive plot to further virtualize the moderation effect. Figure 3 shows that the relationship between third party acquirer’s in-house R&D and CARs is positive when there is no major CVC investor in the target portfolio company, and the relationship becomes negative there is a CVC investor. This finding is consistent with our Hypothesis 3.

*Insert Table 6, Figures 2 & 3 about here*

**Robustness Check**

As robustness check, we create another variable to capture when the target only has small CVC investors, an opposite situation to there is a major CVC investor. The indicator variable equals to 1 if all the investors’ investment percentage to the total investment is less than 6.5% (a 25-percentile cut-off line); otherwise, the value of zero will be assigned. We ran the similar aggressions models by replacing the variable of Major CVC investor with the new variable as well as its interaction with acquirer’s in-house R&D using the split samples of CVC investor acquirers and third-part acquirers, respectively. Table 7 reports the panel regression results. The direct impact of acquirer’s R&D intensity remain the same and significant; that is, the impact of CVC investor acquirer’s R&D intensity is negative (b=-0.0049, p<0.1) while that of third-party acquirer is positive (b=0.0070, p<0.05). The interaction items of all small CVC investors and acquirers’ in-house R&D are significant at the levels of 0.05 (Column 3) and 0.1 (Column 6), respectively. In addition, we create interactive plots to further virtualize the moderation effect (see Figures 4 and 5). Both Figures 4 and 5 show that the relationships between the in-house R&D activity of acquirers (CVC investor acquirer or third party acquirer) and market reactions to their acquisition announcements are positive when there are only small CVC investors. Such relationships become less positive or even negative when not all CVC investors are small. These findings provide additional support to Hypotheses 2 and 3.

*Insert Table 7, Figures 4 & 5 about here*

**DISCUSSION**

Although the literature has theoretically pointed out both the financial and strategic implications associated with CVC acquisitions, empirical research on this topic remains limited. Our study attempts to advance the understanding of this phenomenon by examining the market reactions to CVC acquisitions when different acquirers are involved (CVC investor acquirer vs. third-party acquirer). Our study provides new evidence regarding the impacts of toehold positions in the subsequent acquisitions. Although Higgins and Rodriguez (2006) report pharmaceutical firms earn positive returns when acquiring former alliance partners, our finding, consistent with that of Benson and Ziednis (2010), suggests a negative impact associated with such toehold positions at least in the context of CVC activity.

Why the market doesn’t reward CVC investor’s toehold positions in their portfolio companies in the successive acquisition may be due to several reasons. First, CVC investors may encounter incompetency in evaluating portfolio companies as potential acquiring targets. That is, they could not properly evaluate portfolio companies’ markets, products and technologies, and therefore increase the chance to make wrong acquisition decisions; namely, acquiring portfolio companies when they should not but giving up the option to acquire portfolio companies when they should. Indeed, Benson and Ziedonis’ analysis has revealed that CVC program structure (dedicated fund or not) influences acquisition performance because managers from different CVC programs vary in their abilities to manage CVC investments and to make decisions on acquiring (or not acquiring) their portfolio companies. Future studies could probe more deeply into factors at both the firm and industry levels that could influence CVC investors to decide on whether to acquire portfolio companies and which one to acquire.

For instance, in addition to the CVC organization structure as Benson and Ziedonis (2010) suggested, other factors may bring to CVC investor’s incompetency, for example, CVC managers’ agency issues. Syndicated investments are very common in the venture capital market, especially in the United States. Through investment syndications, CVC managers could diversify their investment portfolio and spread out risks. Being minor investors in multiple deals may benefit CVC managers individually, but such investment strategy may bring negative strategic consequences to their parent.

Another possible explanation is the involvement of other CVC investors in the acquisition decision making process. The presence of other CVC investors in the same portfolio company may lead to acquisition bidding war; namely, other CVC investors in the portfolio companies can be potential acquirers. Thus, the more other CVC investors exist, the more likely CVC investor acquirer faces intense competition in the acquisition bidding process. Such competition may force CVC investors to make acquisition decision quickly without thoroughly examining the potential target, and may drive up the bidding price and make the winner overpay the acquisition.

Although the market generally reacts to CVC acquisitions by third-party acquirers more positively than those by CVC investors, neither of the group’s CARs is significantly different from zero. That is, there are plenty of CVC acquisitions by CVC investors that received positive market reactions, and some of the acquisitions by third party acquirers received negative market reactions. Thus, we further investigate the interactive impacts of acquirer in-house R&D and the characteristics of pre-existing investment relationship (CVC major investor, small investor) on the variation of market reactions.

In general, we find CVC investor acquirer’s R&D activities have negative impacts on market reaction, and such negative impacts become more significant when CVC investor is the major investor. Indeed, the primary purpose for established companies to acquire entrepreneurial companies is to obtain innovative technologies/products developed by the latter. Although in-house R&D intensity reflects a CVC investor acquirer’s technological competency which may help it properly evaluate portfolio company’s technologies, some in-house R&D efforts will be wiped out once the new technologies/products are acquired. It seems that the market views there is a higher chance for the CVC investor with high in-house R&D activity to squander more R&D resources when acquiring an entrepreneurial company with which it has stronger preexisting investment tie. In the future, other factors that may influence the variation of market reaction deserve further investigation.

**CONCLUSION**

Our study attempts to advance the understanding of this phenomenon by examining the market reactions to CVC acquisitions when different acquirers are involved (CVC investor acquirer vs. third-party acquirers).  Specifically, we find the market reacts more positively to CVC acquisitions by third-party acquirers than by CVC investors. Furthermore, the findings show that the relationship between acquirer in-house R&D and market reactions to CVC acquisitions is moderated by whether CVC investors are the major investor *pre* acquisition. The findings could provide managerial implications to CVC investors as well as their CVC managers in terms of acquisition strategies.

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**Table 1: Merger Events by Announcement Year**

|  |  |  |  |
| --- | --- | --- | --- |
| Year of Merger | Total M&As | Acquisition by CVC Investor | Acquisition by Third-party |
| 1982 | 2 | 1 | 1 |
| 1983 | 3 | 2 | 1 |
| 1984 | 9 | 6 | 3 |
| 1986 | 7 | 5 | 2 |
| 1987 | 8 | 7 | 1 |
| 1988 | 8 | 7 | 1 |
| 1989 | 7 | 6 | 1 |
| 1990 | 2 | 2 | 0 |
| 1991 | 7 | 7 | 0 |
| 1992 | 5 | 5 | 0 |
| 1993 | 7 | 4 | 3 |
| 1994 | 15 | 13 | 2 |
| 1995 | 11 | 11 | 0 |
| 1996 | 20 | 16 | 4 |
| 1997 | 19 | 16 | 3 |
| 1998 | 35 | 33 | 2 |
| 1999 | 68 | 58 | 10 |
| 2000 | 109 | 81 | 28 |
| 2001 | 67 | 61 | 6 |
| 2002 | 74 | 67 | 7 |
| 2003 | 72 | 69 | 3 |
| 2004 | 107 | 99 | 8 |
| 2005 | 92 | 86 | 6 |
| 2006 | 80 | 72 | 8 |
| 2007 | 69 | 66 | 3 |
| 2008 | 43 | 40 | 3 |
| 2009 | 39 | 36 | 3 |
| 2010 | 74 | 69 | 5 |
| 2011 | 92 | 83 | 9 |
| 2012 | 100 | 97 | 3 |
| 2013 | 72 | 70 | 2 |
| 2014 | 103 | 99 | 4 |
| 2015 | 48 | 45 | 3 |
| Total | 1,474 | 1,339 | 135 |

**Figure 1: Merger Events by Announcement Year**

**Table 2: Summary Statistics**

**Panel A: Profile of companies acquired by their own CVC investors**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Mean | Median | St. Dev. | Min | Max |
| Company age (years) | 135 | 4.76 | 4.00 | 3.52 | 0 | 20.85 |
| CVC investment ($ millions) | 131 | 38.47 | 22.00 | 42.28 | 0.17 | 242.31 |
| Number of investment rounds | 135 | 3.67 | 3.00 | 2.11 | 1.00 | 13.00 |
| Number of investors | 135 | 8.17 | 7.00 | 5.33 | 1.00 | 26.00 |
| Years as CVC company | 135 | 2.98 | 2.21 | 2.77 | 0 | 12.76 |
| Average round amount ($ millions) | 131 | 10.35 | 7.50 | 10.72 | 0.06 | 82.60 |

**Panel B: Profile of companies acquired by third-party acquirers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Mean | Median | St. Dev. | Min | Max |
| Company age (years) | 1141 | 7.75 | 7.00 | 5.56 | 0 | 79.00 |
| CVC investment ($ millions) | 1129 | 57.46 | 44.63 | 52.74 | 0.02 | 607.88 |
| Number of investment rounds | 1141 | 5.23 | 5.00 | 3.09 | 1.00 | 21.00 |
| Number of investors | 1141 | 12.20 | 10.00 | 7.38 | 1.00 | 47.00 |
| Years as CVC company | 1141 | 4.47 | 3.72 | 3.57 | 0 | 18.38 |
| Average round amount ($ millions) | 1129 | 11.89 | 9.25 | 10.36 | 0.02 | 100.00 |

**Table 3: Profile of Acquirers**

**Panel A: Acquirers of Their Own CVC Portfolio Companies**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Mean | Median | St. Dev. | Min | Max |
| Age | 133 | 25 | 19 | 16 | 3 | 61 |
| Employees (thousands) | 133 | 46 | 34 | 61 | 0 | 387 |
| Total Assets ($ millions) | 133 | 30,729 | 19,512 | 36,100 | 9 | 176,064 |
| Market Value ($ millions) | 110 | 93,929 | 54,538 | 109,421 | 231 | 467,093 |
| Sales Growth | 133 | 0.23 | 0.12 | 0.41 | (0.51) | 2.14 |
| ROA | 132 | 0.15 | 0.16 | 0.16 | (1.05) | 0.43 |
| R&D/Total Assets | 135 | 88 | 47 | 147 | - | 821 |
| Tangible Assets/Total Assets | 133 | 0.14 | 0.11 | 0.11 | 0.01 | 0.52 |
| Leverage | 132 | 0.14 | 0.12 | 0.13 | - | 0.76 |
| Free Cash Flow | 132 | 0.10 | 0.11 | 0.15 | (1.09) | 0.32 |
| Tobin's Q | 132 | 3.74 | 2.32 | 3.63 | 0.60 | 14.78 |
| Cash/Total Assets | 133 | 0.25 | 0.21 | 0.18 | 0.01 | 0.83 |

**Panel B: Third-Party Acquirers**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | N | Mean | Median | St. Dev. | Min | Max |
| Age | 1,283 | 19 | 14 | 16 | 1 | 65 |
| Employees (thousands) | 1,256 | 35 | 4 | 124 | - | 2,200 |
| Total Assets ($ millions) | 1,280 | 22,831 | 2,011 | 90,027 | 1 | 1,562,147 |
| Market Value ($ millions) | 1,093 | 32,981 | 3,384 | 69,821 | 0 | 626,550 |
| Sales Growth | 1,273 | 0.73 | 0.13 | 8.33 | (0.95) | 257.44 |
| ROA | 1,273 | 0.07 | 0.11 | 0.22 | (4.25) | 0.67 |
| R&D/Total Assets | 1,339 | 50 | 30 | 94 | - | 1,683 |
| Tangible Assets/Total Assets | 1,277 | 0.13 | 0.09 | 0.13 | 0.00 | 0.89 |
| Leverage | 1,270 | 0.15 | 0.12 | 0.17 | - | 1.70 |
| Free Cash Flow | 1,272 | 0.01 | 0.08 | 0.38 | (7.36) | 0.72 |
| Tobin's Q | 1,273 | 2.93 | 2.00 | 4.58 | 0.26 | 78.56 |
| Cash/Total Assets | 1,280 | 0.28 | 0.23 | 0.20 | 0.00 | 0.92 |

**Table 4: Univariate Analysis of Merger Announcement Effect**

|  |  |  |  |
| --- | --- | --- | --- |
|  | N | Mean | Std. Error |
| Third-party Acquirers | 1,295 | 0.0064 | 0.0023 |
| CVC Acquirers | 135 | -0.0015 | 0.0034 |
|  |  |  |  |
| Difference |  | 0.00782\*\* | 0.004091 |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 5: Multivariate Analysis of Merger Announcement Effect**

|  |  |
| --- | --- |
|  |  |
| Dependent variable: CAR(-1,0,1) | Pooled Sample |
|  |  |
| Acquirer is CVC investor of target | -0.0124\*\* |
|  | (0.0051) |
| R&D Intensity | 0.0053 |
|  | (0.0035) |
| Size | -0.0003 |
|  | (0.0009) |
| Tobin’s Q | 0.0012\*\*\* |
|  | (0.0004) |
| Cash/Total Assets | 0.0038 |
|  | (0.0187) |
| Target Age | 0.0001 |
|  | (0.0002) |
| In IT | -0.0102 |
|  | (0.0073) |
| Target & acquirer in related industries | -0.0020 |
|  | (0.0070) |
| Constant | 0.0096 |
|  | (0.0098) |
|  |  |
| Observations | 1,375 |
| R-squared | 0.0121 |
| Number of Merger Years | 32 |
| Year Fixed Effects | YES |

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 6: CVC Investor Competition, Acquirer Research Capability, and Merger Announcement Effect**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent variable: CAR(-1,0,1) | CVC Acquirers | CVC Acquirers | CVC Acquirers | Third-party Acquirers | Third-party Acquirers | Third-party Acquirers |
|  |  |  |  |  |  |  |
| Major CVC Investor |  | 0.0016 | 0.0159\* |  | 0.0063 | 0.0114\*\* |
|  |  | (0.0092) | (0.0089) |  | (0.0054) | (0.0055) |
| R&D Intensity | -0.0049\* | -0.0049\*\* | 0.0083\*\*\* | 0.0070\*\* | 0.0072\*\* | 0.0091\*\*\* |
|  | (0.0025) | (0.0024) | (0.0019) | (0.0030) | (0.0031) | (0.0028) |
| Major CVC Investor × R&D Intensity |  |  | -0.0167\*\*\* |  |  | -0.0109\*\* |
|  |  |  | (0.0033) |  |  | (0.0049) |
| Cash/Total Assets | 0.0203 | 0.0199 | 0.0187 | -0.0003 | 0.0007 | 0.0009 |
|  | (0.0271) | (0.0283) | (0.0294) | (0.0176) | (0.0171) | (0.0170) |
| Size | -0.0048 | -0.0047 | -0.0049 | -0.0003 | -0.0002 | -0.0002 |
|  | (0.0032) | (0.0033) | (0.0033) | (0.0010) | (0.0010) | (0.0010) |
| Tobin’s Q | -0.0003 | -0.0003 | -0.0007 | 0.0012\*\* | 0.0012\*\* | 0.0012\*\* |
|  | (0.0006) | (0.0006) | (0.0007) | (0.0005) | (0.0005) | (0.0005) |
| Target Age | -0.0023 | -0.0023 | -0.0020 | 0.0001 | 0.0001 | 0.0001 |
|  | (0.0013) | (0.0013) | (0.0015) | (0.0002) | (0.0002) | (0.0002) |
| In IT | -0.0059 | -0.0059 | -0.0079 | -0.0097 | -0.0096 | -0.0092 |
|  | (0.0089) | (0.0090) | (0.0096) | (0.0076) | (0.0076) | (0.0075) |
| Target & acquirer in related industries | 0.0085 | 0.0089 | 0.0079 | -0.0030 | -0.0028 | -0.0025 |
|  | (0.0082) | (0.0098) | (0.0097) | (0.0076) | (0.0077) | (0.0076) |
| Constant | 0.0534 | 0.0524 | 0.0467 | 0.0092 | 0.0062 | 0.0046 |
|  | (0.0340) | (0.0359) | (0.0372) | (0.0102) | (0.0105) | (0.0103) |
|  |  |  |  |  |  |  |
| Observations | 131 | 131 | 131 | 1,244 | 1,244 | 1,244 |
| R-squared | 0.1002 | 0.1041 | 0.1718 | 0.0120 | 0.0129 | 0.0146 |
| Number of Merger Years | 28 | 28 | 28 | 32 | 32 | 32 |
| Year Fixed Effects | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Table 7: CVC Investor Competition, Acquirer Research Capability, and Merger Announcement Effect**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
| Dependent variable: CAR(-1,0,1) | CVC Acquirers | CVC Acquirers | CVC Acquirers | Third-Party Acquirers | Third-Party Acquirers | Third-Party Acquirers |
|  |  |  |  |  |  |  |
| Only small CVC investors |  | 0.0000 | -0.0279\*\* |  | 0.0037 | -0.0027 |
|  |  | (0.0075) | (0.0123) |  | (0.0064) | (0.0072) |
| R&D Intensity | -0.0049\* | -0.0049\* | -0.0051\*\* | 0.0070\*\* | 0.0070\*\* | 0.0051 |
|  | (0.0025) | (0.0025) | (0.0024) | (0.0028) | (0.0031) | (0.0039) |
| Only small CVC investors × R&D Intensity |  |  | 0.0484\*\* |  |  | 0.0119\* |
|  |  |  | (0.0190) |  |  | (0.0061) |
| Cash/Total Assets | 0.0203 | 0.0203 | 0.0185 | -0.0003 | -0.0008 | -0.0010 |
|  | (0.0271) | (0.0275) | (0.0263) | (0.0140) | (0.0173) | (0.0177) |
| Size | -0.0048 | -0.0048 | -0.0049 | -0.0003 | -0.0003 | -0.0003 |
|  | (0.0032) | (0.0031) | (0.0030) | (0.0011) | (0.0010) | (0.0010) |
| Tobin | -0.0003 | -0.0003 | -0.0008 | 0.0012\* | 0.0013\*\* | 0.0013\*\* |
|  | (0.0006) | (0.0005) | (0.0005) | (0.0006) | (0.0005) | (0.0005) |
| Target Age | -0.0023 | -0.0023\* | -0.0021 | 0.0001 | 0.0001 | 0.0001 |
|  | (0.0013) | (0.0013) | (0.0013) | (0.0003) | (0.0002) | (0.0002) |
| In IT | -0.0059 | -0.0059 | -0.0092 | -0.0097\* | -0.0096 | -0.0099 |
|  | (0.0089) | (0.0091) | (0.0091) | (0.0056) | (0.0075) | (0.0076) |
| Target & acquirer in related industries | 0.0085 | 0.0085 | 0.0074 | -0.0030 | -0.0032 | -0.0032 |
|  | (0.0082) | (0.0083) | (0.0091) | (0.0051) | (0.0077) | (0.0076) |
| Constant | 0.0534 | 0.0534 | 0.0593\* | 0.0092 | 0.0086 | 0.0099 |
|  | (0.0340) | (0.0328) | (0.0316) | (0.0119) | (0.0100) | (0.0103) |
|  |  |  |  |  |  |  |
| Observations | 131 | 131 | 131 | 1,244 | 1,244 | 1,244 |
| R-squared | 0.1002 | 0.1002 | 0.1227 | 0.0120 | 0.0146 | 0.0147 |
| Number of Merger Years | 28 | 28 | 28 | 32 | 32 | 32 |
| Year Fixed Effects | YES | YES | YES | YES | YES | YES |

Robust standard errors in parentheses, \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Figure 2. Moderation Effects of CVC Investor Major Status for CVC Investor Acquirers**

**Figure 3. Moderation Effects of CVC Investor Major Status for Third-Party Acquirers**

**Figure 4. Moderation Effects of Only Small CVC investors for CVC investor Acquirers**

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**Figure 5. Moderation Effects of Only Small CVC investors for Third-Party Acquirers**

1. The MoneyTree™ Report by PricewaterhouseCoopers and the National Venture Capital Association (NVCA) based on data from Thomson Financial [↑](#footnote-ref-1)
2. In our sample, less than 10% of portfolio companies were acquired by their CVC investors. [↑](#footnote-ref-2)