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Firm Experience and Market Entry by Venture Capital Firms (1962–2004)

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ABSTRACT In this paper, we examine a firm's decision to enter new markets as related to the depth and breadth of its experience and the relative distance of those markets. We situate our discussion and analysis in the context of the venture capital (VC) industry, and examine whether and when US VC firms enter five high-technology investment markets through first- or later-round investments. This setting allows us to observe both the firms that chose to enter a new market and those that did not, and analyse the antecedents of these decisions. We find that VC firms overall are less likely to enter distant markets; those with broader experience are more likely to make first-round entries. In addition, VC firms with deeper investment experience are more likely to make first-round entries in proximate markets and less likely to enter distant markets and make later-round entries. These results offer interesting implications for the literature on organizational learning and entrepreneurship.

INTRODUCTION

We do not see others as they are, but as we are. (Simone de Beauvoir)

The search for new opportunities is a persistent feature of organizational behaviour, particularly in competitive environments. As they strive to enhance their future competitive positions, organizations seek to explore (i.e. enter) new markets, new technological or geographical domains (March, 1991; Sidhu et al., 2007).

Yet, entry per se does not guarantee success. Prior studies of market or industry entry have shown that *successful* performance in new markets or industries is related to the possession, *ex-ante*, of certain related resources and capabilities (Carroll et al., 1996; Helfat and Lieberman, 2002; Klepper and Simons, 2000), useful for these new domains. More broadly, firms vary in their degree of pre-adaptation to particular markets or industries, and such variation can be used to explain subsequent differences in performance (Cattani, 2005).

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Intertwined within this view of performance heterogeneity of market entry, and perhaps obscured by it, is the firm's momentous entry decision and, as hinted by the pre-adaptation view, its antecedents. Indeed, the foundations of an organization's search for new opportunities typically gravitate around its history and accumulated experience (Cyert and March, 1963), so pre-adaptation matters not only to explain performance differentials, but also to understand the very decision to enter the new domain in the first place, a decision that some firms make early, and some not at all. In this regard, looking at entrants alone offers limited inferences about the entry decisions themselves, because this population suffers from a self-selection bias. Therefore, the questions of *whether* and *when* firms decide to enter new markets or industries are particularly relevant for researchers, because their examination requires not only an understanding of the domains to be entered and an assessment of the firms' fit for those domains, but also a setting in which both positive and negative entry decisions are observed and analysed.

In this paper we examine the nature, effecting, and timing of market entry, by studying the propensity of venture capital firms to invest in companies operating in new industries. Our theoretical perspective integrates insights from the organizational learning and market entry literatures as potential explanations for a firm's entry decisions. We do so in two stages. First, we consider the evolving nature of the firm's experience and focus on its depth and breadth at various points in time. These two dimensions capture, respectively, the overall amount and variety of the firm's experience, and we use them to explain the firm's general propensity and ability to search for and evaluate new opportunities (e.g. Cohen and Levinthal, 1990; Haleblian and Finkelstein, 1999). Then, in order to determine whether the firm's experience can in fact facilitate entry in a particular (new) market, we focus on the relative position of that prospective market with respect to the firm. Such relative distance reflects the degree to which the firm's experience can be relevant or potentially useful for the new domain (Cattani, 2005; Hoskisson and Busenitz, 2001). As these three constructs (depth, breadth, and distance) vary over time, across firms, and across market domains, we use them to predict whether a particular firm would enter a particular market at a particular point in time.

The empirical part of the paper involves a longitudinal study of the US venture capital (VC) industry over a 43-year period, from its inception until 2004. VC firms, like many others, continuously face competitive pressures to find new opportunities, which in their case may take the form of promising new ventures seeking entrepreneurial finance. Some of these ventures operate in industries in which the VC firm has never invested before. Given the instrumental roles that VC firms play in the development of their portfolio companies, the VC firm's ability to select and add value to such companies is closely related to its investment experience and its relevance for these investments. In particular, we examine whether and when 4446 US VC firms entered each of five different high-technology investment markets. This setting allows us to capture, at each moment, the set of potential entrants, the markets to be entered, the relative position of each prospective market to each potential entrant, and the actual entry decisions. We analyse the data using a discrete-time event history approach, based on a multi-level multinomial logit model. This approach allows us to properly model the nested nature of our data in regard to VC firm, market to be entered, and time, as well as the different types of entry decisions and the attrition in the population of VC firms over time.

Our goal with this paper is to make two contributions to the academic dialogue on organizational learning and entrepreneurship. First, we contribute to the idea that organizational learning is not only defined by the organization's experience but is also domain-oriented, particularly as engine for opportunity-search behaviour. Prior work on firm experience has used a learning logic to affirm the notions that certain experience is better for undertaking particular activities (e.g. Haleblian and Finkelstein, 1999; Helfat and Lieberman, 2002) and that certain (novel) activities expose the limits of particular experience (Gavetti et al., 2005; Tripsas, 2009). But inherent in these arguments is a static, time-specific link between the firm and the actions it undertakes. We make such link dynamic, focusing on how the firm's experience and the attractiveness of opportunities to the firm vary over time. Our focus on the distance of each prospective market helps provide a more elaborate assessment of the evolving relative position between a firm and its potential opportunities and helps determine whether and when the firm enters certain markets.

Second, we provide texture to the relationship between experience and the recognition and pursuit of opportunities. Recent work on this topic highlights the importance of distinct cognitive processes (Baron and Ensley, 2006) and knowledge resources (Haynie et al., 2009). We argue that the nature of the firm's experience, heterogeneous by definition, provides the basis for a differentiated opportunity perception and helps develop a more nuanced understanding of whether and when the firm decides to pursue certain opportunities and when it does not. In addition, in the context of recent work that has emphasized the importance of the VC firms' accumulated investment experience in managing their investments (De Clercq and Dimov, 2008), we elaborate on the considerations associated with the evaluation and management of new investment opportunities. Thus, the value of experience extends not only to making the firm more efficient in its familiar domains, but also to the prospection of novel domains.

THEORETICAL BACKGROUND

Forms of Exploration, Organizational Learning, and Organizational Experience

Exploration, typically described by terms as experimentation, innovation, search, or variation (March, 1991), refers to organizational pursuits in market, technological or geographical domains (Sidhu et al., 2007) that are new to the organization. Such pursuits are essential for expanding the organization's opportunity set and thus for making better, more adaptive decisions in the future (Sutton and Barto, 1998). However, and because of their newness, there is always a degree of uncertainty associated with exploration. As a consequence, the prospects of exploratory efforts are often intractable, remote in time (March, 1995), and their payoffs unclear (Schulz, 2001).

While exploration has many facets, two of its features are particularly useful to introduce and to set up our study. First, we note that exploration can take many forms but it is always endogenous to the firm. Indeed, newness, variation, and search can only be defined and observed in relation to an organization's specific activity, and to the activities it has done in the past. For example, in technology-based companies, explora-

tion has been associated with patenting activity in new scientific domains (George et al., 2008; Katila and Ahuja, 2002; Rosenkopf and Nerkar, 2001). Similarly, in hotel chains or nursery homes, it has been revealed by the acquisition or the establishing of operations in new geographical locations, or in old locations but with different operational characteristics (Baum et al., 2000; Ingram and Baum, 1997). In that vein, exploration can also encompass entry into a market (Helfat and Lieberman, 2002) or industry (Cattani, 2005; Klepper and Simons, 2000) that is new to the firm. This suggests that studying exploratory behaviour requires a contextual understanding of the nature of a firm's activities, and the newness that it may seek. As we explain in the next section, our focus in this paper is on the decisions by venture capital firms to finance entrepreneurial companies operating in industries in which the firms had not invested before; these decisions represent entries by the venture capital firms into new investment markets.

Second, organizations do what they know and know what they learn. Organizations, as collective actors, learn from their own experience and, vicariously, from the experience of other actors with whom they interact (Huber, 1991; Lane and Lubatkin, 1998; Levitt and March, 1988). Formally, organizational learning refers to the processes through which organizations add to their stock of knowledge and, consequently, to their repertoire of capabilities (Levitt and March, 1988). Learning happens in a variety of ways at the individual and collective levels, but it becomes organizational when experience, both personal and collective, is formalized in rules or routines for future retrieval and used to facilitate future decisions (Cyert and March, 1963; Nelson and Winter, 1982).

As collectives of boundedly rational actors, organizations tend to engage in local search for new opportunities (March and Simon, 1958); their actual search behaviour is heavily influenced by the nature of their experience and knowledge (Katila and Ahuja, 2002) and, in addition, it varies over time (Gavetti and Rivkin, 2007). In this sense, organizational experience and the learning it facilitates are intertwined with the search for new opportunities. Consequently, the experience and the knowledge that grow out of it are directly relevant for the scope of exploration efforts, because they make it easier under certain conditions and more difficult under others. These conditions are related both to the type of experience accumulated by the firm and the characteristics of the new domain (Tripsas, 2009). Consequently, the degree of novelty associated with a particular domain can only be defined in the context of specific organizational experience; what is new to one firm may be very familiar to another.

In order to characterize a firm's experience, we conceive of the firm in two ways: first, as operating in a particular industry, i.e. engaged in a general activity such as car manufacturing, commercial banking, or venture capital investing; second, as serving particular markets, each comprising a relatively distinct set of customers. We focus on two dimensions of experience that have been discussed in the literature – depth and breadth – and as they apply to such conception of the firm. Depth pertains to the overall 'amount' of experience in the firm's industry. Greater experience is associated with richer domain representations (Baron and Ensley, 2006) and thus entails a more profound understanding of the firm's activities and the paths that lead to successful performance (e.g. Ethiraj et al., 2005; Haleblian and Finkelstein, 1999). Breadth pertains to the variety in experience and represents the diversity of market domains that

the firm serves. Greater variety is generally associated with greater absorptive capacity and more comprehensive understanding of past or novel situations (e.g. Cohen and Levinthal, 1990; Haunschild and Sullivan, 2002). These two aspects of experience are particularly relevant for new market entry, since the novelty or complexity of the entry decision can invoke analogical reasoning (Gick and Holyoak, 1980). The firm can search for guidance about the new domain in the repertoire of its experience; broader experience makes it more likely that a close match can be found for the problems in the new domain and deeper experience can offer better solutions to these problems (Gavetti et al., 2005).

As defined above, depth and breadth characterize a firm's experience *regardless* of the specific decisions that the firm faces, i.e. they do not capture the relevance of the firm's experience for specific activities, particularly if these activities are novel to the firm, such as those associated with entry into new markets. This theoretical deficiency is particularly potent in view of the evolving nature of the firm's experience and its contingent value for the market entry opportunities that a firm can consider. Opportunities that are related to the firm's experience can appear more attractive; conversely, those that are more remote can appear less attractive (Haynie et al., 2009). Therefore, we also focus on a third, relative aspect of the firm's experience, representing the relative distance of each prospective market that the firm can enter, as viewed through the firm's experience. Prior studies have shown that firms tend to be more effective in activities that are similar to their experience (Haleblian and Finkelstein, 1999) or in new industries that are more closely aligned with their existing resources and capabilities (Helfat and Lieberman, 2002). They can become less effective in radically different environments because the elements that foster success in one environment can become inertial forces and limit the firm's adaptive flexibility in a different environment (Tripsas, 2009). In addition, facing more distant, novel environments can decrease the effectiveness of local search (Gavetti et al., 2005). Before specifying the inter-relationships between depth, breadth, and distance of prospective market in predicting market entry, we first situate these constructs in the venture capital industry.

Market Entry by Venture Capital Firms

VC firms manage a series of individual investment funds, each set up for a fixed period of time (typically 10–12 years), by investing the funds' capital in promising entrepreneurial ventures and seeking to liquidate these investments with substantial gains (Gompers and Lerner, 1999). Each fund is typically organized as a limited liability partnership, in which some or all of the VC firm managers act as general partners and the capital providers (e.g. pension funds, university endowments, or family trusts) serve as limited partners. Although they do not bear most of the financial risk associated with their investments, VC firms need to raise new funds on a regular basis, often from the same limited partners (Gompers and Lerner, 1998; Lerner and Schoar, 2004), and thus stand to benefit from a proven track record of superior financial returns (Cumming et al., 2005).

Each company receiving venture capital operates in a particular industry, such as computer software, biotechnology or energy. Because each industry is distinct in terms of

its competitive structure, performance milestones, and stakeholders, different industries can be regarded as separate markets for venture capital financing. In this regard, in making a new investment, a VC firm faces a choice between staying in the markets in which it currently operates and entering new markets, i.e. invest in a company that operates in an industry in which the VC firm had not invested before. On the one hand, the decision to enter a new market can be driven by diminishing returns in the VC firm's current markets, as they become crowded and brilliant new opportunities disappear. On the other hand, this choice can be driven by the emergence of new markets that can offer superior returns to the investors that enter them in a timely manner. Because it takes a number of years (typically 5–7) before the prospects of a new investment are fully revealed, and perhaps even longer for a new investment market to reveal its promise, the decision to enter a new market has to be made before all information relevant for this decision is available. In addition, it carries considerable uncertainty, and its assessment can vary widely across firms: what appears to be a blockbuster investment to one firm may well be labelled a dud by another. Each such assessment can be related to the VC firm's investment experience and this poses the question of the relationship between a VC firm's experience and whether and when it chooses to enter a particular new investment market.

In order to understand the importance of the VC firm's investment experience, it needs to be pointed out that, unlike traditional investment fund managers, venture capitalists are active investors: they not only focus on selecting companies by careful 'scouting' (Baum and Silverman, 2004), but also are instrumental in making these companies successful (Hellman and Puri, 2002; Sapienza, 1992). Once a venture capital firm invests in a company, it assumes an active role in monitoring and managing the investment (Lerner, 1995), often going as far as giving direct advice to the firm managers. Venture capitalists support their companies by providing access to a broad network of customers, suppliers, and other potential investors, as well as strategic and operational assistance and guidance as needed, particularly in the formative stages of the firm when strategies and courses of actions are defined. At the same time, they monitor the company's progress by serving on the board, and providing capital in multiple stages over the company's life. The success of each investment is therefore related to the VC firm's ability to guide and add value to the development of the company, and then capture that value through a lucrative liquidation (exit) such as initial public offering (IPO) or acquisition by third party (Cochrane, 2005; Guler, 2007b). Reflecting the risks that a VC firm undertakes, the majority of its investments may provide little or no return (Cochrane, 2005).

In identifying, evaluating, and managing their investments, VC firms rely on their accumulated investment experience (e.g. De Clercq and Dimov, 2008; Gompers et al., 2006). Although a VC firm makes its investments through separate investment funds, the investment decisions, monitoring, and value adding activities are essentially performed by the firm's investment team. VC firms have relatively simple, flat structures, comprising a team of general partners – which serve as principals in the individual funds – and a supporting group of investment officers. Typically, the VC firm's management team changes only gradually over time, thereby creating relatively stable collective experience. Although partners bring prior personal experience to the management team, their

collective experience within the firm carries substantial weight in investment decisions and is thus the explicit focus of our study. Indeed, group experience and learning leads to distinct benefits such as shared knowledge and mindset, coordination routines, and collective memory (Zhao et al., 2004). For example, based on their prior successes and failures, the VC firm managers engage in group discussions and decision-making; they make joint interpretations and draw collective inferences about the type of strategies and managerial skills that work in various competitive situations, the effectiveness of different approaches in interacting with the portfolio company managers, and the roles that different stakeholders play in the development of the portfolio company. This implies that in selecting and managing each new investment, the investment team can rely on the experience and insights derived from its previous investments; the knowledge derived from this experience can be instrumental for performing the key investment activities such as identification and evaluation (pre-investment) and monitoring and value-adding (post-investment).

Consistent with our background discussion, the experience of the VC firm, and thus the investment knowledge in which it is distilled, can be characterized in terms of its depth and breadth. Depth pertains to the magnitude of that experience, such as the number of companies that the VC firm has financed. It affects the richness of the firm's understanding of the VC investment process and the intricacies and challenges associated with investment origination, evaluation, due diligence, and governance. Deeper knowledge provides better understanding of the milestones in the investment process, as well as the critical points throughout the firm development process. Breadth pertains to the scope or range of the markets in which the VC firm operates. In each market, the companies seeking venture capital face distinct competitive environments, develop specific business models, engage a different set of stakeholders, and overcome different product and market development hurdles. Exposure to a variety of such circumstances can further enhance the VC firm's investment knowledge and boost its ability to evaluate new investment opportunities. VC firms vary in terms of the depth and breadth of their experience (e.g. Gupta and Sapienza, 1992; Norton and Tenenbaum, 1993). Such variation makes them differentially positioned to consider and recognize the appeal of new investment markets.

HYPOTHESES

The decision to enter a new market requires detailed consideration and careful judgment by the VC firm. Specifically, VC firms evaluate potential investments by assessing the potential risk and returns associated with them and evaluating their ability to add value to the investments. For these considerations, the VC firm's experience plays a primary role, both through the knowledge and learning ability it brings for acquiring and processing new information and through its relevance for the new market. Following from the discussions in the previous section, we relate the decision to enter a particular new market to the depth and breadth of a VC firm's experience, and the relative distance of that market to the firm. We discuss these relationships in the context of the tasks that a VC firm undertakes in selecting and governing a new investment: acquiring and

processing information, evaluating and structuring potential investment opportunities, and conferring strategic and market advantage to the venture.

Depth of Experience

Greater experience can be a better source of solutions that can be used in a new domain (Gavetti et al., 2005). It can offer distinct advantages to the firm in its dealing with novel decisions associated with the search for and evaluation of new opportunities. More experienced firms can decontextualize the issues and decisions they have faced in the past (Zollo and Winter, 2002) and can apply such deeper understanding to the market domains they prospect. By doing so, a firm can imagine new possibilities (Hargadon and Fanelli, 2002) and thus identify new market opportunities. In addition, it can identify, acquire and assimilate relevant and valuable information for understanding and evaluating these opportunities (Cohen and Levinthal, 1990).

In the venture capital context, investment experience enables VC managers to develop richer representations of investment processes and apply more clearly defined investment opportunity prototypes when screening promising entrepreneurial firms (Baron and Ensley, 2006). In addition, investment experience can offer a more complete, balanced understanding of the general milestones and other challenges associated with making long-term investments (Guler, 2007a) that are costly to reverse. This understanding, in turn, can enable the VC firm to discern the value and trajectory of its prospective investments in new markets. For example, based on its extensive experience with due diligence and valuation, a VC firm can better grasp the nuances of the investment at hand and can deflate some of the buoyant optimism about the venture by focusing on the critical junctions or technological and social developments that could affect the venture's viability and competitive position. Such a prudent approach allows the VC firm to explore a wider range of information sources and develop a more balanced view of the prospects of the venture. It can also see an analogy between its previously experienced deal selection difficulties and the challenges posed by the current investment.

In addition, greater investment experience can make the VC firm more competent in monitoring (Gompers, 1995) and adding value to its investments (Sapienza et al., 1996). Applied to prospective investments, such competence enables the VC firm to anticipate and promptly address emerging operational or strategic challenges. Therefore, a more experienced VC firm can expect to minimize agency problems (Sapienza and Gupta, 1994), identify promising strategies (von Burg and Kenney, 2000), source proper managerial expertise (Hellman and Puri, 2002) or cease to invest when the prospects of the company no longer warrant so (Guler, 2007a), thereby enhancing its investment performance.

These arguments suggest that greater experience can help the VC firm both identify and make a more informed assessment of investment opportunities such as those originating in new markets. Consequently, we propose that more experienced VC firms are more likely to invest in such opportunities.

Hypothesis 1: VC firms with greater experience are more likely to enter new investment markets.

Breadth of Experience

Broader experience enables a firm to add new variations in its actions (March, 1991) and enhances its ability to acquire and assimilate new and more diverse information (Zahra and George, 2002). Operating in multiple market domains increases the likelihood that incoming information will be connected to what is already known by the organization (Cohen and Levinthal, 1990). It also enables the firm to observe and learn from a larger set of players, thereby 'picking and choosing' competitive moves and business models from one setting to the next (Miller and Chen, 1996). Such broad oversight helps the firm to scan a wider range of potential ideas, thereby making the recognition of opportunities more likely. It also makes it more likely that the firm identify solutions or action steps that are relevant for its newly identified opportunities (Gavetti et al., 2005).

In the context of new market entry, VC firms face the challenge of sourcing and evaluating information that can be relevant for the prospective investment at hand. In this regard, the mere breadth of their experience can increase the likelihood of timely exposure to and assessment of such information. Firms with broader investment experience have more expansive information networks and privileged access to expert advice across different industries (Sorenson and Stuart, 2001). In addition, exposure to different due diligence, valuation approaches, or strategic challenges, can give a VC firm a more balanced understanding of the investment at hand, a broader set of tools to understand the new market, and higher likelihood that it will find a good match to something it has experienced already. Specifically, the firm can use multiple comparison points to judge the veracity of incoming information and the reasonableness of the assumptions underlying the presented financial forecasts, among many others. Finally, familiarity with different strategic approaches and competitive contexts can assure the VC firm that it can discern threats or opportunities in a timely manner and relay appropriate advice or source relevant expertise from its network to the venture's management team.

These arguments suggest that VC firms with broader investment experience can be better equipped to identify and manage opportunities in new markets. Given such inherent advantage, VC firms with broader experience will seek to explore new markets as not doing so may in fact increase the opportunity costs of their alternative actions (Garud and Nayyar, 1994). We therefore propose that these VC firms will be more likely to enter new investment markets.

Hypothesis 2: VC firms with broader experience are more likely to enter new investment markets.

Relative Distance of Prospective Market

To a firm considering entry, a prospective market domain can be seen as more or less distant, reflecting the ease with which the firm can see operating in that domain as an attractive opportunity (Haynie et al., 2009) or the degree to which it can use its experience to operate successfully in that domain (e.g. Hoskisson and Busenitz, 2001).[1] The relative distance of each prospective market reflects the relevance of the firm's experience for the new market domain. In this sense, the relative distance of a new market can be

viewed as the inverse of its relatedness to the firm, as discussed in the context of market or industry entry (Teece et al., 1994). A core notion of this literature is that higher relatedness (i.e. pertaining to a more proximate or less distant domain) can facilitate performance and survival in the new domain (Carroll et al., 1996; Klepper and Simons, 2000). From an organizational learning perspective, smaller distance is easier to overcome in the search for new opportunities. The firm's search process tends to be local, i.e. close to its existing knowledge base and experience (Rosenkopf and Nerkar, 2001; Stuart and Podolny, 1996), and thus easier and more intuitive to apply. In addition, more remote opportunities may be viewed as illegitimate within the firm (Dougherty and Heller, 1994) and pose difficulty for the firm to break away from its old routines (Martin de Holan and Phillips, 2004) and its cognitive inertial forces (Tripsas, 2009).

In the VC context, a new investment market can be represented by its relative distance to the VC firm, from the viewpoint of the firm's investment experience. Investments in more remote markets may require paradigmatic shifts in how they are understood, identified, appraised, and pursued. This is generally a much more difficult activity for VC firms, given an overall tendency for these firms to be more alert to 'local' opportunities as a result of their continued engagement with particular stakeholders and with the governance of their current ventures. Therefore, entry into more distant markets may be less likely to the extent that it requires the VC firm to tap new sources of information, establish relationships with different sets of experts, and engage with a different set of partners (e.g. law firms, recruitment firms, consulting firms) to support the new venture, and to the extent that such resources are not readily available or easy to institute. This leads us to the following hypothesis:

Hypothesis 3: VC firms are less likely to enter new investment markets that are more distant to them.

But how might the cognitive richness and agility afforded by the depth and breadth of experience fare in the consideration of more distant prospective markets? Such consideration can push the firm towards a more conscious examination of its experiential wisdom (Gavetti et al., 2005). Therefore, to the extent that such consideration requires greater effort or different, less usual activities within the firm, and to the extent that it is difficult for the firm to switch to such idiosyncratic modes of action, the benefits of experience may become more muted.

Firms with greater experience can be more effective in identifying and assessing new investment opportunities, but this process can require much less effort when the search occurs in domains that are more proximate to the firm's past activity. Such firms can exhibit rigidity when prospecting more distant domains (Leonard-Barton, 1992), especially if this requires significant cognitive reconsiderations of how the firm operates (Tripsas, 2009). For VC firm managers, this rigidity is related to the constant challenge of allocating their attention and efforts among the different ventures in their portfolio and the sourcing of new opportunities (Gifford, 1997). With greater investment experience, communication patterns and deal selection processes tend to be set within the management team. These patterns and processes can easily accommodate the consideration of opportunities in proximate investment markets, when no substantial changes should be

made to how deals are sourced, what due diligence process is to be used, and what approaches should be used to valuation and deal structuring. In contrast, when these approaches require special attention and reconsideration, such as when opportunities in distant investment markets are brought forward, there is greater disruption within the investment team. Viewed in the context of each team member's juggling of his or her attention demands, such disruption can slow down the consideration of more remote investments and thus make the VC firm's entry into distant investment markets less likely at the given point in time.

Hypothesis 4a: For more distant investment markets, the relationship between the depth of the VC firm's experience and its likelihood of entering those markets will be weaker.

In contrast, when the VC firm already balances the relationships, information, and governance engagements in multiple investment markets, the consideration of opportunities in distant investment markets is not disruptive and can in fact be more forthcoming. More broadly, the simultaneous operation in several domains may improve the firm's coordination capabilities (Van den Bosch et al., 1999), which may in turn enhance the firm's ability to acquire and assimilate external information and knowledge (Jansen et al., 2005). This can make VC firms with more diverse investment experience natural destination for the business plans of entrepreneurs in newly emerging industries. In addition, such VC firms can be more attuned to the emergence of new industries by observing the actions of other VC firms and, once such investment opportunities become apparent, be in a better position to respond to them in a timely manner. Therefore, firms with broader experience will be more likely to enter distant markets at the given point in time.

Hypothesis 4b: For more distant investment markets, the relationship between the breadth of the VC firm's experience and its likelihood of entering those markets will be stronger.

METHOD

Data

We collected data from the *VentureXpert* database published by Thomson Financial on all investment transactions executed by US venture capital firms over the period 1962–2004. To manage their financial risk, VC firms normally stage investments in each company across different investment rounds; a new (follow-on) round of investment usually requires that the portfolio company meet certain development milestones (Gompers, 1995). Thus, after its initial investment in a portfolio company, a VC firm may decide to invest further in that company if the performance prospects of the company remain satisfactory. Because each investment round is recorded in the database as a separate transaction, we identified the portfolio of each VC firm by selecting the *initial* investments made by each VC firm in each of its portfolio companies. There were a total of 84,237 initial investments made by 4446 VC firms over the above 43-year

period. These investments represented a relatively homogeneous set of decisions – adding a company to the VC firm's portfolio – and excluded the qualitatively different decision to continue to invest in a company already in the portfolio. We used this set of initial investments to represent the chronological development of each VC firm's investment portfolio and thus capture the evolving nature of its investment experience.

Our primary interest pertains to whether and when a VC firm decides to enter a new investment market, i.e. invest in a company operating in an industry in which the VC firm had not invested before. Because each investment is preceded by a period of consideration, due diligence, negotiation, and disbursement arrangement that can last several months and can vary across firms and time periods, the actual date of each investment (as recorded in the dataset) is not a precise reflection of the timing of the investment decision. In this regard, to smoothen out the variations in the unobserved duration between an investment decision and the recording of the investment, we chose to group and summarize the data annually, i.e. consider the year in which an investment was made. Organized in this way, our data contain 21,167 firm-year observations, i.e. the years in which each VC firm had added companies to its portfolio.

As we were interested in the evolution of the composition of the VC firms' portfolios, we sought to capture the industries (i.e. investment markets) in which a VC firm had invested in and prior to a particular year. To do so, we used nine main categories used by the *VentureXpert* database (i.e. the 1-digit VEIC codes) to characterize the industry of each investment: (1) communications and media; (2) computer related; (3) semiconductors and electronics; (4) biotechnology; (5) medical and pharmaceutical; (6) energy related; (7) consumer related; (8) industrial products; and (9) other manufacturing and services. We derived total counts of the additions to a VC firm's portfolio from these industries in each year and in all preceding years (i.e. from the firm's founding up to the year in question).

Market Entry

To test our hypotheses, we chose to examine the VC firms' entries into the high-technology investment markets (i.e. categories (1)–(5) above). Historically, VC firms have played a prominent role in financing high-technology ventures, but notably there is wide variation in the extent and scope of their involvement with such ventures. These industries are more R&D intensive and so companies in these industries that seek venture capital pose a particular 'burden' on the VC investors to understand the underlying technology and related market dynamics. In this regard, there is a substantial learning curve associated with technology investments, making them especially salient for understanding the role of investment experience in facilitating current investments.

To capture the VC firms' entries into the high-technology investment markets, we noted the years in which a VC firm invested in these markets for the first time. In addition, we distinguished two types of entry. The first pertains to cases in which the VC firm is a first-round investor, i.e. the company it backs has not received venture capital previously. In these cases, the VC firm can be considered initiator of the investment in the sense that it is the first to consider whether the company represents a good investment opportunity. The second type of entry pertains to cases in which the VC firm is a

later-round investor, i.e. the company it backs has been previously backed by other VC firms. In these cases, the VC firm is essentially invited to join an existing group of investors. There were a total of 9707 entries, of which 4621 (48 per cent) were of the first-round and 5086 (52 per cent) were later-round. Clearly, there are different motivations underlying each type of entry. We expect our theoretical arguments to be stronger for the first-round entry since later-round entry can be driven not just by the VC firm's particular knowledge at hand but by its overall desirability as an exchange partner and enabled by its network resources (Piskorski, 2004). Figures 1 and 2 show for each year the number of entries of each type in the five high-technology investment markets. There are two distinct peaks in the figures, representing the well documented bubbles of the early 1980s and late 1990s. The first was triggered by excitement about PCs and biotechnology following the spectacular IPOs of Apple Computer in December 1980 and of Genentech in October 1980. The second was triggered by excitement about the possibilities offered by the internet, accelerated following the IPOs of Netscape Communications in August 1995, Yahoo in April 1996, and Amazon in May 1997.

Because each VC firm could potentially enter each of the five high-technology investment markets in an unspecified order, we treated each VC firm's market entries as unordered multiple events of the same type and created an appropriate event history

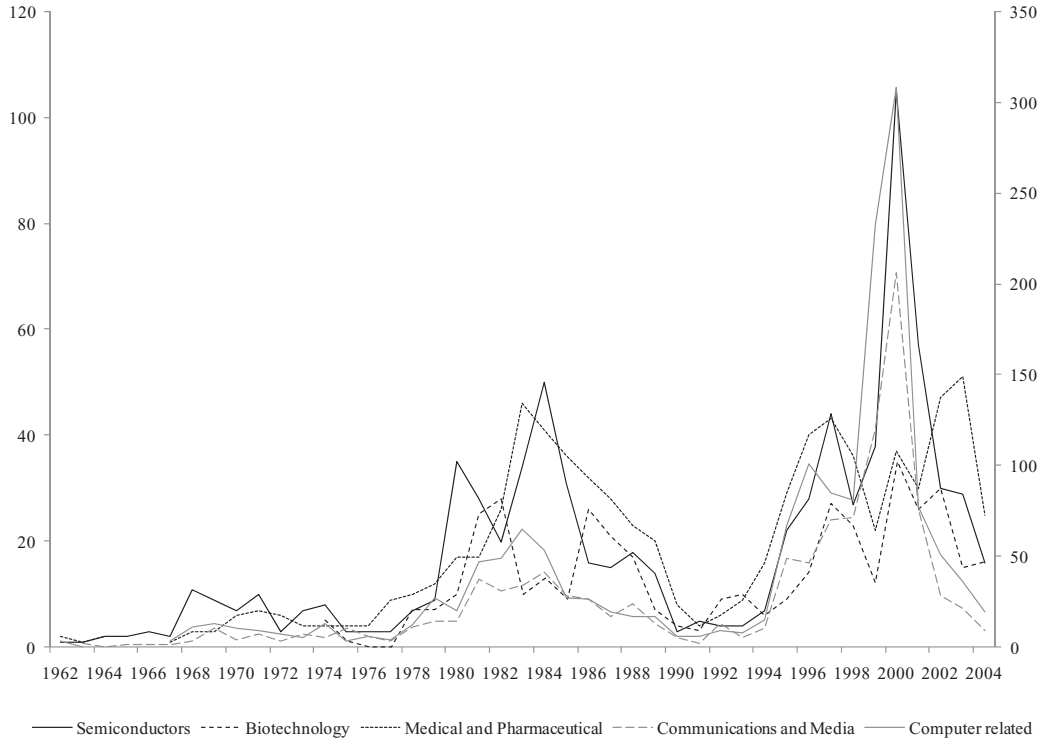

Figure 1. First-round entries by US VC firms into high-technology investment markets, 1962–2004

Notes: Vertical axis shows the number of VC firms making a first investment (first round) in a given market in a given year. The values for Communications and Media and Computer related industries are plotted on the secondary axis.

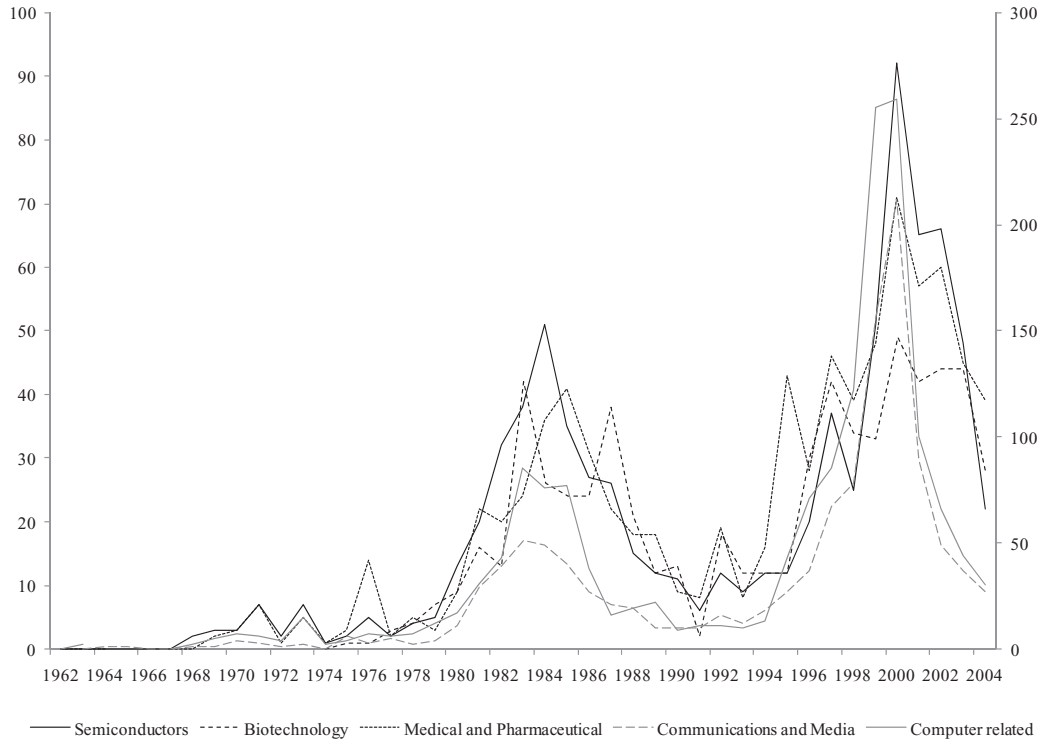

Figure 2. Later-round entries by US VC firms into high-technology investment markets, 1962–2004

Notes: Vertical axis shows the number of VC firms making a first investment (later round) in a given market in a given year. The values for Communications and Media and Computer related industries are plotted on the secondary axis.

data structure. Specifically, we created an event timeline for each of the five possible market entries by replicating the observations for each firm and for each year to match the number of high-technology investment markets that the firm had not yet entered prior to that year. For example, a firm that has already entered markets (1) and (2) prior to 1995 will have three observations for 1995, i.e. one for each possible entry in markets (3), (4), and (5). In other words, each VC firm starts with five series of annual market entry spells and each of these spells ends with the occurrence of entry, with the VC firm's last year of activity, or with the end of the observation period (i.e. end of 2004). This resulted in the creation of 58,299 firm-market-year spells (i.e. observations).

While the non-occurrence of entry would be typically treated as a right-censored observation, right-censoring implies that an event may occur after the end of a particular spell or, in the case of a firm's very last spell, after the end of the observation period. In this regard, among the VC firms, we had to distinguish between those who could be deemed to remain active after the observation period and those who can be considered inactive due to their discontinuation of investment activities. We considered a VC firm to have become inactive for the observations representing the firm's last year of investment activity and occurring at least five years prior to the end of the observation period (i.e. by the end of 1999). We chose this five-year cut-off in reflection of the fact that this

is a period within which VC firms typically seek to exit their previously made investments and initiate new funds.

The final consideration in the construction of our dataset concerned the treatment of a VC firm's first year of investment activity. By default, the VC firm has had no experience prior to that year. In this regard, to the extent that our hypotheses pertain to the relationship between the VC firm's experience and market entry, the first year for each firm falls beyond the scope of our theory. Given this, our event spells exclude the first yearly observations of each VC firm – a total of 22,230 observations (i.e. 4446 firms × 5 markets to be entered), which included 4481 entries by 3516 firms. Of these entries, 3229 (72 per cent) occurred in the bubble periods of 1981–86 and 1996–2001, for which we account among our control variables. Although these first-year entries could not be considered in our analysis – indeed, they had no firm-experience antecedents given their occurrence in the VC firm's very first year of investment activity – we coded the firms making these entries as 'born high-tech' and included this designation as a control variable in our analysis in order to account for the fact that some unobserved characteristics driving the firms' initial choice may also affect their subsequent entry decisions.

In summary, in its final form, our dataset included 36,069 firm-market-year observations. For each observation, our entry indicator variable took one of four possible values:

0 – Observation was right censored (28,804 observations)
1 – First-round entry occurred (2394 observations)
2 – Later-round entry occurred (2832 observations)
3 – Attrition, i.e. firm became inactive (2039 observations)

Independent Variables

Depth of experience. We measured the depth of firm *i*'s experience in year *t* as the log of the number of companies in which firm *i* had invested prior to year *t*. As the measure implies, the more investments a VC firm has made the deeper is its experience and understanding of the VC investment process. In addition, the log specification incorporates the diminishing learning effect from each additional investment (e.g. Argote, 1999).

Breadth of experience. We measured the breadth of firm *i*'s experience in year *t* by Blau's (1977) heterogeneity measure:

$$BE_{i,t} = 1 - \sum p_j^2$$

where p_j represents the proportion of investments made in industry *j* prior to year *t* and *j* belongs to one of the nine industry categories discussed above. This heterogeneity measure reflects how dispersed the VC firm's investments are across industries. It varies between 0 and 0.8889, with a higher score representing higher breadth of the VC firm's experience. Because the value of this variable is by default zero when the VC firm has made only one investment previously, we included a control indicator for these cases.

Relative distance of prospective market. For each prospective market k that a firm i has not yet entered by year t, we measured the distance of market k to firm i at time t in two steps. First, we calculate the relatedness between firm i and market k at time t using the following formula:

$$\mathrm{REL}_{ikt} = \sum p_{ijt} \times r_{kjt} \Big/ \sum p_{ijt},$$

where $\{k\}$ represents the set of high-tech investment markets still not entered, $\{j\}$ represents the set of investment markets in which firm i has invested prior to year t, p_{ijt} represents the proportion of investments made by firm i in investment market j prior to year t, and r_{kjt} represents the relatedness between investment markets k and j in year t. By default, the sets $\{k\}$ and $\{j\}$ do not intersect. In other words, REL_{ikt} represents a weighted average of the relatedness of investment market k with the remaining investment markets j, with the weights representing the respective industry allocations in firm i's portfolio. We measured the relatedness between k and j for each year in order to capture the evolving nature of the industries captured in the *VentureXpert* database. Because the VentureXpert industry classification does not allow a reliable inference for how close or distant two industries are, we measured r_{jkt} using a survivor-based approach, which entails observing the frequencies in which industries are combined in the firms' operating portfolios (Lien and Klein, 2008; Teece et al., 1994). This approach is based on the assumption that investment markets that are more related would be more frequently combined by VC firms. Its essence is to compare the actual occurrences of firms' investing in both markets k and j with the expectations of such occurrences based on a random diversification process. More formally:

$$r_{kjt} = \left(O_{kj,t-1} - \mu_{kj,t-1}\right) \Big/ \sigma_{kj,t-1}$$

where $O_{kj,t-1}$ represents the observed number of firms operating in both markets k and j in year $t-1$, and $\mu_{kj,t-1}$ and $\sigma_{kj,t-1}$ represent, respectively, the mean and variance of the number of firms operating in both markets k and j in year $t-1$ based on a random diversification process. In the few cases where the observed occurrences were lower than the expected ones, r_{kjt} was made equal to zero, i.e. these occurrences were attributed to random diversification. The values for $\mu_{kj,t-1}$ and $\sigma_{kj,t-1}$ are derived from the total number of firms operating in year $t-1$ and the number of firms operating in each market k and j in year $t-1$.[2]

The second step in deriving the market distance measure involved scaling of the relatedness scores and their conversion into 'distances'. Because the magnitude of r_{kjt} varies both across time and across investment markets k, and because we pooled the firm-market spells in a single dataset, we had to ensure that r_{kjt} was expressed on a common scale across time and across markets. Therefore we scaled r_{kjt} so that the maximum and minimum values for each market k and year t were 1 and 0, respectively. We then subtracted these scores from 1 to derive the market distance measure. It had a lowest value of 0 (i.e. lowest distance, highest relatedness) and a highest value of 1 (i.e. highest distance, lowest relatedness).

Control Variables

We included an extensive set of control variables in our analysis in order to eliminate various possible alternative explanations for a VC firm's likelihood of investing in a new investment market. These variables included time-varying and fixed characteristics of the VC firm as well as characteristics of the investment period and the market to be entered.

First, we included three time-varying VC firm characteristics: network centrality, prior performance, and proportion of early-stage investments. The VC firm network centrality accounted for the possibility that the network position of the VC firm may affect its information flow about new investment opportunities and its attractiveness as a potential partner (Hochberg et al., 2007). To measure network centrality, we followed other studies of VC firms and first constructed for each year t a matrix of relationships between all active VC firms, with each element of the matrix R_{ij} representing the number of times firms i and j had co-invested together over the five-year period preceding year t. Using these matrices, we then computed each VC firm's eigenvector centrality for year t, which reflects both the number and centrality of the firm's partners (Bonacich, 1987).[3] We normalized the scores by year, giving the highest status firm in any given year a score of one and the lowest status a score of zero (Podolny, 2001), thereby capturing the annual changes in the VC firm's relative rank. Using alternative measures for network centrality, such as degree or betweenness, produced results consistent with those reported below.

We measured the VC firm's prior performance for year t by first counting the number of IPOs achieved by firm by the end of year $t-1$ and then normalized the scores across the VC firms for each year, so that the lowest performing firm had a score of zero and the highest performing had a score of one. This procedure ensured that performance scores across years could be directly comparable as they reflected the relative ranking of each firm in year t based on its performance prior to year t. The final time-varying characteristic captured the proportion of companies in which the VC firm had invested prior to year t at an early stage of development.

Second, we included several variables capturing stable VC firm characteristics. As mentioned above, we controlled for whether a firm was born high-tech, i.e. whether it invested in one of the high-tech investment markets in its first year of activity. This variable accounted for the possibility that the founding conditions and early activity of the VC firm may have a lasting effect on its future choices (e.g. Boeker, 1989). We also controlled for the ownership characteristics and location of the VC firms. To account for the possibility that independent VC firms had more strategic freedom, while corporate subsidiaries or affiliates of financial institutions could operate under additional strategic or liquidity constraints (Manigart et al., 2002; Mayer et al., 2005), we included indicators for these types of VC firm. In addition, to account for location effects associated with proximity to clusters associated with the emergence of the particular technologies (Saxenian, 1994), we included indicators for whether the VC firm was located in California or Massachusetts.

Third, we included two variables characterizing the period in which a specific spell occurred. To account for possible sparseness of investment data prior to 1980, we included an indicator for those investment years. In view of the two distinct peaks of VC firms entering high technology investment markets – as shown in Figure 1 – we con-

trolled for whether year *t* fell into one of these 'bubble' periods, 1981–86 and 1996–2001. We expected that VC firms that had not previously invested in a particular high-tech investment market might exhibit a herding tendency to do so in these particular periods. In addition, to account for the fact that as more VC firms invest in a particular high-tech market, firms that have not yet done so may be increasingly likely to do so (i.e. institutional effects), we controlled for the (logged) number of VC firms that have entered the particular market *j* within the three years prior to year *t*.

Fourth, to account for the different baseline entry rates in the five high-tech investment markets to be entered by each VC firm, we included four market dummy variables (with category 1, Communications and Media, as the omitted category). In addition, to account for the different baseline probabilities of subsequent entries, we included four dummy variables for the entry number to which each spell referred (with the first entry as the omitted category). Because the VC firm may enter the different markets at different times, these indicator can vary within the spells for a particular market.

Analysis

As specified above, our data were organized in an event history format, comprising annual spells for each VC firm and each of the five markets to be entered. Each spell ended in one of four possible outcomes – right censoring, first-round entry, later-round entry, and attrition – that represent competing risks for the firm. In addition, the data contained three distinct levels – (1) VC firm; (2) industry; (3) annual spell – with the implication that there were repeated observations by VC firm and by year, and that this lack of independence needed to be properly modelled. Given the discrete nature of the time (year) recorded in our data, we tested our hypotheses using a discrete-time competing risks model, based on a multinomial logit specification (Allison, 1982). The advantage of using the discrete-time event history technique is that it allows for the probability of event occurrence to vary over the life of the VC firm and thus enables us to relate that probability to the time-varying characteristics of the VC firm's experience and market to be entered. In addition, this technique enabled us to make full use of the right censored observations and thus provide more complete information about our hypothesized relationships. Finally, the multinomial logit specification allowed for different effects of the covariates in our model on the different types of entry and also for separating and accounting for the attrition among the VC firms.

We used the VC firm's age, i.e. number of years since its first year of activity, as our time variable and used its log value to represent the duration dependence relationship. In addition, to account for the multi-level structure of our data, we specified the multinomial logit model in a multi-level setting, incorporating random heterogeneity effects for VC firm and year. Formally, we estimated the following model for firm (*i*), year (*t*), and outcome (*k*):

$$\mathrm{Log}\left(P_k / P_0\right) = \beta_k * X + \varepsilon_i + \eta_t + \upsilon$$

where P_k and P_0 are, respectively, the probabilities for outcome (*k*) and the baseline outcome (0), X is the vector of independent and control variables, β_k is the vector of

coefficients estimated for outcome (k), the heterogeneity component ε_i captures unobserved firm-specific characteristics, the heterogeneity component η_t captures unobserved year-specific characteristics, and the residual υ captures any remaining variation. By setting up right censoring as the baseline outcome category, the estimated coefficients β_k for our events and variables of interest can be used to test the hypotheses.

We conducted two additional analyses to establish the robustness of our results. First, we re-estimated the full model above using a simple logit model, in which the dependent variable was a simple entry (i.e. combining the values 1 and 2 of the market entry variable). Second, we estimated the model on expanded data, in which we continued the annual spells for each VC firm and each investment market beyond the firm's initial entry into that market and considered whether the VC firm entered the various subdomains of that market (as measured by two-digit VEIC codes). Compared to our main analysis, this analysis included market domain entries that were more incremental in nature as they involved VC firms operating in an already familiar overall market domain.[4] The results of both analyses were consistent with the main results reported below. Due to space limitations, they are not reported here but are available from the first author upon request.

RESULTS

Table I provides the descriptive statistics and correlations of the variables used in the analysis. The multinomial logit estimation is presented in Table II. We ran the estimation in three steps: a base model including only the control variables (Model 1); a main-effects model including the main effects of depth and breadth of experience and the relative distance of prospective market (Model 2); and a full model including the interactions of the experience variables with market distance (Model 3). Due to space limitations, only the coefficients for the two types of entry are included in Table II. The results for the attrition outcome are available upon request from the first author. The addition of both the main and interaction effects improved the fit of the model, as evidenced by the significant incremental chi-square statistics for each model. In addition, in each model there indeed was unobservable heterogeneity related to the VC firm and year, as evidenced by the significant estimates for the variance of these heterogeneity components.

Before moving to formal testing of the hypotheses, we offer several observations in regard to the effects of the control variables on the two types of entry. First, the duration effect was not significant for first-round entries and was positive and significant for later-round entries. This suggests that although the hazard of entering a new investment market increases with VC firm age, the entries that do occur tend to be later-round. Second, the VC firm's network centrality has no effect on first-round entries and a significant positive effect on later-round entries. This is consistent with the higher importance of social networks for the firm's ability to join existing investment syndicates. Third, the VC firm's prior performance has positive and significant effects for both types of entry. On the one hand, higher performance can be associated with an enhanced ability to select and manage investments, which can propel the VC firm towards a new investment market. On the other hand, higher performance can also make the VC firm

Table I. Descriptive statistics and correlations

	Variable	*Mean*	*SD*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*
1	Experience depth	1.49	1.17	1.00															
2	Experience breadth	0.39	0.29	0.70	1.00														
3	Relative distance of prospective market	0.66	0.25	0.08	−0.09	1.00													
4	Network centrality	0.03	0.06	0.24	0.18	−0.02	1.00												
5	Prior IPOs	0.01	0.05	0.19	0.15	−0.03	0.04	1.00											
6	Proportion of early-stage investments	0.36	0.35	−0.03	−0.10	−0.02	0.03	−0.02	1.00										
7	Only one prior investment	0.22	0.42	−0.69	−0.71	−0.04	−0.17	−0.09	0.04	1.00									
8	'Born' high-tech	0.70	0.46	0.02	−0.04	0.01	0.07	−0.04	0.30	−0.02	1.00								
9	Private firm	0.55	0.50	0.08	0.03	−0.01	−0.05	−0.02	0.06	−0.06	0.03	1.00							
10	Corporate affiliate	0.13	0.34	−0.07	−0.14	0.03	0.03	−0.05	0.05	0.05	0.16	−0.44	1.00						
11	Financial firm affiliate	0.16	0.36	0.02	0.08	0.00	0.02	0.06	−0.10	−0.01	−0.15	−0.48	−0.17	1.00					
12	Located in California	0.23	0.42	0.05	−0.04	0.05	0.06	0.00	0.12	−0.03	0.12	0.08	0.03	−0.08	1.00				
13	Located in Massachusetts	0.09	0.28	0.05	0.03	0.00	−0.01	0.00	0.03	−0.02	0.03	0.02	−0.01	−0.02	−0.17	1.00			
14	Investment period prior to 1980	0.08	0.27	−0.06	0.04	−0.09	−0.15	0.34	−0.03	0.02	−0.09	−0.07	−0.05	0.10	−0.02	0.04	1.00		
15	During peak VC activity	0.56	0.50	−0.11	−0.11	0.04	0.08	−0.12	0.02	0.08	0.03	−0.01	0.07	−0.03	0.00	−0.01	−0.32	1.00	
16	VC firms entering industry in last 3 years	5.00	1.03	−0.02	−0.12	0.08	−0.02	−0.32	0.03	0.02	0.11	0.06	0.06	−0.11	0.02	−0.05	−0.70	0.29	1.00
17	Duration (log of VC firm age)	1.26	0.92	0.56	0.48	−0.03	0.06	0.15	−0.07	−0.39	−0.17	−0.07	0.01	0.07	−0.03	0.03	0.01	−0.14	−0.08

Notes: All correlations with absolute value greater than 0.01 are significant at $p < 0.05$.
The dependent variables, market entry is nominal in nature and thus not included in this table.

Table II. Multinomial logit estimation of the likelihood of market entry

Variable	*Base model*		*Main effects*		*Full model*	
	First-round entry	*Later-round entry*	*First-round entry*	*Later-round entry*	*First-round entry*	*Later-round entry*
Experience depth			−0.005 (0.06)	−0.357 (0.06)***	0.349 (0.13)**	0.098 (0.13)
Experience breadth			1.171 (0.24)***	0.180 (0.24)	0.768 (0.44)+	−0.638 (0.43)
Relative distance of prospective market			−1.292 (0.11)***	−1.090 (0.11)***	−1.035 (0.14)***	−0.843 (0.14)***
Experience depth × market distance					−0.460 (0.16)**	−0.611 (0.16)***
Experience breadth × market distance					0.447 (0.55)	1.089 (0.55)*
Network centrality	0.645 (0.49)	3.160 (0.40)***	0.676 (0.49)	3.422 (0.39)***	0.601 (0.49)	3.351 (0.40)***
Prior IPOs	2.611 (0.55)***	2.748 (0.70)***	2.638 (0.52)***	3.120 (0.68)***	2.561 (0.53)***	3.016 (0.69)***
Proportion of early-stage investments	0.349 (0.11)**	0.074 (0.10)	0.435 (0.11)***	0.072 (0.10)	0.432 (0.11)***	0.069 (0.10)
Only one previous investment	−0.061 (0.11)	0.182 (0.10)+	0.345 (0.14)*	−0.056 (0.14)	0.339 (0.14)*	−0.068 (0.14)
'Born' high-tech	0.155 (0.12)	0.304 (0.11)**	0.302 (0.12)*	0.208 (0.12)+	0.328 (0.12)**	0.235 (0.12)*
Private firm	−0.258 (0.12)*	−0.423 (0.11)***	−0.238 (0.11)*	−0.374 (0.10)***	−0.247 (0.11)*	−0.383 (0.10)***
Corporate affiliate	−1.016 (0.16)***	−0.512 (0.14)***	−0.907 (0.15)***	−0.458 (0.13)***	−0.908 (0.15)***	−0.458 (0.13)***
Financial firm affiliate	−0.180 (0.15)	−0.077 (0.13)	−0.172 (0.13)	−0.049 (0.12)	−0.172 (0.14)	−0.048 (0.12)
Located in California	−0.009 (0.10)	0.108 (0.09)	0.060 (0.09)	0.153 (0.08)+	0.065 (0.09)	0.156 (0.08)+
Located in Massachusetts	0.239 (0.14)+	0.164 (0.13)	0.272 (0.12)*	0.198 (0.12)+	0.274 (0.12)*	0.199 (0.12)
Investment period before 1980	0.042 (0.18)	−0.113 (0.17)	0.052 (0.18)	−0.103 (0.17)	0.044 (0.18)	−0.096 (0.17)
During peak VC activity	0.607 (0.07)***	0.341 (0.07)***	0.592 (0.07)***	0.322 (0.07)***	0.590 (0.07)***	0.321 (0.07)***
VC firms entering industry in last 3 years	0.040 (0.04)	0.314 (0.04)***	0.097 (0.04)*	0.356 (0.04)***	0.107 (0.04)*	0.367 (0.04)***
Duration (log of VC firm age)	0.035 (0.05)	0.131 (0.05)**	−0.080 (0.05)	0.121 (0.05)*	−0.065 (0.05)	0.133 (0.05)**
Constant	−3.102 (0.29)***	−4.557 (0.28)***	−3.029 (0.31)***	−3.917 (0.30)***	−3.241 (0.32)***	−4.121 (0.31)***
Variance of firm-level heterogeneity	0.951 (0.06)***		0.697 (0.07)***		0.767 (0.07)***	
Variance of yearly heterogeneity	1.511 (0.05)***		1.637 (0.06)***		1.617 (0.06)***	
LL	−22,793.1		−22,577.1		−22,563.9	
Chi-square	3,892.9***		4,325.1***		4,351.4***	
ΔChi-square			432.2***		26.3***	
N	36,069		36,069		36,069	

Note: Standard errors are shown in parentheses. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

an attractive syndication partner. Fourth, while the proportion of early-stage investments has a positive and significant effect on first-round entries, it has no effect on later-round entries. This is consistent with the notion that investors experienced with dealing with the uncertainty of early-stage investments may be more likely to embrace the uncertainty of new markets. Finally, for both types of entry, there are strong institutional effects, as represented by the positive and significant effects for the bubble periods and entries by other VC firms.

Hypothesis 1 predicted that greater experience would be associated with higher likelihood of market entry. In Model 2, the main effect for the depth of the VC firm's experience was not significant for first-round entries and negative and significant for later-round entries ($\beta = -0.36$, $p < 0.001$). These results fail to support Hypotheses 1. In addition, the negative effect for later-round entries suggests that firms with deeper experience may be less likely to make such entries.

Hypothesis 2 predicted that broader experience would be associated with higher likelihood of entry. In Model 2, the main effect for the breadth of the VC firm's experience was positive and significant for first-round entries ($\beta = 1.17$, $p < 0.001$) and not significant for later-round entries. These results suggest that VC firms with broader experience are more likely to enter new industries by investing in new companies and provide support for Hypotheses 2.

Based on Hypothesis 3, we expected a negative effect of the relative distance of a prospective market on the likelihood of a VC firm's entry into that market. In Model 2, the main effect for market distance was negative and significant for both first-round ($\beta = -1.29$, $p < 0.001$) and later-round ($\beta = -1.09$, $p < 0.001$) entries. This suggests that VC firms are less likely to enter more distant markets, thus supporting Hypothesis 3.

The interaction Hypotheses 4a and 4b predicted that for more distant prospective markets, the effects of the VC firm's depth and breadth of experience on the likelihood of its entry into those markets would be weaker and stronger, respectively. In Model 3, the interaction effect of experience depth and market distance was negative and significant for both first-round ($\beta = -0.46$, $p < 0.01$) and later-round ($\beta = -0.61$, $p < 0.001$) entries. But also, the main effect of experience depth in this model was positive and significant for first-round entries ($\beta = 0.35$, $p < 0.01$) and not significant for later-round entries. This suggests that for first-round entries, the effect of experience depth varies based on whether the VC firm faces a proximate or distant prospective market. To illustrate and understand the nature of this interaction, we plotted the effect of experience depth on the odds of first- and later-round entries in more and less distant markets, as shown in Figure 3. The vertical axis represents the factor by which the baseline odds of market entry are to be multiplied to derive the odds of entry for the particular combination of entry type, distance, and experience. For example, a multiplier of 1.2 increases the odds by 20 per cent; a multiplier of 0.7 decreases the odds by 30 per cent. The plot shows that the VC firms with greater experience are more likely to make first-round entries in more proximate markets and less likely to make second-round entries or enter more distant markets. This finding provides support for Hypothesis 4a.

Also in Model 3, the interaction effect of experience breadth and market distance was not significant for first-round entries and positive and significant for later-round entries ($\beta = 1.09$, $p < 0.05$). But notably, the main effect for experience breadth in this model

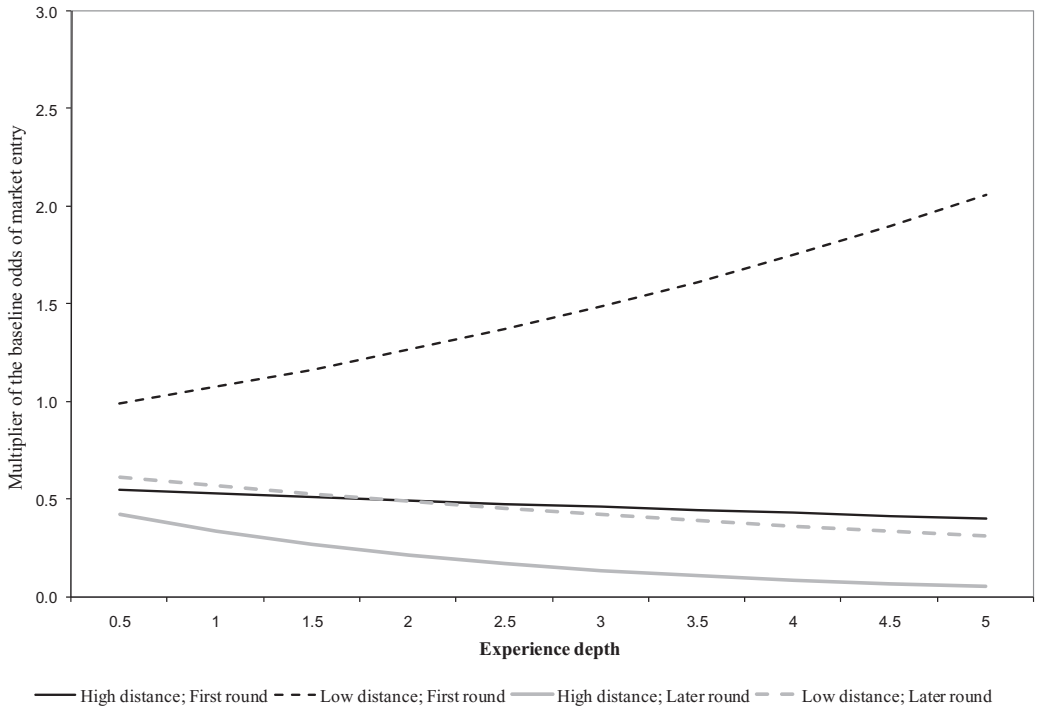

Figure 3. Interaction effect of experience depth and relative distance of prospective market on the likelihood of market entry

was positive and marginally significant for first-round entries ($\beta = 0.77$, $p < 0.10$) and negative but not significant for later-round entries ($\beta = -0.64$, $p > 0.10$). We plotted the effect of experience breadth on the odds of first- and later-round entries in more and less distant markets, as shown in Figure 4. The plot shows that VC firms with broader experience are more likely to enter distant markets; this effect is more pronounced for first-round entries (i.e. a comparison of the two solid lines). For proximate markets, VC firms with broader experience are more likely to make first-round entries but less likely to make later-round entries (i.e. a comparison of the two dashed lines). These results provide some support for Hypothesis 4b, but also suggest a more nuanced view of the relationship between breadth of experience and entry. Viewed in a different way, broader experience facilitates first-round entries, regardless of how close or distant the target is. For later-round entries, the effect of experience breadth is relatively neutral, i.e. it is associated with minimal increases or decreases in the odds of entry.

DISCUSSION

In this paper, we examine the relationship between a firm's experience and its search for new opportunities, operationalized as entry into new markets. In the context of the well established notion that heterogeneous experience makes firms differentially positioned to succeed in the (new) markets they enter, our work has been motivated by the possibility

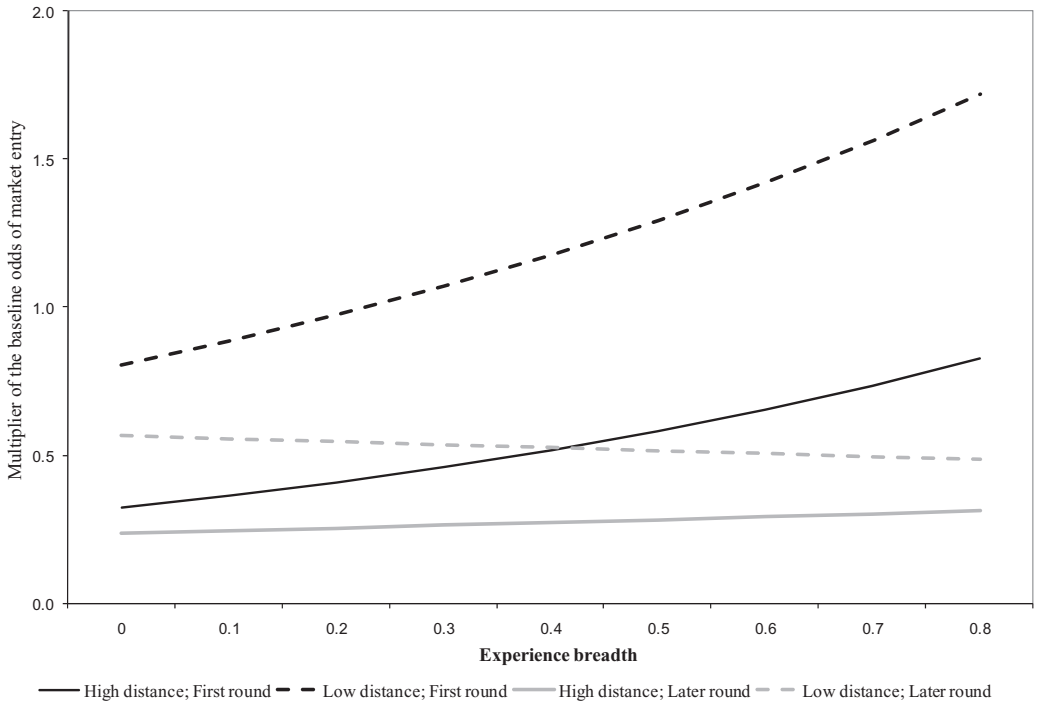

Figure 4. Interaction effect of experience breadth and relative distance of prospective market on the likelihood of market entry

that experience can also affect the decision to enter a new market in the first place. We reason that a firm's decision to enter a prospective market at a particular moment in time is linked to the magnitude and nature of the firm's experience (as represented by its depth and breadth) and to the relative distance of that market to the firm, as viewed through that experience.

We situate our discussion and analysis in the context of the VC industry. Led by the need to achieve superior investment returns, VC firms are constantly seeking new investment opportunities, many of which involve companies that operate in industries in which the VC firm has not invested before. But because successful VC investing requires careful selection of potential investments and, once the investment is made, costly but value-adding involvement in their development, and because the VC firm's ability to perform these tasks is enhanced by its investment experience, we posit that whether and when VC firms enter such new investment markets is related to their experience and to the relative distance of these prospective markets.

Our empirical investigation involves observation of the US VC industry over a 43-year period, in which we trace both the unfolding of each VC firm's investment experience and the timing of the firm's entry into five high-technology investment markets. Unlike prior studies of industry or market entry (Carroll et al., 1996; Klepper and Simons, 2000), in which only the entering organizations are observed and compared, our research design and industry setting allowed us to observe both the firms that chose to enter a new market and those that did not.

In our analysis, we distinguish between *first-round* entries, in which a VC firm backs a new company, and *later-round* entries, in which a VC firm invests in companies that have previously received financing from other VC firms. We find that VC firms are overall less likely to enter more distant markets; an increase of one standard deviation in the relative distance of a market reduces a firm's entry odds for that market by 26 per cent. In addition, firms with broader experience are more likely to make first-round entries; an increase of one standard deviation in a firm's breadth of experience increases its entry odds by 41 per cent. Finally, VC firms with deeper investment experience are more likely to make first-round entries in proximate markets and less likely to enter distant markets and make later-round entries; an increase of one standard deviation in a firm's depth of experience increases the entry odds for proximate markets by 21 per cent and decreases those odds for distant markets by 41 per cent. As we discuss below, these results offer interesting implications for the literature on organizational learning and entrepreneurship.

Our first contribution pertains to the notion that learning is domain-oriented; the opportunities that organizations choose to pursue are dependent not only on the organization's experience but also on the relative distance between them and the domains where such opportunities are situated. In other words, to understand the differences in organizations' opportunity search behaviours, one needs to consider both 'what?' and 'when?' in regard to an organization and its prospective search target. This represents an underexplored angle in organizational learning theory as the question of 'when' is often obscured when researchers use snapshots of organizations and downplay the possibility that the attractiveness and viability of certain opportunities for certain organizations may vary over time. This is implicit in arguments that suggest that certain opportunities favour organizations with particular experience (e.g. Haleblian and Finkelstein, 1999; Helfat and Lieberman, 2002), that certain organizations may ignore particular opportunities (Gavetti et al., 2005; Tripsas, 2009), or that different organizations can engage in different exploratory behaviours (Rosenkopf and Nerkar, 2001). Our work situates the organization in the context of its evolving experience (or, as De Beauvoir would suggest, what the firm's experience 'is') and suggests that, at each time junction, the 'lenses' of that experience reveal a shifting set of opportunities. Each chosen opportunity in turn changes the composition and stock of the organization's experience and, consequently, adjusts the lenses through which new opportunities will be identified and assessed. We captured this recursive relationship between experience and opportunities through the construct of relative distance which is defined by a target domain and the lenses through which it is viewed, and thus varies over time, across firms, and across prospective domains.

Our results for the relative distance of a prospective market are consistent with the notion of local search; search behaviour starts with incremental deviations from the firm's current activities, thereby anchoring the firm's attention on proximate domains and obscuring the more distant domains (Cyert and March, 1963). In this sense, doing new, unfamiliar things requires overcoming certain learning distance associated with a given target domain (Hoskisson and Busenitz, 2001). Our distance construct represents well such target-specific hurdle for the focal firm; the composition of the firm's experience determines how close or distant the certain opportunities are. Indeed, in our setting,

VC firms focusing on non-high-technology sectors may never consider high-technology opportunities. But while this finding may be intuitive by itself – it could arguably be portrayed as a pursuit of related diversification (e.g. Lubatkin and Chatterjee, 1994) – we also show that the nature of the firm's experience may create a differential response to that distance. Deeper experience may harden the boundaries of past searches and thus effect a learning rigidity (Leonard-Barton, 1992), while relative lack of experience can make distant domains less intimidating (Figure 2). In addition, broader experience can enable the firm to search within both proximate and distant domains (Figure 3) by making it attuned to more diverse information sources and equipping it with a wider range of skills that may prove useful in the new domain.

Some of our hypotheses did not receive full support. We found no direct effect of experience depth on the likelihood of entry in a given domain (Hypothesis 1); rather we found its effect to be contingent on the relative distance of that domain from the firm (Hypothesis 4a). Although our original expectation reflects the received wisdom on the benefits of greater experience, our results suggest that there are additional considerations involved in situations that do not replicate the experience. Indeed, discussions of learning curve effects (e.g. Argote, 1999) presuppose that firms continue to engage in the same activity; in our case a firm is expected to engage in a (slightly) different activity. Only when there is high similarity between the past and prospective activity (i.e. when the relative distance of the prospective domain is low) does greater experience matter in ways consistent with prior theory. We take this result as providing further emphasis on the context dependent nature of organizational learning.

In addition, we did not find full support for our hypothesis that experience breadth would be particularly useful for entries into distant domains. Instead, we found the effects of experience breadth and market distance to be largely additive. We did however, find that, for both distant and proximate markets, broader experience is more likely to facilitate first-round entry. A similar pattern was observed for the depth of experience as well. We attribute these results to the different processes that underlie the two types of entry.

The distinction between first- and later-round entries speaks to the social aspect of organizational learning. Firms not only can learn from other firms (Huber, 1991) but also can use their network relationships to access knowledge and information that they do not currently possess (Grant and Baden-Fuller, 2004). This also occurs in the context of VC firms as they syndicate their investments and seek complementary knowledge from their partners (De Clercq and Dimov, 2008). In this regard, our results suggest that the firm's experience matters more for its independent opportunity pursuits (i.e. first-round entries), while it is the firm's network position and prior performance as signals of its desirability as a partner that enable it to tag on to opportunities brought forth by others (i.e. later-round entries).

Our contribution to the entrepreneurship literature is twofold. First, we provide texture to the relationship between experience and opportunity recognition. While prior work has suggested that the identification and evaluation of opportunities may be associated with distinct cognitive processes (Baron and Ensley, 2006; Mitchell et al., 2002), differences in cognition are typically taken for granted. Our work suggests that what may lie behind such differences is interplay between the nature and magnitude of

the firm's experience and the alignment of opportunities that it may consider. As such, opportunity-related cognition can be systematically linked to experience and the 'lenses' with which it equips the firm.

Another aspect of the relationship between experience and opportunities concerns the possession of knowledge necessary for pursuing particular opportunities. In this regard, recent work suggests that opportunities related to the firm's knowledge resources appear more attractive (Haynie et al., 2009) and that greater knowledge can make the firm more effective in pursuing new opportunities (Zahra et al., 2006). But while this work treats knowledge in a non-specified, non-differentiated manner, we show that the nature of the firm's knowledge – as a reflection of the depth and breadth of the firm's experience – provides a more nuanced understanding of whether and when the firm decides to pursue certain opportunities.

As a second contribution to the entrepreneurship literature, we provide insights into the decisions by VC firms to invest in companies that operate in new or unfamiliar industries. In the context of recent work that has emphasized the importance of the VC firms' accumulated investment experience in managing their investments (e.g. De Clercq and Dimov, 2008), we elaborate on the considerations associated with the evaluation and management of new investment opportunities. Our results suggest that these decisions neither reflect pure diversification aspirations nor involve 'objective' evaluation of risks and returns. Rather, the judgment on the merits of these opportunities is grounded in the VC firm's investment experience; experience and the knowledge it entails makes a VC firm susceptible to some opportunities but not others. This suggests that while the pursuit of particular portfolio strategies may be instrumental for the VC firm's current performance, it can have unintended effects on the accessibility of future opportunities. Thus, as the VC firm's experience evolves, so does its opportunity set. The value of experience extends not only to making the firm more efficient in its familiar domains, but also to enabling the prospection of novel domains. It can make the VC firm less susceptible to the cycle of greed and fear. Indeed, in an interview with *Newsweek* in early 2003, shortly after the dot.com crash of 2000–01, asked why so many VC firms were complaining that there was nowhere to put their money, renowned venture capitalist Vinod Khosla of Kleiner, Perkins, Caulfield & Byers replied, 'That's because the same opportunity, through a different-colored glass, looks different. . . . We are seeing as many really good ideas as we ever saw' (Stone, 2003). Notably, after investing in a number of start-ups and technology sectors, in 2004 Vinod Khosla entered the unfamiliar domain of green technology.

By focusing on the effects of the firm's experience, we necessarily overlooked the situations in which a firm has no experience, i.e. it is newly formed. By default, when a firm has no experience, every potential domain is new to it. But different firms choose to enter different domains and this likely reflects the experience and goals of their founders. In our setting, a substantial number of firms entered high-technology investment markets as their first investments. While this should not be surprising in the context of the historical emergence of the venture capital industry as an interface between technology commercialization and capital markets, it also raises interesting questions about the circumstances in which venture capital firms are founded and the experience and prior affiliations of their founders. Particularly intriguing is the possibility that venture capital

managers who are frustrated by their inability to pursue particular investment opportunities within the confines of their existing VC firms may leave these firms to pursue these opportunities by founding new investment firms. These questions represent an important extension of our study and a fruitful avenue for future research.

Inevitably, and as is the case with any empirical work, there are limitations. The first concerns our reliance on an industry classification that may appear relatively crude in representing the novelty of each investment market to the VC firms in our study. On the one hand, the rigid classification of companies into industries may downplay aspects of their operations that make them similar to companies operating in other industries. On the other hand, companies even within the same industry can pursue opportunities with different degrees of novelty, suggesting that the VC firms' opportunity search can also be directed within the sectors in which they have already invested. The second limitation concerns the generalizations of our results beyond the context of VC firms. Although the strategic decision making processes of VC firms share similarities with other industries, particularly the need to anticipate and respond to new technological trends and market developments, VC firms lack the structural complexity of other, more mainstream organizations. We can only speculate whether these differences would make the effects we found stronger or weaker, but clearly this is an empirical question that begs to be answered, as it may hold important implications for the nature of the opportunity search processes in VC vs. other firms, where experience could be more dispersed and/or more abundant.

In conclusion, this paper shows an interesting connection between a firm's experience, the relative distance of a prospective new domain, and the likelihood and timing of the firm's opportunity search within that domain. While more research is needed to extend our findings, we believe this study opens new and intriguing possibilities for scholars interested in organizational learning and opportunity recognition. In addition, understanding the behaviour of venture capital firms may inform entrepreneurs or managers who seek to raise such capital. A closer examination of the VC firms' investment experience can offer important clues to their potential reaction to a particular business plan and thus help identify a more favourable set of prospective investors.

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NOTES

[1] Hoskisson and Busenitz use the term 'learning distance' to designate the amount of learning an organization needs to undertake to succeed in the new domain.

[2] Formally, $\mu_{kjt} = (n_{kt} * n_{jt})/N_t$ and $\sigma_{kjt} = \mu_{kjt} * (1 - n_{kt}/N_t) * \{N_t/(N_t - 1)\}$, where n_{kt} is the number of firms operating in industry (k) in year (t), n_{jt} is the number of firms operating in industry (j) in year (t), and N_t is the total number of firms operating in year (t). See Lien and Klein (2008) for a detailed discussion.

[3] Formally, the measure, $c_i(\alpha,\beta)$ takes the form $c_i(\alpha,\beta) = \Sigma_j (\alpha + \beta c_j) R_{ij}$, where R_{ij} is an element of a relational matrix R, representing the relationship between firms (i) and (j) as discussed above. The parameter α is an arbitrary scaling coefficient of the measure, while β represents the degree to which the centrality of firm (i) is a function of the centralities of other firms in the industry network. We set β equal to three quarters of the largest eigenvalue (see Borgatti et al., 2002; Sorenson and Stuart, 2001). Because the investments networks in the data were quite sparse prior to 1976, we measured the eigenvector centrality only from 1980 onwards and assigned to this variable a value of zero for the years prior to 1980. We included a control indicator for these observations.

[4] There were 47,538 additional firm-market-year spells related to the sub-domain entries. For these spells, given that our market distance variable was calculated at the main market level, we adjusted it by the proportion of the firm's prior investments already made in that investment market (Note: in the main analysis, this proportion was by default zero.) The market distance values for these additional observations were substantially lower and more constrained (mean (SD) of 0.32 (0.12) vs. 0.66 (0.25) in the main analysis). In addition, the breadth of experience values in these spells were higher and more constrained (mean (SD) of 0.67 (0.19) vs. 0.39 (0.29) in the main analysis).

REFERENCES

Allison, P. D. (1982). 'Discrete-time methods for the analysis of event histories'. In Leinhardt, S. (Ed.), *Sociological Methodology*. San Francisco, CA: Jossey-Bass, 61–98.

Argote, L. (1999). *Organizational Learning: Creating, Retaining, and Transferring Knowledge*. Boston, MA: Kluwer Academic.

Baron, R. A. and Ensley, M. D. (2006). 'Opportunity recognition as detection of meaningful patterns: evidence from comparisons of novice and experienced entrepreneurs'. *Management Science*, **52**, 1331–44.

Baum, J. A. C. and Silverman, B. S. (2004). 'Picking winners or building them? Alliance, intellectual, and human capital as selection criteria in venture financing and performance of biotechnology startups'. *Journal of Business Venturing*, **19**, 411–36.

Baum, J. A. C., Li, S. X. and Usher, J. M. (2000). 'Making the next move: how experiential and vicarious learning shape the locations of chains' acquisitions'. *Administrative Science Quarterly*, **45**, 766–801.

Blau, P. M. (1977). *Inequality and Heterogeneity: A Primitive Theory of Social Structure*. New York: Free Press.

Boeker, W. (1989). 'The development and institutionalization of subunit power in organizations'. *Administrative Science Quarterly*, **34**, 388–410.

Bonacich, P. (1987). 'Power and centrality: a family of measures'. *American Journal of Sociology*, **92**, 1170–82.

Borgatti, S. P., Everett, M. G. and Freeman, L. C. (2002). *UCINET for Windows: Software for Social Network Analysis*. Harvard, MA: Analytic Technologies.

Carroll, G. R., Bigelow, L., Seidel, M. D. and Tsai, L. (1996). 'The fates of de novo and de alio producers in the American automobile industry'. *Strategic Management Journal*, **17**, 117–38.

Cattani, G. (2005). 'Preadaptation, firm heterogeneity, and technological performance: a study on the evolution of fiber optics, 1970–95'. *Organization Science*, **16**, 563–80.

Cochrane, J. H. (2005). 'The risk and return of venture capital'. *Journal of Financial Economics*, **75**, 3–52.

Cohen, W. M. and Levinthal, D. A. (1990). 'Absorptive capacity: a new perspective on learning and innovation'. *Administrative Science Quarterly*, **35**, 125–52.

Cumming, D., Fleming, G. and Suchard, J. A. (2005). 'Venture capitalist value-added activities, fundraising and drawdowns'. *Journal of Banking and Finance*, **29**, 295–331.

Cyert, R. M. and March, J. G. (1963). *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

De Clercq, D. and Dimov, D. (2008). 'Internal knowledge development and external knowledge access in venture capital investment performance'. *Journal of Management Studies*, **45**, 585–612.

Dougherty, D. and Heller, T. (1994). 'The illegitimacy of product innovation in established firms'. *Organization Science*, **5**, 200–18.

Ethiraj, S. K., Kale, P., Krishnan, M. S. and Singh, J. V. (2005). 'Where do capabilities come from and how do they matter? A study in the software services industry'. *Strategic Management Journal*, **26**, 25–45.

Garud, R. and Nayyar, P. (1994). 'Transformative capacity: continual structuring by inter-temporal technology transfer'. *Strategic Management Journal*, **15**, 365–85.

Gavetti, G. and Rivkin, J. W. (2007). 'On the origin of strategy: action and cognition over time'. *Organization Science*, **18**, 420–39.

Gavetti, G., Levinthal, D. A. and Rivkin, J. W. (2005). 'Strategy making in novel and complex worlds: the power of analogy'. *Strategic Management Journal*, **26**, 691–712.

George, G., Kotha, R. and Zheng, Y. (2008). 'Entry into insular domains: a longitudinal study of knowledge structuration and innovation in biotechnology firms'. *Journal of Management Studies*, **45**, 1448–74.
Gick, M. L. and Holyoak, K. J. (1980). 'Analogical problem solving'. *Cognitive Psychology*, **12**, 306–55.
Gifford, S. (1997). 'Limited attention and the role of the venture capitalist'. *Journal of Business Venturing*, **12**, 459–82.
Gompers, P. (1995). 'Optimal investment, monitoring, and the staging of venture capital'. *Journal of Finance*, **50**, 1461–89.
Gompers, P. and Lerner, J. (1998). 'What drives venture capital fundraising?'. *Brookings Papers on Economic Activity: Microeconomics*, **1998**, 149–204.
Gompers, P. and Lerner, J. (1999). *The Venture Capital Cycle*. Cambridge, MA: MIT Press.
Gompers, P., Kovner, A., Lerner, J. and Scharfstein, D. (2006). *Specialization and Success: Evidence from Venture Capital*. Working Paper, Harvard University, Boston, MA.
Grant, R. M. and Baden-Fuller, C. W. F. (2004). 'A knowledge access theory of strategic alliances'. *Journal of Management Studies*, **41**, 61–84.
Guler, I. (2007a). *Pulling the Plug: The Capability to Manage Unsuccessful Investments and Firm Performance*. Working Paper, University of North Carolina, Chapel Hill.
Guler, I. (2007b). 'Throwing good money after bad? Political and institutional influences on sequential decision making in the venture capital industry'. *Administrative Science Quarterly*, **52**, 248–85.
Gupta, A. K. and Sapienza, H. J. (1992). 'Determinants of venture capital firms' preferences regarding the industry diversity and geographic scope of their investments'. *Journal of Business Venturing*, **7**, 347–62.
Haleblian, J. and Finkelstein, S. (1999). 'The influence of organizational acquisition experience on acquisition performance: a behavioral learning perspective'. *Administrative Science Quarterly*, **44**, 29–56.
Hargadon, A. and Fanelli, A. (2002). 'Action and possibility: reconciling dual perspectives of knowledge in organizations'. *Organization Science*, **13**, 290–302.
Haunschild, P. R. and Sullivan, B. N. (2002). 'Learning from complexity: effects of prior accidents and incidents on airline learning'. *Administrative Science Quarterly*, **47**, 609–43.
Haynie, J. M., Shepherd, D. A. and McMullen, J. S. (2009). 'An opportunity for me? The role of resources in opportunity evaluation decisions'. *Journal of Management Studies*, **46**, 337–61.
Helfat, C. E. and Lieberman, M. D. (2002). 'The birth of capabilities: market entry and the importance of pre-history'. *Industrial and Corporate Change*, **11**, 725–60.
Hellman, T. and Puri, M. (2002). 'Venture capital and the professionalization of start-up firms: empirical evidence'. *Journal of Finance*, **57**, 169–97.
Hochberg, Y., Ljungqvist, A. and Lu, Y. (2007). 'Whom you know matters: venture capital networks and investment performance'. *Journal of Finance*, **62**, 251–301.
Hoskisson, R. and Busenitz, L. W. (2001). 'Market uncertainty and learning distance in corporate entrepreneurship entry mode choice'. In Hitt, M. A., Ireland, R. D., Camp, S. M. and Sexton, D. L. (Eds), *Strategic Entrepreneurship: Creating a New Integrated Mindset*. Oxford: Blackwell, 151–72.
Huber, G. P. (1991). 'Organizational learning: the contributing processes and the literature'. *Organization Science*, **2**, 88–115.
Ingram, P. and Baum, J. A. C. (1997). 'Opportunity and constraint: organizations' learning from the operating and competitive experience of industries'. *Strategic Management Journal*, **18**, 75–98.
Jansen, J. J. P., Van den Bosch, F. A. J. and Volberda, H. W. (2005). 'Managing potential and realized absorptive capacity: how do organizational antecedents matter?'. *Academy of Management Journal*, **48**, 999–1015.
Katila, R. and Ahuja, G. (2002). 'Something old, something new: a longitudinal study of search behavior and new product introduction'. *Academy of Management Journal*, **45**, 1183–95.
Klepper, S. and Simons, K. L. (2000). 'Dominance by birthright: entry of prior radio producers and competitive ramifications in the US television receiver industry'. *Strategic Management Journal*, **21**, 997–1016.
Lane, P. J. and Lubatkin, M. (1998). 'Relative absorptive capacity and interorganizational learning'. *Strategic Management Journal*, **19**, 461–77.
Leonard-Barton, D. (1992). 'Core capabilities and core rigidities. A paradox in managing new product development'. *Strategic Management Journal*, **13**, 111–26.
Lerner, J. (1995). 'Venture capitalists and the oversight of private firms'. *Journal of Finance*, **50**, 301–18.
Lerner, J. and Schoar, A. (2004). 'The illiquidity puzzle: theory and evidence from private equity'. *Journal of Financial Economics*, **72**, 3–40.
Levitt, B. and March, J. G. (1988). 'Organizational learning'. *Annual Review of Sociology*, **14**, 319–40.

Lien, L. B. and Klein, P. G. (2008). *Measuring Inter-Industry Relatedness: SIC Distances Versus the Survivor Principle*. Working Paper, University of Missouri at Columbia.
Lubatkin, M. and Chatterjee, S. (1994). 'Extending modern portfolio theory into the domain of corporate diversification: does it apply?'. *Academy of Management Journal*, **37**, 109–36.
Manigart, S., De Waele, K., Wright, M., Robbie, K., Desbrieres, P., Sapienza, H. and Beekman, A. (2002). 'Determinants of required return in venture capital investments: a five-country study'. *Journal of Business Venturing*, **17**, 291–312.
March, J. G. (1991). 'Exploration and exploitation in organizational learning'. *Organization Science*, **2**, 71–87.
March, J. G. (1995). 'The future, disposable *organizations* and the rigidities of imagination'. *Organization*, **2**, 427–40.
March, J. G. and Simon, H. A. (1958). *Organizations*. New York: John Wiley & Sons.
Martin de Holan, P. and Phillips, N. (2004). 'Remembrance of things past? The dynamics of organizational forgetting'. *Management Science*, **50**, 1603–13.
Mayer, C., Schoors, K. and Yafeh, Y. (2005). 'Sources of funds and investment activities of venture capital funds: evidence from Germany, Israel, Japan, and the United Kingdom'. *Journal of Corporate Finance*, **11**, 586–608.
Miller, D. and Chen, M.-J. (1996). 'The simplicity of competitive repertoires: an empirical analysis'. *Strategic Management Journal*, **17**, 419–39.
Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A. and Smith, J. B. (2002). 'Toward a theory of entrepreneurial cognition: rethinking the people side of entrepreneurship research'. *Entrepreneurship Theory and Practice*, **27**, 93–104.
Nelson, R. R. and Winter, S. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.
Norton, E. and Tenenbaum, B. H. (1993). 'Specialisation versus differentiation as a venture capital investment strategy'. *Journal of Business Venturing*, **8**, 431–42.
Piskorski, M. J. (2004). *Networks of Power and Status: Reciprocity in Venture Capital Syndicates*. Working Paper, Harvard Business School.
Podolny, J. M. (2001). 'Networks as the pipes and prisms of the market.' *American Journal of Sociology*, **107**, 33–60.
Rosenkopf, L. and Nerkar, A. (2001). 'Beyond local search: boundary-spanning, exploration and impact in the optical disc industry'. *Strategic Management Journal*, **22**, 287–306.
Sapienza, H. J. (1992). 'When do venture capitalists add value?'. *Journal of Business Venturing*, **7**, 9–27.
Sapienza, H. J. and Gupta, A. K. (1994). 'Impact of agency risks and task uncertainty on venture capitalist – CEO interaction'. *Academy of Management Journal*, **37**, 1618–32.
Sapienza, H. J., Manigart, S. and Vermeir, W. (1996). 'Venture capitalist governance and value added in four countries'. *Journal of Business Venturing*, **11**, 439–69.
Saxenian, A. L. (1994). *Regional Advantage: Culture and Competition in Silicon Valley and Route 128*. Cambridge, MA: Harvard University Press.
Schulz, M. (2001). 'The uncertain relevance of newness: organizational learning and knowledge flows'. *Academy of Management Journal*, **44**, 661–81.
Sidhu, J. S., Commandeur, H. R. and Volberda, H. W. (2007). 'The multifaceted nature of exploration and exploitation: value of supply, demand, and spatial search for innovation'. *Organization Science*, **18**, 20–38.
Sorenson, O. and Stuart, T. E. (2001). 'Syndication networks and the spatial distribution of venture capital investments'. *American Journal of Sociology*, **106**, 1546–88.
Stone, B. (2003). 'The hard times in Silicon Valley'. *Newsweek*, **141**, 8, E12.
Stuart, T. and Podolny, J. M. (1996). 'Local search and the evolution of technological capabilities'. *Strategic Management Journal*, **17**, 21–38.
Sutton, R. S. and Barto, A. G. (1998). *Reinforcement Learning: An Introduction*. Cambridge, MA: MIT Press.
Teece, D. J., Rumelt, R., Dosi, G. and Winter, S. (1994). 'Understanding corporate coherence: theory and evidence'. *Journal of Economic Behavior & Organization*, **23**, 1–30.
Tripsas, M. (2009). 'Technology, identity and inertia through the lens of "The Digital Photography Company" '. *Organization Science*, **20**, 441–60.
Van den Bosch, F. A. J., Volberda, H. W. and De Boer, M. (1999). 'Coevolution of firm absorptive capacity and knowledge environment: organizational forms and combinative capabilities'. *Organization Science*, **10**, 551–68.
von Burg, U. and Kenney, M. (2000). 'Venture capital and the birth of the local area networking industry'. *Research Policy*, **29**, 1135–55.

Zahra, S. A. and George, G. (2002). 'Absorptive capacity: a review, reconceptualization, and extension'. *Academy of Management Review*, **27**, 185–203.
Zahra, S. A., Sapienza, H. J. and Davidsson, P. (2006). 'Entrepreneurship and dynamic capabilities: a review, model and research agenda'. *Journal of Management Studies*, **43**, 917–55.
Zhao, Z., Anand, J. and Mitchell, W. (2004). 'Transferring collective knowledge: teaching and learning in the Chinese auto industry'. *Strategic Organization*, **2**, 133–67.
Zollo, M. and Winter, S. G. (2002). 'Deliberate learning and the evolution of dynamic capabilities'. *Organization Science*, **13**, 3, 339.