Syndication of venture capital investment: the art of resource pooling

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This article explores the rationale of syndications of institutional venture capital investors when they fund start-ups. There is an implicit labor division between institutional venture capital investors in which pure venture capital firms are in charge of converting investment uncertainty into risk by funding the seed stage of start-ups. The other investors invest in the following stages to sustain the start-ups’ development. Relationships between investors are also handled following informal rules. Exchanges between institutional venture capital investors are based on a reciprocity that follows the informal principles of the gift exchange theory.

Introduction

According to the Small Business Administration, every year, more than 600,000 new enterprises are created in the United States (612,296 in 2003; 628,917 in 2004; and 644,122 in 2005). The funding of the creation of these enterprises depends on a large variety of sources: self-financing, family, friends (known as “Business Angels”), wealthy individuals, commercial banks, the Small Business Administration, and/or institutional venture capital (VC) investors. The institutional VC investors fund a very limited number of new enterprises at their seed stage. According to the VentureOne database of Dow Jones, institutional VC investors funded the creation of 203 start-ups in 2003, 210 in 2004, and 240 in 2005. Some features of the VC industry such as the size of VC funds and the obligation to return the money to their investors after 10 years limit the capability of VC firms to invest in seed stages of start-ups and lead them to prefer later stages. However, sometimes, VC firms invest in seed stages, and some of the largest American firms, especially in the high-tech industry, have obtained funding from these types of investors to support their start-ups. For example, companies such as Adobe, AMD, Intel, Cisco Systems, Electronic Arts, Oracle, Sun Microsystems, Yahoo!, and Google raised funding at their seed stage from VC firms. Start-ups funded by institutional VC investors usually have a faster growing business (Hellman & Puri, 2002), create numerous jobs, and have an important impact on the business environment. These facts justify research on the VC industry even if VC firms only represent a limited source of funding at the seed stage of start-ups. This study focuses on the investing behavior of institutional VC firms and their relationships with the start-ups they backed. This research does not deal with individual investors (“Business Angels”). Similar to Gompers and Lerner (2001), I acknowledge the
existence of “Business Angels” in the funding of start-ups, but I will not consider them in this research.

Institutional VC investors focus on a very specific kind of start-up. They look for new enterprises that need a large amount of investment and that represent a potentially high growth business. A VC firm is a pool of capital organized as a limited partnership investing in nonpublic companies that present an opportunity for high rates of return within 5 to 7 years (Gompers & Lerner, 2004). Four different stages of development describe the evolution of start-up maturity: the seed stage, the early stage, the expansion stage, and the later stage. These stages can be supported by institutional VC investors through several rounds of funding. Occasionally, these investors are involved in seed stages to fund the creation and development of start-ups (Hellman & Puri, 2000; Kozmetsky, Gill, & Smilor, 1984; Perez, 1987). They may invest before there is a real product or company organized (so called “seed investing”) or may provide capital to start-up a company in its first or second stage of development (known as “early stage investing”). A VC firm may also provide needed financing to help a company grow beyond a critical mass to become more successful (“expansion stage financing”). The VC firm may invest in a company throughout the company’s life cycle, and some funds invest more in seed stages and others more in later stages (National Venture Capital Association, 2005, p. 87).

Institutional VC investors do not invest in start-ups in a single round but through several rounds. According to tournament analysis (Aoki, 1999), for each round, an investor has the choice between stopping investment if the start-up’s failure is anticipated and participating in the next round if potential success is still in the cards.

Generally, investors do not invest alone. They syndicate the funding of companies. A syndicate is run by a “lead” investor who obtains the “informal privilege” of inviting other investors: the “passive” investors (De Clercq & Dimov, 2004; Lerner, 1994; Manigart et al., 2006). The lead investor originates the first round of funding and creates the syndicate by inviting other investors to this and/or to subsequent rounds. Invited investors might refuse the invitation if they are not interested in the start-up. Gorman and Sahlman (1989) mentioned that lead investors typically hold equity-linked claims, and many initial agreements give them preemptive rights and rights of first refusal in future financing rounds. The lead position of the first investor is due to an informal rule inside the VC community. The lead investor develops social ties with the entrepreneur prior to investment. After closing the funding, he or she becomes strongly involved in the management of the start-up (Brander, Amit, & Antweiler, 2002; Hellman & Puri, 2002; Hsu, 2004; Lerner, 1995; Sapienza, 1992). Generally, he or she is on the board of directors of the invested company. On the other hand, “passive” investors are not really involved in the operational management of the start-up. They do not have strong social ties with the entrepreneur and seldom sit on their board of directors. VC investors can be lead or passive investors depending on whether or not they have originated the deal.

There is a theoretical issue to understand the rationale of these syndications. Why do institutional VC investors syndicate their investments? A syndication can be understood as a kind of alliance in which two or more investors come together to take an equity stake in a company (Wright & Lockett, 2003). Different hypotheses have been explored. Syndications have been understood as a means to diversify risk (Bygrave, 1987; Bygrave & Timmons, 1992; Lerner, 1994; Manigart et al., 2006), to improve projects selection (Brander et al., 2002; De Clercq & Dimov, 2004; Lerner; Manigart et al.), to mobilize competencies (Brander et al.; De Clercq & Dimov; Hochberg, Ljungqvist, & Lu, 2007; Manigart et al.), and to gain access to deal flow (Manigart et al.).

This research explores the hypothesis that VC syndications are also used by institutional VC investors to pool useful resources for the development of invested start-ups.
This perspective mobilizes the resource-based theory (Barney, 1991; Penrose, 1959; Rumelt, 1991). A resource-based understanding of strategic networks may highlight the nature of alliances that VC firms nurture with partners that own complementary resources to sustain the creation and business development of a funded company. In this perspective, a syndicate can be understood as a formal contract linking interdependent firms that have complementary resources to sustain the funded start-up. A major issue for VC firms is to acquire resources to sustain the start-ups they have funded, and to find an exit strategy by selling their investments on financial markets through initial public offerings (IPO) or to a large company or a private equity firm. From 2000 to 2005, 1948 venture-backed companies were merged or acquired, and 307 became public.

Generally, institutional VC investors are implicitly understood as a homogeneous population with a common status and common goals. In fact, it is an important point for this research that institutional investors involved in VC syndicates constitute a heterogeneous population. According to the National Venture Capital Association and Galante’s Venture Capital and Private Equity Directory published by Dow Jones, four categories of institutional investors can be identified. The first category is made up of pure VC firms (Sequoia Capital; Kleiner, Perkins Caufield & Byers; Mayfield Fund, etc.). Among institutional VC investors, this category is the only one entirely dedicated to VC investment. For the other institutional investors, VC investments only represent a small part of their activities. The second category is composed of private equity firms (Bain Capital, Blackstone, etc.). The third category is made up of large industrial companies that practice corporate VC (Cisco Systems, Lucent Technologies, ATT, Siemens, etc.). The fourth category is made up of investment banks (Goldman Sachs, JP Morgan, Credit Suisse First Boston, etc.).

The diversity of investors reflects an implicit division of labor between the different institutional VC investors involved in syndications. When they invest in seed stages, pure VC firms do the screening of projects and other investors later participate in further stages to bring the resources needed for further start-up development. The diversity and complementarity of the various investors necessarily induce interdependency and lead to exchanges among them.

The analysis of the VC industry developed in this research highlights different points. First, the funding of the seed stage induces a specific kind of evaluation. Further, in this article, based on Knight’s (1921) distinction between uncertainty and risk, I argue that investors evaluate more uncertainty than risk when they invest at the seed stage. When an investor evaluates a start-up at its seed stage, the latter does not have any clients or products, and sometimes, it does not even exist. A financial analyst does not have explicit information to make his or her investment decision, for example for other kinds of assets. Granovetter (1985, 2005) and Podolny (1994) emphasize the importance of social networks to handle risk in economic exchanges. Based on this perspective, I argue that to handle uncertainty, VC investors use social networks to gather tacit knowledge on the entrepreneur and his or her project before investing. The funding of the seed stage is used as a “learning by collaborating” situation in which investors collect knowledge in order to convert uncertainty on start-ups into risk. Investors progressively convert uncertainty into

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1. This typology replicates the one performed by The Galante’s Venture Capital and Private Equity Directory published every year by Dow Jones that classifies venture capital investors in four categories: Private Venture Capital Firm (Pure Venture Capital Firm), Corporate Venturing Subsidiary (Large Industrial Company), Investment Banking Firm (Investment Bank), and Private Investment Firm (Private Equity Firm). The National Venture Capital Association also makes a distinction between Private Independent Venture Capital Firm, Financial Institutions, and Corporations.
risk by creating and gathering more explicit and formal information. Second, there is a labor division among institutional VC investors. Investments in seed stages carried out by institutional VC investors are mainly performed by pure VC firms that are specialized in uncertainty management. Third, in order to sustain invested start-ups and implement their exit strategy, pure VC firms develop ties with investment banks, private equity firms, and large industrial companies by inviting them into syndications. Lead investors use syndications to pool resources. On the other hand, by participating in syndicates, large companies have access to private information on innovation in their technological and business fields. This is consistent with an acquisitive strategy of start-ups in order to improve the technology portfolio of large industrial firms (Dushnitsky & Lenox, 2005; Keil, 2004). Investment banks use their VC investments in order to be linked with start-ups that will go public or be acquired by large industrial companies. They do this in order to get the mandate to take the company public or to organize its acquisition. Investment banks make business by organizing these financial operations. Private equity firms look for potentially profitable companies generating revenues that can be acquired through leverage buy-out operations in order to resell them when profitability has been restored and debts reimbursed.

The article is organized as follows. First, based on Knight’s (1921) definition of uncertainty, I explore why the seed stage is more about uncertainty management than risk management and argue that pure VC firms are the main institutional investors of seed stages because they have the specific competency to convert uncertainty into risk. Second, I describe how pure VC firms use their informal right as primary investor to invite other investors in order to pool resources to sustain invested start-ups. Finally, another theoretical issue is explored to define the rationale of exchanges between investors. The gift exchange theory defined by the anthropologist Marcel Mauss (1923) is mobilized to understand informal and delayed exchanges between institutional investors involved in VC syndications.

**Theory and Hypothesis**

**The Conversion by Pure VC Firms of Uncertainty into Risk Through the Funding of the Seed Stage**

A resource-based understanding of syndication is based on the heterogeneity and the interdependence of institutional VC investors involved in syndications. The interdependence of the four types of investors, namely VC firms, private equity firms, investment banks, and corporate VC units of large industrial firms, is due to their common interest in the creation and development of start-ups and also to their complementary contributions to the start-up life cycle. In this cycle, pure VC firms hold a specific function because they initiate that cycle by being strongly involved in the funding of the seed stage dedicated to the company’s creation.

The specificity of pure VC activity is mainly linked to the funding of the seed stage. The main screening of potential investments is accomplished before the first round of funding. Of the 500 or so proposed ventures that a VC firm may review each year, about 90% are rejected during the initial screening before the first investment. Of the remaining 10% considered good enough for detailed analysis, only five or six can be financed and managed by each representative venture firm at any one time since the costs of analysis and of management are high (Gompers & Lerner, 2004; Perez, 1987) (Figure 1).

I argue that when a venture capitalist funds the seed stage of a new enterprise, he or she does not undertake risk management but uncertainty management. This statement is
Based on Knight's definition of uncertainty (Knight, 1921, p. 233). Knight draws a distinction between measurable uncertainty and uncertainty that is unmeasurable. He uses the term “risk” to designate the former and the term “uncertainty” for the latter. The practical difference between the two categories risk and uncertainty is that in the former, the distribution of the outcome in a group of instances is known (either through calculation \( a \ priori \) or from statistics of past experience). In the case of uncertainty, this is not true. The reason is generally that it is impossible to form a group of instances, because the situation dealt with is highly unique.

Investments in seed stages do not square with a situation of risk but with a situation of uncertainty because of the uniqueness of each invested company. At the seed stage, investors have to evaluate four categories of uncertainty in their decision-making process: managerial uncertainty (the quality of founders), product uncertainty (the quality of the product), market uncertainty (the reality of the market), and financial uncertainty (the capability of the start-up to generate enough cash flow to remain solvent). The combination of these dimensions of uncertainty progressively evolves to become risk as the invested company matures. Before funding the seed stage, there is no public information, track record, or tangible asset to evaluate the new company. Often, the company does not have any clients, and sometimes it does not exist yet as a legal entity. For this reason, VC investments differ in several important aspects from other financial assets (Tyebjee & Bruno, 1984). First, VC is usually invested in new firms that have very little performance history. As a result, the investor cannot rely on historical performance data, as he or she can in the case of the stock market (Alexander, Sharpe, & Bailey, 2000). Second, the investment is typically in small firms, and the nature of the relationship between investors and entrepreneurs supposes a higher degree of direct involvement compared with the relatively inactive role of investors in publicly traded companies (Kaplan & Stromberg, 2004). Third, VC investments are illiquid in the short term because of the lack of efficient capital markets for equity shares of privately held companies. Long horizons of product
and market development make valuation difficult. Moreover, the legal restrictions that apply to the resale of such investments lock the investor in for a certain period (Friedman, 1990). It is important to consider the effects of the massive uncertainty that typically accompanies new ventures. This uncertainty makes it very difficult for agents to construct precise probabilistic models, especially if they are “boundedly rational,” i.e., have limited processing powers (Admati & Pfleiderer, 1994). For these reasons, at the seed stage, investments in new start-ups involve unmeasurable uncertainty. Therefore, in the decision-making process to invest at the seed stage, VC firms practice uncertainty management and not risk management.

Uncertainty management is based on tacit knowledge. Polanyi (1966) classified human knowledge into two categories. “Explicit” or codified knowledge refers to knowledge that is transmittable in formal and systematic language. On the other hand, “tacit” knowledge has a personal quality, which makes it hard to formalize and communicate. Tacit knowledge is deeply rooted in action, commitment, and involvement in a specific context. Tacit knowledge is a continuous activity of knowing and embodies what Bateson (1973) has referred to as an, “analogue” quality. In this context, communication between individuals may be seen as an analog process that aims to share tacit knowledge to build mutual understanding. By contrast, explicit knowledge is discrete or “digital.” It is captured in records of the past such as libraries, archives, and databases and is assessed on a sequential basis (Nonaka, 1994).

Risk management is about evaluation based on explicit and existing knowledge. Uncertainty management is about creating the knowledge needed for the evaluation. Knowledge is created through social interactions between individuals (Nonaka, 1994). Social ties and embeddedness are essential for collecting information because the evaluation of uncertainty is based on tacit knowledge. In order to reduce uncertainty, an investor in VC cannot rely on tangible information. He or she has to rely mainly on a subjective assessment procedure based upon the business plan presented by the entrepreneur and on its social interactions.

Several scholars in economic sociology emphasize that social networks are efficient for reducing uncertainty before VC investments (Sorenson & Stuart, 2001). Business evaluation of companies, especially new businesses, is an archetypal situation where social networks are a more efficient way to get information than from the market. This is consistent with Granovetter’s conclusion (2005, p. 33) “social networks affect the flow and the quality of information. Much information is subtle, nuanced and difficult to verify, so actors do not believe impersonal sources and instead rely on people they know.” Several studies on banking activities have shown the use of social networks in the evaluation of business carried out by bankers (Ferrary, 2003a; Nohria & Eccles, 1992; Uzzi, 1999). Investors nurture social embeddedness with potential entrepreneurs and their business environment because VC activity is an uncertain investment. When there is an opportunity for investment, a VC does not consult other VCs to get information but people outside the VC community who have information on the entrepreneur, on cutting edge new technologies, and on potential markets. This “due diligence” process supposes a high level of embeddedness because social networks are the main pipe of tacit knowledge. No market exists to get information for evaluating a start-up project. The VC creates a strong tie with the entrepreneur by meeting him or her regularly on a professional and personal basis to get tacit knowledge. There is an asymmetry of information between the entrepreneur and the VC investor that the latter tries to reduce by collecting data. As mentioned by Gompers and Lerner (2004, p. 129), there is a “lemon” problem. The investor may choose not to invest if he or she does not have enough information. In the first round, the entrepreneur does not have any interest in hiding too much information if he or she wants
to secure a follow-up funding. *Ex ante*, the entrepreneur might hide information to get his/her first round of funding, but the investor will not invest in following rounds if *ex post*, he or she discovers hidden information. In the first round, the entrepreneur does not have interest in taking advantage of an asymmetry of information. If he or she wants to be funded, he or she has to reveal as much information as he or she can in order to solve the “lemon” problem and secure future funding. As this information is intangible, he or she can reveal it only through informal social exchanges. There is a social tie constraint to share information.

VC firms really deal with the high level of uncertainty at the seed stage. At this stage, they need to develop strong personal ties with the entrepreneur and be embedded in local social networks to evaluate an investment opportunity efficiently. A venture capitalist uses his or her social network to get information on entrepreneurs (friends, family, former coworkers, etc.) and a network of experts to evaluate the opportunity of the market and the product.

The level of embeddedness determines the quality of the evaluation because social ties give access to more information through informal relationships than through purely formal ones. VCs collect tacit knowledge mainly about the entrepreneur, who is the main factor of uncertainty. Information about personality, intellectual honesty, and managerial capabilities matters in the decision when a start-up is at the seed stage. These factors are not tangible data but tacit knowledge that can only be gathered through informal relations with the potential entrepreneur and his or her social network. The more intangible the information is, the more the redundancy of strong ties is used to validate it. The evaluation results from a combination of intangible information checked several times through redundancy of strong ties. Conversely, the more tangible the information, the less need there is for validation through strong ties.

Nevertheless, even after doing due diligence and closing a round of funding at the seed stage, the investor still faces a high level of uncertainty about the entrepreneur, the market, and the product. *Ex ante*, there is no real information on the market, the technology, and the entrepreneur because often, the company does not yet exist. Even if the venture capitalist has personal ties with the entrepreneur, he or she does not know him or her “as an entrepreneur.”

The venture capitalist will collect more information through the creation and the development of the company. There is a “learning by collaborating” process that begins as soon as the entrepreneur uses the raised funding and the venture capitalist gets involved in the operational management of the company. The first round of funding of a seed stage is a “learning by collaborating” period that reduces the information asymmetry between the investor and the entrepreneur. With a VC investment comes a term sheet that sets up milestones that condition the funding and defines the role of investors in the management of the start-up. According to Gompers and Lerner (2004, p. 130), the lead venture capitalist visits the entrepreneur once a month on average and spends 4 to 5 hours at the facility during each visit. One can use a two-period agency model to describe the learning process that takes place between the entrepreneur and the venture capitalist in the first round of funding of a seed stage (Chan, Siegel, & Thakor, 1990). In the first period, this learning process changes the information structure of agents and modifies the risk evaluation before the second period. Before the first round of funding of the seed stage, there is an asymmetry of information between the entrepreneur and the venture capitalist. This asymmetry can qualify as adverse selection because there is uncertainty about the competitiveness of the product and the reality of the market. This uncertainty can also qualify as moral hazard if for the venture capitalist, there is uncertainty about the personality of the entrepreneur (honesty, managerial competencies, technical skills) (Kaplan & Stromberg, 2004).
Investors voluntarily socialize their professional relationships with entrepreneurs in order to create the tacit knowledge they need to evaluate more deeply the investment opportunity. The round of funding of the seed stage can be understood as a legal device to formalize an implicit obligation of socialization. This funding is not only a financial investment but it also induces more social interaction, especially for the lead investor who is strongly involved in monitoring the invested company. Gompers (1995, p. 302) mentions that, “Venture capitalists are understood to provide intensive oversight of the firms in their portfolios. Their involvement includes service on the boards of firms in their portfolios, frequent informal visits, meetings with customers and suppliers, and active involvement in key personnel and strategic decisions.” Other scholars underscore the involvement of VC firms in the management of start-ups (Gorman & Sahlman, 1989; Hellman & Puri, 2002; Wijbenga, Postma, & Stratling, 2007). This monitoring creates a strong tie between the lead investor and the entrepreneur. Due to the contract, and because he or she is a shareholder, the VC can meet the entrepreneur frequently. The lead investor is on the board of directors, and so, he or she meets the entrepreneur at least once a month. In some special cases, such as top managers recruitments, negotiations on partnerships, or business crises, the lead venture capitalist might be, for a short period of time, in touch with the entrepreneur every day (Gompers & Lerner, 2004, p. 255). For example, P. Lamont, a Sequoia Partner, mentions that for a while, he was involved in the management of Cisco every day when his VC firm funded this start-up. The highest level of involvement is when the venture capitalist accommodates the start-up in his or her own office. For example, Kleiner, Perkins, Caulfield & Byers, one of the most prominent VC firm in Silicon Valley, has an “Entrepreneur in Residence” program to accommodate and support fledgling start-ups. These cases of daily interactions contribute to create strong ties between entrepreneurs and investors.

Behind the formal legal contract through which the VC firm funds a company, there is an implicit contract that involves the venture capitalist in the management of the company and initiates frequent social interactions between the entrepreneur and the investor. In order to reduce uncertainty, the round of funding of the seed stage appears as a legal device to initiate an interpersonal learning process between the entrepreneur and the investor. With this round, the VC gives enough money to start the company and initiate the learning-by-doing collaborative process, but not enough to finance the company until it becomes viable and self-sufficient.

At the end of the seed stage round of funding, the uncertainty has changed into risk. At this point, the investor has more tangible information on the management team, a product exists, some clients have been approached, and the company has a track record (burning rate of cash, respect of milestones, etc.). Explicit knowledge is created as the new company becomes more mature. Thus, the evaluation to fund subsequent stages is based on more explicit information accumulated through the funding of the seed stage. The rate of bankruptcy is higher at the seed stage than in following stages because of the high uncertainty. Hochberg et al. (2007) pointed out that around one-third of companies do not survive beyond the first round of funding and that the survival probability increases in the following stages.

The funding of the seed stage deals with uncertainty management, while the funding of the other stages (early, expansion, and later) are more about risk management. Sometimes, the distinction between uncertainty management and risk management can induce a difference in the legal contract of funding of the seed stage. It is commonly admitted that investors get shares in return for their funding. This is generally true, except in some cases at the seed stage when uncertainty is too important. As explained by Alain Azan, a partner of Sofinova Ventures (a VC firm in Silicon Valley), on some occasions, at the seed stage,
when the uncertainty is too high, investors can receive “convertible notes” instead of shares for the first round of funding. The notes will be converted into shares at the second round of funding based on the valuation carried out by the second round investors. In the first round of funding, an investor lends money to the entrepreneur with the right to convert the loan into shares later. The valuation of the convertibility is unknown when this first round of funding is closed. Yet, the legal contract specifies that the convertibility of the loan will be 20% higher than the price that would be paid by the second round investors.\textsuperscript{2} In this case, investors get shares when they fund the second and following stages. The price they get for these shares is used to calculate the value of shares that primary investors will get in the conversion of their “convertible notes” at the second round. This practice is due to the fact that in some cases, at the first round of funding of a seed stage, neither entrepreneurs nor investors know the value of the new enterprise, which as of yet, has no clients and products. This squares with a situation of high uncertainty. At this stage, neither entrepreneurs nor investors know how many shares should be given in exchange for the funding raised to launch the company. Conversely, both know that they will have more tangible information at the end of the first round. Tangible information will be available for the second round negotiations and investors will be able to calculate a valuation of the start-up. This valuation is used to calculate the conversion of the “convertible notes” that funded the seed stage. This exceptional use of “convertible notes” allows funding of start-ups in situations when high uncertainty does not make the valuation of a new enterprise possible. Following rounds of funding are more a situation of risk, and investors can valuate the company.

Different factors can explain the limited number of VC investors in syndications funding seed stages. Some are related to features of the VC industry. The size of VC funds and the obligation to return the money to their investors after 10 years limit the capability of VC firms to invest at this stage. Also, at the seed stage, start-ups do not need a large amount of money, which would imply a larger number of investors. It also can be argued that socialization of investors with entrepreneurs influences the size of syndications. The learning-by-collaborating process to convert uncertainty into risk is highly time-consuming for investors and entrepreneurs. Socialization induces investments in time and in informal relationships. The creation of strong ties to manage uncertainty is time-consuming for entrepreneurs and investors and because tacit information cannot be easily shared, only very few investors (sometimes, even only one) can create this strong tie. Thus, one expects that just one or a very few institutional investors participate to the funding of the seed stage. Considering these features, one can expect that:

**Hypothesis 1:** At the seed stage, the number of institutional investors in syndicates is low.

Institutional VC investors are a heterogeneous community. They are composed of pure VC firms, investment banks, corporate VC units of large industrial firms, and private equity firms. The specific competence of pure VC firms is to deal with uncertainty and transform this into risk through the funding of a seed stage. To be more precise, it should be mentioned that among pure VC firms, only a limited number of them frequently invest at the seed stage and that a large part prefer to invest in the following stages. It is difficult to clearly separate the two categories, partly because the distinction is not systematically made and partly because investment strategies of VC firms can change over time depending on the size and the maturity of their fund.

\textsuperscript{2} In some cases, this term is forced to be abandoned as part of the conditions of the second round investors.
Pure VC firms are socially embedded in innovative regions and develop local ties (Sorenson & Stuart, 2001). They are able to collect tacit knowledge that other kinds of investors cannot get because they are not settled in each innovative region (for example, private equity firms are mainly located in New York City and the Boston region). Investments at the seed stage are mainly performed by pure VC firms. This means that this kind of investor initiates the funding of start-ups and obtains the lead investor’s privilege of inviting other investors into their syndications. Thus, the lead investor who organized the funding of the seed stage gets valuable private information that highly interests the other categories of investors (large industrial companies, investment banks, and private equity firms) who do not however invest in seed stages.

Only a small proportion of institutional VC investors invest in seed stages, and they are mainly pure VC firms. This reduces the availability of VC investors to find peers in order to syndicate and leads pure VC firms to mainly syndicate with other pure VC firms when they do so (Lerner, 1994; Podolny, 1993).

According to the labor division, among the four categories of investors in which pure VC firms convert uncertainty into risk by becoming an insider investor through the learning-by-collaborating process originated by the funding of the seed stage, it can be expected that:

Hypothesis 2: Pure VC firms are overrepresented in syndication at seed stages funding.

Pooling Resources by Syndicating VC Investments

Implicitly, by investing in a seed stage, an investor pays to become an inside investor and thus obtains valuable private information to exchange with other investors in order to get something in return. He or she also pays to get the informal privilege granted to the lead investor to invite in other investors.

Before closing the funding of the seed stage, none of the members of the investor community has an inside understanding of any given new company. There is information asymmetry between the entrepreneur and the investor community. The situation is completely different at the end of the first round of funding, when the start-up company has used the money raised and is looking to raise a second round to fund its growth. The investor who originated the first round is an inside investor because of his or her strong tie with the entrepreneur. The information asymmetry between the entrepreneur and the VC investors community is reduced at the end of the first round because one member of the community is an inside investor who can share his or her information with his or her peers by inviting them into the syndication for the second and following rounds to fund the development of the start-up.

Through the existing tie built in the first round of funding between the entrepreneur and the lead investor, the latter becomes a bridge between the entrepreneur and the community of investors. Ties between the lead investor and other investors are important to explain the latter’s participation in the funding of following stages as passive investors. The inside investor can be assumed to reveal information truthfully, since he or she has no incentive to misrepresent it. If any reputational assets are at stake with outside investors, the venture capitalist will clearly reveal the information truthfully, thereby resolving the informational asymmetry (Admati & Pfleiderer, 1994). The presence of an inside investor such as a venture capitalist can reduce some of the agency costs that arise for the community of investors if the entrepreneur’s effort level is unobservable. In following rounds of investment to fund the next stages of the start-up development, the effects of
entrepreneurial effort are probably not directly observable by outside parties who are not monitoring the firm since these effects take the form of an increased probability of success that is hard to measure.

If the initial investor decides to fund a second round, it means the project is a potential success (otherwise he or she would not do this) and his or her evaluation is based on inside information. If the initial investor does not fund the following stages of a start-up, this gives a negative signal to outside investors. There is an implicit obligation for the primary investor to invest in the following stages to attract new investors and to show his or her confidence in the potential success of the start-up. At this point, he or she can invite other investors by using his or her “lead investor” position or he or she can invest alone. Invited investors might refuse the invitation if they are not interested in the start-up. The lead investor of a seed stage is not necessarily the lead investor in subsequent rounds. However, he or she strongly influences the lead investor for the following stage by choosing the investors that can get the opportunity to invest. The informal privilege to invite other investors is an implicit right to choose the lead investor of the next round of funding (Podolny, 1993). By inviting other investors instead of investing alone, the lead investor implicitly shares the potential profit. The main question remains: Why does the inside investor invite outside investors into following syndications?

I hypothesize that a lead investor invites other investors through syndications in order to pool resources to sustain the development of the start-up that he or she funded at the seed stage. In order to sustain the development of start-ups in which he or she has invested and to prepare his or her exit strategy, the lead investor uses his or her inside investor privilege as a resource to invite other kinds of investors (large industrial firms, investment banks, and private equity firms) to share private information in the following stages (early, expansion, and later stages). It can be argued that the lead investor uses his or her informal privilege by inviting other investors to share his or her private knowledge in order to initiate a reciprocal exchange with partners owning complementary resources to develop the funded start-up. This invitation is a gift made by pure venture capitalists in order to initiate reciprocal exchanges with other categories of investors by creating the obligation to reciprocate in the future.

The gift exchange theory (Mauss, 1923) is useful for understanding informal exchanges between investors involved in syndications (Ferrary, 2006). The principles of Mauss’ Gift Exchange Theory specify several rules. First, an agent has to give first in order to receive something from another. Second, an individual who receives a gift has to reciprocate, and this is an informal and implicit contract. By definition, reciprocation is delayed (otherwise, it is a barter exchange), and its nature and its terms are not defined. This intrinsically introduces uncertainty into the exchange. The giver is not sure to receive a counter-gift as long as the receiver has not actually reciprocated. Third, the giver gives his or her gift in front of the community to secure reciprocation through social pressure. All community members know the implicit rules of gift exchange (it is common knowledge). Four, if the receiver does not reciprocate, then his or her interindividual exchange with the giver ends. He or she also loses his or her status in the community and gains a negative reputation.

An application of these principles to the relationships between institutional VC investors is that an invitation made by the initial investor is a “gift” (that can be accepted or refused) to other investors in order to involve agents able to sustain the development of the start-up and to prepare an exit strategy (Ferrary, 2003b). The more mature the start-up becomes, the more the initial VC investor tries to pool resources by inviting new investors.

Thus, one can expect that the number of investors increases with the maturity of invested companies.
**Hypothesis 3:** The number of investors in syndications is positively related to the maturity of funded start-ups.

The development of a start-up needs funding to recruit people, settle new branches, or industrialize a product. A syndicate of several investors provides more capital availability for current and follow-on cash needs (Gompers & Lerner, 2004, p. 257). Then, the more obvious justification for the lead investor to invite other investors is to gain more financial resources to support the following development stages of start-ups in which it has invested. In the following stages, investors arbitrate between allocating investments in start-ups already invested in or diversifying their investments by investing in new start-ups. By inviting another VC firm, a lead investor gets more funding in exchange for an investment opportunity and a potential future invitation if the passive VC firm becomes the lead investor of a future syndication. As mentioned by Hochberg et al. (2007), a VC firm is able to generate investment opportunities in the future by syndicating its own deals today in the hope of future reciprocation from its syndication partners.

One can expect that the number of pure VC firms increases in syndications that fund the following stages of invested start-ups in order to bring more financial resources.  

**Hypothesis 4:** The number of investors in syndications is positively related to the amount of capital invested.

If a pure VC firm wants to access resources owned by large industrial firms, investment banks, or private equity firms in order to sustain start-ups in which he or she has invested and prepare an exit strategy, he or she has to give something first to initiate the exchange. His or her invitation to share private information by participating in a syndicate constitutes this initial gift. By inviting investment banks, corporate VC units, and/or private equity firms, a lead VC expects that these partners will reciprocate the gift. There is no formal contract between the investors to enforce reciprocity (the formal contract is only between the start-up and its investors but not between the investors). The investors are bundled by an informal contract. The different kinds of investors have different resources that they use in reciprocal gift exchange to reach their objectives. In order to prepare their exit strategy, pure VC firms use their lead investor’s informal rights to invite private equity firms, investment banks, and large industrial companies in rounds of funding of the following stages. In return, these firms have access to privileged ties and private information for their investment decision making. The pure VC’s gift is private information accumulated at the seed stage. Other investors’ counter-gifts could be partnership, acquisition, or IPO. There is no legal device to enforce this. Reciprocation is intrinsically delayed because the investor invited to the syndication will only be able to reciprocate in the future when the start-up needs its resources. The inviting investor has to support uncertainty on the reciprocation because the receiver could potentially not return the gift. However, for a pure VC firm, that is the only way to prepare an exit strategy.

The investment bank’s competence implicitly secures the success of an IPO or an acquisition. So the gift exchange between a pure VC firm and an investment bank is that the first invites the second in the later stages of start-up funding and the investment bank returns the gift by securing the IPO or the acquisition. The lead investor has an interest in inviting an investment bank into syndication of the later stage when he or she needs the bank’s competencies.

The relation is the same with large industrial companies. A lead VC invites a large corporation in the following stages to favor a business partnership with the start-up and

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3. The size of the fund for each of the co-investors also influences the likelihood to invite more investors.
gives access to private information. The reciprocation will be the acquisition of the start-up by the large company in the future. The relationship between the VC firm Sequoia Capital and Cisco Systems is an archetype of this kind of informal exchange through syndication. Between 1994 and 2000, Cisco Systems (a large industrial firm) was invited into 13 syndications led by Sequoia Capital (a pure VC firm). Later, Cisco Systems acquired five of them shortly after its investment: Allegro Systems (8 months after its investment), MaxComm Technologies (13 months), Netiverse (9 months), Precept Software (3 months), and StratumOne Communications (3 months). The lead investor takes a risk because the potential acquisition by the large company is intrinsically delayed from its participation in the syndication and there is no formal contract to enforce the informal obligation. More than this, there is a risk that the large corporation will use private information to duplicate the innovation internally and not acquire the start-up at all. This uncertainty is due to the informality of the relationship and the delay of reciprocation that intrinsically characterizes gift exchange.

A similar relation can be expected between pure VC firms that lead syndication and private equity firms. The latter have a complementary investment strategy with VC firms. They invest a larger amount of capital in companies that generate positive cash flow. The profitability of the company invested in is crucial because its cash flow is used to reimburse debts contracted to buy the company. A lead VC is interested in inviting a private equity firm in later stages when it expects that the latter will totally acquire the company in the future. By investing in later stages, a private equity firm gets private information to eventually decide to acquire the company.

Funding syndications of seed stages are supposed to be homogeneous because of the specialization of pure VC firms on this kind of funding. Conversely, the involvement of investment banks, large industrial companies, and private equity firms should increase the heterogeneity of syndication. One can expect that the enlargement of syndications is positively related to their heterogeneity due to the invitation of investment banks, large industrial companies, and private equity firms by the lead investor to sustain the growth of invested start-ups.

**Hypothesis 5:** The number of investors in syndication is positively related to the heterogeneity of syndications.

**Methods**

**Data**

The research is based on a statistical analysis of the 2,715 rounds of VC syndication carried out in the United States in 2005. PriceWaterhouseCoopers collects information on VC syndications. The PriceWaterhouseCoopers database provides information on the name of the company funded, the development stage of the funded company, the name of investors involved in the syndication, the amount invested, the industry, and the quarter of investment. Thirty-six syndications were dropped from the population for this research because some information was missing in the database (mainly the name of some investors).

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4. For material reasons, only 1 year of data was available. The year 2005 was chosen because it was the most recent year available and the furthest year from the 2000–2001 Internet bubble and burst that destabilized the VC industry. Also, 2005 is a good year to study because it is a stable year, absent of any major swings in fund-raising or disbursements.
This database has been improved with information provided by Galante’s Venture Capital & Private Equity Directory on the type of institutional investor: pure VC firm, private equity firm, investment bank or large industrial company. In 2005, 1,379 different investors were involved in the 2,679 syndications analyzed and 790 of them were pure venture capital firms (Sequoia Capital; Kleiner, Perkins, Caufield & Byers; Mayfield Fund, etc.) that represent 57.29% of investors involved in VC syndication. Eighty-five of them were investment banks (Goldman Sachs, CSFB, Lehman Brothers, etc.) or 6.16% of investors, and 182 were large industrial companies (Lucent Technologies, Siemens, Kodak, Chevron, Merck, etc.) or 13.20% of investors. Finally, 322 of them were private equity firms (Sprout, Bain Capital, Carlyle, etc.) or 23.35% of investors.

Some of these investors participated in several syndications. For example, in 2005, the Mayfield Fund was the most active pure VC firm with 37 investments (31 for Menlo Venture; 28 for Kleiner, Perkins, Caufield & Byers; and 26 for Sequoia Capital). Intel Capital was the most active large industrial company with 43 investments. JP Morgan Partners was the most active investment bank investor with 40 investments and Sprout was the most active private equity firm with 18 investments (Table 1).

### Measures

A specific analysis of the 160 funding syndications of seed stages was performed to test hypotheses 1 and 2. Ordinary least squares (OLS) regressions with robust standard error control (Eicker–White) have been conducted to test hypotheses 3, 4, and 5.

### Dependent Variable

**The Number of Investors in Syndication.** The purpose of this research is to explain why investors syndicate their VC investments. Explaining the evolution of the syndication size is a way to explore the reasons for syndication. The PriceWaterhouseCoopers database

<table>
<thead>
<tr>
<th>1 Investors</th>
<th>2 Heterogeneity</th>
<th>3 Maturity</th>
<th>4 Venture capital firm</th>
<th>5 Investment bank</th>
<th>6 Private equity firm</th>
<th>7 Large industrial firm</th>
<th>8 Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.601*</td>
<td>0.2152*</td>
<td>0.3143*</td>
<td>0.0516*</td>
<td>0.1637*</td>
<td>0.0564*</td>
<td>-0.1437*</td>
<td>0.0877*</td>
</tr>
<tr>
<td>0.2690*</td>
<td>0.1755*</td>
<td>0.0902*</td>
<td>0.0564*</td>
<td>0.2524*</td>
<td>0.2308*</td>
<td>0.2467*</td>
<td></td>
</tr>
<tr>
<td>0.3628*</td>
<td>0.1538*</td>
<td>0.1755*</td>
<td>0.1120*</td>
<td>0.1197*</td>
<td>0.1179*</td>
<td>0.0877*</td>
<td></td>
</tr>
<tr>
<td>0.5972*</td>
<td>0.2276*</td>
<td>0.4113*</td>
<td>0.2524*</td>
<td>0.2308*</td>
<td>0.2467*</td>
<td>-0.1437*</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.76</td>
<td>1.41</td>
<td>2.80</td>
<td>1.67</td>
<td>0.14</td>
<td>0.36</td>
<td>0.19</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>1.92</td>
<td>0.69</td>
<td>0.80</td>
<td>1.37</td>
<td>0.42</td>
<td>0.62</td>
<td>0.50</td>
</tr>
<tr>
<td>Minimum</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>13</td>
<td>4</td>
<td>4</td>
<td>12</td>
<td>5</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>

*p ≤ 0.01.
provides the number of investors for each syndication. One hypothesis is that syndications are used by lead investors to pool resources to sustain the development of invested start-ups. The more mature an invested start-up is, the larger and more diversified its syndication is.

**Independent Variables**

*The Maturity of the Funded Company.* The different stages of start-up development are clearly defined by the VC industry. When they get funding, companies are obliged to publicize the name of their investors and to specify which stage of development is being funded. There are four different development stages. According to the National Venture Capital Association classification, the first stage is the *seed/start-up stage*. At this stage, the start-up is just a concept. It has no product or client, and sometimes, the company does not even exist. The second stage is the *early stage*. At this stage, the company has a product or a service under test or pilot production. In some cases, the product may be commercially available. It may or may not be generating revenues. The third stage is the *expansion stage*. At this stage, the product or service is in production and commercially available. The company demonstrates significant revenue growth but may or may not be showing profit. It has usually been in business for over 3 years. The last stage is the *later stage*. At this stage, the product or service is widely available. The company is generating ongoing revenue and probably has a positive cash flow. It is more likely to be profitable (but not necessarily). The company is close to going public or can be acquired by a large company or by a private equity firm. Among the 2,679 syndications listed by PriceWaterhouseCoopers, 160 were made at the seed stage, 706 at the early stage, 1,322 at the expansion stage, and 491 at the later stage. The same stage might be funded by several rounds. Generally, the seed stage is funded through one or two rounds and the following stages by three or four rounds of funding.

*Amount Invested.* Pooling financial resources is one of the justifications for the lead investor to invite investors into his or her syndication. The PriceWaterhouseCoopers database gives the amount of capital raised by syndicate at each round of funding.

*Heterogeneity of the Syndication.* A resource-based perspective explains syndication by the involvement of different investors with complementary resources that can sustain the development of the company in which they invested. In this case, the size of the syndication can be explained by the increasing heterogeneity of investors. This heterogeneity can be operationalized by a scale in which a syndicate is labeled 1 when there is only one category of investor and 4 when all four categories of investors (pure venture capital firm, investment bank, large industrial company, and private equity firm) are represented in the syndicate. The first is the most homogeneous syndicate and the last the most heterogeneous.

**Control Variables**

*Industry.* The industrial sector of the company in which they invested may influence the syndication. Some sectors may require more funding or may mobilize different resources. In this case, the size of the syndication is controlled by the industry. The
PriceWaterhouseCoopers database identifies 17 different industries (biotechnology, IT services, business products and services, computers and peripherals, consumer products and services, electronics/instrumentation, financial services, healthcare services, industrial/energy, media and entertainment, medical devices and equipment, networking and equipment, retailing and distribution, semiconductors, software, telecommunications, and others).

**Location of the Start-Up.** VC practices can vary across the United States. The size of the syndication has been controlled for by the 18 geographical classifications used in the PriceWaterhouseCoopers database (Silicon Valley, LA/Orange County, Colorado, New England, New York Metro, Midwest, Northwest).

**The Quarter.** The timing of investment could affect syndication in a “window dressing” perspective (Lakonishok, Shleifer, Thaler, & Vishny, 1991). Investors could be incited to invest more in the last quarter to justify the use of their funds. General partners who run VC funds are accountable for their investments to the limited partners who invest in these funds.

### Results

The resource pooling model is based on two assumptions. First, pure VC firms convert uncertainty into risk by funding the seed stage, and this function is based on socially strongly embedded business relationships. These can only be handled by very few investors for each investment accomplished at the seed stage. Second, syndications are used as a collaborating structure by interdependent investors who own complementary resources in order to sustain the growth of funded start-ups and prepare the exit strategy of the lead investor.

#### Syndications of the Seed Stage

An analysis of 160 incidents of seed stage funding from 2005 (Table 2) reveals that 65% are not syndicated, and 21.25% are syndicated by only two investors. These figures

<table>
<thead>
<tr>
<th>Number of investors</th>
<th>Number of deals (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>104 (65.00)</td>
</tr>
<tr>
<td>2</td>
<td>34 (21.25)</td>
</tr>
<tr>
<td>3</td>
<td>13 (8.13)</td>
</tr>
<tr>
<td>4</td>
<td>4 (2.50)</td>
</tr>
<tr>
<td>5</td>
<td>3 (1.88)</td>
</tr>
<tr>
<td>6</td>
<td>1 (0.63)</td>
</tr>
<tr>
<td>7</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>8</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>9</td>
<td>1 (0.63)</td>
</tr>
<tr>
<td>Total</td>
<td>160 (100.0)</td>
</tr>
</tbody>
</table>
corroborate hypothesis 1 that VC investors rarely syndicate funding of seed stages. An obvious explanation is that start-ups need less funding at the seed stage than at further stages. Then, fewer investors should be involved at this stage. Figures support this explanation. The average investment at seed stages is lower than at following stages. However, a more detailed analysis of seed stage investments points out that the invested amount is not strictly related to the number of investors. At the seed stage, when there is only one investor, the average investment is $2.33 million, $2.12 million for two, $1.35 million for three, and $2.93 million for four investors. This gives room for a complementary explanation based on the constraints related to the socialization of investors and entrepreneurs at the seed stage. The creation and nurturing of social ties between investors and entrepreneurs in order to deal with uncertainty is emotionally costly and time consuming. Only few investors are involved in the seed stage to develop the necessary strong social tie through learning by collaborative relationships.

Concerning the labor division between institutional VC investors and the specialization of pure VC firms in funding of seed stages, the figures show that at this stage, 229 investors out of 257 are pure VC firms (Table 3). They represent 89.11% of institutional investors involved at the seed stage, and this percentage declines in the following stages (80.01% at early stages, 68.28% at expansion stages, and 64.69% at later stages). In comparison with the other investors (investment banks, private equity firms, and corporate VC units), they are overrepresented at this stage. This distribution is due to the specialization of pure VC firms in the conversion of uncertainty into risk through seed stage investments and to the focusing of other institutional investors on the following stages.

This supports hypothesis 2 that pure VC firms are the main investors at this stage among institutional VC investors because they own the specific competence to convert uncertainty into risk by creating strong ties with entrepreneurs and their business environment. The predominant presence of pure VC firms at the seed stage is because they originate the relationship with the entrepreneur.

**Syndications to Pool Resources in Following Stages**

According to the informal rule of the VC industry, the primary investor invites other investors into his or her syndication. The lead investor position and the informal privilege to invite other investors are mainly owned by pure VC firms because in general, they are the primary investors in the first round.

The number of investors increases during the funding life cycle and the maturing of invested companies. From an average number of 1.61 investors at the seed stage, this

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**Table 3**

<table>
<thead>
<tr>
<th>Distribution of Institutional Venture Capital Investors by Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed stage (%)</td>
</tr>
<tr>
<td>Pure Venture Capital Firm</td>
</tr>
<tr>
<td>Investment Bank</td>
</tr>
<tr>
<td>Large Industrial Company</td>
</tr>
<tr>
<td>Private Equity Firm</td>
</tr>
<tr>
<td>Total number of investors</td>
</tr>
</tbody>
</table>
number increases at each following stage: 1.98 at the early stage, 2.41 at the expansion stage, and 2.95 at the later stage. The question is: Why do pure VC firms syndicate in the following stages when they do not in the seed stage?

Model 1 of the OLS regression tests the three control variables (Table 4). The type of industry, the region, and the quarter of investment are not statistically significant to explain the enlargement of syndications.

Model 2 of the OLS regression analysis, which adds the independent variable “maturity” to the control variables to test hypothesis 3, reveals that the maturity of invested companies is statistically significant to explain the enlargement of syndication. The coefficient is positive \( b = 0.525, p = 0.000 \), which indicates that lead investors invite other investors to support the growth of invested companies when the latter become more mature.

This supports hypothesis 3, according to which the start-up development needs other resources than those provided by pure VC firms and that syndications of the following stages are used to involve other kinds of investors that bring in different and complementary resources.

Model 3 of the OLS regression analysis, which adds the independent variable “amount” to the control variables to test hypothesis 4, reveals that the amount invested by the syndication is statistically significant to explain the enlargement of syndication. The coefficient is positive \( b = 0.892; p = 0.000 \), which indicates that lead investors invite other investors to pool financial resources in order to fund the growth of invested companies.

The \( R^2 \) of 0.2136 means that 21.36% of the variance of the size of the syndication is accounted for by the model after adding investment amount. On average, rounds of funding at seed stages raise $2.13 million, $4.64 million at early stages, $7.36 million at expansion stages, and $9.43 million at later stages.

Model 4 of the OLS regression analysis, which adds the independent variable “heterogeneity” to the control variables to test hypothesis 5, reveals that heterogeneity is statistically significant to explain the enlargement of syndication. The coefficient is positive \( b = 1.912, p = 0.000 \), which indicates that lead investors invite investment
banks, large industrial companies, and private equity firms in the funding of following stages. It predicts that the size of syndication is explained by its increasing heterogeneity. The R² of 0.4748 means that 47.48% of the variance of the size of the syndication is accounted for by the model after adding heterogeneity. This result supports the idea that pure VC firms use their lead investor privilege to invite different investors owning resources to sustain the growth of the funded start-up and to prepare an exit strategy. Pure VC firms highly increase the heterogeneity of syndication as soon as the early stage when the uncertain asset has been converted into a risky asset and the invitation privilege into syndication has become valuable for the lead investor.

The combination of the two findings, first, that pure VC firms initiate syndications by funding seed stages and, second, that other kinds of investors (large industrial firms, investment banks, and private equity firms) are involved in the following stages to increase the heterogeneity of syndication supports the hypothesis that lead investors use their informal right to invite other investors in the following stages to share their inside information and to get support in return for developing funded start-ups and to prepare an exit strategy.

**Discussion**

The purpose of this research is to explain why institutional investors in VC syndicate their investments. The resource pooling model is based on two specific features of the VC industry. First, at the seed stage, due to the youth of start-ups that induces a lack of formal and historical data, investors are not dealing with risk but with uncertainty. Second, institutional VC investors constitute a heterogeneous community (pure VC firms, corporate units of large industrial companies, investment banks, and private equity firms) of interdependent agents interested in start-ups. Among these institutional investors, pure VC firms handle the specific function of converting uncertainty into risk through their social networks and a learning-by-collaborating relationship that takes place through the funding of the seed stage. At this stage, investment is used as a legal device to socially embed the business relation between investors and entrepreneurs in order to collect the tacit knowledge needed to reduce uncertainty. Entrepreneurs and investors can only create and nurture a limited number of strong ties because the creation of strong ties is emotionally costly and time consuming for both actors of the relationship. This is why at the funding of the seed stage, only one or two investors, mainly pure VC firms, are involved. In the following rounds of funding, the initial investor becomes the lead investor who continues to nurture the strong tie, and new investors are more passive investors involved in weak ties with the entrepreneur.

**Implications for Theory and Practice**

One of the main findings of social networks theory (Granovetter, 1973, 1985) is that preexisting social ties determine the formal contract. Social embeddedness makes possible a business exchange by reducing uncertainty. The analysis of the VC industry points out another relation: a formal contract can be used to create social ties. The funding of a seed stage is a formal contract that allows a learning-by-collaborating relationship between investors and entrepreneurs in order to transform uncertainty into risk. The formal contract sustains the construction of the strong social tie needed to create and transfer tacit knowledge. If social ties influence business contracts, it is also true that
business contracts influence the creation of social ties. Economic sociology has broadly explored the influence of social networks on business contracts but more rarely on how these networks are created. The analysis of the hidden side of contracts points out that they can be an embedding device that will influence future business contracts by creating strong ties between actors. This could be an interesting research perspective.

Concerning VC activity, my research suggests some practices for pure VC firms, especially for those entering this industry. First, evaluation of start-ups for VC investment differs from other kinds of assets. It is based on tacit knowledge that can mainly be collected through social networks. The main competence of a venture capitalist is more on his or her capability to accumulate the right social capital than his or her technical competence in financial analysis. Second, the profitability of VC firms is linked to their capability to mobilize other kinds of economic agents to support start-ups in which they have invested. Syndication is a device to organize such informal alliances and to bring resources to start-ups.

For non-pure VC firms, this research points out that uncertainty management needs specific competencies and a high level of embeddedness that cannot be handled by non-pure VC firms. This explains the weak presence of large industrial companies, investment banks, and private equity firms in round of funding the seed stage. For example, in 2005, Intel, the largest industrial investor in VC, did not invest in a seed stage and neither did JP Morgan (the largest investor in the investment bank category) and Sprout (the largest investor in the private equity category). Conversely, they should nurture ties with pure VC firms in order to be invited into syndication of the following stages. By participating in syndicates, they get inside information on start-ups, which improves their decision making (acquisition for a large industrial company or a private equity firm; underwriting IPO for an investment bank).

Risk management is well-developed in finance on its theoretical and practical dimensions. Yet, the literature on uncertainty management is rarer. The VC industry suggests that at a macroeconomic level, some economic agents are specialized in dealing with uncertainty to convert it into risk before other economic agents specialized in risk management handle these assets.

Limitations and Extensions

There are two main limitations to this research. First, this research contributes to strategic network analysis by showing that VC syndication of investments in start-ups is a possible framework for cooperation between economic agents. A syndicate can be a cooperative structure for alliances such as joint ventures or long-term contracts. It could be valuable to explore how the heterogeneity of the syndication influences the performance of start-ups. That is a boulevard for new research on the VC industry to validate the common result of studies on strategic networks that network embeddedness of the firm influences its performance (Echols & Tsai, 2004).

Second, there is a methodological issue to statistically validate a gift exchange explanation of relations between investors involved in syndications. The absence of a formal contract to specify reciprocal obligations between the investors (for example, the obligation for a large industrial firm to sustain the start-up and eventually acquire it when it participates in a syndicate) and the fact that the reciprocation is intrinsically delayed (for example, an investment bank will underwrite an IPO only several years after its invitation in a syndicate) suggest that the gift exchange theory might be an interesting framework to explain relationships between investors involved in syndication.
Even if some empirical evidence and interviews with investors support this explanation, it is methodologically difficult to prove it. There is no quantitative evidence of a gift exchange relationship between investors, but some findings indirectly support this hypothesis. The lack of historical data does not allow me to statistically validate the existence of a counter-gift. In my database, the majority of start-ups are still in their development phase and are too young to have been acquired or to have become public. This information is needed to examine whether large industrial companies, investment banks, and private equity firms reciprocate the gift when they have been invited into a syndicate. This limitation opens a research opportunity based on my database. In 3 or 4 years, when we know how each start-up evolved (bankruptcy, acquisition of IPO), reciprocation can be analyzed statistically.

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September, 2010

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