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ABSTRACT

Venture capitalists add value to portfolio firms by obtaining and transferring information about senior managers across firms over time. Information transfer occurs on a significant scale and takes place both among a single venture capitalist's portfolio firms and between different venture capitalists' firms via a network of venture capitalists, which venture capitalists use to locate and relocate managers.

Cross-sectional differences are associated with differences in the intensity with which venture capitalists network. The observable factors relevant in explaining the intensity with which venture capitalists network include: 1) the value of the information transmitted through the network, 2) the riskiness of the activities of portfolio firms, 3) the size of the venture capital fund, 4) the degree of difficulty in enticing executives to manage portfolio firms, and 5) the reputation of the venture capitalist for successfully recycling managers. These factors reflect costs and benefits to venture capitalists of participating in the network.

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1. Introduction

The crucial role of small businesses in creating jobs and spurring innovation gives special importance to the financing of growth companies. The central problem of financing small, growing businesses is to find a way for outsiders to supply equity profitably to entrepreneurs with limited track records in the financial system. Small, growing businesses often need to invest quickly, long ahead of the expected stream of profits, and in a quantity far greater than their capacity to issue debt. But the risks faced by suppliers of equity can be prohibitive in the face of substantial adverse-selection problems in identifying worthwhile firms in which to invest, and the need to monitor and control the use of funds by entrepreneurs, to ensure that outsiders' funds are employed to the advantage of stockholders rather than entrepreneurs. The combination of back-loaded profits, limited debt capacity, large growth opportunities, and adverse-selection and moral-hazard problems in the equity market make the provision of outside equity as difficult as it is important.

For the past four decades in the United States, venture capital funds (or, more generally, private equity funds)¹ have been an important solution to this problem. Venture capital has been very successful in funding some of the most dynamic American enterprises, including Microsoft, Cisco, Intel, Compaq, Federal Express, Apple Computers, Genentech, and Amazon.com. About 30% of the companies that go public in the US received venture capital resources [Gompers and Lerner (1997)]. These results become even more impressive when we consider that the amount of capital raised by institutional venture capitalists in the United States between 1978 and 1997 has

¹ In this article, venture capital and private equity are used as synonyms, but typically venture capital connotes the financing of new products, while private equity is a broader category including all types of equity investments (traditional venture capital investments, industry consolidation, leveraged buyouts, etc.).

averaged less than \$3 billion per year and never exceeded \$7 billion until 1997 (that compared with an average \$8 trillion GDP and nearly \$1 trillion in gross domestic fixed investment).

Most studies of the structure and function of venture capital funds have focused on the structure of private equity funds (their financial design), and their role in solving information and control problems for portfolio firms – i.e., the role of private equity funds in allocating control rights, and in ameliorating adverse selection and moral hazard problems [Admati and Pfleiderer (1994), Amit, Glosten, and Muller (1990), Chan (1983), Cornelli and Yosha (1997), Hellman (1998), Marx (1998), Repullo e Suarez (2000)]. In these papers, venture capital is viewed as a *financial* contract designed to give investors the necessary control, remunerate them for the high risk they assume, and solve incentive problems. Sahlman (1990) describes venture capital as an institution shaped to screen projects and provide monitoring [Gompers (1995) and Lerner (1995) present empirical analyses]. By being actively involved within the firms they fund, venture capitalists have access to information and mechanisms that enable them to deal with adverse selection and moral hazard. As a consequence, venture capitalists can provide financing to young businesses that otherwise would not receive external resources [Barry (1994)]. These various studies all view venture capital funding from the perspective of the financial problem solved by venture capitalists, namely permitting entrepreneurial companies to access external equity funding.

Does venture capital also bring *non-financial* benefits? There is anecdotal evidence that because venture capitalists frequently specialize in a particular technology or stage of development they can offer strategic, technical, and commercial guidance [Barry (1994), Byers (1997), Bygrave and Timmons (1992), Sahlman (1990), Sapienza (1992)]. However, to date, little research has been devoted to quantifying the non-financial benefits of venture capital.

A notable exception is the paper by Hellmann and Puri (2002), who show that venture capital influences the internal organization of portfolio firms. In particular, they show that venture-backed companies are faster to bring in outsiders as CEOs, and that this effect is more noticeable at the very early stage.² The authors do not explore the theoretical foundations of why private equity finance should bring such advantages.

Our study describes a theoretical framework in which venture capital acts as a human resources management mechanism, accompanied by corroborating empirical evidence. The theoretical foundations of our framework are simple: Good management is important to the success of all firms, but it is essential for the success of young, fast-growing enterprises pursuing risky investment strategies. Managerial resources often are particularly scarce in young, growing firms; the most innovative entrepreneurs are not necessarily endowed with talents as managers. And, as the newly organized firm grows, its human resource needs become greater and more complex. Thus, it is often the case that realizing the potential of an entrepreneurial firm depends on its capacity to recruit high-level managers.

Venture capitalists may have a comparative advantage in recruiting management for portfolio firms by virtue of their “networking” capabilities and access to private information about managerial talent based on their previous experiences with managers. The extent of that comparative advantage may depend on various attributes of the venture capitalist and the portfolio firms. Different financiers may have different skills and resources for solving the human resource problems of portfolio firms. And portfolio firms may differ according to the difficulties they face in identifying and attracting the right managers to the firm.

² That is, before the firm has a product on the market or has gone public.

Very risky firms may find it harder to attract managers who are risk-averse (and who, therefore, may prefer a safe job in an established firm to a risky job in the portfolio firm). The ability of the venture capitalist to use his or her network of industry connections to “recycle” good managers whose firms fail (for exogenous reasons) may permit the venture capitalist to attract skilled managers more successfully.

High-risk activities also make the process of screening managers more difficult. The managers of firms in new industries (where risk is higher) will be less well known to the market because of the relative absence of publicly traded securities (and, therefore, public information creation) for that sector. Greater risk also reduces the signal-to-noise ratio with respect to managerial ability. Thus, venture capitalists’ access to private information about managerial talent gives them an advantage in recruiting that is increasing in importance with the riskiness of the industry.

We hypothesize that venture capital brings non-financial benefits to new projects because it allows venture capitalists to use their human resource networking capabilities to transfer valuable information acquired in previous investments and to provide an employment “safety net” for managers. Both the risk aversion of managers, and the adverse-selection problem in identifying managerial talent imply that the comparative advantage of venture capitalists as human resource managers will be an increasing function of the riskiness of the portfolio firm. That hypothesis finds some support in the studies of Hellmann and Puri (2002) and Hsu (2004). Hellman and Puri find that the role of venture capital in attracting outsider CEOs is stronger for firms in their early stages (when the prospects for senior managers is riskier). Hsu (2004) finds that venture capitalists that are regarded as having superior network resources (including management recruiting contacts) are

more likely to succeed when bidding for portfolio firms, and that venture capitalists that possess superior network resources are more likely to be engaged in early-stage financing.

Our empirical examination of cross-sectional differences in the extent that venture capitalists act as human resource managers permits us to test this hypothesis, and other potential influences on the comparative advantage of venture capitalists in human resource management, more directly. Our empirical work is based on a nationwide survey of venture capitalists that identifies various characteristics of portfolio firms and venture capitalists, using objective and subjective measures. These characteristics include the riskiness of portfolio firms and the extent of venture capitalists' involvement in human resource management, as well as many other attributes of portfolio firms and venture capitalists that are relevant to the comparative advantage of venture capitalists in human resource management (e.g., the size of the fund, and the subjective value attributed to the venture capitalist's human resource network as a source of information).

The survey results confirm that human resource networking is an important activity. A majority of the venture capitalists confirm that their relationships with their colleagues include acting on their suggestions when hiring managers, and in turn recommending managers to each other. A substantial proportion of venture capitalists affirm that they adopt the strategy of recycling managers in their portfolio firms.

We find that the extent to which venture capitalists act as human resource managers depends positively on various factors, including: (1) the subjective risk venture capitalists attribute to their investments and observable attributes of the investments related to riskiness; (2) the value they attach to the information transmitted through their networks; (3) the size of their funds (which should be positively correlated with their networking ability); and (4) the extent to which venture

capitalists believe that the firms that they finance would tend to have difficulty recruiting managers. Venture capitalists surveyed also provide evidence that their networking activities are motivated by perceived cost savings in recruiting managers. Venture capitalists report that greater networking results in an improved ability to attract managers due to the reputation venture capitalists acquire for recycling (assisting managers with job placement in the future).

This article is organized as follows: Section 2 discusses the operation of human resource networks within the venture capital industry, and their importance in creating information about managers *ex ante*, and the potential for recycling managers *ex post*. There we consider qualitative evidence of the importance of networks in transferring valuable information about managers, and managers themselves, across firms. Section 3 summarizes our model of the decision to network (which is developed in detail in Carvalho and de Matos 2003). Section 4 describes the survey and relates some of the survey data to the variables in the theoretical framework. Regression analysis of the incentives to network, hypothesized in the model, is presented in Section 5. Section 6 concludes.

2. Screening, Insurance, and the Role of Venture Capital Human Resource Networks

Firms receiving venture capital funding are typically very risky. More importantly, these firms are characterized by a high degree of asymmetric information. Managers frequently have more accurate information about the prospects of the firm than they may be willing to reveal. This information asymmetry makes project governance extremely important. Among the mechanisms venture capitalists adopt to deal with this problem are close monitoring and staging of the investment [Sahlman (1990), Gompers (1995), and Lerner (1995)].

To increase the likelihood of success and improve their information about the quality of projects, venture capitalists frequently become actively involved in the operation of their portfolio firms. For example, they sit on the board of directors, hire³ and recruit managers, help establish business strategies, provide industry knowledge, structure deals with suppliers and customers, and act as confidants to managers [Sahlman (1990)]. Because many of the firms suitable to receive venture capital funds are young companies lacking experience in human resources management, venture capitalists often become involved in selecting, recruiting and properly remunerating key employees.⁴

This involvement of venture capitalists within portfolio firms provides venture capitalists with expertise in selecting, recruiting, and properly remunerating managers, as well as in timing the development of the firms as organizations (e.g., deciding when the time is right to add a professional CEO or CFO). Furthermore, this involvement gives venture capitalists non-public information about the abilities and qualifications of the managers in the firms they fund.

Even though venture capitalists fund firms with potential to become publicly traded, more often than not, their investments end when their portfolio firms are either liquidated, merge, or are acquired by larger corporations. For example, Venture Economics (1988) reports that 34.5% of venture capital investments resulted in losses (result based on a sample of 383 companies funded 13 venture capital partnerships between 1969 and 1985). Black and Gilson (1998) presents data from 1984 to 1996 showing that a significant number of venture capital investments exit through acquisitions. In these cases, the portfolio firm generally becomes a division of the acquiring

³ For example, Baker and Gompers (1999) found that only 55% of the CEOs of venture capital-backed firms going public are founders. Hellmann and Puri (2000) found that 61% of firms funded with venture capital experienced a turnover.

⁴ The adjective “properly” refers to the design of contracts that gives the managers the right incentives, aligning his or her interests with those of the investors.

corporation and does not need a senior management team. Therefore, in many cases, senior managers leave their companies when they are sold or liquidated (this is not necessarily so if the firm goes public). The limited viability of senior managers in firms funded with venture capital means that many portfolio firm managers often are available for repeat hire by venture capitalists.

Venture capitalists bring to a project the expertise they develop in selecting, recruiting, and remunerating managers, and in timing the development of the companies as organizations. The nature of the involvement of venture capitalists within their portfolio firms provides them with the necessary means to acquire non-public information about suppliers, customers, and the management team of the companies they fund, and that information can be reused. For instance, when they exit an investment, they have the possibility of recycling competent managers by rehiring them to manage other firms in their portfolio.⁵

Not only does venture capitalists' involvement improve managerial quality through screening, the recycling of managers across portfolio firms reduces hiring costs via an "insurance effect." Managers in small growing firms are exposed to a high risk of failure. As mentioned before, senior managers find themselves in a vulnerable situation when the firm does not go public. The fact that venture capitalists can offer another chance in another portfolio firm reduces the firm-specific risk

⁵ An example of this is given by Kleiner and Perkins, in *Institutional Investor* (June-1996), pp. 95-96: "The keiretsu conceit aside, the Kleiner partners' role in Silicon Valley may in some ways be closer to that of the Hollywood moguls of the '30s and '40s, whose success was built on their ability to lock up stars, directors and writers. Kleiner Perkins has similarly amassed a pool of talent. 'If you're well regarded as a manager in their stable, you're going to be used over the years,' says Frank Ingari, whom Doerr tapped to run networking software company Shiva Corp. in 1993." "One way Doerr hardwires his network is by placing Kleiner CEOs on the boards of other corporate members of the keiretsu...The CEO of video game maker Crystal Dynamics, Randy Komisar, one of a number of Go veterans now running Kleiner companies, sits on the boards of two Kleiner-associated companies, Total Entertainment Network and MNI interactive. CEO John Kernan of Lightspan Partnership sits on the board of fellow educational software company Academic Systems... "The network has been buttressed by the "CEO-in-residence" program which brings temporarily out-of-work top executives into Kleiner and Perkins to review business plans, to do a little strategic thinking and help with recruiting..."

that managers bear when joining portfolio firms. This insurance effect may explain Hellmann and Puri's (2002) finding that venture backed companies are faster to bring in outsiders as CEOs.

Both the screening and insurance effects depend on the possibility of consecutively employing managers in distinct portfolio firms. The possibility of the same venture capitalist redeploying the same manager are somewhat restricted since few venture capital funds are large enough to match job openings with the availability of managers. However, one factor that broadens the ability to reuse non-public information about managers is the close relationship among venture capitalists, which is an outgrowth of the syndication of investments.

Syndication of investments is commonly used to improve screening, achieve better monitoring, broaden their sources of funds, and diversify their portfolio [Lerner (1994)]. The possibilities for syndication depend on both the connections a venture capitalist has, and on his or her reputation among other venture capitalists. Syndication creates strong bonds among venture capitalists and, therefore, allows reliable information to flow among them. The fact that reliable information can flow among venture capitalists gives them an unusual role as certifiers of senior managers' abilities (in the context of small growth firms financing), and allows them to operate an informal network to locate and relocate skilled managers.

3. The Decision to Network

Here we summarize the model presented formally in Carvalho and de Matos (2003). The venture capitalist conducts a cost-benefit analysis to determine whether to use a network of venture capitalists when hiring managers or use a headhunter to find managerial talent. The degree or probability of project success increases with the quality of the management. The venture capitalist establishes a desired profile for the manager. This profile includes verifiable characteristics such as

experience, industry knowledge, etc. It also includes some non-verifiable characteristics. For instance, very few managers can certify their ability to lead young, fast-growing firms into becoming large, well-structured organizations. Successful managers in large corporations may lack that skill. These non-verifiable characteristics define the managers' type. The model assumes that beforehand neither venture capitalists nor managers know managers' types.

The cost of locating a manager depends on the means used. The cost of hiring a search firm is assumed to be the same for all venture capitalists. To locate managers through the network, the venture capitalist needs to establish relations with other venture capitalists. The cost of networking is equivalent to the monetary value of the time that the venture capitalist has to spend establishing connections. Once the venture capitalist is networked, he or she has access to suggestions coming from his or her network colleagues. The cost of networking when hiring varies across venture capitalists depending on the potential for networking that each venture capitalist has, which in turn can be related to factors like the size of the venture capital fund, the number of partners, how much the venture capitalist syndicates investments, etc.

The outcome of the project will become public information and influence the future salary that the manager expects to obtain in his or her next job. If the firm fails, the manager's future salary will be lower than in case of success. Managers are risk-averse and venture capitalists are risk-neutral.

In addition to using the network for hiring, venture capitalists who network can assist managers with job placement by suggesting managers to other venture capitalists.⁶ A possible

⁶ Only those who locate managers through the network have the option of actively suggesting managers. This dependence allows us to incorporate into the model the idea that venture capitalists who suggest managers have an advantage when recruiting managers because suggesting managers reduces the firm-specific risks to which managers are exposed (the *insurance effect*).

future referral works as an option that managers acquire when they are hired. If the project fails, with a given probability, the assistance can increase the future salary of the manager. In the model, if the firm succeeds, this assistance is irrelevant to the future salary of the manager. By suggesting managers venture capitalists incur a specific cost. This cost is equivalent to the monetary value of the effort and time that the venture capitalist has to spend contacting other venture capitalists to find a match for the managers. This cost varies inversely with venture capitalists' network connections.

In the model, the decision to network involves two aspects: suggesting managers and acting on suggestions when hiring a manager. The decisions to use the network for hiring and for suggesting are separate but related. First, the venture capitalist decides whether or not to participate in the network when hiring managers. If the venture capitalist chooses to use the network for hiring, then he or she has the option also to provide suggestions to the network. The decision to use the network for hiring does not imply that the venture capitalist must use the network for suggesting, but it does make suggesting possible. In turn, the option to suggest managers does affect the decision to use the network for hiring purposes in the first instance, because those who actively suggest managers have an advantage when recruiting managers: managers would accept a monetary salary below their reservation salary because the recommendation increases their expected future salary.

In the model, the benefit that venture capitalists create from suggesting managers is captured by them entirely in the form of lower compensation paid to the managers. When the venture capitalist suggests managers through a network, the manager's reservation salary is diminished by a given amount (reflecting the reduction in risk faced by the manager). That amount

represents the gain that the venture capitalist receives by suggesting managers. The venture capitalist will suggest managers whenever that gain is larger than the costs of suggesting.

The gain received by the venture capitalist from networking increases with the riskiness of the portfolio firm. Assistance with job placement has value to managers only if the firms they manage fail. Thus, the higher the chances of failure, the higher will be the value that managers attribute to the assistance, and thus, the higher the discount on the reservation salary that they are willing to accept. Venture capitalists stand to gain more from suggesting managers involved in risky projects.

In the model, the benefits from taking suggestions from the network when hiring managers can be decomposed into three factors.⁷ A first factor reflects the value to the venture capitalist of networking's effect on higher managerial quality. Firms in which differences in managerial quality have greater consequences for firm performance will benefit more from locating highly skilled management, and will rely more on networks to do so to the extent that networks improve the accuracy of the screening process for hiring managers. With respect to this first factor, in the model, the benefits from improved managerial screening depend positively upon three physical parameters: (1) the relative profitability of a successful project outcome – i.e., the riskiness of the project (2) the effect of managerial quality on the probability of a successful outcome, and (3) the value of networking for identifying skilled managers. In the model, these three parameters appear in a multiplicative way such that the strength of each effect depends on the size of the other two parameters.

⁷ There is also a fourth factor highlighted in the model, which does not correspond to any observable variables in our survey, and which is therefore excluded from this discussion. The fourth factor is the possible additional gain to the venture capitalist from using the network if managers located through the network have a lower probability of being otherwise employed than those coming through headhunters. For the conclusions in this article, it is not important whether managers located through the network have a lower probability of being employed than those located through headhunters.

The second factor is the insurance effect. This is the benefit captured by the venture capitalist by being able to offer to recycle managers via the network, which takes the form of a reduction in the manager's reservation level for compensation. The value of the insurance effect depends positively on: (1) the riskiness of the project, and (2) the credibility of the commitment from the venture capitalist to recycle. Note that the insurance effect, therefore, provides a second rationale for a positive relationship between risk and the decision by venture capitalists to participate in networks.

The third factor reflects cost savings to the venture capitalist from the difference between the physical cost of networking and the physical cost of headhunting. It is plausible to assume that using a headhunter has a constant marginal cost that is the same for all venture capitalists. In contrast, the cost of networking should decline with the size of the venture capital fund. Two conjectures relate the size of the venture fund to the costs of networking. First, large funds are managed by many venture capitalists. Therefore, the incidence of suggestions coming from partners or persons associated with them is more frequent. Secondly, other venture capitalists may have an interest in developing good relations with venture capitalists managing large funds. This may occur because of the interest that venture capitalists have in prospective syndications [Lerner (1994)].⁸ Moreover, well-established venture capitalists are opinion makers in the industry. Therefore, the flow of reliable suggestions to venture capitalists managing large funds can be more intense.

In summary, when one combines the effects of these three factors, the model predicts that a venture capitalist's reliance on networking when *hiring* managers is positively related to several characteristics of the portfolio firm or the venture capitalist: (1) project risk, (2) the effect of

⁸ For instance, this can be related to what Lerner calls *window-dressing*: venture capital funds want to show that they financed successful enterprises in order to promote fund raising. Because of this, the opportunity to join a successful enterprise through syndication is extremely valuable.

managerial quality on the probability of a successful outcome, (3) the value of networking for identifying skilled managers, (4) the credibility of the venture capitalist's commitment to recycle, and (5) the size of the venture capitalist. Note that project risk affects the benefits of networking positively through two distinct affects: the marginal productivity of managerial screening, and the insurance effect. Also, recall that the insurance effect (which is reflected in characteristics (4) and (1)) on the propensity to use networks for hiring is only relevant for venture capitalists that use the network for recycling managers, as well.

The same five characteristics listed above should predict the use of the network for *recycling (suggesting)* managers, as well as for hiring them. In the model, the insurance effect in the *hiring* decision is only operative if the venture capitalist chooses to participate in *suggesting* managers for recycling via the network. Conversely, in the model, suggesting is only physically possible if the venture capitalist has already decided to participate in the network for hiring purposes. This interdependence between the two endogenous networking decisions implies that any exogenous variable that directly influences the probability of deciding in favor of doing one also raises the probability of deciding in favor of the other.

4. Survey Data

Data concerning the existence and use of the hiring network among venture capitalists were obtained through two surveys of venture capitalists. The first (referred to as "the survey") was answered by 160 venture capitalists and contains mostly qualitative information. The second (referred to as "the follow-up"), contains more quantitative questions, for which we obtained 68 responses. Creating these two new datasets through surveys permitted us to match the exogenous structure in the model to observable variables.

The survey was sent to 879 venture capitalists throughout the US, randomly taken from “*Pratt's Guide to Venture Capital Sources* (1994),” a publication that lists all the venture capital sources and their managers. Among the 160 respondents, 70 agreed to a phone interview and a follow-up survey, but we could reach only 68 of them. The survey and interviews were done in 1995 and 1996. Through the interviews we discovered that four respondents to the original survey were persons not directly involved in the investment process. These four responses were deleted, resulting in a final sample of 156 survey responses and 68 follow-up responses. Table 1 describes the variables derived from the survey and follow-up.

As a first step in our analysis, we investigate the perceived importance of human resource management by venture capitalists. In the survey, to assess the importance of recruiting managers, the respondents were asked to rank the three activities performed by venture capitalists that they considered most important. They were given a menu including (1) monitoring performance against goals, (2) helping with management decisions, (3) providing industry knowledge, (4) providing finance, (5) developing business strategy, and (6) recruiting managers. Respondents were also given two blank slots to fill in activities that they deemed important that were not included in this list. A significant proportion (16.7%) listed recruiting managers as the most important activity; 35.5% viewed it as one of the two most important activities, and 54.2% described it as one of the three most important (Table 2).

Survey respondents were also asked to quantify various aspects of their human resource management activities. Table 3 presents data on the number of executives that the venture capitalist has employed more than once or helped with job placement in the previous 5 years. Table 3 also provides data on the number of CEOs replaced in the previous 5 years. The mode and median of the empirical distribution for placement is 2. The mode of the empirical distribution for

replacement is 3, and the median is 4. Table 3 clearly shows that some venture capitalists are far more active than others, which may reflect either differences in the total number of portfolio firms across venture capitalists, or differences in the intensity of human resource management. To provide a clearer indicator of the intensity of human resource management activity, the bottom panel of Table 3 reports placement and replacement activity relative to the size of the venture capital fund (measured by the number of DEALS in the past five years).

Venture capitalists were asked to express their degree of agreement with the following propositions: (1) “*venture capitalists operate informal networks involved in locating and relocating managers*” (proposition NETWORK); (2) “*it is common for me to suggest likely managers to others in the private equity industry*” (proposition SUGGEST); (3) “*it is common for me to act on suggestions from others in the private equity industry when hiring a top manager for a firm*” (proposition TAKE SUGGESTIONS); and (4) “*once I learn about the good qualifications of a manager, I try to keep him/her working for companies I fund, i.e., I entice him/her to leave a firm when I sell or liquidate it and take a position in another company I fund*” (proposition RECYCLING STRATEGY). The follow-up also asked venture capitalists to state the number of managers that the venture capitalist had hired under recommendation and suggested in the previous 5 years both to/from partners and non-partners. The responses to all of these questions are reported in Table 4, where Panel A summarizes responses to the four questions listed above, and Panel B summarizes responses to the follow-up questions about networking.

Clearly, venture capitalists strongly believe in the existence of a human resource network. A large majority, 77.9%, agreed that they operate informal networks (proposition NETWORK, Table 4, Panel A); only 6.5% disagreed. Fully 56.2% agreed that it is common for them to suggest likely managers to others in the private equity industry; only 19.3% disagreed (proposition SUGGEST,

Table 4, Panel A).⁹ The results in the follow-up (Table 4, Panel B) confirm this last result from the survey. Only 24.6% had not suggested any manager to partners and 24.6% to non-partners. Finally, the proportion of venture capitalists that had not recommended any manager amounts to 12.7%, while those who had recommended more than 4 is 52.7%.

Most respondents (62.3%) agreed that it is common for them to act on suggestions when hiring managers (7.1% strongly agreed); only 11% disagreed (proposition TAKE SUGGESTIONS, Table 4, Panel A).¹⁰ The numbers in the follow-up (Table 4, Panel B) are consistent with these results: only 19% of the respondents had not hired any manager under suggestion (30.5% had not hired any manager under suggestion of partners and 52.5%, from non-partners). The proportion of those who hired more than 3 managers under recommendation is 30.2%. A considerable proportion of venture capitalists (37%) affirm that they adopt a recycling strategy (proposition RECYCLING STRATEGY, Table 4, Panel A).¹¹

Summary statistics from our survey and follow-up show that a significant proportion of venture capitalists suggest managers to each other, act on suggestions when hiring senior managers, and have a strategy of recycling managers. It is particularly striking that a large proportion of venture capitalists agree that they operate informal networks involved in locating and relocating managers.

Survey responses also provide evidence on the motives of venture capitalists in using human resource networks. We hypothesize that an important element that may explain the

⁹ The answer given to this question by the subsample of those who answered the follow-up is very similar: 10.3% agree strongly, 52.9% agree, 22.1% are indifferent, and 14.7% disagree.

¹⁰ The answer given to this question by the subsample of those who answered the follow-up is very similar: 10.3% agree strongly, 52.9% agree, 32.4% are indifferent, 2.9% disagree, and 1.5% strongly disagree.

¹¹ Through telephonic interviews, several venture capitalists recognized that the small number of deals does not allow them to implement this strategy, although they would be willing to do it.

motivation that venture capitalists have in networking is the relatively high value that they attribute to the information that they obtain from each other. More specifically, we hypothesize that venture capitalists have (or at least think they have) information about managers that search firms do not.

To address that hypothesis, venture capitalists were asked to express their degree of agreement with the following propositions: (1) *“the success of the firms I fund depends mostly on their top managers”* (proposition MANAGERIAL IMPACT); (2) *”as a venture capitalist I learn substantially more about the managers of the companies I fund than what can be revealed to outsiders by their track records”* (proposition INSIDE INFORMATION); and (3) *“to manage a firm funded with venture capital requires different skills from those needed to manage a company funded with other sources of capital”* (proposition SPECIAL SKILLS).

The level of agreement with these propositions is presented in Table 5, Panel A. The overwhelming majority (93.5%) of respondents agreed that, through their relations with managers, they learn substantially more about the managers than what can be revealed to outsiders by the managers' records (proposition INSIDE INFORMATION). An even higher level of agreement (95.5%) is attained for the proposition MANAGERIAL IMPACT. Finally, 58.7% agree that to manage for venture capital investors require special skills (proposition SPECIAL SKILLS). Together, these responses support the hypothesis that information about managerial skills is important and not readily available.

Next, in Table 5, Panel B, we examine venture capitalists' views of the challenges they face in recruiting managers, and the extent to which the operation of a human resource network can help to reduce the costs of hiring skilled managers. We asked respondents to express their degree of agreement with various propositions related to their activities as human resources recruiters. These

propositions are: (1) *“it can be difficult to entice a manager to leave a stable position in a well established company and take a chance in a new firm with risky prospects”* (proposition DIFFICULT HIRE); (2) *“if it were not for their confidence in my personal commitments to them, some of the top managers of the companies I fund might not have accepted the job offer they received”* (proposition PERSONAL COMMITMENTS); and (3) *“having a reputation of helping good managers with job placement, in the event that the companies for which they work are liquidated, helps entice other managers to work for other companies I fund”* (proposition REPUTATION).

The data in Table 5, Panel B, indicate that venture capitalists make personal commitments to managers, and rely on their personal reputations for helping managers to find replacement jobs, as a means of enticing managers to come to their portfolio firms, which managers may be reluctant to do because of the riskiness of those portfolio firms. The majority of respondents (54.5% agree that it can be difficult to entice managers to a risky portfolio firm, while 25% disagree. 68.7% of respondents emphasize the importance of their personal commitment to managers in getting them to accept a job, while 9.8% disagree. 44% agree that their reputations for assisting in recycling managers help entice managers to their portfolio firms, while 15.1% disagree.

5. Explaining Differences in Venture Capitalists’ Reliance on Human Resource Networking

The summary statistics described thus far demonstrate that venture capitalists tend to agree that: (1) human resource networking is an important activity, (2) information about managerial quality is important, (3) venture capitalists obtain unique information about their managers, and (4) participating in a human resource network is important for attracting skilled managers. Interestingly, however, the results in Tables 2-5 also show that there is a considerable amount of

variation in the opinions venture capitalists express about the importance of participating in human resource networks, and the importance of those networks for attracting skilled managers. In Section 3, we described a model (developed in detail in Carvalho and de Matos 2003) that suggests explanations for that variation in opinion and practice. Specifically, the model suggests that cross-sectional variation in the perceived importance of networks, or in the desire to participate in them, should be linked to factors identified in the model. This section explores the extent to which cross-sectional differences in the use of networks can be explained by observable characteristics of venture capitalists, as predicted by the model.

In what follows, we use respondents' answers to the propositions SUGGEST and TAKE SUGGESTIONS (both from the survey), the number of managers hired under suggestion from non-partners (from the follow-up), and the number of managers recommended to non-partners (from the follow-up) as alternative endogenous variables to measure the extent of the reliance by venture capitalists on networks. TAKE SUGGESTIONS and the number of managers hired under suggestion are alternative measures of the propensity to network when hiring. SUGGEST and the number of managers recommended are alternative measures of the propensity to supply managers to the network. In the model, these are separate decisions. The model suggests factors that should explain variation in the reliance on networks for both *hiring* and *suggesting*. We measure explanatory factors using observable variables based on responses to propositions in the survey and follow-up, and then test to see whether these observable explanatory variables can explain cross-sectional variation in our measures of reliance on networks.

At the end of Section 3 above, we described the empirical predictions of the Carvalho-de Matos (2003) model. According to the model, there should be a positive association between the propensity to rely on networks, for both hiring and suggesting, and the following characteristics: (1)

project risk, (2) the effect of managerial quality on the probability of a successful outcome, (3) the value of networking for identifying skilled managers, (4) the credibility of the venture capitalist's commitment to recycle, and (5) the size of the venture capitalist.

5.1. Measuring the Determinants of Using Networks

Project risk: We employ three alternative measures of project risk: RISK (Table 1), EARLY (Table 1), and DIFFICULT HIRE (Table 5, Panel B). RISK is a subjective measure of risk by the venture capitalist. It is the response to the question: “*In the realm of venture capital, how would you classify most of your investments (use a scale from 1 for low risk to 5 for high risk)?*”

EARLY is an indicator for whether early-stage venture capital is an important area of the venture capitalist's business. Specifically, we asked the venture capitalists to list the three types of financing with which they are primarily involved. The possible categories included seed, startup, R&D, first-stage, second-stage, mezzanine, LBO, acquisition financing, control block purchase, industry consolidation, and a blank slot for other unlisted types.¹² The first four of these categories are considered early-stage venture capital. EARLY is the number of early-stage venture capital activities that were listed in the venture capitalist's list of top three activities. For example, for a venture capitalist that listed R&D, first-stage, and second-stage as his three top categories of activity, EARLY would have a value of 2. As expected, RISK is strongly correlated with EARLY (the correlation coefficient is 0.67). As shown in Table 6, responses measured by the variables RISK and EARLY are reasonably well distributed over the potential range of responses, indicating substantial heterogeneity in our sample.

¹² This classification of the industry was taken from *Venture Economics* (1994).

DIFFICULT HIRE (Table 5, Panel B) is a measure of risk that is especially relevant for capturing the insurance effect, but it is also useful more broadly as a gauge of the riskiness of the activities of the venture capitalist.

Managerial Impact: We capture the effect of managerial quality on the probability of a successful outcome with the variable MANAGERIAL IMPACT (Table 5, Panel A).

Network's Value: The value of networking for identifying skilled managers is captured by SPECIAL SKILLS (Table 5, Panel A). To the extent that the skills of managers are unusual, it should be harder to locate skilled managers, and therefore, the potential contribution of networking should be relatively greater.

Recycling Credibility: We capture the credibility of the venture capitalist's commitment to suggest/recycle with the variable REPUTATION (Table 5, Panel B). This variable measures the extent to which the venture capitalist believes that having a reputation for credible recycling is important, which should be closely related to the extent to which the venture capitalist has invested in such a reputation. Reputation is relevant directly for the value of the suggesting service offered by the venture capitalist, and indirectly, through the insurance effect, for the value of participating in the hiring network.

Size: Size is measured by CAPITAL (Table 1), which is defined as the amount of capital that the venture capital fund currently has under management.

5.2 Regressions

Recall that we consider four measures of the decision to network, two that capture the use of networks for hiring managers, and two that capture the use of networks for suggesting/recycling

managers. Two of these four endogenous variables (one for hiring and one for suggesting) are measured as ordered variables (that is, they are expressions of the degree of agreement or disagreement with certain propositions). The other two endogenous variables are integer measures of the number of managers hired and suggested. We employ ordered probit analysis to explain variation in the ordered variables, and Poisson regression analysis to explain variation in the integer variables. In all four sets of regressions, we use the same set of seven explanatory variables, namely RISK, EARLY, DIFFICULT HIRE, MANAGERIAL IMPACT, SPECIAL SKILLS, REPUTATION, and CAPITAL. In the Poisson regressions, we also include the number of deals by the venture capitalist in the past five years (variable DEALS, Table 1) and the number of senior managers hired by the venture capitalist in the past five years (variable HIRINGS, Table 1) as scaling control variables.

Tables 7 and 8 present an empirical analysis of the incentive to hire under suggestions, using our two alternative measures of the network hiring propensity. Table 7 presents ordered probit regressions where the dependent variable is the extent of agreement with the proposition TAKE SUGGESTIONS. Table 8 contains Poisson regressions where the dependent variable is the number of managers hired under suggestion from non-partners in the previous 5 years.

The explanatory variables are consistently positive (with the exception of CAPITAL in Table 8, possibly reflecting the influence in Table 8 of the presence of the closely related variables, DEALS and HIRINGS), as predicted in the model, and are often statistically significant. We alternate our three measures of risk in the various specifications in Tables 7 and 8, and as expected, they tend to detract from one another's explanatory power.

The measured effects of SPECIAL SKILLS and MANAGERIAL IMPACT are positive but not highly statistically significant. In the case of MANAGERIAL IMPACT, this may reflect the lack of cross-sectional variation in our sample for this variable (see Table 5). Furthermore, although we allow SPECIAL SKILLS and MANAGERIAL IMPACT to enter separately in many specifications in Tables 7 and 8, in the Carvalho and de Matos (2003) model, the two variables should enter interactively; that is, the importance of each should depend on the importance of the other. Thus, in Tables 7 and 8, we also report results where we substitute a new variable, INFORMATION VALUE (defined as the product of SPECIAL SKILLS and MANAGERIAL IMPACT) for SPECIAL SKILLS and MANAGERIAL IMPACT. In Table 7, INFORMATION VALUE enters significantly.

The empirical analysis of the decision to suggest managers appears in Tables 9 and 10, which employs the same explanatory variables as Tables 7 and 8. Table 9 presents ordered probit regressions where the dependent variable is the degree of agreement with the proposition SUGGEST. Table 10 contains Poisson regressions where the dependent variable is the number of managers suggested to non-partners in the previous 5 years.

The variables EARLY, RISK and REPUTATION appear with positive and statistically significant coefficients. In the survey sample, the other variables fail to show statistical significance in accordance with the model. In follow-up sample, DIFFICULT HIRE is positive and statistically significant. In the follow-up sample, SPECIAL SKILLS and MANAGERIAL IMPACT, or alternatively their product, INFORMATION VALUE, enter negatively and statistically significant, contrary to the predictions of the model. This indicates that the more venture capitalists value unique managerial talent, the less they are willing to suggest managers to the network. In other words, while INFORMATION VALUE has a positive effect on the desire by venture capitalists to

use the network for the purposes of hiring, it seems to have the opposite effect on their desire to suggest (rather than try to retain) talented managers. While this result is contrary to the specific model we describe in Section 3, it is not surprising. The Carvalho-de Matos (2003) model does not consider the fact that venture capitalists may wish to reuse managers themselves; incorporating that feature into the model, we conjecture, could explain the incentives of venture capitalists not to suggest managers when those managers possess unique and important talents (which make venture capitalists want to keep those managers for themselves).

6. Conclusion

A significant part of a firm's value depends upon the skills, knowledge and experience of its senior managers. Along with their investment activities, venture capitalists become actively involved within their portfolio firms and acquire non-public information about managerial quality. Venture capitalists have the opportunity to share that information via their participation in a network for hiring skilled managers.

In this study, we examine evidence of the perceived importance of that network in the minds and actions of venture capitalists, and the determinants of their decisions to employ the network for human resource management. We compare that evidence with the predictions of the Carvalho-De Matos (2003) model of venture capital networking.

In theory, reliance on the network benefits venture capitalists by raising their portfolio firms' productivity, reducing prospective managers' risks and compensation, and reducing the costs of locating senior managers. Through a nationwide survey, we obtained evidence that venture capitalists operate an informal network involved in locating and relocating managers: 77.9% of the respondents agreed with the proposition that venture capitalists operate networks for locating and

relocating managers. A majority of the venture capitalists affirm that it is common for them to hire managers under suggestions from their colleagues (62.3%) and to suggest managers (56.2%). Furthermore, 37% affirm that they adopt the strategy of recycling managers.

Interestingly, there is substantial heterogeneity in the intensity with which venture capitalists participate in human resource networks. Econometric analysis of cross-sectional variation gives support to the theoretical reasoning that the intensity with which venture capitalists locate managers through the network is positively influenced by the following factors: (1) the value of the information transmitted through the network (the importance of managerial skill for the portfolio firm); (2) the risk of venture capital investments; (3) the size of the venture capital fund; (4) the degree of difficulty in enticing executives to manage firms funded with venture capital; and (5) the reputation of the venture capitalist for successfully recycling managers via the network.

Theoretical and empirical arguments provided in this article support the view that venture capitalists add value by bringing to their portfolio firms the capacity to attract superior management. This indicates that human resources management is one of the keys to understanding the success of the venture capital industry.

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TABLE 1
Main Variables

| VARIABLE | DESCRIPTION | SOURCE |
|---|---|---------------|
| PLACEMENT | Answer to the question: <i>in the last five years, approximately how many executives have you either employed more than once or helped to be placed after their firms were sold or liquidated?</i> | SURVEY |
| REPLACEMENT | Answer to the question: <i>approximately how many CEOs have you replaced in the last five years?</i> | SURVEY |
| DEALS | Answer to the question: <i>approximately how many deals have you made in the last five years?</i> | SURVEY |
| HIRINGS | Answer to the question: <i>in the last 5 years, approximately how many managers have you hired?</i> | FOLLOW-UP |
| AVERAGE PLACEMENT | Ratio between PLACEMENT and DEALS. | SURVEY |
| AVERAGE REPLACEMENT | Ratio between REPLACEMENT and DEALS. | SURVEY |
| MANAGERS SUGGESTED TO PARTNERS | Answer to the question: <i>in the last 5 years, approximately how many possible top managers have you recommended to venture capitalists who work for your firm?</i> | FOLLOW-UP |
| MANAGERS SUGGESTED TO NON-PARTNERS | Answer to the question: <i>in the last 5 years, approximately how many possible top managers have you recommended to venture capitalists who do not work for your firm?</i> | FOLLOW-UP |
| MANAGERS HIRED UNDER SUGGESTION OF PARTNERS | Answer to the question: <i>among the top managers you hired in the last 5 years, approximately how many were recommended by venture capitalists who work for your firm?</i> | FOLLOW-UP |
| MANAGERS HIRED UNDER SUGGESTION OF NON-PARTNERS | Answer to the question: <i>approximately how many of the top managers you hired in the last 5 many were suggested by venture capitalists who do not work for your firm?</i> | FOLLOW-UP |
| EARLY | Venture capitalists were asked to rank the three types of financing in which they are most involved. The received a list containing seed, start up, R&D, first-stage, second-stage, mezzanine, bridge financing, LBO, acquisition financing, control-block purchase, industry consolidation, and a blank slot for other unlisted types. The first four of these categories are considered early stage venture capital. Variable EARLY is the number of early-stage venture capital activities in the venture capitalist's list of top three activities. | SURVEY |
| RISK | Venture capitalists were asked to answer the question: <i>in the realm of venture capital, how would you classify most of your investments (use a scale from 1 for low risk to 5 for high risk).</i> | SURVEY |
| CAPITAL | Amount of capital that the funds of a venture capitalist has under management. | SURVEY |

TABLE 2**Importance Given by Venture Capitalists to the Activity of Recruiting Managers**

Venture capitalists were asked to rank the three activities performed by venture capitalists that they considered most important. They were given a menu including 1) monitoring performance against goals, 2) helping with management decisions, 3) providing industry knowledge, 4) providing finance, 5) developing business strategy, 6) recruiting managers, and two blank slots to complete with unlisted activities. Some answers presented a tie. In case two answers were tied in the first place, the second place was taken as blank. If three activities were tied in first, then the second and third places were taken as blank, and so on.

| Rank | Frequency | Valid percentage |
|------------------------------------|------------------|-------------------------|
| Most important | 26 | 16.7 |
| One of the two most important | 55 | 35.5 |
| One of the three most important | 84 | 54.2 |
| Not among the three most important | 71 | 45.8 |
| Missing | 1 | |
| Number of answers | 155 | |

TABLE 3

Venture Capitalists' Involvement with Human Resources Management

PLACEMENT is the number of executives that the venture capitalist has employed more than once or helped with job placement in the previous five years and REPLACEMENT is describes the number of CEOs replaced in the previous five years. The in the averages, variables PLACEMENT and REPLACEMENT are divided by the number of deals structured in the previous five years. When the answer was in the form of an interval, the midpoint was considered. This is why some answers are non-integer numbers.

| Number of Managers | PLACEMENT | | | REPLACEMENT | | |
|--------------------|-----------|------------|-----------------------|-------------|------------|-----------------------|
| | Frequency | Percentage | Cumulative percentage | Frequency | Percentage | Cumulative percentage |
| 0 | 35 | 24.8 | 24.8 | 7 | 4.9 | 4.9 |
| 1 & 1.5 | 16 | 11.4 | 36.2 | 15 | 10.5 | 15.4 |
| 2 | 36 | 25.5 | 61.7 | 18 | 12.6 | 28.0 |
| 3 & 3.5 | 27 | 19.2 | 80.9 | 29 | 20.3 | 48.3 |
| 4 | 3 | 2.1 | 83.0 | 20 | 13.9 | 62.2 |
| 5 | 11 | 7.8 | 90.8 | 20 | 13.9 | 76.1 |
| 6 | 2 | 1.4 | 92.2 | 5 | 3.5 | 79.6 |
| 7 | 1 | 0.7 | 92.9 | 2 | 1.4 | 81.0 |
| 8 & 8.5 | 1 | 0.7 | 93.6 | 6 | 4.2 | 85.3 |
| ≥ 10 | 9 | 6.4 | 100.0 | 21 | 14.7 | 100.0 |
| Total | 141 | | | 143 | | |

| Number of Managers | AVERAGE PLACEMENT | | | AVERAGE REPLACEMENT | | |
|---|-------------------|------------|-----------------------|---------------------|------------|-----------------------|
| | Frequency | Percentage | Cumulative percentage | Frequency | Percentage | Cumulative percentage |
| $0 \leq x \leq 0.1$ | 59 | 41.5 | 41.5 | 11 | 7.9 | 7.9 |
| $0.1 < x \leq 0.2$ | 34 | 24.0 | 65.5 | 40 | 28.5 | 36.4 |
| $0.2 < x \leq 0.3$ | 21 | 14.8 | 80.3 | 17 | 12.0 | 48.6 |
| $0.3 < x \leq 0.4$ | 7 | 4.9 | 85.2 | 28 | 20.0 | 68.6 |
| $0.4 < x \leq 0.5$ | 8 | 5.6 | 90.8 | 20 | 14.3 | 82.9 |
| $0.5 < x \leq 0.6$ | 3 | 2.2 | 93.0 | 9 | 6.4 | 89.3 |
| $0.6 < x \leq 0.8$ | 4 | 2.8 | 95.8 | 5 | 3.6 | 92.9 |
| $0.8 < x$ | 6 | 4.2 | 100.0 | 10 | 7.1 | 100.0 |
| Total | 142 | | | 140 | | |

TABLE 4

Evidence on the Existence of the Network

| Panel A: QUALITATIVE DATA (in percentage) | | | | | | | |
|---|---|-----------------------|--------------|----------------|-----------------|--------------------------|--------------------------|
| Proposition | Wording | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Number of answers |
| NETWORK | Venture capitalists operate informal networks involved in locating and relocating competent managers | 19.5 | 58.4 | 15.6 | 5.2 | 1.3 | 155 (100) |
| SUGGEST | It is common for me to suggest likely managers to others in the private equity business | 6.5 | 49.7 | 24.5 | 18.7 | 0.6 | 155 (100) |
| TAKE SUGGESTIONS | It is common for me to act on suggestions from others in the private equity industry when hiring a top manager for a firm | 7.1 | 55.2 | 26.7 | 9.7 | 1.3 | 154 (100) |
| RECYCLING STRATEGY | Once I learn about the good qualifications of a manager, I try to keep him/her working for companies I fund, i.e., I entice him/her to leave a firm when I sell or liquidate it and take a position in another company I fund | 8.4 | 28.6 | 27.3 | 23.7 | 13.0 | 156 (100) |

Panel B: QUANTITATIVE DATA

(in percentage)

| Number of Managers | Managers Suggested to | | | Managers Suggested by | | |
|---------------------------|------------------------------|---------------------|-------------|------------------------------|---------------------|-------------|
| | Partners | Non-partners | Both | Partners | Non-partners | Both |
| 0 | 24.6 | 24.6 | 12.7 | 30.5 | 52.5 | 19.0 |
| 1 | 8.7 | 15.7 | 3.6 | 28.8 | 21.3 | 22.4 |
| 2 | 17.5 | 17.5 | 9.1 | 15.2 | 18.0 | 17.2 |
| 3 | 12.2 | 12.2 | 12.7 | 8.9 | 3.2 | 12.1 |
| 4 | 5.2 | 1.7 | 9.1 | 6.8 | 1.6 | 10.3 |
| ≥ 5 | 31.5 | 28.0 | 52.7 | 10.2 | 3.2 | 19.0 |
| Total | 57 (100) | 57 (100) | 55 (100) | 59 (100) | 61 (100) | 58 (100) |

TABLE 5**Challenges in Recruiting Managers and the Value of the Network**
(in percentage)**Panel A: VALUE AND UNIQUENESS OF THE INFORMATION**

| Proposition | Wording | Strongly agree | Agree | Neutral | Disagree | Strongly disagree | Number of answers |
|--------------------|---|-----------------------|--------------|----------------|-----------------|--------------------------|--------------------------|
| MANAGERIAL IMPACT | The success of the type of firms I fund depends mostly on their top managers | 71.1 | 24.4 | 3.2 | 1.3 | 0.0 | 156 (100) |
| INSIDE INFORMATION | As a venture capitalist I learn substantially more about the managers of the companies I fund than what can be revealed to outsiders by their track records | 49.7 | 43.8 | 5.2 | 1.3 | 0.0 | 153 (100) |
| SPECIAL SKILLS | To manage a firm funded with venture capital requires different skills from those needed to manage a company funded with other sources of capital | 14.8 | 43.9 | 18.7 | 20.0 | 2.6 | 155 (100) |

Panel B: VENTURE CAPITALIST'S CHALLENGES IN RECRUITING MANAGERS

| | | | | | | | |
|----------------------|---|------|------|------|------|-----|--------------|
| DIFFICULT HIRE | It can be difficult to entice a top manager to leave a stable position in a well established company and take a chance in a new firm with risky prospects | 12.2 | 42.3 | 20.5 | 21.8 | 3.2 | 156 (100) |
| PERSONAL COMMITMENTS | If it were not for their confidence in my personal commitment to them, some of the top managers of the companies I fund might not have accepted the job offer they received | 20.3 | 48.4 | 21.5 | 7.8 | 2.0 | 153 (100) |
| REPUTATION | Having a reputation of helping good managers with job placement, in the event that the companies for which they work are liquidated, helps entice other managers to work for other firms I fund | 7.2 | 36.8 | 40.9 | 10.5 | 4.6 | 152 (100) |

TABLE 6**Characteristics of Venture Capitalist in the Sample**

EARLY takes the value of 0, 1, 2, or 3, which corresponds to the number of early-stage financing listed among the three main types of financing performed by a venture capitalist. RISK corresponds to a subjective assessment of the riskiness of the venture capitalist's investments on a scale from 1 for low risk to 5 for high risk. EXPERIENCE is the number of years in the venture capital industry. Deals represent the number of deals made in the previous 5 years. These variables are precisely described in Table 1.

| | EARLY | | | RISK | | |
|--------------------|-----------|------------|-----------------------|-----------|------------|-----------------------|
| | Frequency | Percentage | Cumulative percentage | Frequency | Percentage | Cumulative percentage |
| 0 | 45 | 28.8 | 28.8 | | | |
| 1 | 20 | 12.8 | 41.6 | 7 | 4.5 | 4.5 |
| 2 & 2.5 | 41 | 26.3 | 67.9 | 28 | 18.2 | 22.7 |
| 3 & 3.5 | 50 | 32.1 | 100.0 | 37 | 24.1 | 46.8 |
| 4 & 4.5 | | | | 49 | 31.8 | 78.6 |
| 5 | | | | 33 | 21.4 | 100.0 |
| Total | 156 | | | 154 | | |

| | HIRINGS | | | DEALS | | |
|---------------------------------------|-----------|------------|-----------------------|-----------|------------|-----------------------|
| | Frequency | Percentage | Cumulative percentage | Frequency | Percentage | Cumulative percentage |
| $0 \leq x \leq 3$ | 8 | 12.9 | 12.9 | 5 | 3.5 | 3.5 |
| $3 < x \leq 6$ | 23 | 37.1 | 50.0 | 22 | 15.3 | 18.8 |
| $6 < x \leq 9$ | 4 | 6.5 | 56.5 | 18 | 12.5 | 31.3 |
| $9 < x \leq 12$ | 14 | 22.5 | 79.0 | 39 | 27.0 | 58.3 |
| $12 < x \leq 15$ | 7 | 11.2 | 90.2 | 10 | 7.0 | 65.3 |
| $16 < x \leq 20$ | 3 | 4.9 | 95.1 | 21 | 14.6 | 79.9 |
| $21 < x \leq 25$ | 0 | 0 | 95.1 | 10 | 6.9 | 86.8 |
| $25 < x$ | 3 | 4.9 | 100 | 19 | 13.2 | 100.0 |
| Total | 62 | | | 144 | | |

TABLE 7

Empirical Determinants of the Decision to Network: Taking Suggestions

The dependent variable is the agreement to proposition TAKE SUGGESTIONS: *it is common for me to act on suggestions from others in the private equity industry when hiring a top manager for a firm*. Independent variables are described in Tables 1 and 5. Variable INFORMATION VALUE is the product of variables SPECIAL SKILLS and MANAGERIAL IMPACT. Estimates come from ordered probit analysis. In parentheses are the regression coefficients' z-values.

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|--------------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|------------------|
| SPECIAL SKILLS | 0.10 (1.12) | 0.13 (1.48) | 0.13 (1.56) | 0.11 (1.18) | | | | |
| MANAGERIAL IMPACT | 0.24 (1.59) | 0.19 (1.30) | 0.19 (1.30) | 0.25 (1.63) | | | | |
| INFORMATION VALUE | | | | | 0.03* (1.88) | 0.03* (1.95) | 0.03** (2.10) | 0.03* (1.84) |
| REPUTATION | 0.23** (2.23) | 0.10** (2.54) | 0.24** (2.41) | 0.24** (2.29) | 0.22** (2.13) | 0.26** (2.47) | 0.24** (2.35) | 0.23** (2.19) |
| DIFFICULT HIRE | 0.22** (2.36) | | | 0.25*** (2.64) | 0.20** (2.24) | | | 0.24** (2.52) |
| RISK | | 0.14* (1.73) | | 0.15 (1.27) | | 0.14* (1.73) | | 0.14 (1.24) |
| EARLY | | | 0.12 (1.60) | 0.03 (0.30) | | | 0.12 (1.60) | 0.04 (0.33) |
| logCAPITAL | 0.16** (2.25) | 0.11 (1.59) | 0.14* (1.93) | 0.16** (2.06) | 0.16** (2.24) | 0.12 (1.61) | 0.14* (1.95) | 0.16** (2.06) |
| N | 144 | 142 | 144 | 142 | 144 | 142 | 144 | 142 |
| Pseudo R ² | 0.05 | 0.04 | 0.04 | 0.07 | 0.05 | 0.04 | 0.04 | 0.07 |
| LogLikelihood | -151.85 | -150.18 | -153.38 | -146.52 | -152.01 | -150.18 | -153.25 | -146.84 |
| Wald χ^2 | 18.58 | 15.61 | 15.52 | 22.92 | 18.26 | 15.60 | 15.79 | 22.27 |

*, **, and *** indicate statistical significance levels of 10, 5, and 1% respectively (2-tailed)

TABLE 8

Empirical Determinants of the Number of Managers Hired under Suggestion of Non-Partners

The dependent variable is the number of managers hired under suggestion of non-partners in the previous 5 years. Independent variables are described in Tables 1 and 5. Variable INFORMATION VALUE is the product of variables SPECIAL SKILLS and MANAGERIAL IMPACT. Estimates come from Poisson regressions. In parentheses are the regression coefficients' z-values.

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|---------------------------------|-------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|
| SPECIAL SKILLS | 0.25 (1.35) | 0.31 (1.63) | 0.24 (1.35) | 0.25 (1.32) | | | | |
| MANAGERIAL IMPACT | 0.00 (0.00) | -0.02 (0.12) | 0.05 (0.28) | 0.04 (0.21) | | | | |
| INFORMATION VALUE | | | | | 0.30 (1.03) | 0.03 (1.18) | 0.03 (1.21) | 0.03 (1.14) |
| REPUTATION | 0.09 (0.54) | 0.21 (1.25) | 0.24 (1.45) | 0.16 (0.85) | 0.11 (0.67) | 0.23 (1.43) | 0.25 (1.56) | 0.17 (0.94) |
| DIFFICULT HIRE | 0.30 (2.21) | | | 0.12 (0.72) | 0.31** (2.35) | | | 0.13 (0.82) |
| RISK | | 0.05 (0.32) | | -0.34 (1.45) | | 0.08 (0.53) | | -0.32 (1.40) |
| EARLY | | | 0.34*** (2.65) | 0.47** (2.45) | | | 0.35*** (2.76) | 0.47** (2.48) |
| logCAPITAL | -0.14 (1.28) | -0.14 (1.21) | -0.17 (1.51) | -0.22* (1.66) | -0.14 (1.28) | -0.14 (1.19) | -0.17 (1.51) | -0.21* (1.64) |
| DEALS | -0.00 (0.30) | -0.00 (0.16) | -0.00 (0.26) | -0.00 (0.05) | -0.00 (0.39) | -0.00 (0.23) | -0.00 (0.29) | -0.00 (0.10) |
| HIRINGS | 0.08*** (4.62) | 0.06*** (3.71) | 0.06*** (3.53) | 0.07*** (3.71) | 0.07** (4.60) | 0.06*** (3.60) | 0.05*** (3.49) | 0.07*** (3.69) |
| CONSTANT | -2.50** (1.98) | -1.96 (1.37) | -2.35* (1.87) | -1.39 (0.87) | -2.09*** (2.17) | -1.63 (1.43) | -1.81** (1.96) | -0.95 (0.71) |
| N | 56 | 55 | 56 | 55 | 56 | 55 | 56 | 55 |
| Pseudo R² | 0.15 | 0.11 | 0.16 | 0.18 | 0.14 | 0.10 | 0.16 | 0.18 |
| LogLikelihood | -74.09 | -76.14 | -72.87 | -0.70 | -74.54 | -76.88 | -73.25 | -70.56 |
| Wald χ^2 | 26.30 | 20.20 | 28.74 | 31.37 | 25.39 | 18.72 | 27.97 | 30.64 |

*, **, and *** indicate statistical significance levels of 10, 5, and 1% respectively (2-tailed)

TABLE 9

Empirical Determinants of the Decision to Network: Suggesting Managers

The dependent variable is the agreement to proposition SUGGESTS: *It is common for me to suggest likely managers to others in the private equity business.* Independent variables are described in Tables 1 and 5. Variable INFORMATION VALUE is the product of variables SPECIAL SKILLS and MANAGERIAL IMPACT. Estimates come from ordered probit analysis. In parentheses are the regression coefficients' z-values.

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|--------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| SPECIAL SKILLS | 0.00 (0.09) | 0.01 (0.20) | 0.03 (0.41) | 0.00 (0.00) | | | | |
| MANAGERIAL IMPACT | -0.03 (0.25) | -0.08 (0.54) | -0.06 (0.40) | -0.06 (0.37) | | | | |
| INFORMATION VALUE | | | | | 0.00 (0.10) | 0.00 (0.04) | 0.00 (0.29) | -0.00 (0.07) |
| REPUTATION | 0.49*** (4.53) | 0.47*** (4.33) | 0.50*** (4.65) | 0.46*** (4.16) | 0.49*** (4.55) | 0.48*** (4.40) | 0.50*** (4.71) | 0.46*** (4.20) |
| DIFFICULT HIRE | 0.12 (1.31) | | | 0.15 (1.58) | 0.12 (1.35) | | | 0.15* (1.64) |
| RISK | | 0.22*** (2.73) | | 0.25** (2.16) | | 0.22*** (2.72) | | 0.25** (2.16) |
| EARLY | | | 0.13* (1.81) | -0.01 (0.13) | | | 0.13* (1.80) | -0.01 (0.13) |
| logCAPITAL | -0.02 (0.29) | -0.01 (0.23) | -0.03 (0.43) | 0.01 (0.08) | -0.02 (0.28) | -0.01 (0.22) | -0.02 (0.42) | 0.01 (0.09) |
| N | 144 | 142 | 144 | 142 | 144 | 142 | 144 | 142 |
| Pseudo R ² | 0.07 | 0.08 | 0.07 | 0.09 | 0.07 | 0.08 | 0.07 | 0.09 |
| LogLikelihood | -159.96 | -155.62 | -159.17 | -154.37 | -159.99 | -155.79 | -159.29 | -154.44 |
| Wald χ^2 | 25.99 | 29.84 | 27.56 | 32.33 | 25.93 | 29.50 | 27.33 | 32.20 |

*, **, and *** indicate statistical significance levels of 10, 5, and 1% respectively (2-tailed)

TABLE 10**Empirical Determinants of the Number of Managers Suggested to Non-Partners**

The dependent variable is the number of managers suggested to non-partners in the previous 5 years. Independent variables are described in Tables 1 and 5. Variable INFORMATION VALUE is the product of variables SPECIAL SKILLS and MANAGERIAL IMPACT. Estimates come from Poisson regressions. In parentheses are the regression coefficients' z-values.

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|---------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| SPECIAL SKILLS | -0.28*** (3.02) | -0.14* (1.67) | -0.16* (1.87) | -0.27*** (2.91) | | | | |
| MANAGERIAL IMPACT | -0.30*** (3.73) | -0.36*** (4.32) | -0.34*** (4.05) | -0.32*** (3.73) | | | | |
| INFORMATION VALUE | | | | | -0.07*** (5.25) | -0.06*** (4.60) | -0.06*** (4.64) | -0.08*** (5.13) |
| REPUTATION | 0.23** (2.24) | 0.27*** (2.62) | 0.30*** (2.87) | 0.20* (1.91) | 0.25** (2.45) | 0.30*** (2.86) | 0.31*** (3.05) | 0.23** (2.20) |
| DIFFICULT HIRE | 0.40*** (4.77) | | | 0.44*** (4.81) | 0.41*** (5.08) | | | 0.45*** (5.03) |
| RISK | | 0.10 (1.26) | | 0.25* (1.84) | | 0.12 (1.53) | | 0.25* (1.86) |
| EARLY | | | 0.10 (1.52) | -0.15 (1.33) | | | 0.12* (1.90) | -0.14 (1.29) |
| logCAPITAL | 0.01 (0.28) | -0.02 (0.45) | -0.06 (1.24) | 0.11 (1.44) | -0.00 (0.02) | -0.05 (0.83) | -0.09 (1.61) | 0.08 (1.20) |
| DEALS | -0.01 (1.29) | -0.00 (0.21) | -0.00 (0.46) | -0.01 (1.10) | -0.01 (1.52) | -0.00 (0.30) | -0.00 (0.52) | -0.02 (1.39) |
| HIRINGS | 0.03*** (3.17) | 0.01 (1.29) | 0.01 (1.48) | 0.03*** (2.79) | 0.03*** (3.08) | 0.00 (0.85) | 0.01 (1.10) | 0.03*** (2.68) |
| CONSTANT | 1.18* (1.91) | 2.06*** (2.97) | 2.38*** (4.05) | 0.09 (0.11) | 0.05 (0.11) | 0.98* (1.64) | 1.37*** (2.86) | -1.06 (1.30) |
| N | 50 | 49 | 50 | 49 | 50 | 49 | 50 | 49 |
| Pseudo R² | 0.19 | 0.12 | 0.13 | 0.20 | 0.20 | 0.12 | 0.13 | 0.20 |
| LogLikelihood | -137.43 | -147.23 | -148.22 | -134.74 | -136.39 | -147.74 | -148.14 | -133.84 |
| Wald χ^2 | 68.68 | 41.97 | 47.10 | 66.95 | 70.77 | 40.95 | 47.27 | 68.75 |

*, **, and *** indicate statistical significance levels of 10, 5, and 1% respectively (2-tailed)