

Network Ties, Reputation, and the Financing of New Ventures

Scott Shane • Daniel Cable

3355 Van Munching Hall, R.H. Smith School of Business,
University of Maryland, College Park, Maryland 20742
Kenan-Flagler Business School, University of North Carolina,
Chapel Hill, North Carolina 27599-3490
sshane@rhsmith.umd.edu • dan_cable@unc.edu

Explaining how entrepreneurs overcome information asymmetry between themselves and potential investors to obtain financing is an important issue for entrepreneurship research. Our premise is that economic explanations for venture finance, which do not consider how social ties influence this process, are undersocialized and incomplete. However, we also argue that organization theoretic arguments, which draw on the concept of social obligation, are oversocialized. Drawing on the organizational theory literature, and in-depth fieldwork with 50 high-technology ventures, we examine the effects of direct and indirect ties between entrepreneurs and 202 seed-stage investors on venture finance decisions. We show that these ties influence the selection of ventures to fund through a process of information transfer.

(Entrepreneurship; Venture Finance; Social Capital)

Entrepreneurs are often wealth constrained, and need to obtain external financing to pursue their opportunities, making financing central to the process of entrepreneurship (Evans and Leighton 1989, Casson 1982). However, the financing of opportunities is fraught with difficulties because entrepreneurs possess information about themselves and their opportunities that potential financiers do not possess (Amit et al. 1990, Barry 1994, Chan et al. 1990, Gompers 1995). Thus, financiers face high risks when selecting among entrepreneurs because entrepreneurs may act opportunistically towards them, and because entrepreneurs vary in their ability to identify and exploit opportunities.

Given this information asymmetry, how do seed-stage investors select which ventures to fund? Economic explanations generally hold that three mechanisms—the allocation of contractual rights, the staging of capital, and risk shifting—lead entrepreneurs to self-select and disclose information in ways that

overcome this information asymmetry (Gompers and Lerner 2000). In contrast, organizational theorists have generally proposed that seed-stage investors rely on social relationships to select which ventures to fund (e.g., Venkataraman 1997). In particular, organization scholars have argued that two different mechanisms—information transfer through social ties and social obligation—influence investors' decisions.

In this paper, we first review the venture finance literature to justify our premise that economic explanations for seed-stage financing decisions are undersocialized. Second, we integrate in-depth fieldwork with 50 high-technology ventures with the organizational literature to develop a socially embedded explanation about how direct and indirect ties between entrepreneurs and investors influence seed-stage venture finance decisions. Finally, because qualitative research can overstate theoretical processes, we complement our field interviews with a quantitative study of 202 seed-stage investors.

Theory Development

Entrepreneurship is the process by which "opportunities to bring into existence 'future' goods and services are discovered, created, and exploited" (Venkataraman 1997, p. 120). Because people possess different information and beliefs, some individuals recognize opportunities that others cannot yet see (Shane 2000). Thus, idiosyncrasies of information and beliefs are necessary for opportunities to exist (Kirzner 1973). If a resource owner held the same beliefs and information as an entrepreneur, she would try to capture the entrepreneurial profit by adjusting the price of resources to the point where the entrepreneurial profit would be eliminated (Shane and Venkataraman 2000). Likewise, if other entrepreneurs possessed the same beliefs and information, competition between entrepreneurs would eliminate the entrepreneurial opportunity (Schumpeter 1934).

The Information Asymmetry Problem

The same idiosyncratic beliefs and information that allow entrepreneurs to discover opportunities for profit also create information asymmetry between entrepreneurs and potential investors that make it difficult for the entrepreneurs to obtain external financing. Take, for example, a biotechnology start-up founded by a university scientist and a Merck sales representative to create a drug to cure hypertension. The scientist's research has led her to see an opportunity to produce a drug that will reduce hypertension. Because the scientist has worked on the development of the drug, she is more knowledgeable than potential investors about it. For example, her experiments have shown her that the drug becomes less efficacious as it is produced in larger volume. Moreover, she has tacit knowledge about the drug's production because her experiments have shown that the drug's performance varies more when mixed in tall, thin beakers. Similarly, over years of working at Merck, the scientist's partner has accumulated knowledge that introducing a hypertension drug is a high priority at Merck.

The information possessed by the two entrepreneurs creates two problems when they seek financing. First, the entrepreneurs are reluctant to fully disclose this information to potential investors because such disclosure will make it easier for other people to pursue

the opportunity. At the very least, the information would allow others to bid for the same financial resources, and for resource owners to raise their prices, reducing the potential for entrepreneurial profit. Therefore, the entrepreneurs are reluctant to tell potential investors all that they know about the opportunity, and investors must decide whether or not to fund the opportunity with less information than the entrepreneur possesses.

Second, because the entrepreneurs have information that the investors lack, they can engage in opportunistic behavior. All entrepreneurs seeking funding have psychological and financial incentives to convince investors that their opportunities are important and that they are entrepreneurial visionaries. Not only is successful entrepreneurship socially desirable, but entrepreneurs who misrepresent their abilities can gain personally by consuming investors' cash (Cable and Shane 1997) or by exploiting the reputations of successful investors to gain wealth or social standing (Sahlman 1990). Finally, opportunistically inflating the potential of the opportunity and one's own entrepreneurial talent will ostensibly increase the probability of funding relative to other entrepreneurs. Thus, the entrepreneurs in our example have incentives to withhold the information that the drug that they have developed is difficult to produce in large volume without decreased efficacy. Similarly, they will likely overstate their knowledge of Merck's strategy and the probability of a Merck partnership.

Theoretically, the information asymmetry described above could make investors unwilling to invest in the specialized assets necessary to develop the new venture unless the entrepreneur makes large, irreversible, credible commitments to the venture (Venkataraman 1997). Unfortunately, these commitments create a market for lemons (Akerlof 1970) by raising entrepreneurs' sunk costs and driving high-quality entrepreneurs from the market. Thus, only undesirable deals will be available to investors, causing market failure when investors abandon the market (Amit et al. 1990).

Solutions to Information Asymmetry Problems

Despite the existence of information asymmetries in venture finance, we do not observe failure in this market. Many individuals successfully obtain resources

from seed-stage investors to start new businesses. How do entrepreneurs obtain funding to exploit opportunities when the information asymmetry that gives rise to the identification of opportunity itself makes financing problematic?

Economists argue that the allocation of contractual rights, the staging of capital, and risk shifting lead entrepreneurs to self-select in ways that overcome the problems engendered by information asymmetry (Gompers and Lerner 2000, Kaplan and Stromberg 1999). For example, Gompers (1997) has noted that venture capitalists use convertible securities and covenants to delay the entrepreneur's compensation until the outcome of the venture is revealed. Sahlman (1990) explains that venture capital contracts are typically staged, providing the capitalist with the right to abandon if negative information about the entrepreneur or venture is revealed. Hoffman and Blakely (1987) argue that entrepreneurs face forfeiture provisions that require them to lose shares if they have below-target performance, and punitive dilution rates, which protect the investor's investment if the venture underperforms. From an economic perspective, contract provisions select appropriate entrepreneurs by shifting the risk of inappropriate selection to the entrepreneur. As Sahlman (1990, p. 510) noted, "it would be foolish for the entrepreneur to accept these terms if they were not truly confident of their own abilities and deeply committed to the venture."

The premise of our paper is that these economic explanations for how investors overcome information asymmetry are incomplete for at least two reasons. First, the overoptimism of entrepreneurs has been well documented (Cooper et al. 1988), and overoptimism undermines the effectiveness of the contractual mechanisms described by economists. While it might be foolish for untalented entrepreneurs to accept financing from investors who shift risk to them, entrepreneurial overconfidence makes self-selection an ineffective mechanism in this setting.

Second, early-stage equity investors cannot shift all of the risk of investing in a new venture to entrepreneurs. Unlike the providers of debt, who can demand collateral to cover the risk of total failure, equity investors provide capital beyond the level that

can be guaranteed by a venture's assets. As a result, seed-stage equity investors must make investments that risk the total loss of their capital. Thus, seed-stage investors cannot shift risk to entrepreneurs completely, and must bear some of it themselves.

The Social Embeddedness Solution

Contrary to the asocial economic perspective, organizational theorists have suggested that investors use social ties to overcome the problem of information asymmetry in venture finance decisions (Venkataraman 1997). Drawing on the concept of embeddedness (Granovetter 1985), organizational scholars argue that social obligations between connected parties, and information transfer through social relationships, influence venture finance decisions. However, prior research¹ on the social embeddedness of new venture finance does not address two fundamental questions that we examine here: First, do social relationships operate through information transfer mechanisms, social obligation, or both? Second, do social relationships influence the probability that entrepreneurs will receive seed-stage equity investments?

Organization theoretic explanations for venture finance decisions often draw upon mechanisms of social obligation as well as information transfer to explain how social relationships influence venture finance decisions. For example, Uzzi and Gillespie (1999, p. 33) argue that social ties "interject expectations of trust and reciprocity into the economic exchange that, in turn, activate a cooperative logic of exchange. This logic promotes the transfer of private information and resources ... and motivates [both parties] to search for integrative rather than zero-sum outcomes. In this way, embedded ties both created new collaborative opportunities and induced the mutual rather than selfish distribution of rewards." However, if social ties influence the venture

¹ Some studies do not look at investors' decisions to make seed-stage equity investments in new firms. Larson (1992), for example, explains that social ties enhance resource acquisition from strategic alliance partners. However, because the mechanisms by which investors make equity investment decisions are different from the mechanisms by which managers make strategic alliance decisions, studies of alliance assistance do not provide direct insight into the question that we explore.

finance decision solely through information transfer mechanisms, this type of social obligation explanation is unparsimonious and oversocialized.

Moreover, most studies that explore the role of social ties in venture finance do not examine the central issue of investment selection. For example, Kelly (2000) and Landstrom et al. (1998) examine the negotiation of a financing agreement once the venture has been chosen, and Sapienza (1992), Sapienza and Korsgaard (1996), and Steiner and Greenwood (1995) all explore the post-investment relationship between investors and entrepreneurs. However, these studies cannot shed light on how social ties affect investors' initial decisions to invest. For example, social relationships might influence entrepreneur-investor relations over time without influencing the initial decision to finance the venture. Thus, prior research has not ascertained whether social relationships provide an efficient mechanism for information transfer to overcome information asymmetries between entrepreneurs and investors.

Finally, prior studies do not explore the role of social relationships in overcoming information asymmetry problems in seed-stage venture finance. For example, Stuart et al. (1999) find that young firms with social ties to high-status strategic alliance partners perform better than other new firms because their social ties provide them with attributions of quality when their actual quality is uncertain. However, Stuart et al. (1999) examine different issues from those explored in the present paper because they (a) focus on firm performance rather than on venture finance, (b) examine status transfer mechanisms rather than information transfer mechanisms, and (c) explore uncertainty rather than information asymmetry problems.

In the next section, we combine the organization theory literature with in-depth field work on high-technology ventures to develop hypotheses about the effects of social ties on seed-stage investors' venture finance decisions. To this end, we conducted field interviews with individuals involved with 50 companies that were started to exploit Massachusetts Institute of Technology (MIT) inventions. We used a retrospective design to obtain information on the seed-stage financing of a random sample of 50 new

high-technology companies that were established during the period 1980–1996. To create the sample, every third company was selected from a list of 150 MIT companies that the Technology Licensing Office records indicated were started to exploit inventions in which the Institute was the assignee to the patent. For each interview, we tape recorded the conversation and then worked from tape transcriptions. In total, we conducted 100 hours of interviews with 106 individuals. In all cases, the minimum informant set included the lead investor and the firm founder.

Social Ties

We define a direct tie as a personal relationship between a decision maker and the party about whom the decision is being made (Larson 1992). We define an indirect tie as a relationship between two individuals who are not directly connected but through whom a connection can be made through a social network of each party's direct ties (Burt 1987). Direct and indirect social ties between entrepreneurs and investors can vary both across entrepreneur-investor dyads (i.e., cross-sectionally) and within a given entrepreneur-investor dyad over time (i.e., longitudinally). In this study, we focus on cross-sectional variation in ties. At the point in time when an entrepreneur seeks financing from a seed-stage investor, that entrepreneur-investor dyad has some level of direct and indirect social ties as a result of prior activity. For example, the two parties could have a strong direct tie because they were roommates in college, or they could be strangers and have no direct tie at the time financing is sought. We seek to examine empirically the effect of variation in the direct and indirect ties across investor-entrepreneur dyads, at the time the entrepreneur seeks seed-stage financing, on the investor's decision whether or not to finance a new venture.²

Direct Ties. Under conditions of uncertainty and information asymmetry, direct ties can provide an advantage to people who seek to obtain resources from others (Podolny 1994). The explanation for this behavior depends largely on two factors: social obligation and access to private information.

² This study does not explore how the level of direct and indirect ties change over time within a venture.

Theoretically, direct social ties between parties could shift the logic of the transaction from one of economic behavior to one of social relationship (Marsden 1981, Uzzi 1996). Unlike arm's-length transactions, which are governed by norms of self-interest, social relationships are governed by norms of fairness and equity (Granovetter 1985). Moreover, direct social ties between parties transfer expectations about people's behavior from a prior social setting to the new business transaction (Uzzi 1996). By embedding a transaction in an ongoing social relationship, direct ties (a) motivate both parties to maintain the relationship in a fair and trusting manner, and (b) generate a sense of obligation between the parties, which causes the parties to behave generously towards each other (Gulati 1995). Thus, in the absence of direct prior social ties, people are more likely to engage in zero-sum business transactions; in the presence of direct ties, they shift from the pursuit of self-interest to the pursuit of mutual gain (Uzzi 1996). Direct social ties also enhance resource acquisition under conditions of information asymmetry because direct ties provide a fast mechanism for obtaining private information about the quality of people's talents and their tendency to behave opportunistically (Aldrich and Zimmer 1986, Gulati and Gargiulo 2000, Uzzi 1996).

Our fieldwork provided some evidence that direct ties influence seed-stage investors' decisions to invest in new ventures. While unfunded entrepreneurs tended not to have direct ties to investors, funded entrepreneurs were likely to have those ties prior to starting their companies. As one entrepreneur explained, "our venture capitalist knew [ENTREPRENEUR A] from his days as an investment banker when [ENTREPRENEUR A] had acted as an advisor and consultant to judge the viability of technologies. They stayed very much in touch and formed a pretty close bond over the years, starting in 1960 and lasting over 30 years."

Many of the investors interviewed also provided qualitative evidence that direct ties are useful, primarily because they provide information about entrepreneurs' abilities and skills. As one investor said,

We got to know [ENTREPRENEUR B] in our prior relationship. This enabled us to learn things about him and we began to think very highly of him. We

decided that he was a person of high integrity, high intellect, very well educated, and very purposeful. He had the human qualities that would make him an excellent partner and the sort of person who was likely to accomplish what he set out to do in life if he had the right opportunity and resources behind him. We told him that if at some point he was ready to bet his career on a particular project that we would love to have the chance to at least look at it and see whether or not it was something we wanted to back. We started with the person rather than the product

Similarly, another investor explained

One of the founders worked for us the summer between his first and second year. Everybody in my company was impressed with him. He's thoughtful, hardworking, analytical, and impressive. We based our decision to invest on him on his integrity, desire and drive to do something on his own. I did very little checking outside of the data that we asked him to bring us. We didn't call up any potential customers or competitors. It would be fair to say that if I had not known [ENTREPRENEUR C] and had him work for me prior to coming to me with this business plan, I never would have invested in this business.

A third investor noted

I had met [ENTREPRENEUR D] in the 1970s when I got involved in financing some technology start-ups in Israel. I had funded several companies when I met [ENTREPRENEUR D]; who was then starting a company called [COMPANY E]. I ended up funding [ENTREPRENEUR D's] company and I joined the board. I worked very closely with [ENTREPRENEUR D] and his staff and we became close personal friends . . . I sold my stock when he left because my relationship was with him personally. We stayed in touch and remained good, close, personal friends. When he came to the United States, we started to discuss his ideas for [COMPANY E]; [ENTREPRENEUR D] asked me to be a founding investor of the company. So I put in some money and joined the board.

Thus, theoretical arguments from the organizational literature combined with our own field research about the effects of direct ties suggest the following hypothesis:

HYPOTHESIS 1. Investors are more likely to invest in new ventures when they have a previously established direct tie to the entrepreneur than when they do not.

Indirect Ties. Under uncertain conditions, indirect ties can provide an advantage to people who seek to obtain resources from others. The explanation for this behavior again depends largely on two factors: social obligation and access to private information. Several researchers have suggested that indirect ties transfer expectations about people's behavior from one relationship to another (Uzzi 1996). Sociologists have long argued that referrals by people in whose judgment the decision maker has confidence make people more favorably disposed to the person referred (Blau 1964). With indirect ties, the go-between transfers behavioral expectations from the existing relationship to the new one (Uzzi 1996). In addition, the go-between exploits a debt of reciprocity owed to him or her, and transfers the credit to the entrepreneur (Uzzi 1996). Since reciprocity is one of the major social norms present in all societies (Gouldner 1960), people accumulate social debts to each other. This norm of reciprocity suggests that social relations generate obligations to others that can be cashed in or transferred to other parties (Coleman 1988).

In addition to creating social obligations, indirect ties enhance resource acquisition because they improve people's ability to obtain information about others. A network of social ties allows people to obtain information about others with whom they do not have a direct contact, providing access to more information than what they could obtain alone (Burt 1997). "The network becomes an important screening device. It is an army of people processing information who can call your attention to key bits—keeping you up-to-date on developing opportunities, warning you of impending disasters" (Burt 1992, p. 14). Thus, networking, or the creation and maintenance of ties to information flows, enhances one's ability to obtain nonpublic information (Nohria 1992).

Indirect ties also reduce the cost of obtaining information. Information is costly to acquire because it requires human attention, a scarce commodity (Coleman 1988). Indirect ties thus lower information-gathering costs because "social relations, often established for other purposes, constitute information channels that reduce the amount of time and investment required to gather information" (Nahapiet and

Ghoshal 1998, p. 252). Clearly, speed of information transfer is advantageous in settings like venture finance where information has a short half-life. Referrals from indirect ties also provide information about qualities that the decision maker finds hard to observe, such as competence. As a result, indirect ties improve the quality of applicants by helping to screen out unqualified individuals (Fernandez and Weinberg 1997).

Our fieldwork supports arguments derived from organization theory because indirect ties appeared to influence seed-stage investors' decisions to invest in new ventures. Interviews suggested that entrepreneurs who were not successful in obtaining financing were outside of the financiers' social networks. For example, one semiconductor entrepreneur explained

We weren't from the investors' community. We were just three engineers. We presented our business plan at the MIT Enterprise Forum and the Technology Capital Network and met some angels and venture capitalists. We talked to one or two of them at length but we never struck a deal, even though some of them thought that our business was interesting.

Conversely, entrepreneurs who successfully obtained financing often received money from investors who made use of their social networks to obtain private information about the entrepreneurs. One investor said

[ENTREPRENEUR F] ... was a controversial figure at the time he approached us for money and we needed to know if he was any good. The trick to finding an answer is to get off the reference list and get to people we know who also intimately know the person in question so that we will get an unbiased reference. We did that with [PERSON G]. There were few people in [PERSON G's] position. He was on [COMPANY H's] executive compensation committee for the board and really knew what was happening on the inside. ... Since [PERSON G] was also on another company's board with one of my partners we knew him and could ask him things about [ENTREPRENEUR F] that other people could not ask. We made our investment largely because of [PERSON G]. We figured that he had better information than us on [ENTREPRENEUR F] and if he believed in [ENTREPRENEUR F], then we should too.

A third investor explained

Clearly I had a bias for anyone inside of MIT. Once I step outside of the MIT family ... it is harder for me to do due diligence. ... I did not know if they are legitimate. Inside of MIT, I can call a department chairman if I don't know the person personally. So it's very easy to make a couple of phone calls to find out about someone.

The field research also provided some evidence that indirect ties were valuable because referrals provided investors with information about the entrepreneurs. An Internet entrepreneur explains the information transfer process underlying referrals:

Venture capitalists will make this bet with people they had invested in the past who have already made them tens of millions of dollars, but we were a guy who has never started a company before and two MIT undergraduates. Most venture capitalists are not going to take that gamble. Our investor did it because of his knowledge of people who knew me. This is what led them to write a check for \$500,000. At the end of the day it was because of the reference that I was paid attention to.

Investors confirmed the information value of referrals. As one investor explained:

We were heavily influenced by her high opinion of [ENTREPRENEUR I] because we have a lot of confidence in her judgement based on our prior relationship with the licensing office and with [PERSON J] in particular. We had done several deals with her before. She is an extremely well-known person and her competency in these matters is widely recognized.

Perhaps the strongest evidence for the referral process comes from entrepreneurs who started without referrals, but then shifted to using referrals over time. As one software entrepreneur explains,

When we first sought financing, I looked for venture capital on my own. I pitched the idea to some very good venture capital firms, but I did not get any investment. I don't think I had credibility with them ... That's when I asked our attorney for some introductions. Then we received funding from two venture capital firms that our attorney introduced us to. Since he was a lawyer at Testa Hurwitz, he had a large number of venture clients. People said he was a very good source for deals.

Combining theoretical arguments with our field research about the effects of indirect ties suggests the

following hypothesis:

HYPOTHESIS 2. *Investors are more likely to invest in new ventures when they have a previously established indirect tie to the entrepreneur than when they do not.*

The Mediating Role of Reputation

As described above, two basic mechanisms have been proposed to explain why social ties might provide an advantage to people who seek to obtain resources from others in situations of information asymmetry (Podolny 1994). First, social ties may provide decision makers with access to private information about the actors and their opportunities, which allows them to remove some ambiguity from the decision (Burt 1992). Second, direct and indirect ties between parties may create social obligations between the parties, which cause them to behave generously towards each other (Gulati 1995).

Interestingly, these two mechanisms provide very different theoretical rationales regarding how social ties may influence investors' decisions. Specifically, the "access to private information" rationale is consistent with a self-interested perspective, in which investors exploit their social relationships to locate better investments. The "social obligation" rationale, on the other hand, provides a far more socialized view of investors' decision making, such that investment decisions depend, in part, on the relationships themselves, rather than competence-based criteria. Given the differences between these rationales, an understanding of why social ties influence venture finance decisions is needed. Unfortunately, to date, research on the effect of social ties on venture finance decision making has explored the effects of information transfer and social obligation collectively. Consequently, it is difficult to determine whether the effect of social ties on these decisions exist because those ties motivate information transfer, because they motivate social obligation, or both.

To disentangle the "access to private information" and "social obligation" explanations for why social ties affect seed-stage investment decisions, we invoke the concept of the entrepreneurs' reputation. Reputation is defined as information about an individual's past performance (Podolny 1994). Because the

entrepreneur's reputation provides information about his or her ability to implement the venture, investors should be more likely to fund opportunities proposed by entrepreneurs with positive reputations.

Reputation can help to disentangle the effects of social obligation and information access in venture finance decisions. To the extent that social ties are used only to gather information, and not to imbue transactions with norms of social obligation, reputation should mediate the effects of direct and indirect ties on the venture finance decision. That is, if information about the quality of an entrepreneur is already publicly available from his or her reputation, then efforts to obtain private information about the individual's competence gathered via social ties will provide relatively little additional value to the investor.

In contrast, if social ties also generate obligations that mitigate self-interested behavior and imbue a transaction with norms of social relationships, then social ties should affect the probability of venture finance even *after* the informational benefits of reputation have been controlled. Thus, to the extent that social ties continue to predict investment decisions after reputation is accounted for, evidence would exist for the "social obligation" rationale of why social ties matter to venture finance decisions.

Although the existing research literature provides arguments for both the social obligation and information transfer benefits of social ties, our fieldwork strongly suggested that the primary mechanism through which social ties operate in venture finance is information transfer. As a result, we predict that information about the entrepreneur's reputation will mediate the effects of social ties on venture finance decisions. Thus, based on existing theory and our field research, we hypothesize:

HYPOTHESIS 3A. *The reputation of an entrepreneur mediates the effect of direct ties, such that the effect of direct ties on investment decisions is removed when reputation is included.*

HYPOTHESIS 3B. *The reputation of an entrepreneur mediates the effect of indirect ties, such that the effect of*

indirect ties on investment decisions is removed when reputation is included.

Methodology

Sample and Procedure

First, we surveyed the population of U.S. seed-stage venture capitalists in 1998 about the most recent seed-stage investments they evaluated.³ We randomly divided the sample into two groups. The first subgroup was asked about the most recent seed-stage investment that they evaluated and made. The second subgroup was asked about the most recent seed-stage investment that they evaluated, but did not make.

The population of venture capitalists, identified from *Pratt's Guide to Venture Capital Sources*, the industry directory, consisted of 566 individuals listed in the 1997 and 1998 directories who indicated that they make seed-stage investments; 136 individuals responded, resulting in a response rate of 24%. The respondents had an average of 17 years of investment experience, and had previously made an average of 12 seed-stage investments. The average size of their seed-stage investments was \$949,317.

To examine the representativeness of our sample, we compared respondents with nonrespondents in terms of their firm, geographic location, and the types of investments that they make. No statistically significant differences emerged on these dimensions, suggesting that the respondents were representative of the population of seed-stage venture capitalists operating in the United States at the time of the survey.

To improve the generalizability of our sample, we also surveyed two groups of business angels, or individuals who invest in new ventures outside of the

³ A seed-stage investment is the initial stage in the financing of a new firm. It consists of "a small amount of capital provided to an inventor or entrepreneur to determine whether an idea is worthy of further consideration and further investment. The idea may involve a technology or it may be an idea for a new marketing approach. If it is a technology, this stage may involve building a small prototype. This stage does not involve production for sale" (Sahlman 1990, p. 479).

legal structure of a venture capital limited partnership. Since business angels are not listed in any directories, no information on the population exists, making it impossible to randomly sample them. Therefore, we sampled the largest and most well-known angel groups. The first group, called the Band of Angels, consists of 123 individual investors in Silicon Valley. This is a high-profile group, having been featured in *The New York Times* and a Harvard Business School case for investment in several major technology new ventures. Our response rate from this group was 27%. The second group of angels consisted of 128 investors who were members of the Technology Capital Network (a Boston-area angel group), the oldest and largest group of angels on the East Coast of the United States. Our response rate from this group was 26%. The angels had an average of 13 years of investment experience. They had previously made an average of 13 seed-stage venture capital investments, and the average size of their seed-stage investments was \$362,550.

In the case of both angel groups, we could not obtain the lists of investors themselves (the organizations protect the identities of their members). Rather, the organizations agreed to participate and mail prepackaged surveys, cover letters, and response envelopes to their members on our behalf. Again, we randomly divided the groups into two parts. The first subgroup was asked about the most recent seed-stage investment that they evaluated and made. The second subgroup was asked about the most recent seed-stage investment that they evaluated, but did not make. We pooled the angels and the venture capitalists in our data because (a) we found no significant effects for a dummy variable representing angel investors in our regression analysis, (b) we did not find any significant interaction effects between angel investor status and the social tie measures when predicting finance decisions, and (c) we found no substantive differences in our results when we examine the data for the venture capitalists alone.

Measures

Investment Decision. The dependent variable was a binary variable of one if the investment was made and zero if the investment was not made.

Social Ties. Unlike previous research that measured social ties through archival variables that do not allow differentiation between the constructs of reputation and social ties, we measure social ties directly. The social tie variables were multi-item, evenly weighted scales, and individuals responded to five-point Likert scale items ranging from 1 = strongly disagree to 5 = strongly agree. Each scale was calculated by adding together the values for the items that composed the scale and dividing by the number of items. The items were derived from prior ethnographic and archival research on different dimensions of social ties (e.g., Podolny and Stuart 1995, Uzzi 1996, Burt 1992, Larson 1992) and our field interviews.

The indirect tie scale was composed of four questions about indirect ties between the investors and the venture team prior to the investment decision (Cronbach's $\alpha = 0.75$). These items were: "Someone whom I trust to discuss important confidential matters knew at least one member of the venture team"; "A third party whose judgement I trust provided me with nonpublic information about the venture team"; "I could obtain information about the venture team from my network of contacts faster than other investors could obtain the same information"; "By calling people I know, I could obtain information about the venture team in a relatively inexpensive manner".

The direct tie scale was composed of three questions about direct ties between the investors and the venture team prior to the investment decision (Cronbach's $\alpha = 0.78$). The items were: "Prior to seeing the deal, I had a professional relationship with at least one venture team member"; "Prior to seeing the deal, at least one member of the venture team was someone with whom I had engaged in informal social activity (e.g., playing tennis, going to the movies)"; "Prior to seeing the deal, at least one member of the venture team was a personal friend".

Reputation. The reputation scale was composed of three questions about the members of the venture team's reputation as entrepreneurs (Cronbach's $\alpha = 0.71$). The items were: "Someone on the venture team had a reputation for successfully building public companies"; "A third party I respected vouched for the team's ability to start a successful

company"; "At least one venture team member is viewed by other investors as giving the venture credibility". These items were derived from prior ethnographic and archival research on different dimensions of reputation (e.g., Podolny and Stuart 1995, Uzzi 1996). The reputation scale was evenly weighted based on individual responses to questions administered on a five-point Likert scale items ranging from 1 = strongly disagree to 5 = strongly agree.

Control Variables. To provide more accurate estimates of our hypothesized variables, we controlled for other factors that previous research has found to be important in explaining venture finance decisions. We used a dummy variable to control for whether or not the investor was an angel investor because our sampling process was different for angels and venture capitalists. We also controlled for industry because prior research shows that venture capitalists and angel investors favor certain industries for early-stage investments (Haar et al. 1988). To control for industry, we employed a series of dummy variables for biotech, hardware, medical, Internet, software, and telecom industries.⁴

In addition, we controlled for several dimensions of the quality of venture opportunities presented to the investors by the entrepreneurs. Thus, we controlled for the venture's expected market size by measuring the dollar value of the U.S. market for the business for the current year as stated in the business plan because MacMillan et al. (1985) and Hall and Hofer (1993) have shown that the size of the market influences investors' decisions. We also controlled for the attractiveness of the business opportunity by measuring the forecasted dollar value of earnings before interest and taxes of the venture (EBIT) in Year 5 as stated in the business plan because previous research has shown that the magnitude of the opportunity influences investors' decisions (Tyebee and Bruno 1984). Likewise, we controlled for the dollar amount of the investment request because the magnitude of the investment influences investor decisions (Tyebee and Bruno 1984, Wetzel 1987).

⁴ Other industry was the reference group in the regression.

Two final dimensions of ventures that past research suggested should be controlled for are investors' perceptions of the technology (Haar et al. 1988, Roberts 1991) and the perceived quality of the business plan (MacMillan and Subbanarasimha 1987, Roberts 1991). Thus, we measured the perceived value of the technology with a scale composed of two items regarding the value of the venture's technology (Cronbach's alpha = 0.86). The items were: "The technology employed by the venture would provide a significant competitive advantage"; "The venture's technology had a strong proprietary position". We measured perceived quality of the business plan with a two-item scale (Cronbach's alpha = 0.92): "The business plan was thorough in its coverage of key issues"; "The business plan did an excellent job of articulating the opportunity".

We also controlled for several attributes of the investors making the decision. We controlled for the number of prior seed-stage investments made by the investor because Elango et al. (1995) found that investors with significant seed-stage experience made different decisions from those with little seed-stage experience. We controlled for the number of years that individuals have invested in start-ups because Lerner (1994) found that more experienced investors approach the investment process differently from less-experienced investors. Finally, we controlled for investor gender because Sapienza and Gupta (1994) and Sapienza and Timmons (1989) found that relational demography influenced venture investors' decisions, and the pool of potential high-tech entrepreneurs is predominantly male.

Results

First, to examine how well our survey questions mapped onto the intended constructs, we used LISREL 8 to conduct a confirmatory factor analysis of the measurement model associated with the Likert scale items in our study (Jöreskog and Sörbom 1996). A goodness-of-fit index at or above 0.90, and a root mean-squared error of approximation of below 0.08, is believed to indicate acceptable fit (Browne and Cudeck 1993, Medsker et al. 1994). Results indicated that our model fit the data very well, as indicated

by a comparative fit index of 0.95, an incremental fit index of 0.95, and a root mean-squared error approximation of 0.062. We also estimated alternative models to examine whether a model with fewer constructs fit the data better. We found that (a) models with fewer constructs had a worse fit with the data than the model with the five constructs we anticipated, (b) no single higher-order construct emerged from the five constructs or any combination of them, and (c) none of the scales had superior reliabilities if any of the items were removed. Finally, we estimated a final confirmatory factor analysis where we focused on the factor structure of only the theoretical predictors (reputation, indirect ties, and direct ties), excluding the technology and business plan items. The fit of this confirmatory factor analysis also was high (fit indexes above 0.91), and the factor loadings were clean (specifically, the average on-factor loading was 0.70, while the average off-factor loading was 0.11). In general, these results support the construct validity of our measures.

Investment Decision

We now turn to the analyses of the investment decision. Table 1 shows the descriptive statistics and correlation matrix. The business plan and technology scales have means around the midpoint of the scale, most likely because our sample was evenly weighted among investments made and investments not made. Thus, on average, investors find the plans and competitive advantages presented by entrepreneurs to be average, lending some confidence to the design of our study.

Table 2 provides the results of the logistic regression predicting the investment decision as a function of the social tie dimensions, controlling for other factors. Model 1 is the base model, including the four measures of the attributes of the inventors (angel, gender, prior deals, and experience), the four measures of opportunity (market size, Earnings Before Interest and Taxes (EBIT) in Year five, business plan, technology); the size of investment request; and industry dummies (biotech, hardware, Internet, medical, software, and telecom industries). The results indicate that among the control variables, four variables significantly predicted the decision to fund a venture opportunity: the business plan

($\text{Exp}(B) = 2.06, p < 0.0001$), the technology ($\text{Exp}(B) = 2.21, p < 0.0001$), the amount of the funding request ($\text{Exp}(B) = 1.00, p < 0.05$), and the dummy variable for the telecommunications industry ($\text{Exp}(B) = 4.76, p < 0.05$).

The control variables provide some important insight about entrepreneurial activity. As prior research has predicted, venture funding is more likely when entrepreneurs have better business plans and technology that provides a strong and proprietary competitive advantage. Moreover, results showed that the greater the amount of money requested, the lower the likelihood of funding.

Several results for the control variables provide an interesting contrast to previous research. Past research on entrepreneurial finance indicates that investors prefer to fund more profitable opportunities in bigger markets (MacMillan et al. 1985, Hall and Hofer 1993). Our results suggest that investors do not prefer to fund opportunities that entrepreneurs *claim* are more profitable opportunities in larger markets. This finding is perhaps not surprising, given that entrepreneurs face no cost to opportunistically present their business opportunities as financially desirable. Moreover, overoptimism (Cooper et al. 1988) leads entrepreneurs to express unrealistic expectations about their ventures. Therefore, entrepreneurs' claims about the value of their opportunities as stated in their business plans do not influence investors' decisions.

Models 2 and 3 show the individual effects of direct and indirect social ties. Each of these variables has a significant effect on the venture finance decision. Model 2 shows that direct ties are strongly and positively related to the probability of investment ($\text{Exp}(B) = 1.48, p < 0.05$). The addition of the direct tie measure also significantly improves the model's fit (chi-square of change = 4.06, $p < 0.05$).

Model 3 indicates that indirect ties also are positively related to the probability of investment ($\text{Exp}(B) = 1.66, p < 0.001$). The addition of the indirect tie measure to the base model significantly improves the fit of the prediction of which opportunities are financed (chi-square of change = 6.05, $p < 0.05$).

Model 4 examines both types of social ties simultaneously. The model shows that the effects of direct

Table 1 Descriptive Statistics and Correlation Matrix (*N* = 202)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Financed	1.00																		
2. Angel	0.06	1.00																	
3. Amount	-0.06	-0.20*	1.00																
4. EBIT	0.07	-0.02	0.23*	1.00															
5. Market	0.06	-0.08	-0.07	0.34*	1.00														
6. Plan	0.34*	0.17*	0.06	0.01	0.12	1.00													
7. Technology	0.37*	0.01	0.04	0.08	0.02	0.21*	1.00												
8. Reputation	0.38*	0.12	0.02	0.02	0.07	0.35*	0.17*	1.00											
9. Indirect tie	0.16*	-0.10	0.10	0.16*	0.12	-0.08	0.08	0.28*	1.00										
10. Direct tie	0.19*	0.08	-0.00	0.13	0.09	0.13	0.08	0.38*	0.34*	1.00									
11. Biotech	-0.08	-0.21*	0.09	-0.09	-0.05	-0.07	-0.07	-0.10	0.04	-0.04	1.00								
12. Hardware	0.06	0.02	-0.01	-0.02	-0.01	0.08	0.16*	0.10	0.02	-0.10	-0.11	1.00							
13. Internet	-0.07	0.18*	-0.02	-0.02	-0.06	0.10	-0.09	-0.01	-0.10	-0.01	-0.14*	-0.12	1.00						
14. Medical	-0.06	-0.18*	-0.00	-0.05	-0.01	-0.04	0.02	0.00	0.12*	0.11	-0.17*	-0.14*	-0.18*	1.00					
15. Software	-0.05	-0.04	-0.11	-0.07	-0.07	-0.04	-0.04	-0.11	-0.08	-0.07	-0.15*	-0.07	-0.16*	-0.19*	1.00				
16. Telecom	0.20*	-0.01	0.13	0.18*	0.08	-0.01	0.01	0.16*	0.12	0.08	-0.15*	-0.07	-0.16*	-0.19*	-0.17*	1.00			
17. Male	0.01	0.05	0.10	-0.04	0.00	0.04	0.06	-0.07	-0.03	-0.01	0.04	0.09	-0.00	-0.06	0.06	-0.05	1.00		
18. Prior	0.02	-0.12	-0.07	0.24*	0.08	-0.07	0.05	-0.05	0.07	-0.02	-0.09	-0.09	0.02	0.02	0.01	0.03	-0.11	1.00	
19. Experience	-0.03	-0.01	-0.09	0.08	0.07	-0.09	-0.04	-0.01	0.05	0.14*	0.00	-0.08	-0.02	-0.04	0.00	-0.00	0.18*	0.48*	1.00
Mean	0.55	0.32	3.26e ⁶	18.07e ⁶	4.80e ⁹	3.21	3.65	2.97	3.65	2.06	0.11	0.08	0.13	0.18	0.14	0.14	0.93	16.08	12.82
Std. Deviation	0.50	0.47	4.46e ⁶	31.36e ⁶	1.76e ¹⁰	1.11	1.07	0.96	0.89	0.94	0.32	0.28	0.34	0.39	0.35	0.35	0.26	17.15	9.03
Minimum	0.00	0.00	0.00	-12.00e ⁷	0.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Maximum	1.00	1.00	40.00e ⁶	2.00e ⁸¹	2.00e ¹¹	5.00	5.00	5.00	5.00	5.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	100.00	50.00

* = Significant at *p* < 0.05 or better in a two-tailed test.

Table 2 Regressions Predicting Venture Funding ($N = 202$)

Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	$B(S.E.)$	$Exp(B)$	$B(S.E.)$	$Exp(B)$	$B(S.E.)$	$Exp(B)$	$B(S.E.)$	$Exp(B)$	$B(S.E.)$	$Exp(B)$
CONTROLS										
Angel	-0.23 (0.42)	0.80	-0.32 (0.42)	0.73	-0.26 (0.43)	0.77	-0.30 (0.44)	0.74	-0.36 (0.44)	0.70
Male	0.10 (0.71)	1.10	0.06 (0.71)	1.06	0.10 (0.72)	1.11	0.09 (0.72)	1.09	0.35 (0.73)	1.41
Prior deals	0.00 (0.01)	1.00	0.00 (0.01)	1.00	0.00 (0.02)	1.00	0.00 (0.01)	1.00	0.00 (0.01)	1.00
Experience	0.00 (0.02)	1.00	-0.01 (0.02)	0.99	0.00 (0.02)	1.00	-0.00 (0.02)	1.00	-0.01 (0.02)	0.99
Market	-6.7e ¹² (1.0e ¹¹)	1.00	-8.1e ¹² (1.1e ¹¹)	1.00	-9.2e ¹² (1.1e ¹¹)	1.00	-9.8e ¹² (1.1e ¹¹)	1.00	-9.2e ¹² (1.1e ¹¹)	1.00
EBIT	2.6e ⁹ (6.6e ⁹)	1.00	1.3e ⁹ (6.8e ⁹)	1.00	1.6e ⁹ (6.7e ⁹)	1.00	9.8e ¹⁰ (6.8e ⁹)	1.00	2.4e ⁹ (7.0e ⁹)	1.00
Plan	0.72 (0.17)	2.06****	0.69 (0.17)	1.99****	0.79 (0.18)	2.19****	0.75 (0.18)	2.12****	0.63 (0.18)	1.88***
Technology	0.79 (0.17)	2.21****	0.79 (0.18)	2.21****	0.77 (0.18)	2.16****	0.77 (0.18)	2.17****	0.76 (0.18)	2.14****
Amount	-7.7e ⁸ (4.0e ⁸)	1.00*	-7.6e ⁸ (4.1e ⁸)	1.00*	-8.8e ⁸ (4.3e ⁸)	1.00*	-8.6e ⁸ (4.4e ⁸)	1.00*	-8.9e ⁸ (4.4e ⁸)	1.00*
Biotech	-0.70 (0.64)	0.49	-0.78 (0.64)	0.46	-0.86 (0.65)	0.43	-0.87 (0.65)	0.42	-0.73 (0.67)	0.48
Hardware	-0.39 (0.67)	0.68	-0.36 (0.67)	0.70	-0.54 (0.68)	0.58	-0.49 (0.68)	0.61	-0.67 (0.69)	0.51
Internet	-0.67 (0.59)	0.51	-0.70 (0.60)	0.50	-0.70 (0.60)	0.50	-0.71 (0.61)	0.49	-0.73 (0.64)	0.48
Medical	-0.46 (0.53)	0.63	-0.64 (0.55)	0.53	-0.71 (0.55)	0.49	-0.78 (0.56)	0.46	-0.78 (0.57)	0.46
Software	-0.52 (0.57)	0.60	-0.51 (0.56)	0.60	-0.54 (0.58)	0.58	-0.54 (0.58)	0.58	-0.43 (0.58)	0.65
Telecom	1.56 (0.68)	4.76*	1.51 (0.69)	4.53*	1.41 (0.69)	4.09*	1.40 (0.70)	4.06*	1.24 (0.71)	3.46*
PREDICTORS										
Direct tie	#		0.39 (0.20)	1.48*	#		0.26 (0.21)	1.30	0.11 (0.22)	1.12
Indirect ties	#		#		0.51 (0.21)	1.66***	0.41 (0.22)	1.51*	0.30 (0.23)	1.35
Reputation	#		#		#		#		0.57 (0.22)	1.77***
-2 LL	213.48		209.41		207.45		205.86		199.09	
Chi-square	64.57****		68.63****		70.62****		72.19****		78.96****	
Chi-square change	#		4.06*		6.05*		7.62*		14.34****	

Key: **** = $p < 0.0001$; *** = $p < 0.001$; ** = $p < 0.01$; * = $p < 0.05$ in one-tailed tests.

ties ($\text{Exp}(B) = 1.30, p > 0.10$) are mitigated when indirect ties ($\text{Exp}(B) = 1.51, p < 0.05$) are measured. These results suggest that while direct ties may encourage investments, they are superceded by information from indirect sources. Thus, Hypothesis 1 is supported, but Hypothesis 2 is not supported. However, taken together, the results support organizational theoretic arguments that social relationships influence investors' decisions about which ventures to finance.

Model 5 examines the role of reputation, and thus offers more direct evidence about whether social ties are valuable because they provide a mechanism for information transfer, because they imbue transactions with norms of social obligation, or both. Our results support Hypotheses 3a and 3b, suggesting that social ties operate primarily as a mechanism for information transfer. Model 5 reveals that when entrepreneurs' reputations are considered ($\text{Exp}(B) = 1.77, p < 0.001$), the effects of indirect ties ($\text{Exp}(B) = 1.35, p > 0.10$) and direct ties ($\text{Exp}(B) = 1.12, p > 0.10$) are mitigated. In general, these results suggest that once information is publicly available about the quality of an entrepreneur, social ties no longer influence the investment decision.

It also is possible that direct and indirect ties have multiplicative effects with reputation on the probability of venture finance rather than additive effects. We explored whether interactions between direct and indirect ties, between direct ties and reputation, and between indirect ties and reputation have any significant effect on the probability of venture finance. We found no significant effects for any of the interactions, suggesting that the effects of direct and indirect ties have neither additive effects nor multiplicative effects on the probability of venture finance once reputation is considered.

Discussion

Our study was based on the premise that economic explanations for venture finance decisions are incomplete and undersocialized, and that social ties provide an important mechanism through which information asymmetry is overcome in venture finance. Since both our qualitative and quantitative results show that social ties influence seed-stage

finance decisions, we received general support for our premise.

However, our results also suggested that organizational theoretic explanations for the role of social relationships in venture finance are unparsimonious and oversocialized. The literature to date has relied on two very different theoretical mechanisms to explain why social ties should matter: access to private information and social obligations. We examined the extent to which these two mechanisms are operative by incorporating the concept of reputation. Our data suggest that reputation mediates the effects of social ties, indicating that investors exploit their social ties to gather private information, but does not support the argument that investors make investment decisions based on social obligations.

These results are important because they promote a Schumpeterian (1934) perspective on entrepreneurship. Knight (1921) and Schumpeter (1934) disagreed on whether individuals could easily obtain financing to pursue new business opportunities. Schumpeter (1934) believed that if individuals perceived viable opportunities, others would provide resources. Knight (1921), on the other hand, presaged the modern finance literature when he emphasized the information asymmetry problem in venture finance. Given information asymmetry, Knight argued that the pursuit of opportunity involved the joint possession of capital and entrepreneurial insight. Evans and Jovanovic (1989) tested these alternative explanations and found a liquidity constraint that prevents people from becoming entrepreneurs. Not considering the role of social relationships, they used this evidence to "reject Schumpeter in favor of Knight" (Evans and Jovanovic 1989, p. 810). Results from our study indicate that such a rejection may be premature. Since social relationships are used to overcome market failure in venture finance, entrepreneurship does not require the perception of an opportunity *and* the possession of financial capital.

Our results also have important implications for the interpretation of prior research on venture finance. For example, Fried and Hisrich (1994, p. 31) found that "while VCs receive many deals 'cold' (without any introduction), they rarely invest in them. . . . Most funded proposals come by referral." Although we

agree with this descriptive finding, our results suggest a particular normative interpretation. The reason why most funded proposals come by referral is that the referral provides information. If, however, information is already publicly available, the entrepreneur will not need a referral to obtain financing.

Although prior research has examined some aspects of the questions that we discuss (e.g., Freear et al. 1994, Haar et al. 1988), methodological weaknesses such as sample selection biases, averaging effects, and univariate testing have limited the acceptance of their findings. Our study provides several important methodological advances. For example, we surveyed a representative sample of active investors about the most recent investments they evaluated. Accordingly, we were able to minimize retrospective rationalization and the averaging effect that has hindered past studies, where respondents report their general approach to investing. Moreover, using direct survey measures rather than proxies permitted us to differentiate between effects of social obligation and information transfer on venture finance decision making.

Limitations

This study is not without limitations. First, we assumed that social contacts would provide information about entrepreneurs, and that more information would make investors more likely to invest. This assumption is tenable because investors know that every entrepreneur has both strengths and weaknesses, and that more information about both strengths and weaknesses should make the investor more likely to invest. Although this assumption is consistent with the "mere exposure" (e.g., Zajonc 1968) and the "consideration set" (e.g., Tybout and Artz 1994) literatures in social psychology, it would be interesting for future research to examine both the *amount* and the *favorableness* of information gleaned from social contacts about an entrepreneur. Information about the favorableness of the information would allow more specific tests of how a social network operates, and would allow researchers to examine whether social contacts help or penalize genuinely gifted entrepreneurs who experience early bad luck and receive sullied reputations.

Second, we asked investors to report about past decisions. As a result, our results might have been affected by retrospective recall bias (e.g., Golden 1992). In addition, the decision to invest may involve post-hoc justification. All else being equal, it is possible that higher reputation ratings would be given by those who decided to invest than those who did not as a way of justifying decisions. However, Miller et al. (1997) found that retrospective reporting is a viable research methodology if the measures used to generate the reports are adequately reliable and valid. In this study, we demonstrated the reliability of our measures using confirmatory factor analysis, and we maximized the validity of our data by asking investors about the *most recent* funding decision that they made. Because our respondents make investment decisions on an ongoing basis, they were reporting about a decision that likely occurred no more than three months prior to answering our survey.⁵ This approach minimizes the risk of retrospective recall bias because the ventures they described should have changed very little after the investment decision but before completing our survey. Nevertheless, future research should examine how changes in venture performance alter the way that investors report the reasons for their investment.

Third, our study examined only seed-stage investments made by venture capitalists and business angels. Consequently, we can generalize the effects of social ties on financing decisions only to those investments for which these sources of capital are used. Because venture capitalists and business angels generally invest in high-technology businesses that are highly uncertain, one potential boundary condition for our findings is the uncertainty of the opportunity. Future research is necessary to know if social ties are equally important to investment decisions about less uncertain opportunities (e.g., a franchise outlet).⁶

⁵ Because investors decide not to invest in approximately 10 times as many ventures as they decide to invest in, the decision-to-invest group was asked to recall a decision that occurred, on average, ten months before, whereas the decision not-to-invest group was recalling a decision that occurred approximately one month before.

⁶ We thank an anonymous reviewer for bringing this observation to our attention.

Fourth, the implications of our results are limited to explaining the initial decision to invest in a new venture. While our results indicate that social obligations are not an important factor in investment decisions, we cannot conclude that they do not influence other aspects of the venture finance process. The presence of direct and indirect ties is a good, but imperfect proxy for social obligations. In addition, investors might become influenced by social obligations that develop over time within a venture (Sapienza and Koresgaard 1996, Steiner and Greenwood 1995). Future research is necessary to explore different mechanisms through which social ties influence other aspects of venture finance before researchers can conclude that information transfer is the central mechanism in venture finance.

Future Directions

Because this study examined only U.S. investments, future research should consider the extent to which our explanation is universal or is linked to societal context, as Zucker (1986) has argued. Although social ties are important to overcoming problems of market failure in the pursuit of new business opportunities, there may be interactive effects between social ties and institutional context. The use of social ties might vary across economies or sociocultural contexts. Possible approaches to researching this question include cross-national comparisons of new venture financing in different institutional settings, and experimental studies designed to manipulate financing decisions in simulations of firm creation.

Another related boundary condition is newness of industry, which is directly related to the inability to judge competence among transactors. In the context of imitative entrepreneurship, for example, social ties may be less valuable than in the case of new industry creation because information problems are less severe. This suggestion is consistent with Aldrich and Fiol (1994), who identified the importance of social ties to new organizational forms that result from the creation of new industries. Future researchers could follow this research stream to examine the relative value of social ties in new versus mature industries.

This study also suggests an important avenue for research on new venture legitimacy. Although the

relationship between social ties and legitimacy is most directly related to new venture uncertainty rather than information asymmetry, our results suggest some ideas for how new firms gain legitimacy. Specifically, social ties might lead newly financed firms to possess different endowments of social capital (Shane and Stuart 2002). Because social capital can be exploited to generate legitimacy, this variation in social capital endowment might generate variation in legitimacy that influences new firm performance (Stuart et al. 1999). Thus, while population ecologists imply that organization and industry characteristics are the source of new venture legitimacy, future research may demonstrate that individual-level attributes, such as social ties, also influence legitimacy.

Finally, our results suggest a future direction for research examining the geographic concentration of high-technology firms. Lerner (1998) explains that new high-technology firms are geographically concentrated. Economic explanations for this phenomenon include knowledge spillovers, specialized labor markets, and the existence of other firms closely related in the value chain (Henderson et al. 1998, Krugman 1991). This literature does not discuss the importance of social ties to this clustering process. Since people tend to have greater social ties, on average, with others with whom they interact with more frequently, the geographic concentration of high-technology firms might result from the effect of social ties on the venture finance process. For example, Nohria (1992, p. 257) contends that "since trust is largely process based and relies on reputational credibility built on occupational history, certification by mutually known contacts, and the prospect of future exchange—participants from outside the region have a hard time in this market." Consistent with the arguments of Sorenson and Audia (2000), our results imply that the clustering of new high-technology firms occurs because entrepreneurs need to locate in certain areas given the role of social ties in the process of funding new technology companies.

Conclusion

Given the importance of new business creation to global innovation and economic growth, an

understanding of how people successfully obtain financing to pursue entrepreneurial opportunities is a fundamental area of research for entrepreneurship scholars. The basic contribution of this paper is straightforward. Social ties provide a mechanism by which investors obtain information, thereby allowing entrepreneurs without high-capital endowments to obtain resources to pursue business opportunities.

Acknowledgments

The authors thank Bob Anderson, Lita Nelsen, Lori Pressman, Hans Severeins, and Allan Will for their assistance in obtaining access to the data sources. Ken Morse provided us with helpful feedback on the questionnaire. We would like to thank participants in the Organizations and Markets seminar at the University of Chicago, the Entrepreneurship Research seminar at NYU, the Organization Studies seminar at MIT, Howard Aldrich, Ted Baker, Robert Baron, Diane Burton, Holly Raider, Ed Roberts, and Toby Stuart for useful comments.

References

- Akerlof, G. 1970. The market for lemons: Quality uncertainty and the market mechanism. *Quart. J. Econom.* **84** 4889–5000.
- Aldrich, H., M. Fiol. 1994. Fools rush in? The institutional context of industry creation. *Acad. Management Rev.* **19**(4) 645–670.
- , C. Zimmer. 1986. Entrepreneurship through social networks. D. Sexton, R. Smilor, eds. *The Art and Science of Entrepreneurship*. Ballinger, Cambridge, MA.
- Amit, R., L. Glosten, E. Muller. 1990. Entrepreneurial ability, venture investments, and risk sharing. *Management Sci.* **38**(10) 1232–1245.
- Barry, C. 1994. New directions in research on venture capital finance. *Financial Management* **23**(3) 3–15.
- Blau, P. 1964. *Exchange and Power in Social Life*. Wiley, New York.
- Browne, M. W., R. Cudeck. 1993. Alternative ways of assessing model fit. K. A. Bollen, J. S. Long, eds. *Testing Structural Equation Models*. Sage, Newbury Park, CA. 136–162.
- Burt, R. 1987. Social contagion and innovation: Cohesion versus structural equivalence. *Amer. J. Sociology* **92** 1287–1335.
- . 1992. *Structural Holes: The Social Structure of Competition*. Harvard University Press, Cambridge, MA.
- . 1997. The contingent value of social capital. *Admin. Sci. Quart.* **42** 339–365.
- Cable, D., S. Shane. 1997. A prisoner's dilemma approach to entrepreneur-venture capitalist relationships. *Acad. Management Rev.* **22**(1) 142–176.
- Casson, M. 1982. *The Entrepreneur*. Barnes and Noble Books, Totowa, NJ.
- Chan, Y., D. Siegel, A. Thacker. 1990. Learning, corporate control and performance requirements in venture capital contracts. *Internat. Econom. Rev.* **31**(2) 365–382.
- Coleman, J. 1988. Social capital in the creation of human capital. *Amer. J. Sociology* **94** S95–S120.
- Cooper, A., C. Woo, W. Dunkelberg. 1988. Entrepreneurs perceived changes for success. *J. Bus. Venturing* **3** 97–108.
- Elango, B., V. Fried, R. Hisrich, A. Polonchek. 1995. How venture capital firms differ. *J. Bus. Venturing* **10** 157–179.
- Evans, D., B. Jovanovic. 1989. An estimated model of entrepreneurial choice under liquidity constraints. *J. Political Econom.* **97**(4) 808–827.
- , L. Leighton. 1989. Some empirical aspects of entrepreneurship. *Amer. Econom. Rev.* **79**(3) 519–535.
- Fernandez, R., N. Weinberg. 1997. Sifting and sorting: Personal contacts and hiring in a retail bank. *Amer. Sociological Rev.* **62** 883–902.
- Freear, J., J. Sohl, W. Wetzel. 1994. The private investor market for venture capital. *Financier* **1**(2) 7–15.
- Fried, V., R. Hisrich. 1994. Toward a model of venture capital investment decision making. *Financial Management* **23**(3) 28–37.
- Golden, B. R. 1992. The past is the past – Or is it? The use of retrospective accounts as indicators of past strategy. *Acad. Management J.* **35** 848–860.
- Gompers, Paul A. 1995. Optimal investment, monitoring, and the stages of venture capital. *J. Finance* **50** 1461–1489.
- . 1997. An examination of convertible securities in venture capital investments. Working paper, Harvard University, Boston, MA.
- , J. Lerner. 2000. *The Venture Capital Cycle*. MIT Press, Cambridge, MA.
- Gouldner, A. 1960. The norm of reciprocity: A preliminary statement. *Amer. Sociological Rev.* **25** 161–179.
- Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. *Amer. J. Sociology* **91**(3) 481–510.
- Gulati, R. 1995. Does familiarity breed trust? The implications of repeated ties for contractual choice in alliances. *Acad. Management J.* **38**(1) 85–112.
- Gulati, R., M. Gargiulo. 2000. Where do interorganizational networks come from? *Amer. J. Sociology*.
- Haar, N., J. Starr, I. MacMillan. 1988. Informal risk capital investors: Investment patterns on the east coast of the U.S.A. *J. Bus. Venturing* **3** 11–29.
- Hall, J., C. Hofer. 1993. Venture capitalists' decision criteria in new venture evaluation. *J. Bus. Venturing* **8** 25–42.
- Henderson, R., A. Jaffe, M. Trajtenberg. 1998. Universities as a source of commercial technology: A detailed analysis of university patenting, 1965–1988. *Rev. Econom. Statis.* **78** 119–127.
- Hoffman, H., J. Blakely. 1987. You can negotiate with venture capitalists. *Harvard Bus. Rev.* **65**(2) 6–24.
- Jöreskog, K. G., D. Sörbom. 1996. *LISREL 8: User's Reference Guide*. Scientific Software International, Inc., Chicago, IL.
- Kaplan, S., P. Stromberg. 1999. Financial contracting theory meets the real world: An empirical analysis of venture capital contracts. Working paper, University of Chicago, Chicago, IL.
- Kelly, P. 2000. Private investors and entrepreneurs: How context shapes their relationship. Unpublished Ph.D. dissertation, London Business School, London, U.K.
- Kirzner, I. 1973. *Competition and Entrepreneurship*. University of Chicago Press, Chicago, IL.

- Knight, F. 1921. *Risk, Uncertainty and Profit*. Augustus Kelley, New York.
- Krugman, P. 1991. *Geography and Trade*. MIT Press, Cambridge, MA.
- Landstrom, H., S. Manigart, C. Mason, H. Sapienza. 1998. Contracts between entrepreneurs and investors: Terms and negotiation processes. P. Reynolds, W. Bygrave, N. Carter, S. Manigart, C. Mason, D. Meyer, K. Shaver, eds. *Frontiers of Entrepreneurship Research*. Babson College, Boston, MA.
- Larson, A. 1992. Network dyads in entrepreneurial settings: A study of the governance of exchange relationships. *Admin. Sci. Quart.* **37** 76–104.
- Lerner, J. 1994. The syndication of venture capital investments. *Financial Management* **23**(3) 16–27.
- . 1998. Venture capital and the commercialization of academic technology: Symbiosis and paradox. Working paper, Harvard Business School, Boston, MA.
- MacMillan, I., R. Siegal, P. Subbanarasimha. 1985. Criteria used by venture capitalists to evaluate new venture proposals. *J. Bus. Venturing* **1** 119–128.
- MacMillan, I., P. Subbanarasimha. 1987. Characteristics distinguishing funded from unfunded business plans evaluated by venture capitalists. *Strategic Management J.* **8** 579–585.
- Marsden, P. 1981. Introducing influence processes into a system of collective decisions. *Amer. J. Sociology* **86** 1203–1235.
- Medsker, G., L. Williams, P. Holahan. 1994. A review of current practices for evaluating causal models in organizational behavior and human resources management research. *J. Management* **20** 439–464.
- Miller, C., L. Cardinal, W. Glick. 1997. Retrospective reports in organizational Research: A reexamination of recent evidence. *Acad. Management J.* **40** 189–204.
- Nahapiet, J., S. Ghoshal. 1998. Social capital, intellectual capital, and the organizational advantage. *Acad. Management Rev.* **23**(2) 242–266.
- Nohria, N. 1992. Information search in the creation of new business ventures. N. Nohria, R. Eccles, eds. *Networks and Organizations*. Harvard University Press, Cambridge, MA, 241–261.
- Podolny, J. 1993. A status-based model of market competition. *Amer. J. Sociology* **98** 829–872.
- . 1994. Market uncertainty and the social character of economic exchange. *Admin. Sci. Quart.* **39** 458–483.
- , T. Stuart. 1995. A role-based ecology of technological change. *Amer. J. Sociology* **100** 1224–1260.
- Roberts, E. 1991. High stakes for high-tech entrepreneurs: understanding venture capital decision making. *Sloan Management Rev.* **32**(2) 9–20.
- Sahlman, W. 1990. The structure and governance of venture capital organizations. *J. Financial Econ.* **27** 473–521.
- Sapienza, H. 1992. When do venture capitalists add value? *J. Bus. Venturing* **7** 9–27.
- , A. Gupta. 1994. Impact of agency risks and task uncertainty on venture capitalist-CEO interaction. *Acad. Management J.* **37**(6) 1618–1632.
- , M. Korsgaard. 1996. The role of procedural justice in entrepreneur-venture capital relations. *Acad. Management J.* **38** 544–574.
- , J. Timmons. 1989. The roles of venture capitalists in new ventures: What determines their importance? *Acad. Management Best Papers Proc.* 74–78.
- Schumpeter, J. 1934. *The Theory of Economic Development: An Inquiry Into Profits, Capital, Interest, and the Business Cycle*. Harvard University Press, Cambridge, MA.
- Shane, S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. *Organ. Sci.* **11**(4) 448–469.
- , T. Stuart. 2002. Initial endowments and the performance of university start-ups. *Management Sci.* **48**(1) 154–170.
- , S. Venkataraman. 2000. The promise of entrepreneurship as a field of research. *Acad. Management Rev.* **25**(1) 217–226.
- Sorenson, O., P. Audia. 2000. The social structure of entrepreneurial activity: Geographic concentration of footwear production in the United States, 1940–1989. *Amer. J. Sociology* **106**(2) 424–462.
- Steiner, L., R. Greenwood. 1995. Venture capital relationships in the deal structuring and post-investment stages of new firm creation. *J. Management Stud.* **32**(3) 337–357.
- Stuart, T., H. Huang, R. Hybels. 1999. Interorganizational endorsements and the performance of entrepreneurial ventures. *Admin. Sci. Quart.* **44** 315–349.
- Tybout, A., N. Artz. 1994. Consumer psychology. *Annual Rev. Psych.* **45** 131–169.
- Tyebjee, T., A. Bruno. 1984. A model of venture capital investment activity. *Management Sci.* **30** 1051–1066.
- Uzzi, B. 1996. The sources and consequences of embeddedness for the economic performance of organizations: The network effect. *Amer. Sociological Rev.* **61** 674–698.
- , J. Gillespie. 1999. Corporate social capital and the cost of financial capital: An embeddedness approach. R. Leenders, S. Gabbay, eds., *Corporate Social Capital and Liability*, Kluwer Academic Publishers, Boston, MA.
- Wetzel, W. 1987. The informal venture capital market: aspects of scale and market efficiency. *J. Bus. Venturing* **2** 299–313.
- Venkataraman, S. 1997. The distinctive domain of entrepreneurship research. *Adv. Entrepreneurship Res., Firm Emergence Growth* **3** 119–138.
- Zajonc, R. 1968. Attitudinal affects of mere exposure. *J. Personality Social Psych.* **9** 1–29.
- Zucker, L. 1986. Production of trust: Institutional sources of economic structure, 1840–1920. B. Staw, L. Cummings, eds. *Research in Organizational Behavior*. Vol. 8 JAI Press, Greenwich, CT, 53–111.

Accepted by Ralph Katz; received November 2000. This paper was with the authors 3 months for 2 revisions.

Copyright 2002, by INFORMS, all rights reserved. Copyright of Management Science is the property of INFORMS: Institute for Operations Research and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.