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Article

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Article

Effect of Financial Clusters on Startup Mergers and Acquisitions

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Abstract: The conventional wisdom has maintained that being in proximity to entrepreneurial ecosystems helps startups to raise financing, develop and grow. In this paper, we examine the effect of a major component of an entrepreneurial ecosystem—financial or venture capital clusters on the exit of a startup through mergers and acquisitions (M&A). We find that probability of successful exit through M&A increases if the venture capitalist invested in the startup is in a venture capital (VC) cluster. Location of the startup in a top VC cluster is not significant for success once we control for the location of the VC in a top VC cluster. Our results are robust to different specifications of the models that use different time periods, reputation of VC, industry, and the quality of the startup company. Our results provide evidence for VCs, startups and policy makers who want to better understand the components of entrepreneurial ecosystems and their relation to the M&A exits of startups.

Keywords: startup financing; financial institutions; venture capital; financing clusters; mergers and acquisitions



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1. Introduction

Startup companies are recognized as the engine that drives growth and economic development in a region (Schumpeter 1911). Financial institutions act as conduits for channeling financing for various projects and companies (Shaw 1973). The combination of startups and financial institutions provide fuel that allows regions to develop economically (Peng et al. 2009; Spigel 2017). However, only specific financial institutions have the ability and know-how to finance the peculiar nature and characteristics of startups. Startups lack ability to obtain financing from traditional institutions such as banks because they lack collateral and financial history (Hellwig 1991; Rajan 1992). Startups typically have novel and untested products and services, this combined with incorporation of startups as a private company makes the information asymmetry problems severe. Markets have responded to the unique need of startups by coming up with financial institutions such as the venture capitalists (VC). VCs specialize in providing financing for the startups in return for equity stakes (Lerner 1995; Kaplan and Stromberg 2001).

We analyze startup financial or VC clusters in this paper. Financial clusters are regions characterized by having the largest amounts of startup financing. We study if the location of a startup in a financial cluster affects its chances of success. We follow the classification in literature of mergers and acquisitions (M&A) exit as a successful outcome for a startup (Bernstein et al. 2016). Additionally, we look at the location of the financier—venture capitalist—and how it affects the success of the startup. Venture capitalists in the financing clusters have provided the largest amount of funding to the entrepreneurial firms (Lerner 1994a; Gompers 1996). Engel (2015) in his discussion of Silicon Valley and its success as a cluster refers to the large pools of private funds as a major component of success.

We use data from the National Venture Capital Association to rank regions based on the amount of venture capital funding received by startup firms in these regions. The

presence of venture capitalists leads to growth of various networks important for a startup such as head-hunters, patent and corporate lawyers, investment bankers, etc. (Gorman and Sahlman 1989). The networks that develop in these financing clusters directly and indirectly help the startups and the VCs located in these clusters. For example, Gorman and Sahlman (1989) and Sapienza (1992) show that VCs and their networks help startups with recruitment, and introduction to potential customers and suppliers. Hence, one would expect that presence of a startup and VC in a financing cluster will have a positive influence on the startup success.

We contribute to the literature in various ways. First, we analyze M&A exits of startups and show how financial clusters effect the success of exit through M&A. Majority of the successful exits of venture capital backed companies are through M&A, yet the literature on VC backed companies focusses primarily on high profile initial public offering (IPO) exits (Gompers and Lerner 2004). Focus of our research is on M&A exits and complements the VC entrepreneurship literature on exit through IPOs. Second, while existing research looks at the geographical proximity between a startup and a VC. We, on the other hand, analyze the colocation of startups in financing or VC clusters irrespective of whether the VC invested in the startup is close to the startup. This allows us to isolate the effect of the location of a VC and the location of a startup. We report that presence of a VC in a financing cluster is related to M&A exit, however, the mere presence of a startup in the VC cluster does not increase the probability of exit through mergers and acquisitions. Financing clusters provide various tangible and intangible benefits to a startup such as presence of network of suppliers, complementary industries, access to people with expertise in the industry etc. Such effects are different from the information asymmetry and monitoring effects that are studied in the geographical proximity literature between a startup and a specific VC or a bank. Our results can help policymakers to understand the effects of financing clusters on startup success. Our results also provide evidence for startups and venture capital backed companies planning to locate or relocate.

Rest of the paper is structured as follows. We start by examining the literature, we then develop our hypotheses, describe the data and the methodology used, report our results, and discuss the results proposing further research.

2. Literature Review

The relation of location and entrepreneurship has been extensively researched in the literature (Glaeser et al. 1992; Audretsch 2015). Government and non-government organizations increasing look towards entrepreneurial firms to grow their economies (Auerswald 2015). It has been shown that entrepreneurial ecosystems comprised of VCs, banks and accelerators help a region to achieve high growth rates (Malecki 1997; Audretsch and Fritsch 2002; Glaeser et al. 2009). Zhang (2007) describes Silicon Valley as the largest cluster in the world where venture backing is easy due to the abundance of capital. Fehder and Hochberg (2014) prove that the desire to establish clusters has led local governments to fund accelerators that attract venture capital but that the success of these accelerators is not clear.

Aouni et al. (2013) established a link between venture capital and success of technology clusters. Bernstein et al. (2016) show that VCs contribute to innovation and success of startups. Chen et al. (2010) found that VCs based in venture capital centers outperform VCs that are not located in these cluster areas. Gilding (2008) laments the tyranny of distance in the Melbourne biotech cluster where venture capital support is lacking indicating that a cluster cannot survive without VC support. Kolympiris et al. (2011) test the hypothesis that biotech firms co-locate to benefit from inputs such as researchers and capital linking success in technology clusters to geography and capital.

Several authors have defined success of startup companies that are funded by VCs in different terms, but they are consistent that a higher valuation was the basis of success Cumming et al. (2014). Streletzki and Schulte (2013) found that German high-flyer exits, that returned more than five times the original investment, were more likely to be in a

metropolitan cluster and close to the lead investor. Nahata et al. (2014) indicate that initial public offerings (IPO) and acquisitions are defined as VC success since VCs can convert their investments into cash through these transactions. Cumming et al. (2014) find that independent VCs increase likelihood of a successful exit through IPO. Teten et al. (2013) defined success as higher return on investment that is typically in the top-quartile. It is obvious from the literature that converting the VC investment into cash (exiting) and achieving a good return on the investment are two major foundations for VC success.

Colocation of startups and VCs has been analyzed in various studies. Coval and Moskowitz (1999) questioned the local bias in investments given the gains that one can obtain from diversification. Cumming and Dai (2011) found that more experienced VCs have shown less local bias due to their larger networks although specialization in technology areas tended to increase local bias. Häussler and Zademach (2007) examined cluster performance and suggested that money and ideas co-locate. Hochberg et al. (2010) indicate that VCs with strong local networks restrict entry by other VCs from outside the area. Mohr et al. (2014) indicate that alliances predict rapid growth in a technology cluster and that alliances are highly linked to venture-backed firms.

The question how location of VCs and startups in financing clusters effects the M&A exits of startups has received little attention in the literature and is developed in this paper. We also add to the literature of entrepreneurial ecosystems and innovation clusters by isolating and analyzing the effects of one component of the entrepreneurial ecosystems—the financing clusters. We isolate the effect of the VC vs a startup being in a financing region and find that presence of VCs in a financing cluster positively affects the probability of successful M&A exit of a startup. We also report that the presence of startup in the financing cluster is, by itself, not associated with a higher probability of a successful exit through M&A.

3. Hypotheses

It has been well established that certain regions are better at producing entrepreneurial activity than others (Feldman 2001; Glaeser et al. 2009; Delgado et al. 2010; Jocquet et al. 2015). The existing research is not clear as to whether the mere addition of venture capital to locations that support entrepreneurship activities produces significant returns (Lerner 2009).

The presence of venture capitalists leads to growth of various linkages and relationships that are important for a startup such as head-hunters, patent and corporate lawyers, investment bankers, etc. The networks that develop in these financing clusters indirectly help startups that the VCs in these clusters invest in (Bernstein et al. 2016; Chen et al. 2010). Hence, one would expect that presence of a startup and VC in a financing cluster will have a positive influence on the startup exit success.

Two primary strands of theory that support why the location is important for investors can be categorized as information asymmetry and behavioral. VC's want to reduce information asymmetry between themselves and the startups, and hence prefer to invest in startups that are located near them (Coval and Moskowitz 1999; Cumming and Dai 2010). Second strand of theory proposes that local bias in investments is driven by human psychology where investors prefer to invest in the familiar. People feel more comfortable investing in visible and geographical proximate businesses (Huberman 2001; Franke et al. 2006).

In this paper, we test the proposition that the geographical proximity of venture capital clusters leads to successful M&A exits for startups. We isolate the effect of the VC vs a startup being in a VC Cluster (financing clusters) by testing the effect of each on the exit success separately. Various studies have shown that startup firms co-locate with VC investor and that helps to improve the probability of successful exit (Häussler and Zademach 2007; Kolympiris et al. 2011). While on other hand Chen et al. (2010) document that well-established VCs also invest non-locally and some of the most successful investments are the non-local ones. To test if the co-location of a startup in a VC cluster improves the chances of its success, we formulate our first hypothesis as follows:

Hypothesis 1 (H1). *The M&A exit of a venture capital funded startup depends on its co-location in a VC Cluster.*

VC clusters are regions that have developed to support startups in various ways. These regions have well developed financing, legal, syndication and networking structures that are beneficial to both the startups and the investors (Hochberg et al. 2007; Kelly 2011). VCs located in the top VC clusters perform better than other VCs located elsewhere by achieving higher IRR (Lerner et al. 2010). Dantas Machado and Raade (2006) show that US technology hubs such as the Silicon Valley provide better investment and exit opportunities for VCs and startups. The networks in the top VC clusters provide VCs with better opportunities, bargaining power over entrepreneurs and access to corporates for arranging exits (Hochberg et al. 2007, 2010; Duke and Simanis 2017). To empirically test if the presence of a VC in the VC cluster effects the probability of M&A exits of a startup, we state the following hypothesis:

Hypothesis 2 (H2). *The M&A exit of a venture capital funded startup depends on co-location of the VC investor (invested in the startup) in a VC Cluster.*

4. Methodology

In the paper we define VC or Financing Clusters as top Metropolitan Statistical Area (MSA) locations that had the most amount of venture capital investment. VC clusters indicate access to investors, but it also indicates presence of experts and networks that can help a startup with various strategy and management issues. We look at the location of startup in a VC Cluster, the presence of at least one of the investor VCs in the VC cluster. We define the key cluster variables as follows:

Startup in VC Cluster: For each startup and the corresponding venture capital firm(s) we used the respective company headquarter location zip code to map it to a corresponding MSA code. If a startup company's MSA code matches any of the top 10 MSA codes defined in the data section, we classify it as a VC cluster company and the variable "Startup in VC Cluster" takes the value of one and zero otherwise.

VC in VC Cluster: Similarly, if a VC firm's MSA code matches any of the above top 10 MSA codes we classify it as a cluster VC firm and the variable "VC in VC Cluster" takes the value of one and zero otherwise.

Data

To test the effect of geographical location or "place" as represented by venture capital clusters on startup M&A exits, we define place by using the metropolitan statistical area (MSA) designation defined by the US Office of Management and Budget and used by the US Census Bureau to collect statistical data. There are 388 MSAs in the US and they represent geographical regions with a relatively high population density at its core with numerous linkages with the surrounding areas. The MSA's are also characterized by close economic ties throughout the MSA area. MSA is the preferred method for studying regional economies since they are not limited by arbitrary political boundaries that other regions such as a city or county are subject to (Glaeser et al. 2009; Bernstein et al. 2016).

We started by using the data from the National Venture Capital Association's list of top MSAs and selected the top MSA codes where start-ups received the most VC funding in the recent years. The top 10 MSAs are shown in Table 1. Since our data sample of startups is from 1990 to 2014 to ameliorate any confounding due to overlapping windows of ranking and analysis, we decided to rank the VC clusters based on ten-year window of 1980–1989 data. We then used these rankings to analyze the impact on startup M&A from 1990 onwards. We also checked to see if the top VC clusters are sensitive to the time window used to calculate the top VC clusters ranking. While the ranking of different VC clusters changes over time the top VC clusters are stable across different choices of the time windows. For example, a VC cluster may fall in ranking from third to fourth, but it still

retains its place as the top VC cluster and in the analysis all the top ten VC clusters are treated equally.

Table 1. Top venture capital MSA (Metropolitan Statistical Areas) codes by investment dollars. Following table lists top MSAs based on data by the National Venture Capital Association (NVCA) on startup funding received.

Rank	MSA	Region	Counties
1	7360, 7400	San Francisco; San Jose, CA	Marin, San Francisco, San Mateo, Santa Clara
2	1120	Boston, MA/ New Hampshire,	MA: Bristol, Essex, Middlesex, Norfolk, Plymouth, Suffolk, Worcester; NH: Rockingham
3	5600	New York, NY	Bronx, Kings, New York, Putnam, Queens, Richmond, Rockland, Westchester
4	4480	Los Angeles/Long Beach, CA	Los Angeles
5	7600	Seattle/Bellevue/Everett, WA	Island, King, Snohomish
6	5775	Oakland, CA	Alameda, Contra Costa
7	1600	Chicago, IL	Cook, DeKalb, DuPage, Grundy, Kane, Kendall, Lake, McHenry, Will
8	8840	Washington, DC; Maryland; Virginia; West Virginia;	Calvert, Charles, Frederick, Montgomery, Prince George, Arlington, Clarke, Culpeper, Fairfax, Fauquier, King George, Loudoun, Prince William, Spotsylvania, Stafford, Warren, Berkeley, Jefferson
9	7320	San Diego, CA	San Diego
10	640	Austin/San Marcos, TX	Travis, Williamson

We used Thomson Reuters SDC Platinum database to collect data about the location of the company headquarters and the VC office. SDC Platinum's private equity module started collecting data on VC firms in 1977 and backfilled the data to 1962. For our analysis, we use observations of venture capital deals, but we exclude buyouts and other non-venture capital deals to focus on startup companies (Lerner et al. 2010). Specifically, we include observations that has the US Venture disbursement variable set as "Yes" and the investment type field that specifies "Venture Capital" and the US Venture buyout field set as "No". We also filter deals that had no VC investment, or the investment amount was less than USD 10,000. Applying these criteria gives us 20,432 observations from 1962 to 2014. We follow the startups up to 3 years after 2014 to check if they had any M&A exit. To ensure that our data are not simultaneous (i.e., VC firms are in an MSA due to successful companies and successful companies are in an MSA due to successful VCs), we have used the 10-year window from 1980 to 1989 to develop the top ten VC clusters. Hence excluding observations before 1990 results in the final sample size of 15,111 observations.

Since M&A exit is a binary outcome that takes a value of one if the startup undergoes an M&A and zero otherwise; we use logit regressions with M&AExit as the dependent variable. We use existing literature to identify various factors that can effect exit through M&A and control for them in our analysis. Experience and reputation of a venture capital firm invested in a startup is a significant predictor of a startup's success (Megginson and Weiss 1991; Lerner 1994a; Gompers 1996). We control for the reputation of a VC firm by determining if the VC funds that are invested in the startup came from a follow-on fund. VCs build their reputation by picking "winner" startups and leading them to successful exits. The success of a VC in the previous fund determines if they will be able to raise money for subsequent funds. Hence, if a VC has a follow-on fund, it is an indicator of a successful VC. We control for the quality of a startup by the amount invested in the startup and the number of rounds of financing it received and total amount invested in it. We also

control for industry of a startup firm by including industry dummies based on the SIC code. Details of the variables used in the analysis appear in the Appendix A.

5. Results

5.1. Summary Statistics

Table 2 provides sample statistics of the VC funds and startups in our sample. The average investment by a single VC in a startup is USD 5.63 million. According to NVCA average investment by VCs ranged from USD 0.75 million to USD 8.0 million in 2014 depending on the stage (seed, early or late) of the investment. Average number of rounds received by a startup is 3.58 and on average 5.4 VC firms are invested in a startup and is comparable to [Cumming and Dai \(2011\)](#). Table 3 shows the correlation matrix of the VC funds in our sample.

Table 2. Summary Statistics of VC Backed Startups.

Variable	Mean	Median	1st Quartile	3rd Quartile	Std Dev	Minimum	Maximum
Average VC Firm Investment (USD m)	5.63	3.9	2	6.83	9.22	0.0006	500
Total Amount Invested by VC (USD m)	32.70	17.5	6.06	41.58	46.94	0.0011	1014.03
Number of VC Rounds Startup Received	3.58	3	2	5	2.52	1	22
Number of VC Firms Invested	5.42	4	3	7	4.01	1	31

The table shows summary statistics of the sample VC firms and startups. VC Fund Size is the total capital under management in the VC fund. Average VC Firm Investment is the mean investment made by a VC Firm in a startup. Total Amount Invested is the total amount of dollars invested by a VC fund. Number of Rounds is number of rounds of funding that a startup received. Number of VC Firms Invested is the total number of VC firms invested in a startup. The sample is from 1990 to 2014 and includes all observations where the VC funding indicator is set to 1 in the SDC Platinum.

Table 3. Correlation Matrix for VC Backed Startups.

Variables	Average Firm Investment (USD m)	Total Amount Invested by VC (USD m)	Number of VC Rounds Startup Received	Number of VC Firms Invested
Average Firm Investment (USD m)	1			
Total Amount Invested by VC (USD m)	0.5836	1		
Number of VC Rounds Startup Received	0.1139	0.6122	1	
Number of VC Firms Invested	0.0477	0.5869	0.8586	1

The table shows correlations among the variables. Average VC Firm Investment is the mean investment made by a VC Firm in a startup. Total Amount Invested is the total amount of dollars invested by a VC fund. Number of Rounds is number of rounds of funding that a startup received. Number of VC Firms Invested is the total number of VC firms invested in a startup. The sample is from 1990 to 2014 and includes all observations where the VC funding indicator is set to 1 in the SDC Platinum.

Table 4 shows the summary statistics for Venture Capital funds based on the location of their VC firm. Firms that are headquartered in one of the top VC clusters gave funding to 6120 startups vs. 1014 startups funded by funds of VC firms in MSA locations different from the top VC MSA clusters. VC funds in top VC MSA clusters tended to invest larger

amounts in startups, syndicate with more VCs and invest in more rounds than non-cluster VC funds.

Table 4. Summary Statistics of Funding by VC Cluster.

Panel A—ClusterVC = Yes							
Variable	Mean	Median	1st Quartile	3rd Quartile	StdDev	Minimum	Maximum
Average VC Firm Investment (USD m)	5.92	4.2	2.325	7.13	9.63	0.0006	500
Total Amount Invested by VC (USD m)	36.41	21.298	8.136	47.09	49.09	0.0011	1014.03
Number of VC Rounds Startup Received	3.80	3	2	5	2.56	1	22
Number of VC Firms Invested	5.90	5	3	8	4.08	1	31
Panel B—ClusterVC = No							
Variable	Mean	Median	1st Quartile	3rd Quartile	StdDev	Minimum	Maximum
Average VC Firm Investment (USD m)	3.76	2	1	4.13	5.71	0.0117	76.9
Total Amount Invested by VC (USD m)	9.28	4.88	1.8	10.50	16.27	0.018	307.60
Number of VC Rounds Startup Received	2.23	2	1	3	1.77	1	16
Number of VC Firms Invested	2.50	2	1	3	1.62	1	12

The table shows the summary statistics of the sample VC firms and startups. Sample is divided into two parts. Panel A is based on the startups that have at least one of the VCs invested in the startup in a VC cluster. Panel B is comprised of startups where none of the VCs invested in the startup are in any of the top ten VC clusters. VC Fund Size is the total capital under management in the VC fund. Average VC Firm Investment is the mean investment made by a VC Firm in a startup. Total Amount Invested is the total amount of dollars invested by a VC fund. Number of Rounds is number of rounds of funding that a startup received. Number of VC Firms Invested is the total number of VC firms invested in a startup. The sample is from 1990 to 2014 and includes all observations where the VC funding indicator is set to 1 in the SDC Platinum.

5.2. Regression Analysis

We use a logit regression model based on the equation below to test if a startup's exit is related to the headquarter location of a startup or a VC firm in a financial cluster. Our dependent variable of interest is M&AExit. We follow the existing literature and use the M&A type of exit of a startup as a measure of success (Hochberg et al. 2007; Bernstein et al. 2016). If a startup is acquired by some other firm or merged with another company, we categorize it as a M&A exit outcome and the variable M&AExit is set equal to 1 and 0 otherwise.

Out of the total exit outcomes of the venture capital backed companies in the United States over the time period between 1990 and 2014 we find that 4629 startups exited through M&A. 45 startups were in process of M&A in 2014–2015. We follow these startups for up to three years to check if they indeed went through the merger and include them in our list.

We test our hypothesis by running logistic regressions based on the following equation:

$$M\&AExit_{(i)} = \alpha + \beta_1 \text{Startup in VC Cluster}_i + \beta_2 \text{VC in VC Cluster}_i + \beta_n \text{Control Variables} + e_i$$

where:

- (i) is one observation per startup.
- M&AExit is defined as exit through Mergers and Acquisitions (M&A)

Our primary variables of interest are the VC Cluster Startup and VC Cluster VC. The variable VC Cluster Startup takes on a value of 1 if the startup is headquartered in one of the top VC cluster MSA codes. The variable VC Cluster VC takes on a value of 1 if at least one of the venture capital firms invested in the startup is headquartered in one of the top

10 cluster MSA codes. The loadings on these variables show the effect of having a VC or a startup headquartered in one of the top clusters.

The results of running regressions with M&A exit as dependent variable are shown in Table 5. The Cluster VC variable is significant across all specifications A, B and C in Table 5. Successful exit of a startup is positively and significantly associated with the venture capital firm financing the startup located in one of the top VC clusters. The coefficient of the variable Startup in VC Cluster shows that the location of the startup itself in the top VC cluster has no significant effect on the successful exit of the startup. We cannot interpret this result to imply that startups derive no benefit from locating in a VC cluster because of various reasons. One, startups that chose to locate in a VC cluster self-select to locate. Unless the self-selection process is modelled, we cannot claim causality. Second, startups can be deriving myriad of other benefits by locating in the VC clusters.

Table 5. Regression Results of Startup, Industry and VC Cluster Variables on M&A Exits.

	Dependent Variable M&A Exit		
	A	B	C
Cluster VC	0.2505 *** (0.0720)	0.2275 *** (0.0821)	0.2025 ** (0.0828)
VC Cluster Startup	−0.02540 (0.0543)	−0.04810 (0.0599)	−0.09887 (0.0607)
Reputation		0.05954 (0.0685)	0.04197 (0.0690)
Number of Rounds		0 (0.0141)	0 (0.0142)
Total Amount Invested (USD m)		−0.003248 (0.0009)	0 (0.0009)
Industry Fixed Effects	No	−0.005001 *** (0.0009)	−0.004423 *** (0.0009)
Year Fixed Effects	Yes	No	Yes
Constant	0.4133 *** (0.0671)	−1.1142 (1.0686)	−1.4817 (0.9970)
Observations	7134	6979	6979
Pseudo R-squared (%)	0.13	11.74	12.51

Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The table shows the results of the logit regression of startup M&A exit on cluster variables. Dependent variable is indicator variable that takes a value of 1 if the startup exit was categorized as M&A. VC Cluster Startup is set to 1 if a startup company's MSA code matches any of the top 10 VC Cluster MSA codes. Cluster VC is set to 1 if the VC firm's MSA code matches any of the top 10 VC Cluster MSA codes. Number of Rounds is the number of rounds of funding that a startup received. Reputation takes on value of 1 if VC fund invested in the startup, is a repeat fund. Total Amount Invested is the total amount of dollars invested by the VC fund. Industry is industry of the startup in the SDC platinum database. The sample is from 1990 to 2014 and includes all observations where the VC funding indicator is set to 1 in the SDC Platinum.

To isolate the effect of geographical proximity of a cluster VC and the startup we run further analysis in Table 6.

Table 6. Regression Results of Startup, Industry and VC Cluster Variables on M&A Exits while controlling for MSA co-location.

	Dependent Variable M&A Exit				
	A	B	C	D	E
	VC and Company in the Same MSA	VC and Company Not in the Same MSA	VC and Company in the Same MSA	VC and Company Not in the Same MSA	
Cluster VC	0.4076 ** (0.1706)	0.1220 (0.0982)	0.4095 ** (0.1710)	0.09291 (0.0993)	
VC Cluster Startup	−0.08358 (0.1148)	−0.08758 (0.0775)	−0.1419 (0.1163)	−0.1265 (0.0786)	
Reputation	0.03215 (0.1062)	0.06716 (0.0906)	−0.009510 (0.1073)	0.06713 (0.0913)	0.1356 * (0.0738)
Number of Rounds	0.009190 (0.0201)	−0.01919 (0.0195)	0.01958 (0.0204)	−0.01243 (0.0195)	0.04024 ** (0.0193)
Total Amount Invested (USD m)	−0.006365 *** (0.0011)	−0.003399 *** (0.0012)	−0.005821 *** (0.0011)	−0.002842 ** (0.0012)	0.005953 *** (0.0018)
matchMSA = 1					0.05337 (0.0617)
Industry Fixed Effects	No	No	Yes	Yes	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Constant	−0.3053 (0.3297)	−0.3932 (1.1867)	−0.7994 ** (0.3457)	−0.6691 (1.0426)	3.8999 *** (0.7149)
Observations	3468	3506	3468	3506	6875
Pseudo R-squared (%)	11.49	12.2	12.36	12.88	16.97

Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The table shows the results of the logit regression of startup M&A exit on cluster variables. Dependent variable is indicator variable that takes a value of 1 if the startup exit was categorized as M&A. VC Cluster Startup is set to 1 if a startup company's MSA code matches any of the top 10 VC Cluster MSA codes. Cluster VC is set to 1 if the VC firm's MSA code matches any of the top 10 VC Cluster MSA codes. matchMSA is set to 1 if startup and VC are co-located in the same MSA. Number of Rounds is the number of rounds of funding that a startup received. Reputation takes on value of 1 if VC fund invested in the startup, is a repeat fund. Total Amount Invested is the total amount of dollars invested by the VC fund. Industry is industry of the startup in the SDC platinum database. The sample is from 1990 to 2014 and includes all observations where the VC funding indicator is set to 1 in the SDC Platinum.

In specifications A, B, C and D we divide our sample in two parts. One where the startup and the VC are co-located in the same MSA code and second where they are not. Specification A is run for the subsample of startups that are co-located with at least one VC funding the startup. Specification B is run for rest of the sample. Specification A shows that when startup and VC are co-located in the same MSA the Cluster VC variable is significant. Specification B shows the results of the analysis for the sub-sample where the VC and the startup are not co-located in the same MSA. Similarly, specifications C and D are run with industry fixed effects and clusterVC variable retains significance for the subsample where VCs and startups are co-located. To check if the results are merely being driven by mere co-location, we introduce the variable matchMSA in specification E. matchMSA takes value of 1 if the startup and VC are headquartered in the same MSA code. The coefficient of matchMSA is insignificant indicating that geographic co-location matters only when the VC is located in one of the top VC clusters.

6. Discussion

The conceptualization of entrepreneurial ecosystems dates to 1980s at which time researchers and policy makers began to pay attention to the environment of the startups instead of merely looking at the individual characteristics of the startups (Aldrich 1990; Nijkamp 2003; Stam and Van de Ven 2021). Subsequent literature showed that certain

regions do a better job at promoting startup activity and supporting successful startups. Presence and access to venture capital is recognized as a vital component of the successful entrepreneurial ecosystems (Gorman and Sahlman 1989; Cumming et al. 2014; Bernstein et al. 2016).

Our results extend the literature by showing how the presence of VC effect the probability of successful M&A exit for a startup. We analyze the relationship between M&A Exit and each one of our co-location variables (Startup in VC Cluster and VC in VC Cluster). We find that the relationships between M&A exit success and the co-location of the VC in financial clusters is a significant variable positively influencing the probability of a successful exit through M&A. Our findings complement research on positive and significant effect of presence of VCs on IPO exits and success of entrepreneurial ecosystems (Colombo and Grilli 2010; Dutta and Folta 2016).

We also examined how cluster variables affect the M&A exit success of a startup while controlling for the proximity of the startup with the VC invested in it. We find that the influence of a Cluster VC is more significant and stronger if the startup and VC are located near to each other. Our results show that co-location of the VC and startup increases the probability of a successful exit through M&A. The results extend the literature on importance of distance between the VC investor and startup (Gilding 2008; Cumming and Dai 2010; Xiaoli et al. 2020). Mergers and acquisitions are driven by ability to match with a buyer and resolving information asymmetries inherent in a startup. Presence of VC near to the startup can help in increasing mergers and acquisition success in various ways. One, VC can use their network to arrange marriage of a startup with an appropriate buyer. Secondly, the presence of VC as an intermediary gives confidence to the buyer that the startup they are buying is reputable, is backed by informed investors and hence the severity of information asymmetries is reduced.

7. Conclusions

Startups require much more than capital to be successful. Other factors such as connections and networks of suppliers and customers, access to skilled labor, infrastructure, and ancillary businesses such as lawyers, banks, encourage new startup formation. VCs have traditionally provided access to such networks and connections. Our results show that presence of VC in top VC clusters allow startups to tap into their elaborate VC networks that help a startup exit successfully through M&A. We also show the importance of making distinction between having a VC in a top VC Cluster vs. having a startup in a VC cluster. Success comes from locations where VCs have built a system of interconnections for syndication, marketing, operations, and other activities. Having a VC in a top financing cluster is a better predictor of startup success through M&A.

Our results are confined to startups that received VC funding. The success of startups that do not receive VC funding may be affected differently by financing clusters and is an important question that we do not address in this paper. The primary reason is that data on startups that do not receive VC funding are extremely hard to find. SDC platinum private equity data are biased towards bigger startups and hence our results are biased accordingly. In general, VC backed startups tend to be bigger in size than startups that do not obtain or need VC funding. Majority of startups that receive VC funding tend to be in technology sectors. Our results should not be interpreted for non-technology startups.

Further research into different components and networks of entrepreneurial ecosystems and their availability in the top VC cluster areas might give us a more concrete explanation of how various components interact to make the ecosystem successful. There are also many other questions as to the relationship to the world economy and other financial and market factors that need to tie into this analysis. Our results, however, are intriguing to start that conversation.

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Appendix A. Variable Definitions

VC Cluster Startup: If a startup company's MSA code matches any of the top 10 VC Cluster MSA codes we classify it as a cluster company and the variable "Startup in VC Cluster" takes value of one and zero otherwise.

Cluster VC: If a VC firm's MSA code matches any of the top 10 VC Cluster MSA codes we classify it as a cluster VC firm and the variable "VC in VC Cluster" takes value of one and zero otherwise.

M&AExit: If a startup is acquired by some other firm or merged with another company the variable M&AExit is set equal to 1 and 0 otherwise.

matchMSA: If startup and VC are co-located in the same MSA then the variable matchMSA takes value of 1 and 0 otherwise.

Industry: SDC Platinum classifies portfolio companies into the following six industries: biotechnology, communications and media, computer related, medical/health/life science, semiconductors/other electronics, and non-high-technology. Industry dummy variables are for each of these industry groups.

Number of Rounds: Number of rounds of funding that a startup received.

Reputation/Follow on Fund: Takes the value of one if VC fund invested in the startup is a repeat fund.

Total Amount Invested: Total amount of dollars invested by the VC fund.

Average VC Firm Investment: Average investment made by a VC Firm in a startup.

Number of VC Firms Invested: Number of VC firms invested in a startup.

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