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Exploring the innovation strategies of young firms: Corporate venture capital and venture capital impact on alliance innovation strategy[☆]

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ABSTRACT

We investigate how governance structure and power influence alliance exploration strategy. Adopting a real options perspective and the agency view, we suggest that innovation strategies differ based on the firm's governance authority. We find that the motivations of corporate venture capitalist firms, venture capitalists, and firm founders may have an impact on the formation of exploratory alliances among adolescent firms. Using a sample of 122 adolescent firms, we examine the influence that governance structure has on the firm's alliance portfolio and innovation potential. While the influence of corporate venture capitalist firms alone do affect alliance formation strategy, corporate venture-backed firms with founders having high influence (knowledge or ownership in the firm) are more likely to form innovation-focused alliances. In contrast, venture capitalist-backed firms tend to avoid innovation-focused alliances, preferring more exploitive ones, even when founders have high influence within the firm.

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1. Introduction

Innovative startups are key drivers of new and novel products, services, and ideas in existing industries (Dushnitsky & Lenox, 2005; Schumpeter, 1934). The pursuit of innovation is often characterized as highly uncertain compared with implementing previously developed competencies or investing in known technology (Beckman, 2006; McGrath & Nerkar, 2004). While innovations originating from internal markets relate positively to long-term performance, a firm's innovation strategy may weaken as a result of governance changes that occur during the growth stages of a firm (Bernstein, 2012; Guo, Lev, & Shi, 2006; Wu, 2012). When seeking support from outside corporate investors, entrepreneurial firms face a tradeoff between satisfying the need for capital and disclosing private information about their innovation capabilities. Young firms may be able to create immediate value when they disclose information that might appropriate their novel technologies (Dushnitsky & Lenox, 2005). Ownership dilution and governance

changes following acceptance of outside investment are also likely to affect firm-level strategy, particularly as it relates to innovation (Bernstein, 2012; Jiménez-Jiménez & Sanz-Valle, 2011; Kaplan & Strömberg, 2003; Wu, 2012).

This situation presents a critical question: which circumstances will allow greater pursuit of innovation following equity exchange? Recent studies identify the setting of initial public offerings (IPO) as a specific context influencing firm-level decision making, and find that the process of equity exchange may have a negative impact on firm innovation strategy (Bernstein, 2012). We contribute to literature examining how and why firm innovate through the use of exploratory relationships; in addition, we examine how these firms can reap the greatest benefit from different investor relationships. This paper contributes to the growing stream of literature investigating the innovation performance effects of different governance structures (Colombo & Murtinu, 2016; Dushnitsky & Lenox, 2005; Park & Steensma, 2013; Van de Vrande & Vanhaverbeke, 2013; Wadhwa, Phelps, & Kotha, 2016; Yoo & Sung, 2015).

We propose that a young firm's innovation strategy will impact the governance structure following an equity exchange. The governance structure that emerges will determine whether a firm utilizes an exploration or exploitation alliance framework (March, 1991; Rothaermel & Deeds, 2004). Extensive research explores the performance implications of exploration versus exploitation, yet few studies focus on how

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young ventures are organized to pursue innovation, despite increased pressure from equity partners. Specifically, little is known about how differences in governance structure and organization may change a young venture's pursuit of innovation over exploitation (Gulati & Higgins, 2003; Park & Steensma, 2013; Rothaermel & Deeds, 2004; Tidd, 2001).

We suggest that strategic investment and governance influences from different institutional investors (e.g., venture capital) may influence the propensity toward establishing innovation-focused alliances which have long-term effects on innovation performance of entrepreneurial firms. This study examines the innovative practices of private and corporate venture capital firms, and identifies how these practices influence alliance formation strategy among young firms (we consider pre-IPO firms to be in the young or adolescent stage of development, and use these terms interchangeably throughout).

While the top management team of a young firm's primary concern is maintaining a long-term innovation strategy, management is not the only voice influencing its strategic direction. Much research focuses on the detrimental effects of corporate venture capital "sharks," as these firms may stall innovation while expropriating knowledge and technology from young firms (Katila, Rosenberger, & Eisenhardt, 2008). While some research calls into question whether "all sharks are dangerous" (Diestre & Rajagopalan, 2012), less research focuses on the governance structure needed to assuage the overbearing influence of corporate venture capital (CVC) firms. Whether a firm falls victim to CVC firms may depend on its internal governance structure, for example, when founders retain power within the firm.

Venture capitalists (VCs) are highly influential in shaping a young firm's strategies. VCs proactively assess growth strategies and the development of organizational structure designed to ensure superior returns (Hellmann & Puri, 2002; Hsu, 2006; Kaplan & Strömberg, 2003; Strömsten & Waluszewski, 2012). We find that VC influence on alliance innovation strategy is often uncompromised by the entrepreneurial firm's internal governance structure. However, when other governance actors also have authority, VCs do allow for some exceptions.

Finally, founders have a direct impact on the organizational blueprint of the firm and may influence its organizational strategy and managerial practices, including exploratory alliance formation when they maintain an influential position in the firm (Baron, Burton, & Hannan, 1999, p. 3). We suggest that the presence of founders acting in the firm's best interest may counterbalance any potential negative influence of CVC investors. When founders have greater authority, IPO firms not only influence the decisions of VCs, but may lessen the risk of expropriation by CVCs.

We investigate the governance ownership structures that can influence an exploratory alliance formation strategy, including whether venture capitalists and founders mitigate or enhance this effect. This study complements a growing body of literature exploring the impact of external investors on new ventures' outcomes (e.g., Hellmann & Puri, 2002; Hsu, 2006; Katila et al., 2008; Park & Steensma, 2013). This study focuses on the developmental consequences of CVC and VC funding on founder-led new ventures. By taking the perspective of new ventures, we contribute to the literature in corporate governance, illustrating how early governance structures may influence the strategy and outcomes of young or adolescent private firms.

We examine firms during the IPO process since recent research suggests that following an IPO, ownership dilution and changes in governance can have an impact on firm-level decisions, often resulting in decreased focus on innovation strategies (Bernstein, 2012; Wu, 2012). Using a sample of 122 adolescent firms, we examine situations where CVC investors, venture capitalists, and founders have high equity, and founders have greater control over the organizational structure and strategy of the firm. We then theorize that such actors may influence the exploratory alliances formed by new entrants.

2. Theoretical framework

2.1. Exploitation versus exploration

The exploration-exploitation framework (March, 1991) distinguishes two broad patterns of behavior and provides a framework for understanding the different needs of ventures at various stages in the product development process. Levinthal and March (1993), characterize exploration as opportunity seeking and "the pursuit of knowledge, of things that might come to be known" (p. 105). In contrast, exploitation is "the use and development of things already known" (p. 105) and focuses on short-term economic returns from existing products or knowledge.

While exploitation and exploration are antecedents to innovation and new product development (Hoang & Rothaermel, 2010; Lavie, 2007; Rothaermel & Deeds, 2004), they may encompass a certain level of uncertainty and risk. Exploration is often characterized by a high risk of failure, while exploitation involves uncertainty, such as government approval for new products, weak sales, or difficult marketing campaigns. Industry incumbents often prefer a cooperation strategy over internalization, as this maximizes real options and takes advantage of external knowledge resources (Folta, 1998; Jiang, Tao, & Santoro, 2010; Van de Vrande & Vanhaverbeke, 2013; Wadhwa & Kotha, 2006).

For young firms, any increase of risk may be particularly prohibitive. Following equity capitalization, investors tend to focus less on innovation, particularly new and unfamiliar knowledge pursuits (Bernstein, 2012; Wu, 2012), as managers' stakes in innovations lessen and incentives to cash out increase. Additionally, career concerns and threats of takeover may pressure managers to pursue safer investment options. While these firms may be less apt to take on risk, they face other risks by not being innovative. As result, firms may be more likely to leverage their risk by pursuing collaborative exploration strategies.

2.2. The influence of institutional investors

CVC firms often see young firms as a source of new technology or innovation (Benson & Ziedonis, 2009; Katila et al., 2008; Wadhwa et al., 2016). In May of 2010, Toyota announced a \$50 million stake in Tesla Motors. This afforded Toyota access to Tesla's superior battery control systems which the company then used to develop better electric model vehicles. For its part, Tesla Motors gained both credibility and access to Toyota's manufacturing and sales process (France-Presse, 2010).

Once CVC firms hold equity in a firm, they become principals of the ventures in which they invest; however, they are also agents of the parent firm making the venture investments. This can create a multiple-agency issue for the CVC firm (Arthurs, Hoskisson, Busenitz, & Johnson, 2008), especially if conflicts of interest arise due to competing products. While the CVC firm is vested in the performance of its portfolio firm, it has the power, via equity and voting rights, to exploit the smaller firm for the benefit of the CVC firm. CVC affiliation is thus likely to influence the corporate governance of portfolio firms, as CVC-backed firms have been found to have more independent boards, fewer insiders on compensation committees, and fewer primary shares sold to preserve CVC voting rights when a portfolio firm goes public (Ivanov & Masulis, 2008; Park & Steensma, 2013). As a result, external investors tend to play larger roles in overseeing private investments in comparison with public investments (Lerner, 1995).

Since most CVCs invest for strategic reasons and for longer periods of time (in comparison to VCs), they may have a greater incentive to maintain tighter control of rights (Ivanov & Masulis, 2008). Equity ownership and associated control rights can be used to mitigate potential problems between strategic alliances. In instances where CVCs act as both alliance partner and equity owner of an entrepreneurial firm, the CVC can "force" the entrepreneurial firm to accommodate to the strategic plans of the CVC firm, even if those are contrary to the strategy of the younger firm. Additionally, CVCs are active investors and collaborators, which may facilitate the transfer of knowledge and resources between the two firms. As such,

they may have access to the trade secrets, business strategies, and proprietary knowledge of the startup firm (Ivanov & Xie, 2010; Dushnitsky & Lenox, 2005; Wadhwa & Kotha, 2006). This may be beneficial for the young firm, as the CVC's industry and innovation experience can help it identify and select optimal innovations that produce greater future benefit for the firm.

However, CVC firms may constrain the alliance formation of startups, preventing portfolio firms from forming relationships with the parent company's competition, even when an alliance would benefit the startup (Ivanov & Xie, 2010; Park & Steensma, 2012). Similarly, CVC influence over the innovation process may constrain the performance of the portfolio firm if its innovation strategy might result in products or processes that directly challenge or compete with the parent firm's strategy. In such cases, CVC firms are able to act as "sharks," expropriating knowledge and technology from portfolio firms for the opportunistic benefit of the CVC firm (Katila et al., 2008).

One way that CVC firms can maintain a strong influence over portfolio firm innovation is to promote an internal innovation strategy, which limits outside interference by other parties or firms. Research demonstrates that CVC-backed firms pursue more internal innovation strategies than non-CVC backed firms (Chammanur, Loutskina, & Tian, 2014). This focus on internal R&D decreases the need for exploratory alliances and has a twofold benefit of increasing the absorptive capacity of the young firm, while minimizing inertia and potentially assisting with strategic renewal for the CVC firm (Benson & Ziedonis, 2009; Lavie & Rosenkopf, 2006). However, when a young firm utilizes an external innovation strategy, this external alliance partly mediates the CVC firm's control over such innovations. This source of external governance over the innovation may reduce the ability of the CVC firm to expropriate this knowledge. Hence, we suggest that allied firms may act as monitors over the innovation, reducing agency issues within the CVC-entrepreneur relationship.

Since CVC relationships with portfolio firms may last for a number of years, they are vested in a long-term strategy regarding performance. When CVCs are directly vested in the welfare of the firms in their portfolios, they may choose to utilize real options to decrease the risk and uncertainty of exploration by helping firms select alliance partners (Van de Vrande & Vanhaverbeke, 2013; Wadhwa & Basu, 2013).

When uncertainty is high, firms may be better off initiating small investments that allow them to learn more about the investment opportunity and delaying major investments until the level of uncertainty diminished (Folta, 1998; Kogut, 1991; Van de Vrande, Lemmens, & Vanhaverbeke, 2006; Van de Vrande & Vanhaverbeke, 2013). Alliances allow firms to share the risk and diminish the cost of investment. Instead of choosing to develop innovations internally, CVC firms may use their capacity for functional exploration to guide portfolio firms in selecting partners that provide the greatest learning opportunities and enhance their ability to internalize and apply knowledge gained from alliance partners (Clarysse, Bobelyn, & del Palacio Aguirre, 2013; Colombo, Grilli, & Piva, 2006; Lavie & Rosenkopf, 2006; Wadhwa & Kotha, 2006; Wadhwa et al., 2016). As complexity increases—for example, when pursuing exploratory innovations—focus may shift from internal assets and competencies to a firm's innovation network, including developing new competencies (Clarysse et al., 2013; Tidd, 1997).

The real options view suggests that managers value flexibility and make limited investments in multiple technologies, preferably owned by different firms (Kogut & Kulatilaka, 2001; Sahaym, Steensma, & Barden, 2010); thus, investing in exploratory alliances may allow CVC managers to explore the opportunities that reside in prospective partners on a contingent basis (Kogut & Kulatilaka, 2001; Wadhwa & Basu, 2013). As managers weigh options, they retain the right to explore but not commit to any technology or partner in the future (McGrath & Nerkar, 2004). Such a mix of factors and motivations propel arguments over whether CVC actions are opportunistic and negative or friendly and developmental for investment firms. We choose to take a more nuanced perspective to examine the

innovation strategy that firms utilize by examining the impact of CVC investment on firms with powerful founders.

2.3. Founder influence

When CVC firms pose a threat of expropriation, acting on behalf of their own interests, founders may be able to minimize such threats. Founder management can positively affect firm performance in smaller, younger firms, as well as established Fortune 500 companies (Hsu & Lim, 2013; Jayaraman, Khorana, Nelling, & Covin, 2000). One key assumption in upper echelon and corporate governance is that top executives and organizational leadership have direct and substantial influence over a firm's strategy and performance (Hambrick, 2007; Hambrick & Mason, 1984). In smaller firms, executive officers are even more likely to influence organizational structure and firm strategy (Finkelstein & Hambrick, 1990; Hambrick, 2007).

Founder imprint literature suggests that founders have a long-lasting influence on the organizational structure, strategy, practices, and performance of a firm (Baron et al., 1999; Beckman & Burton, 2008; Hsu & Lim, 2013; Nelson, 2003; Stinchcombe, 1965). As an engineer, co-founder and CEO of Tesla Motors, Elon Musk has had a direct influence on the development of the company's all-electric plug-in car (Valdes-Dapena, 2013). Musk's drive for innovation "on the edge of the impossible... [and] his ability as a visionary who actually can bring his ideas to fruition" (p. 1B) permeates Tesla Motors culture (Woodyard, 2012). This follows recent work by Hsu and Lim (2013) that suggests early founder actions and ideals act as the means by which opportunity is identified and may have long-lasting consequences for firm performance.

Founders may provide unique knowledge and an entrepreneurial vision. Firms where founders remain major owners likely leave a legacy of innovative success, since dynamic environments are difficult to manage without considerable innovation. In fact, firms controlled by founders tend to be more innovative (Block, 2012). Founders also tend to keep the firm's best interest in mind, acting more like stewards of a firm than its agents, since the interests of founders typically align with those of the principals (Donaldson & Davis, 1991). Founders typically maintain a strong attachment to their firms, identifying closely with organizational goals and strategy. Retaining a higher level of equity may allow founders to maintain a sense of control over the direction of the organization, further increasing the psychological and situational factors that promote stewardship behavior (Pierce, Kostova, & Dirks, 2001; Wasserman, 2006). Founders are keen to pursue exploration, which involves a search for relatively far-flung knowledge elements; recombining these elements may allow firms to develop novel offerings to the market (Beckman, 2006). Additionally, organizational blueprints and founder imprints can override other institutional or normative pressures, such that these creators leave legacies attuned to their own particular backgrounds (Burton & Beckman, 2007). Block, Miller, Jaskiewicz, and Spiegel (2013) find that founder ownership positively relates to both R&D intensity and the level of R&D productivity. Founders tend to be more gain seeking than loss averse, while their goals focus less on survival and more on firm growth and performance. This demonstrates that founders with greater influence via equity ownership are more likely to seek exploratory strategies.

However, founder-backed firms may be limited in outside resources. Outside directors can provide advice, social capital, and access to important external resources (Eisenhardt & Schoonhoven, 1996). While VCs and CVCs can provide resources and enhance the capabilities of these firms, CVC backing presents a potential dilemma to founders who have a strong attachment to their firms. CVC firms may appropriate knowledge from firms in which they invest; founders are often aware of these risks, and may pursue an external exploratory strategy rather than an internal one. Toyota's portfolio firm, Tesla Motors, created an R&D partnership with the Dana Holding Corporation to help it resolve issues related to heat buildup in the car's batteries, a technology that

Toyota specifically pursued (Dana Holding Corporation, 2009). External alliance partners who co-invest in R&D projects may act as an additional governance mechanism to keep CVC firms from appropriating knowledge from the younger firm.

Thus, we expect that when a firm is backed by a corporate venture capital firm and founders maintain a high degree of equity, an exploration alliance strategy may be a priority, as this decreases the risk of appropriation.

H1. CVC-backed firms will form more exploration alliances when the firm's founder controls greater equity.

2.4. Venture capital investors

While both CVC and VC investors can influence firm strategy, the motivations of these actors are quite different. Both CVCs and VCs interests focus on maximizing financial returns. CVC fund managers are mostly compensated by a fixed salary and corporate bonuses, and thus less likely concerned about immediate returns. VC firms are typically structured as limited partnerships, funded by institutions who invest in private ventures in order to realize capital gains through an exit event such as an IPO or acquisition (Gompers & Lerner, 1999). VCs frequently use a performance-based compensation structure to focus on quick returns because their funding is temporary (usually ten years), and superior gains not only increase the wealth of the VCs but signal success, leading to improved fundraising (Gompers & Lerner, 1999; Sahlman, 1990).

VCS with greater ownership power have high levels of influence within entrepreneurial firms, helping design their organizational structure, monitor their management, build teams, develop market share, and influence innovation and learning (Clarysse et al., 2013; Hellmann & Puri, 2002; Kaplan & Strömberg, 2003; Strömsten & Waluszewski, 2012). While CVCs may increase innovation, firms funded by VCs tend to exhibit lower innovation rates, as VCs are driven by the motivations of their various principals (Park & Steensma, 2013).

Like CVCs, VCs are multiple agents, vested in the new venture as well as agents for the VC syndicate. Although VCs have strong control during the startup process, they have a limited investment horizon and seek to relinquish ownership and return financial gains to the syndicate (Kaplan & Strömberg, 2003). This increases the pressure on VCs to obtain immediate performance. Since exploitative alliances tend to provide short-term benefits, VCs likely prefer this type of strategy (Colombo et al., 2006). Exploratory alliances are inherently fraught with uncertainty as well as structural and governance complexities. When entrepreneurial technology is complex or ambiguous, the information asymmetry and uncertainty over value of the firms increase, resulting in less accurate assessments (Guo et al., 2006; Heeley, Matusik, & Jain, 2007). Similarly, the likelihood of successful exploratory alliances that focus on R&D is more ambiguous and contains higher risk due to the uncertainty of product development. While exploration alliances can have a positive, if indirect, relationship to performance, there is greater uncertainty within these types of relationship (Rothaermel & Deeds, 2004). More certainty, faster returns, and more accurate value assessments can create an incentive for VCs to pursue exploitative alliance strategies through their investments, preferring incremental development and exploitation of existing resources.

As explained, founders are likely to prefer an exploration innovation strategy. However, founder involvement can increase underpricing at time of IPO (Nelson, 2003) yet founder replacement is common when VCs are present as VCs often influence the formation of top management teams, which could imply that founders with greater ownership power may acquiesce to the VC's preference. Even when founders have a large ownership stake in a firm, the strong negative influence of VCs on exploratory alliances may hold, as firms pursue less exploration via alliances. Thus, VCs tend to negatively moderate a firm's alliance

exploration strategy even when the firm founder has high equity power in the organization. Accordingly we posit:

H2. VC-backed firms will form fewer exploration alliances when the firm's founder controls greater equity.

2.5. Founder expert knowledge

Founder knowledge and expertise is a critical resource to enable firms to appropriate rents and competitive advantage (Castanias & Helfat, 2001; Grant, 1996). Expertise and knowledge are important operational efficiencies that allow founders to build competency and incorporate knowledge from diverse domains which can influence the firm's strategic actions. Founders with a technical background may have more complete understanding of the firm's innovation and technology and serve as a cognitive guide to organizational strategy and practices (Hambrick, 2007; Hambrick & Mason, 1984). Link and Ruhm (2011) find that entrepreneurs with academic backgrounds and higher education are more likely to publish their work and adopt a strategy based on open science, while founders without such a background are more likely to patent and privatize their knowledge. Similarly, career experience in R&D, such as engineering or scientific experience, consistently enhances the innovation activities of startup firms and positively influences firm growth (Colombo & Grilli, 2010; Ding, 2011).

Founder backgrounds may also influence a firm's search orientation and knowledge brokering—converting ideas to innovative possibilities—which can impact the innovative performance of the firm (Hsu & Lim, 2013; Le, Kroll, & Walters, 2013). Founders with functional backgrounds specializing in science or technology tend to excel at identifying and bundling information related to innovation and exploration and may embody rare and valuable expertise, a key resource of human capital that can be utilized to create value for the firm. While expert knowledge allows founders to recognize the firm's innovation needs, they may lack the ability to identify potential alliance partners. This presents an opportunity for CVC-backed firms that focus on new technology or innovation opportunity via young firms rather than increased revenue (Benson & Ziedonis, 2009; Chammanur et al., 2014; Katila et al., 2008).

Because CVC firms tend to be long-term oriented, investing for the purpose of strategic alignment, they may fill the founder's knowledge gap by utilizing network capabilities to help the young firm form exploratory relationships with other firms. Thus, we suggest that CVCs will positively moderate the relationship between founder expertise and exploratory alliance strategy.

H3a. CVC-backed firms will form more exploratory alliances when founders have greater technology related knowledge.

This effect may not hold in all situations, however, since positive performance effects created when firm founders have work experience in technology functions may disappear when VCs are present (Colombo & Grilli, 2010). Since VCs are highly motivated toward short term results and likely to pursue more exploitative alliance strategies, they typically prefer exploitation over exploration in order to provide less uncertainty, faster returns, and decreased underpricing (Colombo et al., 2006; Hsu, 2006). Additionally, when VCs have a strong influence (i.e., equity) in a firm, they are more likely to have an impact on organizational structure (i.e., by shaping the top management team) (Beckman & Burton, 2008), further adding to their influence on organizational strategy. Thus, we predict that VC backing will negatively moderate the relationship between founders' scientific or technological backgrounds and the firm's propensity for exploratory alliance strategies.

H3b. VC-backed firms will form fewer exploratory alliances when founders have greater technology related knowledge.

Table 1
Sample of content analysis categorization.

Categorization	Descriptive phrases
Exploitation	<p>The Home Depot and The Stanley Works announced the formation of a strategic business alliance that is expected to expand the world's largest home improvement retailer's offerings of Stanley products... Home Depot has named Stanley its principal national supplier of branded hand tools... Stanley will to sell Husky(R) branded mechanics tools and toolboxes to The Home Depot on an exclusive basis.</p> <p>Avalara, a leading small and medium business-oriented provider of on-demand, web-based sales tax compliance services and NetSuite Inc., a leading provider of on-demand enterprise resource planning and customer relationship management application software, today announced an alliance extending Avalara's innovative SaaS based sales tax automation solution, AvaTax to NetSuite customers as an add-on.</p> <p>Replidyne, Inc., a privately held biopharmaceutical company and Forest Laboratories Holdings, Ltd., a wholly owned subsidiary of Forest Laboratories, Inc. announced today that the two companies have entered into an agreement for the commercialization, development and distribution of Replidyne's new oral antibiotic, faropenem medoxomil, in the United States.</p>
Exploration	<p>Epoch Biosciences, Inc. and Specialty Laboratories formed a strategic alliance with Specialty Laboratories to jointly develop assays to test for residual human leukemias.</p> <p>Iron Solutions and NetSuite Inc. collaborate to develop industry-specific software solution for agricultural equipment dealerships, delivered via NetSuite's SuiteBundler.</p>
Simultaneous exploitation and exploration	<p>Barrier Therapeutics, Inc., a biopharmaceutical company focused on the discovery, development and commercialization of pharmaceutical products in the field of dermatology, today announced that it has established agreements with Alliance Pharmaceuticals Ltd. and Neopharm Ltd. for the marketing, sales, and distribution of Barrier's initial products. Alliance Pharmaceuticals will be responsible for marketing, sales and product distribution in the United Kingdom and Scandinavia, while Neopharm will embark on the same initiatives in Israel and Turkey.</p> <p>Cisco products and Akamai Technologies wish to enter into a strategic development, integration and joint marketing arrangement, and wherever practicable, Akamai is and to undertake such other obligations as are set forth herein, on the terms and conditions contained in this Agreement... This Agreement contemplates certain joint development activities between Cisco and Akamai that are intended to facilitate and promote faster and more efficient Internet content delivery by, among other things, developing protocol specifications and algorithms enabling Cisco's router and switch hardware and equipment technologies and capabilities to interoperate with Akamai's Internet content delivery technologies, services and capabilities.</p>

3. Methodology

3.1. Sample and data collection

We test our hypotheses using a dataset that combines archival information related to alliance activity, institutional investments, and financial records of entrepreneurial firms. Using the Security Data Corporation's (SDC) Global New Ventures and Merger & Acquisition database, we identified U.S. firms that filed for initial public offering during

1997–2007. We excluded closed end mutual funds, real estate investment trusts (REITs), unit offerings, spin-offs, demutualization of savings banks and insurance companies, and reverse leveraged buyouts (LBOs). We then identified firms that completed at least one strategic alliance five years prior to filing for public offering. Overall, we identified 130 adolescent firms that filed for IPO between 1997 and 2007, and had at least one alliance. We complemented, verified, and hand-corrected these records by searching alliance announcements, press releases from corporate websites, LexisNexis, SEC filings, and firm prospectuses accessed on the Edgar database (Lavie, 2007). We cross-validated most alliances with at least two sources. Each alliance was categorized into one or more of the following categories: licensing, manufacturing, marketing, R&D, and other (Jiang et al., 2010). Pre-IPO investment and performance information was gathered from company prospectuses using the Edgar database. Missing data reduced the sample to 218 different alliance types, formed by 122 firms.

3.2. Measures

3.2.1. Dependent and independent variables

We used content analysis to code firms as exploratory, exploitive, or a combination of both in order to create our dependent variable, the *exploratory alliance index*. We calculated this as a weighted portfolio of strategic alliances formed within five years prior to the firm's IPO (Lin, Peng, Yang, & Sun, 2009). Given that strategic alliances are often long-term, the relationships formed prior to going public will likely continue in the following years. Upstream alliance activities such as R&D may lead to innovative technologies and applications; we characterized these exploratory purposes. At the other end of this spectrum are alliances that are exploitive in nature, often involving downstream activities such as product commercialization and utilization of existing technologies. Following the procedure established by Yang, Lin, and Peng (2011), each alliance was accorded a description from the SDC database, with alliances that focus on "R&D" (discovery or development of new products, processes, or services) coded as exploratory alliances, while those that focus on "licensing," "distribution," or "marketing" are coded as exploitation alliances. A combination of both was weighted equally between alliance types.

If these data were missing in SDC, alliance announcement content was analyzed. Two coders, one author and one independent coder, categorized alliances into the appropriate category(s). We coded alliances from the perspective of the entrepreneurial firm (Lavie & Rosenkopf, 2006). Each article was examined for phrases and descriptions of the alliance relationship that were similar to the SDC categorization, such that licensing and distribution agreements or marketing agreements were categorized as exploitive alliances, while alliances that focused on the development of new products or services were categorized as exploratory in nature. Overall reliability between coders was calculated (0.95) using the Holsti formula. This provided the measure for each alliance; however, since we sought to examine alliance formation strategy at the firm portfolio level, each firm's portfolio was weighted by the total number of alliances formed. This allowed us to examine our research question at the firm level. A sample of alliances and their respective coding is included in Table 1.

We identified the level of VC equity ownership (*VC Equity*), CVC equity ownership (*CVC Equity*), and founder equity ownership (*Founder Equity*) expressed as a fraction of total shares outstanding immediately prior to IPO (Chahine & Goergen, 2011). *Founder Tech Bkgd* is coded as 1 if the founder has a background in technology or science, and zero otherwise.

3.2.2. Control variables

Since younger and smaller firms are often subject to failure due to liabilities of newness and smallness (Eisenhardt & Schoonhoven, 1996; Hannan & Freeman, 1984), the control variable for the new venture's size was calculated as the logarithm of the number of employees as

Table 2
Correlations and descriptive statistics.

	Mean	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Exploratory alliance	0.38	0.40	1										
2. Underwriter rep	8.39	1.21	-0.231*	1									
3. Year 1997	0.13	0.34	0.116	-0.217*	1								
4. Year 1998	0.09	0.29	0.053	-0.081	-0.122	1							
5. Year 1999	0.31	0.47	-0.041	0.165	0.261*	-0.212*	1						
6. Year 2000	0.16	0.36	0.031	0.042	-0.167	-0.135	0.288**	1					
7. Year 2001	0.05	0.22	0.079	0.100	-0.088	-0.072	-0.153	-0.098	1				
8. Year 2002	0.02	0.16	-0.168	0.021	-0.062	-0.05	-0.107	-0.068	-0.036	1			
9. Year 2003	0.03	0.18	-0.195*	-0.032	-0.072	-0.058	-0.124	-0.079	-0.042	-0.029	1		
10. Year 2004	0.07	0.25	0.142	-0.097	-0.103	-0.083	-0.178*	-0.114	-0.060	-0.042	-0.049	1	
11. Year 2005	0.06	0.23	-0.013	0.002	-0.096	-0.078	-0.166	-0.106	-0.056	-0.039	-0.045	-0.065	1
12. VC rep	18.70	25.95	0.021	0.157	-0.022	-0.118	0.129	0.063	-0.141	-0.164	0.125	0.035	-0.047
13. Age	7.01	8.26	-0.135	0.058	0.014	-0.021	-0.158	-0.130	-0.129	0.153	0.194*	0.109	0.104
14. Lockup	183.75	33.75	0.226*	-0.014	0.041	-0.038	-0.021	0.033	-0.027	-0.019	-0.022	-0.025	0.099
15. CA	0.48	0.50	0.123	-0.026	0.019	0.044	0.104	-0.001	-0.141	-0.151	0.101	0.079	-0.164
16. MA	0.06	0.23	-0.088	-0.011	0.009	-0.078	0.062	-0.106	-0.056	-0.039	-0.045	0.077	0.091
17. Size	2.45	0.58	-0.015	0.344**	-0.030	-0.226*	-0.027	-0.086	0.322**	0.180*	0.157	-0.133	0.066
18. Risk factors	30.52	8.43	-0.022	-0.012	0.362**	0.299**	-0.138	0.135	-0.002	0.027	0.120	0.317**	0.136
19. Pre-alliances	1.61	1.12	-0.087	0.103	0.168	0.032	-0.020	-0.158	0.063	-0.125	-0.145	0.059	-0.066
20. CVC equity	12.25	22.48	-0.051	0.050	-0.006	0.091	-0.123	0.049	0.119	-0.012	0.132	0.054	-0.147
21. VC equity	12.79	12.32	-0.166	0.077	-0.041	-0.045	0.000	-0.035	-0.018	0.064	0.048	-0.026	0.162
22. Founder equity	10.85	16.67	-0.018	-0.020	-0.123	0.200**	0.326**	-0.100	-0.190*	-0.194*	-0.164	0.056	-0.091
23. Founder tech bkgd	0.37	0.48	0.250**	0.007	0.055	-0.063	0.036	0.093	-0.095	-0.121	-0.141	0.209*	0.031
24. Founder CEO	0.42	0.50	-0.068	-0.009	-0.132	0.081	0.291**	-0.043	-0.193*	-0.135	-0.063	0.044	-0.066
25. Founder chair	0.48	0.50	-0.030	0.084	-0.133	0.153	0.199**	-0.009	-0.144	-0.154	-0.178*	0.075	-0.098

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

described in the firm prospectus, and *age* was measured by the number of years between the firm's founding date and its IPO. To account for higher levels of risk in firms that might be prone to failure, such as those involved in more technologically complex industries, we include control variables for *industry* effects using the industry 2-digit SIC code.¹ Risk and uncertainty may influence alliance strategy, thus, we include the sum of all *risk factors* mentioned in the prospectus. Traditional control variables in IPO literature were included, such as the IPO firm's *lockup* period, the number of days of lock-up, the number of alliances formed prior to IPO (*pre-alliances*), and underwriter reputation (*Underwriter rep*). In order to account for other potential influences, we included dummy variables for firm location, specifically firms located in California (CA) and Massachusetts (MA), and the year firms went public. Following the literature examining VC quality, (Lee, Pollock, & Jin, 2011), we controlled for VC reputation (*VC rep*) using Tim Pollock's on-line database. Finally, in order to insure that equity ownership was driving our results, other forms of founder power were included such as *Founder CEO* or founder-led board of directors (*Founder Chair*).

4. Results

4.1. Analysis

The number of alliances ranged from 1 to 9, with firms having an average of 1.67 alliances. While there were a low number of alliances, the average number of alliance functions (marketing, manufacturing, R&D, licensing) totaled 2.20.

We examine the impact of governance structure via equity ownership and power on alliance formation. Our dependent variable is based on a scale of zero to 1, with values closer to 1 denoting a greater number of exploratory alliances within the entrepreneurial firm's

alliance portfolio. Within our sample, 21.3% of firms pursued only exploratory alliances, 41.8% focused solely on exploitive alliances, and 36.9% pursued a combination of both strategies. Alliances were formed between two days and five years prior to IPO, with the average alliance formed 1.7 years prior to IPO. Forty-four percent of firms in our sample received CVC backing ranging from 84% to 1.20% with average funding at approximately 26%. Eighty percent of firms were funded by venture capitalists with funding ranging from 73.9% to 1.4% with an average of approximately 17% VC ownership.

Table 2 provides the means, standard deviations, and correlations for our variables. We find that the maximum VIF index is <5.3, well within the accepted threshold of 10 (Neter, Wasserman, & Kutner, 1985). This suggests that multicollinearity is not significantly influencing the results of our models. Since all models include interactions, we follow Aiken and West (1991) by mean-centering the predictor variables before computing interaction terms.

Table 3 presents our results. Model 1 provides the baseline model using control variables, while Model 2 examines the main effects of CVC, VC, and founder ownership equity, founder technology background, and founder positional power. Models 3–6 test our hypotheses by assessing the combined effects when more than one governing body has high equity or power within the firm. While not directly hypothesized, an assumption of our model is that CVCs and VCs with greater equity will have a negative impact on exploratory alliance strategy. By the same token, we assume founders will prefer exploration alliance strategies. We test our baseline effects and find that, as expected, high VC ownership and CVC ownership negatively relate to exploratory alliances. However, while VC ownership is marginally significant, greater founder ownership is negative but not significant. Founder's expert knowledge has a marginal and positive effect on exploration innovation strategy.

Models 3–6 test our hypothesized interaction effects by examining the likelihood that firms will pursue an exploratory alliance strategy. We find support for Hypothesis 1 in Model 3, as seen in Fig. 1. When entrepreneurial firms are CVC-backed and the founder retains a high level of ownership, firms are more likely to pursue alliance strategies focused on exploration. In Model 4, we find a significant negative effect on alliance exploration, supporting Hypothesis 2. Fig. 2 shows that when

¹ In early models we added a control for firms in the IT industry and substituted IT industry for our current industry control. Such models provided the same results when we used the two-digit SIC industry control. We chose this industry control as it provided the best model fit.

12.	13.	14.	15.	16.	17.	18.	19.	20.	21.	22.	23.	24.	25.
1													
-0.166	1												
-0.061	-0.006	1											
0.337**	0.046	0.008	1										
0.142	0.012	-0.029	0.235**	1									
-0.177	0.320**	-0.194*	-0.146	-0.195*	1								
0.076	-0.061	-0.048	0.062	0.097	0.078	1							
0.001	0.168	-0.179*	-0.053	0.023	0.281**	0.043	1						
-0.143	0.047	-0.025	0.052	-0.127	0.204*	-0.115	0.024	1					
0.137	-0.168	-0.086	-0.019	0.101	-0.026	0.127	-0.083	-0.223*	1				
-0.132	-0.162	-0.058	-0.004	0.083	-0.122	-0.248**	0.014	-0.043	-0.212*	1			
0.150	0.063	0.093	0.055	0.177	-0.184*	0.090	-0.058	-0.129	-0.057	0.269*	1		
-0.042	0.047	0.136	0.092	0.005	0.234**	-0.037	0.052	0.009	0.087	0.463**	0.144	1	
-0.041	-0.075	0.117	0.031	0.043	-0.198*	-0.052	0.091	-0.128	0.044	0.636**	0.110	0.510**	1

VCS retain high equity in an entrepreneurial firm, founder ownership power has a negative effect on exploratory alliance formation. Since there is often greater uncertainty about capabilities when founders retain much of the equity, VCs may encourage founders to pursue more conservative strategies to avoid creating uncertainty about the firm. Models 5 and 6 examine situations where founders have expert power, such as a scientific or technology background. Like the results in Hypothesis 1, Fig. 3 shows that CVCs have a significant positive effect on alliance formation strategy while VCs have a negative but only marginally significant effect.

4.2. Additional robustness checks and post-hoc analysis

While we find support for Hypothesis 2, we did not anticipate that founders with greater firm equity will be less likely to pursue exploratory alliances (see Fig. 1). We further explore these results by conducting a post-hoc analysis examining the influence of founders on exploratory alliances. We find that when the board is controlled by insiders and the founder has greater equity in the firm, founders are significantly less likely to pursue exploratory alliances ($p < 0.001$). However, when CVC firms are present, firms are more likely to pursue exploratory alliances ($p < 0.01$). When the founder is chairman of a board comprised of mainly insiders, firms are significantly more likely to pursue exploratory relationships ($p < 0.001$), whether or not CVCs are present.

An alternative argument suggests that if the alliance occurs prior to VC or CVC investment in an IPO firm, other governance structures might influence our results. In order to rule this out, we examined all firms that filed for their IPO between 2000 and 2007, using a sample from VentureXpert to compare the date the alliance was completed with the date the firm received its first investment from a VC or CVC firm. Our sample shows no instance in which an alliance had been formed prior to investment by any third parties. Although our data limited us to confirming only those firms that went public after the year 2000, we are able to confirm that the alternative approach does not explain the results for over half our sample.

Another situation in which founders have a strong influence over firm strategy occurs when the founder is on the board but maintains considerable equity ownership in the firm. While this scenario was

initially included, because board presence is highly correlated with founder ownership, it was dropped from the final analysis. When we examine CVC-new venture relationships and remove founder ownership from our model, we find further support for Hypothesis 3 ($p < 0.05$), suggesting that another form of positional power occurs when the founder is also on the board of directors.

Finally, a key point of interest is the long term effects of governance structures on the innovation strategy of entrepreneurial firms. Using SDC data and content analysis, we create a second exploratory alliance index based on post-IPO alliances, and conduct a post-hoc analysis, controlling for the number of alliances formed during three years following an IPO (2000 – 2010). After examining 359 post-IPO alliances, we find that CVC-backed firms use an exploratory alliance strategy when founders have a technology background ($p < 0.05$), and when the founder of VC-backed firms is also CEO ($p < 0.05$). This is somewhat surprising, given that it is the only instance when VC-backed firms pursue an exploratory alliance strategy.

5. Discussion and conclusion

This study examines the conditions when adolescent firms are more inclined to form exploratory alliances, and highlights how the power and influence of founders vis-à-vis that of CVCs and VCs may affect a firm's alliances. This is one of the first studies to highlight the role of the equity ownership and technology background of IPO firm managers in enabling the exploratory alliance strategy of adolescent firms.

Specifically, our results show that given equity ownership and technical expertise, IPO managers may enter into innovation-oriented exploratory alliances. While both VCs and CVCs may act as “sharks,” discouraging exploratory alliance formation in order to reduce inherent uncertainties (see Diestre & Rajagopalan, 2012; Katila et al., 2008; Park & Steensma, 2013), an important implication is that IPO firm managers' own resources and capabilities may provide legitimacy and positional power as they negotiate exploratory alliances. This study contributes to the literature by demonstrating that when they maintain high ownership and technical superiority, managers can serve as stewards for adolescent firms' innovation strategies including exploratory alliances, as these may limit expropriation by multiple agents (Arthurs et al., 2008).

Table 3
Regression models predicting performance of post-IPO firms.

Ind. variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Industry	Yes ^a	Yes ^a	Yes ^a	Yes ^a	No	Yes ^a
Year	Yes [*]	Yes [*]	Yes [*]	Yes [*]	Yes [*]	Yes [*]
VC Rep	0.056	0.032	0.008	0.031	0.054	0.188
Underwriter rep	-0.231 [*]	-0.256 [*]	-0.270 [*]	-0.272 [*]	-0.263 [*]	-0.269 [*]
Age	-0.034	-0.081	-0.105	-0.075	-0.091	-0.073
Lockup	0.129	0.114	0.108	0.076	0.110	0.108
CA	0.102	0.088	0.089	0.109	0.071	0.056
MA	-0.032	-0.063	-0.075	-0.048	-0.066	-0.056
Size	0.257 [*]	0.271 [*]	0.278 [*]	0.278 [*]	0.299 [*]	0.273 [*]
Risk factors	0.049	0.005	0.059	0.032	0.004	0.017
Alliances	-0.107	-0.096	-0.076	-0.073	-0.114	-0.089
Founder chairman		0.005	0.021	0.059	0.000	0.019
Founder CEO		-0.124	-0.109	-0.060	-0.140 ^a	-0.129
CVC equity		-0.110	-0.128 ^a	-0.144 ^a	-0.194 [*]	-0.088
VC equity		-0.138 ^a	-0.161 ^a	-0.299 ^{**}	-0.161 ^a	-0.075
Founder equity		-0.090	-0.143	-0.438 ^{**}	-0.073	-0.109
Founder tech bkgd		0.143 ^a	0.154 ^a	0.149 ^a	0.188 [*]	0.116
Founder equity × CVC equity			0.219 ^{**}			
Founder equity × VC equity				-0.397 ^{**}		
Founder tech bkgd × CVC equity					0.204 [*]	
Founder tech bkgd × VC equity						-0.176 ^a
R ²	0.250	0.305	0.343	0.353	0.333	0.327
Adjusted R ²	0.110	0.124	0.163	0.176	0.150	0.124
F-statistic	1.789 ^{**}	1.682 ^{**}	1.908 ^{**}	1.994 ^{**}	1.824 ^{**}	1.773 ^{**}
ΔR ²	0.250	0.055	0.038	0.048	0.028	0.022
F-statistic Δ	1.789 [*]	1.259	5.558 ^{**}	7.110 ^{***}	4.027 ^{**}	3.114 ^a

Two-tailed, N = 122.

^a p < 0.10.

*** p < 0.001.

** p < 0.01.

* p < 0.05.

5.1. Theoretical implications of the findings regarding CVC and VC governance

This study contributes to several research streams. First, it contributes to the literature on innovation and CVC or VC funding entrepreneurial firms, providing insights into the developmental consequences for young firms considering funding sources. While CVCs receive a great deal of attention, most studies focus on the antecedents and consequences for the funding firms (e.g., Anokhin, Peck, & Wincent, 2016; Benson & Ziedonis, 2009; Dushnitsky & Lenox, 2005; Wadhwa &

Interaction plot for VC-backed IPO firms and founders' equity ownership

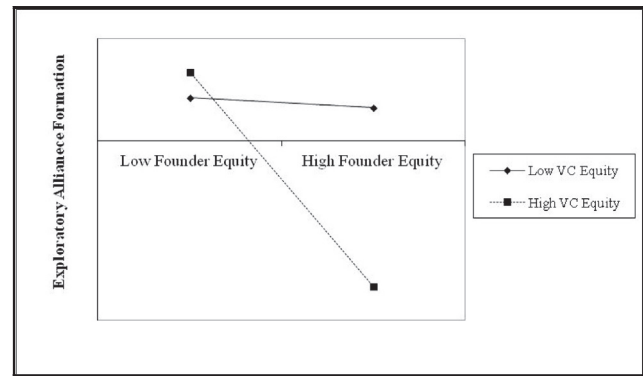


Fig. 2. Interaction plot for VC-backed IPO firms and founders' equity ownership.

Kotha, 2006). This paper joins a nascent yet growing body of work exploring the impact of funding sources from the perspective of new ventures (e.g., Ivanov & Xie, 2010; Katila et al., 2008; Park & Steensma, 2013).

Our results suggest that IPO firm managers' ownership and expertise are beneficial for the firm as these factors may allow a venture to pursue long term growth, via entering into exploratory alliances, as well as mitigate potential agency issues (see Fig. 3). We also show that differences in legacy and objectives between CVCs and VCs may have a bearing on ventures' choice of strategies. Consistent with predictions in the prior literature (Ivanov & Masulis, 2008; Park & Steensma, 2012), we find that CVCs tend to invest for such reasons as identifying technology trends, acquiring acquisition, and maintaining long-term returns. CVC fund managers are generally compensated by a fixed salary and corporate bonuses, and are thus less concerned about immediate returns. In contrast, VCs generally provide stage-based funding and are primarily interested in short-term maximization of returns. As their funds are limited to a ten-year cycle, the sooner they can get funds out and invest in other opportunities, the better it is for their firms (Gompers & Lerner, 1999; Park & Steensma, 2013).

Second, our study advances the multiple agency perspective by demonstrating that the performance and strategic outcomes of young firms may be affected by intangible sources of investor influence (Arthurs et al., 2008; Park & Steensma, 2013). Our findings add to the literature on multiple agency theory by confirming that VCs often pursue

Interaction plot for CVC-backed IPO firms and founders' equity ownership

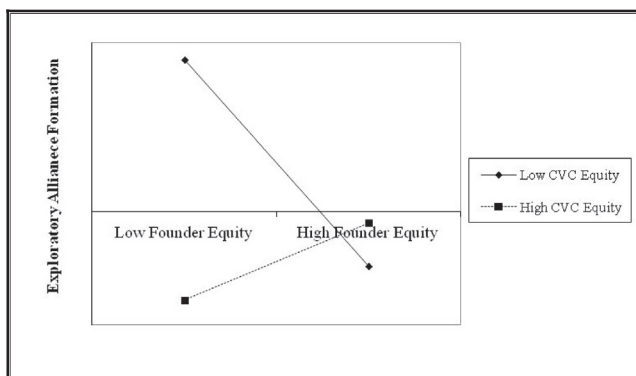


Fig. 1. Interaction plot for CVC-backed IPO firms and founders' equity ownership.

Interaction plot for CVC-backed IPO firms and founders' expertise

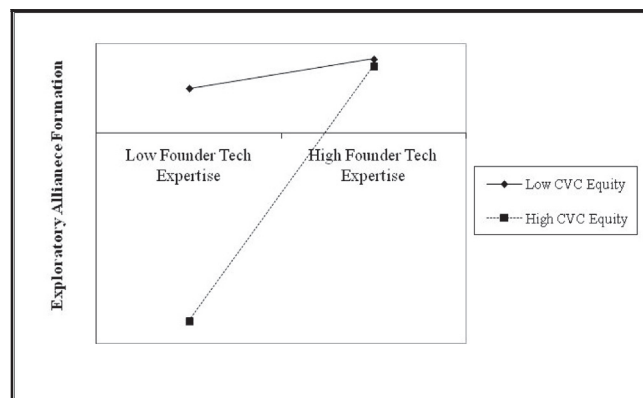


Fig. 3. Interaction plot for CVC-backed IPO firms and founders' expertise.

a risk-averse and stable growth agenda, particularly when they have positional power—that is, when they encourage IPO firm managers to pursue more conservative strategies, notwithstanding a high degree of founder ownership. From the agency perspective, CVCs are also agents who may seek proprietary technologies. Ventures may preclude this possibility by forming exploratory alliances via contractual arrangements with other firms in the market (e.g., alliance partners). This could help control their proprietary technologies and assuage concerns over technological appropriation by CVC firms.

Our post-IPO alliance formation examination shows that only firms whose founders are technology experts continue to use alliances for exploration purposes. This reduction in exploratory alliance strategies following investment in a firm may have several causes. Other studies note that, following IPO, firms may become less innovative and pursue exploitation strategies of current technologies. Alternatively, firms may choose to pursue more internal innovation. When choosing the latter following IPO, firms may feel less susceptible to opportunism by external parties. Future researchers could investigate this premise by studying the pre- and post-IPO behavior of CVC-backed firms longitudinally.

A key contribution of this study is to empirically demonstrate that the negative influence of VCs on exploratory strategies may be moderated when managers retain positional and ownership power within an IPO firm, given that their opinions likely matter in terms of strategic negotiations about a firm's direction and they may be better positioned to counter the conservative risk-averse approach taken by VCs. Since exploitation strategies tend to provide more immediate if incremental results, and VCs try to avoid organizational uncertainty prior to IPO's, such results are consistent with the literature (Colombo et al., 2006; Guo et al., 2006; Heeley et al., 2007; Park & Steensma, 2013).

5.2. The impact of founder governance

Although we expected that IPO firm managers would encourage a more exploratory alliance strategy, these findings suggest that managers pursue exploratory relationships only when they are associated with a more stable, less uncertain structure via CVC and when they, themselves, have a background in science and/or technology. Our results show that under other conditions, such as greater equity and/or when they are associated with VCs, they pursue exploitative alliances. We suggest that such differences in influence exist due to managers' psychological ownership, particularly a 'lack of emotional distance' from the firm (Pierce et al., 2001). Greater equity would allow them to maintain a sense of control over the direction of the organization, increasing their sense of psychological ownership (Wasserman, 2006). This is consistent with Arthurs and Busenitz (2003) suggestion that greater psychological ownership "over and above his or her legal ownership" (p. 157) will result in a greater willingness by the entrepreneur to invest sweat equity in the firm. One way that founder-managers can maintain control over their organizations is to pursue internal innovations rather than sharing knowledge and technology with outside actors.

We contribute to the literature by showing that a background in science or technology provides IPO firm managers with knowledge-based power, legitimacy, and independence in negotiating with agents. They are better positioned to influence firm allies and capable of judging their capabilities and compatibility. Agents such as CVCs know that managers effectively monitor and control technology-related governance during the post-alliance stage. In contrast, managers without a background in technology might hesitate to pursue external exploration due to concerns over opportunism, a lack of vision about the technological trajectory, and lack of experience in dealing with contingencies associated with alliance governance. Our results show that experienced advisors such as CVC firms may motivate them to pursue exploration strategies.

CVC firms also act as advisors to managers and boards of directors. They may strengthen managers' exploratory strategies by offering

guidance in selecting alliances, lending them greater confidence in pursuing such strategies. Additionally, when founder-managers have a strong strategic influence over firm strategy, such as when the founder-manager is chairman of the board, and the firm's actions are guided by an experienced CVC firm, exploratory strategies are more likely to be pursued since CVCs can effectively identify resource gaps and assist in partner selection. We suggest that the influence of CVC's may mediate both a sense of psychological ownership on the part of IPO managers, and increase their confidence in pursuing an exploratory alliance strategy.

5.3. Practical implications and limitations

We believe these results have practical implications for managers. First, this paper identifies the conditions which either motivate or inhibit adolescent firms from pursuing exploratory strategies. With the knowledge that greater equity and technology backgrounds may provide greater discretion in forming exploratory alliances, founder-managers can focus on retaining ownership and leveraging their backgrounds. They may consider including at least one member with a technology skill set on their foundational team.

Second, recent studies question the motivations and benefits of CVC firms. We identify several ways that CVC portfolio firms may limit agency risk and opportunism on the part of the CVC. When these risks are diminished, such as when managers maintain a high degree of governance influence, CVCs can use their functional experience to select alliance partners and form a stronger exploration strategy. Finally, our results suggest that VCs can have the strongest, least compromising influence by avoiding exploratory alliances that significantly impact firm strategy.

Most studies that examine the educational background of founders focus on a single sector (e.g., biotechnology or information and communications technology). Thus, one limitation of prior research is generalizability (c.f., Ding, 2011; Link & Ruhm, 2011). This study employs a sample of both technology and non-technology firms in order to show founder-managers' knowledge and expertise has an impact on firm strategy.

Because this study focuses on why IPO firms may be less driven in forming exploratory alliances (Bernstein, 2012), our sample is limited to IPO firms. As such, it does not include firms that withdrew before achieving an IPO. Given that exploration increases the risk of failure, generalizability to all firms headed for an IPO is necessarily limited. Even so, this study addresses the question of why firms are less innovative following equity exchange. Thus, such a limitation is an acceptable tradeoff for achieving our findings.

While this study focuses on exploration via alliances, future research could examine firms' internal exploration strategies, including R&D. Prior research suggests that the IPO process fundamentally reshapes a firm's organizational structure and processes (Wu, 2012). However, we believe it is important to distinguish among firm strategies as they go through their lifecycles. Although we study only IPO firms, researchers may wish to build on our findings and design a longitudinal study for mapping strategic fit between lifecycle stages and innovation strategies. Although we could not measure the degree of direct CVC or VC guidance offered and utilized, future researchers may build on the literature that demonstrates the strong governance influence of CVC's and VC's over their portfolio firms (cf. Diestre & Rajagopalan, 2012; Ivanov & Xie, 2010; Katila et al., 2008; Park & Steensma, 2012, 2013; Sapienza, 1992).

Our research design does not allow us to directly measure the extent to which CVC-backed firms utilize their alliance relationships. We build on the premise that firms have heterogeneous needs and form alliances in order to benefit from alliance partner's resources and capabilities. Future research may achieve more nuanced results by developing a longitudinal qualitative study that highlights how VC experience and the absorptive capacity of CVC's may allow for the optimal selection of

exploratory alliance partners, and how such an alliance arrangement can lead to the creation of value.

Future studies could also examine the nature of innovation in more depth, such as how different levels of internal complexity and uncertainty affect the management of innovation (Tidd, 2001), specifically how different funding sources, i.e., CVCs, VCs, and non-venture backed firms, influence the types of innovation that firms pursue.

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