WORKING PAPER SERIES

Active Financial Intermediation: Evidence on the Role of Organizational Specialization and Human Capital

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Working Paper n. 266

July 2004

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July 2004 (First version: October 2003)

Abstract

Financial intermediaries can choose the extent to which they want to be active investors, providing valuable services like advice, support and corporate governance. We examine the determinants of the decision to become an active financial intermediary using a hand-collected dataset on European venture capital deals. We find organizational specialization to be a key driver. Venture firms which are independent and focused on venture capital alone get more involved with their companies. The human capital of venture partners is another key driver of active financial intermediation. Venture firms whose partners' have prior business experience or a scientific education provide more support and governance. These results have implications for prevailing views of financial intermediation, which largely abstract from issues of specialization and human capital.

1 Introduction

A central question for understanding financial intermediation is whether investors merely allocate funds, or whether they also play an active role in the companies they finance. The modern literature on financial intermediation has identified several dimensions of active involvement, such as monitoring, corporate governance, as well as a number of information-based advice and support services (see Boot (2000), Fama (1985), Petersen and Rajan (1994, 1995), Shleifer and Vishny (1997), and Stiglitz (1985) among others). There is also a widespread belief that active financial intermediation positively affects the behavior of portfolio companies (Hart (1995, 2001)). Recent empirical evidence supports the notion that active investors are valuable to the companies they finance, providing monitoring and governance which results in better performance (Anderson et al. (2003), Cremers and Nair (2004), Gompers, Ishii and Metrick (2003), Qiu (2003)).

In this paper we ask what makes some financial intermediaries more active and involved with the companies they finance than others. We submit that specialization is a key driver of investor involvement. Ever since Adam Smith, economists emphasize specialization as a driver of economic transactions. We build on this fundamental concept and ask if specialization can help us better understand the nature of financial intermediation. More specifically, we look at whether more focussed and specialized intermediaries become more involved with the companies they finance. We look at two dimensions of specialization. First, we consider specialization at the level of the organization. Second, we consider that financial intermediation is performed by people and look at specialization at the level of human capital. We also look at the interaction of these two levels of specialization, and ask whether the decision to be active resides at the level of the organization or whether it is individuals within the financial intermediaries who drive this choice.

Recent theories of financial intermediation emphasize the role of organizational structure. Stein (2002), in particular, shows how organizational structure affects the processing of 'soft' information, which he argues is at the core of financial intermediation. Empirically, the recent work of Berger et al. (2004), and Liberti (2003) also points to the role of organizational structure for financial intermediation. We build on this line of thought and ask how specialization of a financial intermediary—both in terms of organization and human capital—affects its involvement with the companies it finances.

Our analysis focuses on one important form of financial intermediation, venture capital. Venture capital has become an important part of the financial system, having grown enormously both in the US and globally (Bottazzi and Da Rin (2002, 2004), Gompers and Lerner (1999a), Lerner and Schoar (2004), Megginson (2004)). Central to our analysis is that venture capital is a form of financial intermediation where investors can choose how much to become involved with their portfolio companies. Indeed, prior research has already documented that there is considerable scope for active investing in venture capital. Active venture investors can help their portfolio companies in many ways, including giving advice and support, helping with professionalizing the management team, creating strategic alliances, or exercising corporate governance (Gompers (1995), Hellmann and Puri (2002), Hochberg (2004), Hsu (2004), Kaplan and Strömberg (2003, 2004), Lerner (1994), Lindsey (2003)). Venture capitalists can also spur their companies' innovation (Hellmann and Puri (2000), Lerner and Kortum (2000)). However, not all venture capital firms are

alike. Using the industry's language, some are "hands-on," while others are "hands-off" investors. We ask what explains this heterogeneity in venture capital investment styles.

We base our analysis on a hand-collected dataset of European venture capital investments. The data covers the period 1998-2001, and consists of a sample of venture capital deals in all the members of the European Union (in the period under study), plus Norway and Switzerland. Our primary data source is a comprehensive survey of all the venture capital firms in these countries. We augmented the data with numerous secondary sources, including commercial databases and websites. The relevant data for this paper consist of over 120 venture capital firms, over 500 partners, and over 1,600 portfolio companies. The data collection required considerable time and effort, but resulted in a dataset that is significantly larger than other hand-collected datasets on venture capital, and much richer than the commercially available datasets.

The extent of active investor involvement cannot be ascertained from standard sources of venture capital data (such as VenturExpert), nor can it be deduced from venture capital contracts. A unique strength of our survey-based approach is that it allows us to compile a variety of measures for active investor involvement. We obtain data on the frequency of interaction with a portfolio firm, the exercise of corporate governance, the support for recruiting management, and any assistance in obtaining additional financing.

Another advantage of our data is that we are able to construct several measures of specialization, both for the intermediary, and for its individual partners. In terms of specialization at the organizational level, we have a variety of measures, such as whether a venture capital firm is an independent partnership or not, whether it invest only in venture capital, or how many companies it finances per partner. We also have detailed data on individual partners' background, that allow us to document the relevance of human capital for financial intermediation. We measure human capital along three different dimensions: a partner's accumulated experience as venture capitalist, a partner's previous business experience, and a partner's scientific education. We construct both the average human capital for the venture firm as a whole, and the human capital profile of the individual partner (or partners) responsible for specific deals.

We find three main results, that are strikingly consistent across our measures of involvement. First, we find that an active investment style is strongly related to a financial intermediary's organizational specialization. Independent venture capital firms are significantly more likely to get involved with their companies. The same is true for firms that specialize their investment activities to doing only venture capital deals and for firms which concentrate on relatively few deals per partner. Second, beyond specialization at the organizational level, we find that human capital is also associated with a more active investment style. In particular, venture capitalists with prior business experience are significantly more involved with the companies they finance. Our third result comes from looking at the interaction between these two dimensions of specialization. We find that human capital augments, rather than replacing, organizational characteristics. Moreover, human capital effects operate mainly at the level of the venture firm, so that variation in human capital across venture firms has more explanatory power than variation among partners within the same firm.

We further refine these results in a series of extensions. Among other things, we

document that the role a venture firm plays in deal syndication is important: firms which lead a syndicate are more active than passive participants. Still, our main results on the importance of specialization are not affected by the inclusion of syndication variables. We also perform several robustness checks, including tests for endogeneity, sample selection, and a variety of measurement issues, and consistently find that the main results continue to hold.

We believe that our results provide new insights into the nature of financial intermediation. The recent literature suggests that the organizational structure of financial intermediaries matters. Our analysis not only empirically confirms the importance of organizational structure, it also pushes the argument one step further. If financial intermediation is about individuals processing soft information, as suggested by Stein (2002), then organizational structure can explain some variation, but some of the variation will also come from the individuals who process the information. That is, once we put the processing of soft information at the center stage of financial intermediation, we cannot escape the fact that the human capital of those in charge might matter. Our results confirm the importance of human capital for the process of intermediation. This poses a challenge to the prevalent theories of financial intermediation, which effectively ignore the role of human capital.

By introducing the role of human capital into financial intermediation, our work also relates to recent advances in understanding how individuals may affect corporate policies more broadly. Bertrand and Schoar (2003) and Malmendier and Tate (2003), for example, provide evidence that managerial characteristics affect corporate decision making.

The paper is structured as follows. Section 2 discusses our data. Section 3 examines the role of specialization at the organizational level. Section 4 looks at the role of human capital. Section 5 considers several extensions. Section 6 discusses numerous robustness checks. It is followed by a brief conclusion.

2   The Data

In this Section we discuss the sources and nature of our data. Before doing so, we wish to stress the advantages of using European data. The European venture capital market has matured considerably throughout the 1990s, growing in size and in its ability to invest in innovative companies with a potential for high-growth (Bottazzi and Da Rin (2002), Da Rin, Nicodano, and Sembenelli (2004)). The European market is also more heterogenous and less institutionalized than the US market, thus harboring a greater variety of venture capital firms that vary in terms of their organizational structure and human capital attributes. Therefore, it provides a fertile ground to study differences in investment styles, and thus to understand the effects of organizational specialization and human capital on financial intermediation.

2.1   Sources of data

Our data come from a variety of sources. Our primary source is a survey that we sent to 750 venture capital firms in the following seventeen countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Norway,

Portugal, Spain, Sweden, Switzerland, and the UK. This set of countries includes all the members of the European Union in the period under study, plus Norway and Switzerland.

We contacted venture firms that satisfied three conditions: (i) in 2001 they were full members of the European Venture Capital Association (EVCA) or of a national venture capital organization, (ii) they were actively engaged in venture capital and (iii) they were still in operations in 2002.

We deliberately excluded private equity firms that only engage in non-venture private equity deals such as mezzanine finance, management buy-outs (MBOs) or leveraged buy-outs (LBOs).[1] However, we did include private equity firms that invest in *both* venture capital and non-venture private equity deals. For these, we considered only their venture capital investments.

We collected our survey data between February 2002 and November 2003. We asked venture capital firms about the investments they made between January 1998 and December 2001. The questions centered on key characteristics of the venture firm, on the involvement with portfolio companies, and on some characteristics of these companies.[2] The survey asked respondents a substantial amount of detailed company-level information. We also asked information on the educational background and work experience of each venture partner.

We received 127 responses with various degrees of completeness. Of these, three venture firms had been formed in 2001 but had not yet made any investments, so we do not include them in our sample. We contacted all the venture firms that had sent us incomplete answers, and attempted to complete them whenever possible. As a further step, we augmented the survey data with information from the websites of the respondents and their portfolio companies. Finally, we turned to commercially available databases: Amadeus, Diane, Worldscope, and VenturExpert. We use information from these databases for two purposes. First, they allow us to obtain missing information, such as the dates, stages, and amounts of venture deals. Second, we use these databases to cross-check the information obtained from respondents. Such cross-validation further enhances the reliability of our data. Overall, we obtain data on 124 venture firms, 518 venture partners and 1,656 portfolio companies. Notice that we collect data only on the first financing given by a venture capital firm to a portfolio company.

Because of the survey nature of our data, we perform a variety of checks to assess how well the sample represents the population of European venture capital firms. Our first concern is how the sample fares in spanning the underlying population. Table 1 compares the sample with the population of 750 venture capital firms. Panel A looks at the country composition. While there is some variation in response rates across countries, our data represent a comprehensive cross-section which provides a good coverage of all countries. The overall response rate of over 16% is quite remarkable, and provides us with a substantial amount of information. This means that our sample is significantly larger than any prior survey of the European—or even US—venture capital industry. No single country dominates the sample, and no country is left out. Most notably, our sample

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[1] See Fenn, Liang and Prowse (2003) for a discussion of how the venture capital market is structure in two different segments, 'venture capital' and 'non-venture private equity.'

[2] Throughout the paper we reserve the term 'firm' for the investor (i.e., the venture capital firm) and the term 'company' to the company that receives the venture capital financing.

performs well in terms of including firms from the larger venture capital markets: France, Germany, and the UK all have response rates above 13%.

As a second step, we believe it is useful to show how our sample properties compare to the population characteristics. For this we made a substantial additional effort to collect data for all the 750 European venture capital firms, including those that did not respond to our survey. Unlike banks, venture capital firms are not regulated and do not need to fulfil any disclosure requirement. It is therefore left to their discretion whether to provide us with the requested information, and venture firms are notoriously secretive. Still, we were able to gather information on between two thirds and the whole of the population, depending on the dimension considered. We obtained the information through direct contact and through websites, commercial databases, or trade publications.

Panel B looks at the structure of both sample and population in terms of organizational types. We partition the sample into independent, bank, corporate, and public venture capital firms. As we argue later in the paper, different types of venture firms are likely to behave differently, and we want to make sure that our results are not driven by the sample composition. Panel B clearly shows that our sample reflects very closely the distribution of types in the population. The only possible exception is public venture firms, where our sample slightly under-represents the population. We therefore caution that our data is not ideally suited for generalizing about public venture capital firms.

Panel C compares the size distribution of our respondents with that of the whole population. We consider two possible size measures: the number of partners, and the amount of funds under management, both measured at the end of 2001. The number of partners is a simple and useful size measure for this form of financial intermediation, which crucially depends on a few high-quality professionals. For the sample and the population both the mean and median values of partners virtually coincide. The amount under management comprises all funds managed by venture capital firms, including those invested in non-venture private equity. The average firms size is larger for the population. This difference stems mainly from several very large private equity firms, that invest mainly in non-venture private equity, and that chose not to respond to our survey.Consistent with this, the median firm size is very similar for the sample and the population.

Another notable strength of our data is that it does not rely on a few venture capital firms. Indeed, the largest venture capital firm accounts for only 5% of the observations, and the largest 5 venture capital firms for only 16% of the observations.

Finally, we consider a potentially important source of reporting bias. Our respondents may in fact choose to report only part of their portfolio. Since we are not asking any information related to performance, we are not particularly worried that we obtain information biased towards more successful companies. Still, one may wonder that the detailed information we ask may result in under-reporting across the board. To check whether this is true, in late 2003 we checked all the websites of the respondents, listing all the portfolio companies contained. If a reporting bias was present, we would find a larger number of companies than had been reported. This turns out not to be the case. When we exclude the 137 portfolio companies of the 15 respondents that do not list companies in their website, we find 1,675 companies on respondents' websites. This compares to 1,519 companies from our sample. The difference of 156 companies amounts to just 10% of the companies

reported. We conclude that it is unlikely that under-reporting affects our results.

2.2 Data variables

Table 2 summarizes the definitions of our variables. In this Section we discuss how we construct them. Table 3 contains descriptive statistics for all the variables used in the analysis, grouped into four classes: dependent variables, organizational variables, human capital variables, and company variables.

2.2.1 Dependent variables

Our dependent variables are constructed at the level of the portfolio company. They capture five different aspects of the involvement of venture capital firms with each portfolio company:

INTERACTION is a dummy variable that takes the value 1 if the venture capital firm is reported to interact with the company on a monthly or weekly basis; 0 if it interacts with on an annual or quarterly basis. We obtain the data from our survey instrument, which asked: *How many times per year does (did) the responsible partner(s)/manager(s) personally interact with this company? (check one).* Possible answers were: *annually; quarterly; monthly; weekly.*

BOARD SEAT is a dummy variable that takes the value 1 if the venture capital firm is reported to sit or have sat on the board of directors of the company; 0 otherwise. We obtain the data from our survey instrument, which asked: *Is (or was) your firm represented on this company's board of directors?* Possible answers were: *Yes, No.*

HIRE DIRECTORS is a dummy variable that takes the value 1 if the venture capital firm is reported to be involved in the hiring of outside directors of the company; 0 otherwise. We obtain the data from our survey instrument, which asked: *Has your firm been involved in hiring some of this company's outside directors?* Possible answers were: *Yes, No.*

RECRUITING is a dummy variable that takes the value 1 if the venture capital firm is reported to be involved in recruiting senior management for the company; 0 otherwise. We obtain the data from our survey instrument, which asked: *Has your firm been involved in recruiting senior management for this company?* Possible answers were: *Yes, No.*

CEO, CFO, VP MARKET, HEAD OF R&D, OTHER are a set of five dummy variables that take the value 1 if the venture capital firm is reported to be involved in recruiting the Chief Executive Officer (CEO), the Chief Financial officer (CFO), a vice president of marketing, or the head of R&D, or another executive, respectively; 0 otherwise. We obtain the data from our survey instrument, as a direct follow-up on the RECRUITING question, asking: *If Yes, whom? (multiple choices allowed).* Possible answers were: *CEO; CFO; Vice President for marketing; Director of R&D; and other (specify).*[3]

FUNDRAISING is a dummy variable that takes the value 1 if the venture capital firm is reported to be help the company obtain additional financing; 0 otherwise. We obtain

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[3] We obtained 109 responses which indicated other management positions, ranging from Chief Operating Officer to Head of IT services.

the data from our survey instrument, which asked: *Has your firm helped this company obtain additional financing?* Possible answers were: *Yes, No.*

2.2.2 Organizational variables

The following variables are constructed at the level of the venture capital firm:

INDEPENDENTVC, BANKVC, CORPORATEVC and PUBLICVC are four dummy variables that take the value 1 if the venture capitalist defines itself as an independent, bank, corporate or public venture capital firm; 0 otherwise. We obtain the data from our survey instrument, which asked: *Would you define your firm as (check one): Independent venture firm, Corporate venture firm, Bank affiliated venture firm or Other (specify).*[4]

VCSIZE is the amount under management of the venture capital firm at the end of the sample period, in millions of current euros. We obtain the data by contacting directly respondent companies after receiving their main answers. For those firms for which we had not received the information directly we gathered the data from commercial databases, company websites and industry sources.

VCAGE is the age of the venture capital firm, measured in months at the end of the sample period. We obtain the data from our survey instrument, which asked: *Indicate the date of creation of your firm (mm/yy).* For those firms for which we had not received the information directly we gathered the data from commercial databases, company websites and industry sources.

MARKET FOCUS is a dummy variable which takes value 1 if the venture capital firm is reported to engage only in venture capital deals (i.e., excluding other private equity deals like MBOs or LBOs); 0 otherwise. We obtain the data from our survey instrument, which asked: *Does your firm invest in non-venture private equity deals such as management buy-outs (MBOs)?* Possible answers were: *Yes, No.*

DEAL FOCUS is a variable given by the inverse of the average number of companies financed, per partner, per year. We obtain the data to compute this ratio from two separate questions of our survey instrument. The first question asked: *Indicate how many business plans has your firm financed for each of the following years: 1998, 1999, 2000, 2001.* The second question asked: *Indicate the number of all partners/senior managers active as of December 2001.*[5]

2.2.3 Human capital variables

In our survey we asked: *Identify anonymously all partners/senior managers active as of December 2001.* On the basis of this information we can measure human capital profiles at two distinct levels. First, we construct them at the level of the venture firm. For this we consider the average human capital profile of the venture firm. This means that we

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[4] We carefully examined the three respondents which checked the 'other' category. One is a public university fund, and was classified as public; another is a family-controlled fund, and was classified as independent; the third is a fund owned by a a government company which engages in financing for small businesses, and was classified as public.

[5] In our survey instrument we specified that: *a partner or senior manager is a person with investment decision power within your firm, i.e. somebody who can decide whether to fund or not a company.*

measure the human capital of each partner, and then take the average across all partners within the firm. This leads to the following variables:

VENTURE-EXPERIENCE is the average number of years of experience in venture capital. We obtain the data from our survey instrument, which asked (for each partner/senior manager): *Indicate the years of experience as venture capitalist.*

BUSINESS-EXPERIENCE is the fraction of partners which have prior business experience. We obtain the data from our survey instrument, which asked (for each partner/senior manager): *Indicate the professional background (multiple answers possible).* Possible answers were: *finance; industry (including previous entrepreneurial experience); accounting; consulting; legal; other (specify).*

SCIENCE-EDUCATION is the fraction of partners which have an education in science or engineering. We obtain the data from our survey instrument, which asked (for each partner/senior manager): *Indicate the professional background (multiple answers possible).* Possible answers were: *business; humanities; engineering/science; law and social sciences; other (specify).*

Second, we construct human capital profiles at the level of the single portfolio company. For this we consider only the partner (or partners, if there is more than one) in charge of a deal. We obtain this data from an additional question from our survey instrument, which asked (for each company): *Which partner(s)/senior manager(s) has/had responsibility for monitoring this company?* Since the variables at the firm and company level are (by construction) correlated, we focus on the additional information provided by the fact that a particular deal was made by a particular partners. For this we take the human capital profile of the partners-in-charge, and subtract the average human capital profile of the firm. We indicate the resulting variables with: P-VENTURE-EXPERIENCE, P-BUSINESS-EXPERIENCE, P-SCIENCE-EDUCATION.

2.2.4 Company variables

Finally, we construct two independent variables at the level of the portfolio company:[6]

INDUSTRY is set of a dummy variables that we obtain the data from our survey instrument, which gave the following choices: *Biotech and pharma; Medical products; Software and internet; Financial services; Industrial services; Electronics; Consumer services; Telecom; Food and consumer goods; Industrial products (incl. energy); Media & Entertainment; Other (specify).*

EARLY STAGE is a dummy variable that takes the value 1 if a deal is reported as seed or start-up; 0 otherwise. We obtain the data from our survey instrument, which asked: *Indicate the type of your first round of financing to this company (check one).* Possible answers were: *Seed; Start-up; Expansion; and Bridge.*

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[6]For companies for which we had not received information directly from respondents, we gathered additional data from commercial databases, company websites and industry sources.

3 Specialization at the organizational level

We begin our analysis by asking how the specialization of an investor at the organizational level affects its involvement with the companies it finances. We already discussed the data construction of our variables. To motivate our empirical analysis, we now turn to their economic significance.

3.1 Motivating the dependent variables

Hellmann and Puri (2002) show that, beyond monitoring, venture capitalists actively support and professionalize the companies they finance. Our dependent variables thus capture how much venture capital firms get involved with their companies. The strength of using hand-collected survey data is that it provides us with a variety of involvement measures that are otherwise not available. These measures allow us to capture a broad array of governance and support activities.

The theoretical work of Casamatta (2003), Hellmann (2004), Inderst and Müller (2004), Repullo and Suarez (2004), Schiendele (2004), and Schmidt (2003) emphasizes the importance of venture capital effort, within a double moral hazard setting. Our first dependent variable is a summary measure of the intensity of interaction, measuring the reported frequency with which an investor interacts with the company. This variable can be broadly thought of as a proxy for the effort level provided by the venture investor.

The theoretical importance of board seats and governance in venture capital is developed by Dessein (2004), Gompers (1995), and Hellmann (1998). Gompers and Lerner (1996), Hochberg (2004), Lerner (1995) and Kaplan and Strömberg (2003) provide supporting empirical evidence. For our second dependent variable we then ask whether an investor sits on the boards of directors, which is a standard measure of corporate governance. Our third dependent variable is a complementary measure of how much the venture capital firm plays an active role in providing governance. We ask whether an investor helps portfolio companies to hire outside board members.

One of the unique features of the venture capital relationship is the role that the investors play in structuring the management team. Hellmann (1998) provides the theoretical foundations to the empirical work by Hellmann and Puri (2002), who show that venture capitalists play a substantial role in the professionalization of management teams. See also Sahlman (1990). For our fourth dependent variable we therefore ask whether an investor gets involved in recruiting management teams.

Finally, we are particularly interested in how venture capital firms can help in the process of obtaining additional financing from other financiers. Our fifth dependent variable therefore asks whether an investor helped the firm with further fund-raising from additional sources. This constitutes a new and alternative measure of venture capital support.

3.2 Motivating the independent variables

Looking at specialization at the organizational level, the most important dimension is whether a venture capital firm is independent or not. Independent firms can essentially

define their own investment styles. By contrast, so-called 'captive' venture capital firms—those owned by a bank, a corporation, or the government—can be strongly affected by the strategic goals of their parent organization. The work of Gompers and Lerner (2000), Hellmann (2002), Hellmann, Lindsey and Puri (2004)) already provide some evidence on how captive venture capital firms behave differently than their independent counterparts. In this paper we address an important unanswered question in this literature, namely whether independent venture capital firms are more or less active investors. We can think of independence as a form of specialization, in the sense that these firms are conceived as separate entities, whose driving goal is to make a profit from investing in venture capital.

We consider two other measures of the organizational specialization of venture capital firms. First, we ask whether a firm specializes only in venture capital, or whether it invests more broadly in other types of private equity deals, including mezzanine finance, leveraged and management buy-outs (LBOs and MBOs). Our market focus measure identifies those firms which concentrate on a single form of intermediation. Second, we ask how much a firm is willing to focus on a few companies rather than spreading its attention across a larger number of deals. Our deal focus measure looks at how many partners are, on average, available per company. Both of these variables measure the degree of specialization, one at the level of the focus on a single type of financing, the other at the more fine-grained level of how to manage the firm's deal flow.

We also control for the age and size of venture capital firms. Looking at US data, Gompers (1996) and Gompers and Lerner (1999b) suggest that the size and age of a venture capital firm may be a proxy for its quality and reputation. In the European context, the age of a venture capital firm also signals its vintage: older firms were founded at a time when the European venture capital industry was still in its infant stages and investment philosophies were considerably more conservative (Bottazzi and Da Rin (2004)).

Our regressions also include a number of company characteristics. We adopt a parsimonious specification for the main model, and discuss several additions and extensions in Section 5. We focus on two essential deal characteristics: industry and stage. Companies which receive venture finance at an early stage are likely to benefit to greater extent of the involvement of the venture capital firm, which can help them mature, harness their strategy, find valuable managers and additional sources of finance. We also control for the industry where a company operates since this might also affect the likelihood of receiving support from venture capital firms.

3.3 Estimation results

Table 4 reports the results for our model with measures of organizational specialization. For each dependent variable we report in column *(i)* the estimated coefficient and (below) its t-ratio, while in column *(ii)* we report the marginal increase in probability implied by the estimated coefficients. In all our regressions we use Huber-White robust standard errors. The number of observations differs across regressions because of missing values for some of the variables. We further discuss this in Section 6.

Table 4 shows that organizational specialization matters. First and foremost, it shows that independent venture capital firms are much more involved with their companies than captives. This is true for all five involvement measures. Being an independent venture

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firm thus strongly favors an active investment style.

Both the market focus and the deal focus variables also have a strong positive effect on most of the involvement variables. This says that firms that specialize on the venture capital market, and firms that focus on financing relatively few companies per partner, provide more governance and support to their companies.

The regressions of Table 4 also control for some additional venture firm characteristics. The size of the venture capital firm either is insignificant or it has a negative coefficient, suggesting that larger venture firms become less involved as investors. The venture firm' age coefficient is negative in the interaction and board seat regressions, but positive otherwise. This suggests an interesting pattern, whereby older venture capital firms place less emphasis on frequent interactions or board seats, but they are more active in hiring directors, recruiting management, and fund-raising. This is consistent with older venture firms relying less on formal governance mechanisms and providing a higher level of support to their companies, with less need for frequent interaction.

Overall, the results from Table 4 provide clear evidence that the specialization of financial intermediaries is strongly related to an active investment style. Notably, these effects are not only statistically significant, but also economically large. For example, across the five involvement measures, we find that independent firms have between 15% and 32% higher probabilities of being involved.

4   The role of human capital

4.1   Motivating the independent variables

Ultimately, financial intermediation is performed by people. Hayek (1945, p.520) and Becker (1993) both emphasize the importance of individuals acquiring specific knowledge about a narrow range of problems, thus specializing their human capital. Yet, the literature on financial intermediation essentially ignores human capital (see, e.g., Greenbaum and Thakor (1995) and Freixas and Rochet (1997)).[7]

We consider three distinct measures of human capital specialization. First, we look at a partner's experience in venture capital, as measured by the number of years that s/he has worked in the venture capital industry. The natural conjecture is that having more experience improves a partner's ability to perform his/her tasks. Second, we look at whether before becoming a venture capitalist, the individual had some business experience, be it by working in industry, consulting, or as an entrepreneur. Prior business experience might help a partner to better understand the challenges of portfolio companies, providing a measure of the partner's specialized experience in handling business problems. Third, we look at whether a partner has an education in science or technology. Science specialization may give a partner a better and deeper knowledge which can facilitate the appreciation of the technological and operational challenges of the companies s/he is in charge of.

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[7]It is interesting to note practitioners consider the venture capitalists' human capital of central importance. When the business press reports on venture capital, it regularly comments on the importance of individual partners and the importance of having the right background. Also, the web pages of venture capital firms typically introduce their firm by talking about their partners' backgrounds.

4.2 The main effects

Table 5 shows the results for our model with human capital, which uses only human capital variables and company characteristics. Table 6 presents the results of our full model, where we consider both organizational specialization and human capital variables. The two tables show very similar results.

The main result is that human capital seems to be an important driver for how active venture capitalists are. The most important human capital factor is prior business experience, which has a consistently positive, large and significant effect on all the involvement variables. This result confirms the notion that business expertise is important for practicing an active investment style. Having more experience in venture tends to also have a positive effect on involvement, but the effects are much weaker. Scientist partners get more involved in recruiting management and sitting on boards. However, they spend less time interacting with their companies.

Apart from being statistically significant, the effect of human capital also has a large economic impact. For instance, the probability of involvement increases between 16% and 47% if the venture partners marginally increase their business experience above the sample mean.

Comparing Tables 5 and 6 allow us to examine how organizational and human capital factors interact. One extreme view is that organizational structure does not matter by itself, and that investment styles are entirely defined by the specialized skills of managers (i.e., partners, in the context of venture capital). If this were true, we should find organizational variables to loose their significance once we control for partners' human capital. An intermediate view is that human capital operates on top of any organizational structure. In this case, we would expect human capital variables to provide additional explanatory power, without affecting the base effect of organizational structure. The other extreme view is that human capital doesn't matter at all. In this case, human capital variables would be insignificant. This is effectively what most of the financial intermediation literature implicitly assumes.

The results from Tables 5 and 6 show that human capital matters, and that adding human capital hardly affects the significance of organizational variables. This rejects either of the extreme positions, and favors the intermediate view. To further explore this pattern of interactions we also looked at the selection of partners into venture firms. In unreported regressions, we switched our unit of analysis and considered the data on individual venture capital partners. We looked at how human capital traits are related to different venture firms, but found relatively little correlation.[8] Selection of partners into venture capital firms therefore does not appear to be the driving force behind the effects of human capital on active involvement.

4.3 Do individual partners-in-charge matter?

So far we have shown that human capital matters. We now ask exactly whose human capital matters, and at what level. Is it that human capital matters because every partner

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[8]The strongest effects concerned the age of venture capital firms, with older venture capital firms attracting more partners with experience and science.

is unique? This would suggest that human capital should matter at the level of individual partners. Or is it that human capital matters because it contributes to define venture firms' own identity? This would suggest that human capital should matter mostly at the level of firms. Put differently, does the effect of human capital stem mainly from across-firm or within-firm variation?

To address this interesting question, we leverage the fact that when companies obtain funding, they will typically interact with only one or a few of the firm's partners. A unique strength of our data is that we can observe which partners are in charge of which deals. We have this data for many but not all our deals, so that we loose about 20% of our observations by going down to the level of the partners-in-charge. As before, we construct three human capital variables, but now we take averages only across the partners-in-charge instead of across all the venture firm's partners. Not surprisingly, the firm-level and partners–in-charge-level human capital variables are highly correlated. Since we want to see whether there is any additional information that stems from the heterogeneity at the level of the partners-in-charge, we use the difference between the partners-in-charge level and firm-level human capital variables. These difference measures are no longer correlated with the firm-level human capital variables. We label our difference variables at the partner level with the P-prefix.

We then use two approaches to estimate the effects of partners-in-charge. Table 7 reports the results from including the partners-in-charge variables into the main model from Table 6. Table 8 uses a conditional logit model, based on Chamberlain (1980), where the only variation that is used for the estimation is within-firm variation.[9] By construction, the conditional logit drops all observations when there is no within-firm variation, leaving us with a lower number of observations.

While Tables 7 and 8 use different estimation approaches, they show a consistent pattern of results. The overall effect of the partners-in-charge is relatively small. Most coefficients are statistically insignificant. The most important variable at the partner level is venture experience: More venture experience by individual partners has a positive effect on the involvement variables. While we noted before that venture experience does not matter much at the firm level, we now find that individual partners leverage greater venture experience to get more involved with their portfolio companies.

Overall, Tables 7 and 8 provide consistent evidence that the specialization of human capital is an important determinant of the behavior of financial intermediaries.

5   Further thoughts

In this section we further probe into our main result that organizational specialization and human capital are key drivers of investment styles, and provide a number of model extension.

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[9] This essentially amounts to using firm fixed effects. Indeed, we also reran all of our conditional logit models as linear probability models with firm fixed effect, and found analogous results.

5.1 The role of syndication

Investors may assume different attitudes toward involvement depending on the role they play in a company. Syndication may thus affect the degree of investor activism. Being part of a syndicate may dilute individual incentives, leading to a potential free-rider problem (Kaplan and Strömberg (2003)). A syndicate leader, on the other hand, typically assumes great responsibility and may also have a reputation at stake, suggesting more involvement (Brander, Antweiler, and Amit (2002), Lerner (1994)). We consider how syndication affects involvement decisions. We include two additional variables, one for whether a deal is syndicated, and one for whether the investor is the lead syndicator. Table 9 reports the results, suggesting three main insights. First, syndication is associated with lower levels of involvement. Second, leading a syndicate has a positive effect on the involvement variables. Third, adding the syndication variables barely affects all other coefficients, particularly those of our measure of specialization. This confirms that our main results are not driven by the presence of syndication or by the role of syndicate leader.

5.2 Are captive venture firms all alike?

Our analysis finds strong differences in the behavior between independent and captive venture capital firms. A natural question to ask is whether captive firms are all alike, or whether there are any important differences among them. We thus break out captive venture firms into bank, corporate, and public venture capital firms. For this, we need to make independent venture firms the default category. Table 10 shows that bank, corporate and public venture firms all have a negative effect on the involvement variables.[10] Virtually all the coefficients are highly significant. Corporate venture firms tend to have slightly smaller negative (and statistically less significant) coefficients, suggesting that bank and public venture firms are the least involved.

The fact that public venture capital is consistently less active than independent venture firms suggests a more cautious approach on part of those policy-makers who try to favor the creation of national venture capital industries through direct public involvement. As argued by Da Rin, Nicodano and Sembenelli (2004), public money is probably better spent in ensuring adequate conditions for the development of a private venture capital industry.

5.3 Depth of involvement

Hellmann and Puri (2002) note that when venture capitalists support the professionalization of their companies, they are not only concerned with recruiting chief executive officers (CEOs), but also become involved more deeply with building an entire management team. Our survey therefore asked additional detail about the role of venture capitalists in recruiting. Table 11 reports additional probit regressions, where the dependent variables are dummy variables that take the value of 1 if an investor reported to have helped the company with recruiting (respectively) the CEO, the chief financial officer (CFO), a vice-president of marketing, the head of R&D, or another executive. Our results on organizational specialization and human capital continue to hold for all of these more detailed

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[10]Remember that a positive coefficient for independent firms is the same as a negative coefficient for captive firms.

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recruitment variables. These results confirm that more focussed venture capitalists whose partners have more business experience are involved with recruiting irrespective of the particular position in the management team.

5.4 Additional deal characteristics

We want to investigate whether the model we employ adequately controls for the heterogeneity of venture deals. Because each additional company-level variable reduces the number of observations, we prefer to keep our base model parsimonious. We now discuss how adding further company-level variables does not affect our main results.

Kaplan and Strömberg (2003) note that the size of an investor's equity stake affects its incentive to be involved with the company. While we do not have data on equity stakes, we do have some data on the amount of money invested, on the basis that it is likely that investing larger amounts of money is correlated with larger ownership stakes. We use two variables. First, we consider the total amount of money that a venture capital firm invests in the deal. Second, we consider what percentage of the total financing raised by the company in the round is provided by our investor. The absolute amount invested has a positive effect on the involvement variables. The percentage of the financing provided by a venture capital firm has little explanatory power. Again, we find that including these additional variables does not affect our main results.

Another concern might be that our sample period includes the 'dotcom' period. The dotcom bubble was smaller in Europe than in the US. Nonetheless we ask whether time periods affect our results. We add a set of time dummies, one for each sample year, to measure when a deal was completed, but we find that they do not affect our results. We also reran all of our regressions dropping all deals that were classified as "Software and internet" and found that this did not affect our results either.

In our model involvement depends on the stage of the company. In addition to controlling for stage, we can also control for the age of the company when the deal was completed. Again, this does not affect the results.

Our data covers a total of seventeen different countries. In a companion paper we investigate the importance of country effects on venture capital investing (Bottazzi, Da Rin, and Hellmann (2004)). For this paper, we consider two simple extensions. We group countries by legal origin (LaPorta et. al. (1998)), both using a company's and an investor's legal system of origin. And we reran our regressions using individual country dummies. In all of these regressions, we find that our results are not materially affected by these additional controls.

6 Robustness of results

6.1 Endogeneity

To begin with, we want to clarify issues of endogeneity. We do not have any statistical endogeneity problem, in the sense that our left-hand side variables would directly cause right-hand side variables. For example, helping with recruiting cannot increase a partner's prior business experience. Endogeneity thus concerns the interpretation of our estimated

coefficients. Our main objective is to establish equilibrium patterns. This is conceptually different from making strong statements about specific causal links, which we don't claim to do. For example, when we observe a correlation between recruiting and independent venture firms, this establishes that, in equilibrium, independent venture firms provide more help with recruiting. This is consistent with the notion that such firms are better at providing such help. But it does not exclude selection effects, where companies that want more help with recruiting, seek out independent venture firms. Either outcome constitutes an economically meaningful equilibrium pattern. Establishing these equilibrium patterns is the explicit goal of this paper.

Naturally, and as an additional step, one can try to decompose treatment and selection effects, estimating a simultaneous equation model (Heckman (1976)). We focus on the choice between independent and captive venture capital firms. This is the most visible selection criterion for entrepreneurs. And our analysis shows that it has the biggest impact on the involvement outcomes. For the simultaneous equation model our base Probit models represent the treatment equations. We augment these with a selection equation to determine what kind of firms select independent venture firms. The independent variables for this are the company characteristics, namely industry and stage. To properly identify the system we want an additional independent variable that influences selection, but not outcomes. We propose to use the fraction of deals made by independent venture capital firms in the company's country. We name this variable VCINDE-SHARE. It is useful for identification, since, one the one hand, one would expect it to affect selection: a higher fraction represents a greater supply of independent venture firms, which makes it more likely for any one company to choose an independent venture firm. On the other hand, one would think that this fraction should not have any effect on the on-going involvement that a specific investor has with the specific company.

Table 12 reports the results from the simultaneous equation models. Accounting for selection does not change the fundamental insights of the main analysis. The coefficients for independent venture firms remain large and statistically significant in all the outcome regression. In fact, adding the selection equation hardly affects the main model at all. Interestingly, the estimates for ρ, which capture the strength of selection on unobservable characteristics, are mostly insignificant. This suggests that the selection equations does not interfere much with the treatment equations. Finally, we note that the system is well identified, in that the fraction of independent venture firms is significant with the expected sign.

6.2 Sample and measurement issues

We already discussed that our sample is unprecedentedly large, and that it closely matches population characteristics. As with any other hand-collected data, and in spite of a major effort to fill as many gaps as possible, we still end up with some missing observations on some variables. To verify that our data do not suffer from sample selectivity bias we perform several additional tests. First, we estimate a Heckman sample selection model, using the maximum likelihood approach. In the first step an ordinary Probit model is used to obtain consistent estimates of the sample selection equation. We find no strong patterns among the missing observations. Still, we estimate the second step, to verify that

there is no correlation between the selection equation and our main regressions. None of our regressions appear to be affected by this, suggesting that it is unlikely that our results are affected by sample selection problems.

As a further check on sample selectivity bias, we run our regressions on a sample restricted to those deals for which we have complete information. We find that our results are qualitatively unaffected.

Another sample-related concern might be that within our sample we have multiple deals made by the same investor. One may argue that these observations are not fully independent, and one might consider clustering standard errors. (This actually imposes a fairly strong assumption too, namely that all deals by the same investor have a common error structure). As one would expect, clustering tends to increase standard errors. This occasionally reduces the statistical significance of an individual coefficient, but does not affect the overall pattern of our results.

To measure human capital, we have considered average partner profiles. If, for example, half the partners in a firm have a science education, the value for science education is 0.5. To be sure that the results are not driven by this measurement approach, we consider an alternative way of measuring human capital. It might be that all that matters is whether one partner has a science education: others would benefit from that partner's specialized knowledge. To address this possibility we consider using 'maximal' instead of 'average' profiles. This means taking the highest value across partners for all human capital measures. In the above example, the value for science education would be 1. We find that using maximal profiles does not change the results. It thus appears that the results are robust to alternative ways of measuring human capital.

To construct our INTERACTION variable we pooled weekly and monthly interactions, and we pooled quarterly and annual interactions. We want to make full use of the information we have, and be sure that pooling has no effect on our results. To this purpose we estimate ordered probit models with the disaggregated information, where the dependent variable is an ordered categorical variable for annual, quarterly, monthly, or weekly interactions. We found that pooling did not affect any of our results.

Similarly, to construct our EARLY STAGE variable, we pooled seed and early stage, and we pooled expansion and bridge stage. We reran all of our regressions using the variable STAGE, where we add four independent dummy variables, which take the value 1 if a deal is reported as seed, start-up, expansion or bridge, respectively. We find that pooling stage information did not affect any of our results.

7 Conclusion

What makes financial intermediaries more or less active investors? In this paper we use data on venture capital to examine investor heterogeneity, and how it affects investment styles. Our findings suggest a fundamental economic force that has been largely ignored: specialization. Specialization matters at the level of firm: independent venture capital firms and firms that are focussed purely on venture capital have more active investment styles. We also document the relevance of specialization at the level of human capital: venture firms whose partners have prior business experience and a scientific education are

also more active investors.

These results have several important implications for the theory of financial intermediation. For one, this literature has largely ignored forces of specialization. It is curious to note that corporate finance scholars have been advocating the benefits of focus and specialization in the large and growing literature on conglomerate discounts. Yet they have been reluctant to take their own medicine, and apply the same logic to financial intermediation itself. This paper focuses on venture capital as one type of financial intermediation, but future research might want to extend this kind of analysis to other financial intermediaries too.

This paper also hopes to bring human capital to the forefront of financial intermediation research. Theories of intermediation typically assume homogenous agents, effectively abstracting away from human capital. Yet, if we take Stein's emphasis on the processing of soft information serious, we recognize that differences in ability are likely to be an important determinant of the process of financial intermediation. We thus hope that our findings will provide a broader impetus for looking at the role of human capital in financial intermediation.

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Table 1: Sample properties

This table compares our sample to the population it is drawn from. Panel A looks at the country composition and response rates, Panel B at the composition by venture firm type, Panel C at the size composition, and Panel D at the age composition. Variables are defined in Table 2. Partners are measured in units, the amount managed in million of current euros, and age in months in December 2001.

Panel A: COUNTRY COMPOSITION AND RESPONSE RATE

	POPULATION	SAMPLE	RESPONSE RATE
Austria	23	8	34.8%
Belgium	34	5	14.7%
Denmark	29	4	13.8%
Finland	33	6	18.2%
France	101	15	14.9%
Germany	146	19	13.0%
Greece	8	4	50.0%
Ireland	15	3	20.0%
Italy	37	6	16.2%
Luxembourg	3	1	33.3%
The Netherlands	52	5	9.6%
Norway	22	2	9.1%
Portugal	10	2	20.0%
Spain	38	10	26.3%
Sweden	17	6	35.3%
Switzerland	43	6	14.0%
UK	139	22	15.8%
TOTAL	*750*	*124*	*16.5%*

Panel B: COMPOSITION BY VENTURE FIRM TYPE

	POPULATION	SAMPLE
Independent	65.7%	67.7%
Corporate	8.0%	9.7%
Bank	19.3%	17.8%
Public	6.9%	4.8%

Panel C: COMPOSITION BY SIZE

POPULATION				
	Mean	Median	Min.	Max.
Partners	4.3	3	1	25
Amount managed	333.4	60	1	14,200
SAMPLE				
	Mean	Median	Min.	Max.
Partners	4.2	3	1	20
Amount managed	179.8	52	2	4,500

Table 2(a): Dependent variables

Variable	Description
INTERACTION	dummy variable that takes the values 1 if the venture firm interacts with the portfolio company monthly or weekly; 0 if it interacts annualy or quarterly.
BOARD SEAT	dummy variable that takes the value 1 if the venture capitalist is reported to sit on the board of directors of the company; 0 otherwise.
BOARD HIRE	dummy variable that takes the value 1 if the venture capitalist is reported to be involved in the hiring of the company's outside directors; 0 otherwise.
RECRUITING	dummy variable that takes the value 1 if the venture capitalist is reported to be involved in recruiting senior management for the company; 0 otherwise.
FUNDRAISING	dummy variable that takes the value 1 if the venture capitalist is reported to be involved with helping the company obtain additional financing from other sources; 0 otherwise.

Table 2(b): Organizational variables

Variable	Description
INDEPENDENTVC	dummy variable that takes the value 1 if the venture firm defines itself as an independent venture firm; 0 otherwise.
BANKVC	dummy variable that takes the value 1 if the venture firm defines itself as bank-affiliated venture firm; 0 otherwise.
CORPORATEVC	dummy variable that takes the value 1 if the venture firm defines itself as a corporate venture firm; 0 otherwise.
PUBLICVC	dummy variable that takes the value 1 if the venture firm is affiliated to government; 0 otherwise.
CAPTIVEVC	dummy variable that takes the value 1 if the venture firm is a BANKVC, CORPORATEVC or PUBLICVC; 0 otherwise.
VC-SIZE	is the amount under management at the venture firm.
VC-AGE	is the age of the venture capital firm, measured in months at the end of the sample period.
MARKET FOCUS	dummy variable that takes the value 0 if the venture firm is reported to invest also in non-venture private equity; 1 otherwise.
DEAL FOCUS	is the number of partners of the venture firm divided by its average yearly number of deals.

Table 2(c): Human Capital variables

Variable	Description
VENTURE-EXPERIENCE	is the average number of years of experience as venture capitalists by the venture firm's partners.
BUSINESS-EXPERIENCE	is the share of a venture firm's partners reported to have a professional background of working in industry or consulting.
SCIENCE-EDUCATION	is the share of a venture firm's partners reported to have an education in science or engineering.
P-VENTURE-EXPERIENCE	is the difference between the years of experience in the venture capital industry by the partner(s)-in-charge of a company and VENTURE-EXPERIENCE
P-BUSINESS-EXPERIENCE	is the difference between the share of partner(s)-in-charge of a portfolio company reported to have a professional background of working in industry or consulting and BUSINESS-EXPERIENCE.
P-SCIENCE-EDUCATION	is the difference between share of partner(s)-in-charge of a portfolio company reported to have an education in science or engineering and SCIENCE-EDUCATION.

Table 2(d): Company-level variables

Variable	Description
INDUSTRY	set of a dummy variables which assign each company to one of the following industries: Biotech and pharma; Medical products; Software and internet; Financial services; Industrial services; Electronics; Consumer services; Telecom; Food and consumer goods; Industrial products (incl. energy); Media & Entertainment; Other.
EARLY STAGE	dummy variable that takes the value 1 if a deal is reported as a seed or start-up, and 0 if it is reported as expansion, or bridge.
SYNDICATE	dummy variable that takes the value 1 if the deal is syndicated; 0 otherwise.
SYNDICATE LEAD	dummy variable that takes the value 1 if the venture firm is leading the syndicated deal.

Table 3: Descriptive statistics

This table provides descriptive statistics for all our dependent and independent variables. The definition of each variable is found in Table 2. For dummy variables the MEAN column reports the frequency of observations.

VARIABLE	MEAN	MEDIAN	MIN	MAX	OBS
Interaction	0.693	-	0	1	1,457
Board Seat	0.660	-	0	1	1,608
Board Hire	0.408	-	0	1	1,514
Recruiting	0.484	-	0	1	1,538
Fundraising	0.524	-	0	1	1,471
IndependentVC	0.594	-	0	1	1,643
BankVC	0.217	-	0	1	1,643
CorporateVC	0.088	-	0	1	1,643
PublicVC	0.099	-	0	1	1,643
CaptiveVC	0.406	-	0	1	1,643
VC-Size	258	109	1	4,500	1,631
VC-Age	93	54	12	390	1,643
Market Focus	0.557	-	0	1	1,643
Deal Focus	0.942	0.942	0.082	8	1,642
Venture-Experience	6.549	5.857	0	20.334	1,618
Business-Experience	0.584	-	0	1	1,633
Science-Education	0.378	-	0	1	1,633
P-Venture-Experience	0.643	0	-11.667	17.875	1,578
P-Business-Experience	0.004	0	-1	0.8	1,592
P-Science-Education	-0.014	0	-0.875	0.834	1,582
Early Stage	0.596	-	0	1	1,431
Syndicate	0.679	-	0	1	1,390
Syndicate Lead	0.582	-	0	1	1,271
Biotech and pharma	0.141	-	0	1	1,623
Medical products	0.073	-	0	1	1,623
Software and Internet	0.305	-	0	1	1,623
Financial services	0.017	-	0	1	1,623
Industrial services	0.052	-	0	1	1,623
Electronics	0.069	-	0	1	1,623
Telecom	0.083	-	0	1	1,623
Consumer services	0.020	-	0	1	1,623
Food and consumer goods	0.037	-	0	1	1,623
Industrial products	0.111	-	0	1	1,623
Media & entertainment	0.036	-	0	1	1,623
Other sector	0.056	-	0	1	1,623

Table 4: Specialization at the level of the organization

This table reports results from probit regressions for our base model. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are INDEPENDENTVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION (i)	INTERACTION (ii)	BOARD SEAT (i)	BOARD SEAT (ii)	BOARD HIRE (i)	BOARD HIRE (ii)	RECRUITING (i)	RECRUITING (ii)	FUNDRAISING (i)	FUNDRAISING (ii)
IndependentVC	0.468*** (5.38)	[0.17]	0.855*** (11.15)	[0.31]	0.739*** (8.75)	[0.26]	0.731*** (8.86)	[0.27]	0.474*** (6.13)	[0.19]
Market Focus	0.007 (0.09)	[0.01]	−0.112 (−1.35)	[−0.04]	0.346*** (4.15)	[0.13]	0.673*** (8.12)	[0.26]	0.221*** (2.71)	[0.09]
Deal Focus	0.235*** (3.63)	[0.08]	0.273*** (3.29)	[0.10]	−0.043 (−0.86)	[−0.01]	0.131** (2.92)	[0.05]	−0.030 (−0.75)	[−0.01]
VC-Size	−0.001*** (−3.40)	[−0.01]	−0.001*** (−3.25)	[−0.01]	−0.001** (−2.11)	[−0.01]	−0.001** (−2.13)	[−0.01]	−0.001 (−0.48)	[−0.01]
VC-Age	−0.005*** (−10.78)	[−0.01]	−0.003*** (−8.64)	[−0.01]	0.001*** (3.30)	[0.01]	0.001** (2.43)	[0.01]	0.002*** (4.97)	[0.01]
Early Stage	−0.123 (−1.42)	[−0.04]	−0.040 (−0.48)	[−0.01]	−0.067 (−0.82)	[−0.02]	0.061 (0.76)	[0.02]	0.171** (2.14)	[0.07]
Industry controls	Yes		Yes		Yes		Yes		Yes	
Observations	1,268		1,411		1,332		1,346		1,308	
χ²	209.48		271.73		206.43		257.93		139.44	
Model p-value	0.000		0.000		0.000		0.000		0.000	
Pseudo R²	0.152		0.181		0.112		0.159		0.073	

Table 5: The role of human capital

This table reports results from probit regressions for our model with human capital variables only. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION		BOARD SEAT		BOARD HIRE		RECRUITING		FUNDRAISING	
	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
Venture-Experience	0.015	[0.01]	0.054***	[0.02]	0.019*	[0.01]	0.051***	[0.02]	0.017	[0.01]
	(1.31)		(4.60)		(1.65)		(4.37)		(1.55)	
Business-Experience	0.722***	[0.25]	0.838***	[0.30]	0.926***	[0.35]	1.047***	[0.41]	0.956***	[0.38]
	(6.16)		(7.69)		(8.26)		(9.13)		(8.91)	
Science-Education	−0.540***	[−0.19]	0.833***	[0.30]	0.058	[0.02]	0.528***	[0.21]	−0.082	[−0.03]
	(−3.96)		(6.33)		(0.48)		(4.34)		(−0.66)	
Early Stage	0.010	[0.01]	−0.051	[−0.02]	0.037	[0.01]	0.197**	[0.08]	0.202***	[0.08]
	(0.11)		(−0.66)		(0.48)		(2.58)		(2.63)	
Industry Controls	Yes		Yes		Yes		Yes		Yes	
Observations	*1,255*		*1,308*		*1,329*		*1,343*		*1,295*	
χ^2	*59.85*		*181.28*		*142.96*		*200.20*		*137.82*	
Model p-value	*0.000*		*0.000*		*0.000*		*0.000*		*0.000*	
Pseudo R^2	*0.039*		*0.102*		*0.084*		*0.121*		*0.080*	

Table 6: The full model

This table reports results from probit regressions for our full model. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, INDEPENDENTVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION		BOARD SEAT		BOARD HIRE		RECRUITING		FUNDRAISING	
	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
Venture-Exp.	0.010 (0.58)	[0.01]	0.028** (2.00)	[0.01]	-0.022* (-1.66)	[-0.01]	0.016 (1.12)	[0.01]	-0.018 (-1.40)	[-0.01]
Business-Exp.	0.467*** (3.36)	[0.16]	0.852*** (7.18)	[0.30]	1.044*** (8.58)	[0.39]	1.164*** (9.83)	[0.46]	1.203*** (9.80)	[0.48]
Science-Educ.	-1.296*** (-7.57)	[-0.44]	0.459*** (3.13)	[0.16]	0.052 (0.039)	[0.02]	0.544*** (4.07)	[0.21]	-0.092 (-0.69)	[-0.04]
IndependentVC	0.505*** (5.09)	[0.17]	0.798*** (9.66)	[0.29]	0.785*** (8.42)	[0.27]	0.667*** (7.45)	[0.26]	0.591*** (6.77)	[0.23]
Market Focus	-0.010 (-0.11)	[-0.01]	-0.178* (-2.01)	[-0.06]	0.275*** (3.18)	[0.10]	0.666*** (7.68)	[0.26]	0.133 (1.72)	[0.06]
Deal Focus	0.209*** (3.10)	[0.06]	0.272*** (3.59)	[0.09]	-0.012 (-0.23)	[-0.01]	0.153*** (3.35)	[0.06]	-0.006 (-0.15)	[-0.01]
VC-Size	-0.001 (-1.65)	[-0.01]	-0.001*** (-3.40)	[-0.01]	-0.001 (-1.93)	[-0.01]	-0.001** (-2.10)	[-0.01]	0.001 (0.29)	[0.01]
VC-Age	-0.006*** (-12.36)	[-0.01]	-0.003*** (-6.72)	[-0.01]	0.002*** (4.89)	[0.01]	0.002*** (5.10)	[0.01]	0.004*** (6.81)	[0.01]
Early Stage	-0.051 (-0.57)	[-0.02]	-0.100 (-1.16)	[-0.04]	-0.090 (-1.06)	[-0.03]	0.019 (0.24)	[0.01]	0.162** (1.93)	[0.06]
Industry Controls	Yes		Yes		Yes		Yes		Yes	
Observations	*1,252*		*1,395*		*1,326*		*1,340*		*1,292*	
χ^2	*267.60*		*350.10*		*257.64*		*384.26*		*203.95*	
Model p-value	*0.000*		*0.000*		*0.000*		*0.000*		*0.000*	
Pseudo R^2	*0.199*		*0.221*		*0.169*		*0.231*		*0.144*	

Table 7: Full model with individual (partner) effects

This table reports results from probit regressions for our full model with the addition of partners' individual effects. The dependent variables are INTERACTION, BOARDSEAT, HIRE DIRECTOR, RECRUITING, and FUNDRAISING. The independent variables include two measures of specialized human capital. First we consider the difference between the human capital attributes of the partner(s)-in-charge of the portfolio company and the average human capital of their venture firm: P-VENTURE-EXP, P-INDUSTRY-EXP, and P-SCIENCE-EDU. Second, we consider the average human capital attributes of the venture firm financing the portfolio company: VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION. The other independent variables are INDEPENDENTVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION		BOARD SEAT		BOARD HIRE		RECRUITING		FUNDRAISING	
	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)	(i)	(ii)
P-Venture-Experience	0.031***	[0.01]	0.013	[0.01]	0.025**	[0.01]	0.027***	[0.01]	0.024**	[0.01]
	(2.70)		(1.17)		(3.31)		(2.51)		(2.21)	
P-Business-Experience	-0.078	[-0.03]	0.079	[0.02]	-0.084	[-0.03]	0.045	[0.01]	-0.014	[-0.01]
	(-0.56)		(0.57)		(-0.58)		(0.33)		(-0.09)	
P-Science-Education	-0.053	[-0.01]	-0.267*	[-0.08]	-0.118	[-0.03]	0.114	[0.05]	0.054	[0.02]
	(-0.40)		(-2.03)		(-0.87)		(0.87)		(0.28)	
Venture-Experience	-0.001	[-0.01]	0.065***	[0.02]	-0.013	[-0.01]	0.014	[0.01]	-0.040***	[-0.02]
	(-0.01)		(3.77)		(-0.88)		(0.86)		(-2.74)	
Business-Experience	0.340**	[0.13]	1.116***	[0.39]	0.945***	[0.33]	1.192***	[0.47]	1.019***	[0.40]
	(2.13)		(7.02)		(6.51)		(8.22)		(7.11)	
Science-Education	-1.001***	[-0.37]	-0.126	[-0.04]	-0.074	[-0.03]	0.185	[0.07]	-0.115	[-0.05]
	(-4.94)		(-0.60)		(-0.42)		(1.06)		(-0.65)	
IndependentVC	0.477***	[0.17]	0.583***	[0.21]	0.876***	[0.28]	0.611***	[0.23]	0.917***	[0.33]
	(4.24)		(5.74)		(7.92)		(5.93)		(8.72)	
Market Focus	0.263**	[0.09]	-0.132	[-0.04]	0.382***	[0.13]	0.341***	[0.21]	0.116	[0.05]
	(2.42)		(-1.24)		(3.61)		(5.20)		(1.13)	
Deal Focus	0.227***	[0.07]	0.205***	[0.06]	-0.031	[0.01]	0.169***	[0.06]	0.061	[0.02]
	(2.92)		(2.78)		(-0.66)		(3.49)		(1.29)	
VC-Size	-0.001*	[-0.01]	-0.001***	[-0.01]	-0.001	[-0.01]	-0.001**	[-0.01]	-0.001	[-0.01]
	(-1.65)		(-2.65)		(-1.45)		(-2.05)		(-0.23)	
VC-Age	-0.008***	[-0.01]	-0.004***	[-0.01]	0.003***	[0.01]	0.002***	[0.01]	0.003***	[0.01]
	(-14.02)		(-7.08)		(5.25)		(4.03)		(5.97)	
Early Stage	-0.082	[-0.03]	0.200**	[0.06]	0.032	[0.01]	0.230**	[0.08]	0.323***	[0.12]
	(-0.81)		(1.99)		(0.33)		(2.39)		(3.33)	
Industry controls	Yes		Yes		Yes		Yes		Yes	
Observations	*1,011*		*1,094*		*1,076*		*1,081*		*1,029*	
χ^2	*323.70*		*300.37*		*240.00*		*320.62*		*229.75*	
Model p-value	*0.000*		*0.000*		*0.000*		*0.000*		*0.000*	
Pseudo R^2	*0.268*		*0.243*		*0.206*		*0.234*		*0.197*	

Table 8: Full model with individual effects (conditional logit)

This table reports results from probit regressions for our full model. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The dependent variables are P-VC-EXPERIENCE, P-BUSINESS-EXPERIENCE, P-SCIENCE-EDUCATION, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, the firs row reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION	BOARD SEAT	BOARD HIRE	RECRUITING	FUNDRAISING
P-Venture-Experience	0.094**	0.055**	0.080**	0.048	0.067
	(2.41)	(2.13)	(2.20)	(1.29)	(1.64)
P-Business-Experience	0.012	0.407	−0.274	0.207	0.320
	(0.03)	(1.35)	(−0.58)	(0.56)	(0.77)
P-Science-Education	−0.639*	−0.465	−0.083	0.013	−0.021
	(−1.65)	(−1.76)	(−0.23)	(0.05)	(−0.07)
Early Stage	0.154	0.744***	0.511**	0.392*	0.669***
	(0.54)	(3.01)	(1.98)	(1.65)	(2.59)
Industry Controls	Yes	Yes	Yes	Yes	Yes
Observations	*550*	*891*	*634*	*806*	*750*
χ^2	*36.90*	*29.75*	*22.60*	*22.35*	*24.18*
Model p-value	*0.001*	*0.013*	*0.093*	*0.099*	*0.062*
Pseudo R^2	*0.086*	*0.045*	*0.046*	*0.037*	*0.042*

Table 9: Full model, controlling for syndication

This table reports results from probit regressions for our full model, where we break out VCCAP into VCBANK, VCCORP, VCPUB. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are SYNDICATION, SYNDICATE LEAD, VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, INDEPENDENTVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION (i)	INTERACTION (ii)	BOARD SEAT (i)	BOARD SEAT (ii)	BOARD HIRE (i)	BOARD HIRE (ii)	RECRUITING (i)	RECRUITING (ii)	FUNDRAISING (i)	FUNDRAISING (ii)
Syndication	-0.109 (-1.02)	[-0.04]	-0.281*** (-2.85)	[-0.10]	-0.449*** (-4.47)	[-0.16]	-0.453*** (-4.48)	[-0.17]	-0.350*** (-3.59)	[-0.14]
Syndicate Lead	0.076 (0.63)	[0.03]	0.824*** (6.77)	[0.26]	0.570*** (5.22)	[0.22]	0.536*** (4.84)	[0.21]	0.544*** (5.01)	[0.21]
Venture-Exp.	0.021 (1.22)	[0.01]	0.027* (1.77)	[0.01]	0.005 (0.29)	[0.01]	0.006 (0.48)	[0.01]	-0.021 (-1.26)	[-0.01]
Business-Exp.	0.797*** (5.49)	[0.26]	0.761*** (5.58)	[0.28]	1.120*** (8.20)	[0.38]	1.279*** (9.17)	[0.48]	1.404*** (10.09)	[0.55]
Science-Educ.	-1.553*** (-8.63)	[-0.51]	0.443*** (2.81)	[0.16]	0.297** (2.00)	[0.09]	0.744*** (5.12)	[0.27]	-0.048 (-0.34)	[-0.02]
IndependentVC	0.585*** (5.38)	[0.19]	0.758*** (8.46)	[0.29]	0.861*** (8.58)	[0.29]	0.640*** (6.63)	[0.24]	0.556*** (5.85)	[0.22]
Market Focus	0.060 (0.62)	[0.02]	-0.252*** (-2.58)	[-0.09]	0.315*** (3.35)	[0.10]	0.604*** (6.39)	[0.22]	0.100 (1.10)	[0.03]
Deal Focus	0.203** (2.76)	[0.05]	0.406*** (4.91)	[0.14]	-0.038 (-0.69)	[-0.03]	0.220*** (3.74)	[0.06]	0.011 (0.23)	[0.01]
VC-Size	-0.001 (-0.84)	[-0.01]	-0.001*** (-4.23)	[-0.01]	-0.001** (-2.77)	[0.01]	-0.001** (-2.43)	[-0.01]	-0.001*** (-0.27)	[-0.01]
VC-Age	-0.007*** (-9.75)	[-0.01]	-0.003*** (-4.83)	[-0.01]	0.001* (1.82)	[0.01]	0.003*** (4.21)	[0.01]	-0.004*** (5.60)	[0.01]
Early Stage	-0.042 (-0.51)	[-0.02]	-0.083 (-0.86)	[-0.05]	-0.109 (-1.14)	[-0.04]	0.003 (0.03)	[0.01]	0.146 (1.59)	[0.07]
Industry Controls	Yes		Yes		Yes		Yes		Yes	
Observations	1,037		1,170		1,128		1,144		1,092	
χ^2	270.47		321.87		256.11		323.29		201.62	
Model p-value	0.000		0.000		0.000		0.000		0.000	
Pseudo R^2	0.227		0.268		0.218		0.248		0.166	

Table 10: Full model, breaking out captive venture firms

This table reports results from probit regressions for our full model, where we break out VCCAP into VCBANK, VCCORP, VCPUB. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, VCBANK, VCCORP, VCPUB, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION (i)	INTERACTION (ii)	BOARD SEAT (i)	BOARD SEAT (ii)	BOARD HIRE (i)	BOARD HIRE (ii)	RECRUITING (i)	RECRUITING (ii)	FUNDRAISING (i)	FUNDRAISING (ii)
Venture-Exp.	-0.001	[-0.01]	0.048***	[0.02]	-0.021	[-0.01]	0.018	[0.01]	-0.017	[-0.01]
	(-0.06)		(3.09)		(-1.58)		(1.25)		(-1.30)	
Business-Exp.	0.387***	[0.13]	1.097***	[0.39]	1.025***	[0.37]	1.201***	[0.48]	1.244***	[0.49]
	(2.67)		(7.79)		(8.28)		(9.94)		(9.81)	
Science-Educ.	-1.413***	[-0.47]	-0.044	[-0.02]	-0.071	[-0.04]	0.469***	[0.18]	-0.266*	[-0.11]
	(-7.74)		(-0.25)		(-0.49)		(3.32)		(-1.83)	
BankVC	-0.403***	[-0.14]	-0.587***	[-0.22]	-0.835***	[-0.27]	-0.503***	[-0.19]	-0.513***	[-0.20]
	(-3.04)		(-5.74)		(-7.41)		(-4.72)		(-4.85)	
CorporateVC	-0.343**	[-0.13]	-0.099	[-0.04]	-0.308**	[-0.10]	-0.811***	[-0.29]	-0.363**	[-0.14]
	(-2.14)		(-0.62)		(-2.05)		(-4.71)		(-2.40)	
PublicVC	-1.349***	[-0.50]	-2.375***	[-0.70]	-1.333***	[-0.34]	-0.864***	[-0.32]	-1.099***	[-0.38]
	(-7.23)		(-11.53)		(-7.29)		(-5.43)		(-7.02)	
Market Focus	0.083	[0.03]	-0.110	[-0.04]	0.307***	[0.11]	0.704***	[0.28]	0.204**	[0.08]
	(0.85)		(-1.20)		(3.46)		(8.07)		(2.33)	
Deal Focus	0.221**	[0.05]	0.264***	[0.09]	-0.025	[-0.01]	-0.156**	[0.04]	-0.007	[-0.02]
	(3.35)		(3.40)		(-0.53)		(-3.23)		(-0.13)	
VC-Size	-0.001*	[-0.01]	-0.001***	[-0.01]	-0.001	[-0.01]	-0.001*	[-0.01]	0.001	[0.01]
	(-1.97)		(-3.07)		(-1.64)		(-2.03)		(0.21)	
VC-Age	-0.006***	[-0.01]	-0.004***	[-0.01]	0.002***	[0.01]	0.002***	[0.01]	0.004***	[0.01]
	(-11.57)		(-6.54)		(5.30)		(4.98)		(6.61)	
Early Stage	-0.037	[-0.02]	0.043	[0.01]	-0.064	[-0.02]	0.040	[0.01]	0.199**	[0.09]
	(-0.41)		(0.48)		(-0.75)		(0.47)		(2.35)	
Industry Controls	Yes		Yes		Yes		Yes		Yes	
Observations	1,252		1,395		1,326		1,340		1,292	
χ^2	300.62		354.33		290.74		407.10		219.44	
Model p-value	0.000		0.000		0.000		0.000		0.000	
Pseudo R^2	0.213		0.287		0.184		0.233		0.154	

Table 11: Full model, expanding recruiting

This table reports results from probit regressions for our full model, where the dependent variables are expansion of the RECRUITING variable. The dependent variables are: CEO (CHIEF EXECUTIVE OFFICER), CFO (CHIEF FINANCIAL OFFICER), VP (VICE PRESIDENT) FOR MARKETING, HEAD OF R&D (RESEARCH AND DEVELOPMENT), and OTHER (other types of executive positions). The independent variables are VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, CAPTIVEVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. For each independent variable, column (i) reports the estimated coefficient and the T-ratio (in parenthesis), computed using Huber-White robust standard errors; column (ii) provides the change in probability of the dependent variable due to a change in the independent variable implied by the probit coefficient, evaluated at the sample mean. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	CEO (i)	CEO (ii)	CFO (i)	CFO (ii)	VP MARKET. (i)	VP MARKET. (ii)	HEAD OF R&D (i)	HEAD OF R&D (ii)	OTHER (i)	OTHER (ii)
Venture-Experience	0.001 (0.02)	[0.01]	0.017 (1.22)	[0.01]	-0.054*** (-2.89)	[-0.01]	-0.061** (-2.47)	[-0.01]	0.062*** (3.88)	[0.05]
Business-Experience	0.941*** (6.61)	[0.30]	0.801*** (5.24)	[0.19]	1.345*** (6.75)	[0.05]	1.664*** (6.33)	[0.07]	0.015 (0.09)	[0.02]
Science-Education	0.654*** (4.21)	[0.20]	0.881*** (5.65)	[0.21]	-0.628*** (3.55)	[0.03]	0.546** (2.08)	[0.02]	0.252 (1.27)	[0.02]
IndependentVC	1.237*** (10.73)	[0.34]	1.048*** (8.63)	[0.23]	0.992*** (6.39)	[0.03]	1.916*** (6.08)	[0.02]	0.286** (2.12)	[0.03]
VC-Size	0.001 (1.23)	[0.01]	0.001* (1.68)	[0.01]	-0.003*** (-4.58)	[-0.01]	-0.002*** (-4.71)	[-0.01]	-0.001 (-1.18)	[0.01]
VC-Age	0.003*** (6.16)	[0.01]	-0.003*** (-4.50)	[-0.01]	-0.001 (-0.97)	[-0.01]	0.009*** (8.49)	[-0.01]	-0.005*** (-4.83)	[0.01]
Market Focus	0.826*** (7.78)	[0.25]	0.639*** (5.76)	[0.15]	0.034 (0.28)	[0.01]	0.001 (0.01)	[0.01]	0.453*** (3.43)	[0.04]
Deal Focus	-0.007 (-0.012)	[-0.01]	-0.085 (-1.40)	[-0.02]	-0.064 (-0.57)	[-0.01]	-0.570*** (-2.69)	[-0.02]	0.039 (0.62)	[0.01]
Early Stage	0.186* (1.87)	[0.05]	-0.065 (-0.87)	[-0.02]	0.095 (0.69)	[0.01]	0.350** (2.23)	[0.01]	0.04 (0.31)	[0.01]
Industry controls	Yes		Yes		Yes		Yes		Yes	
Observations	1,243		1,243		1,222		1,222		1,243	
χ^2	387.18		215.14		149.01		197.84		138.06	
Model p-value	0.000		0.000		0.000		0.000		0.000	
Pseudo R^2	0.334		0.236		0.291		0.454		0.158	

Table 12: Endogeneity

This table reports results from bi-probit regressions for our full model. The dependent variables are INTERACTION, BOARD SEAT, BOARD HIRE, RECRUITING, and FUNDRAISING. The independent variables are VC-EXPERIENCE, BUSINESS-EXPERIENCE, SCIENCE-EDUCATION, CAPTIVEVC, MARKET FOCUS, DEAL FOCUS, VC-SIZE, VC-AGE, and EARLY STAGE. In all regressions, INDUSTRY CONTROLS are included but not reported. Variables are defined in Table 2. The lower part of the Table reports the selection equations for each dependent variable, where the independent variables are VCINDE-SHARE and EARLY STAGE. For each independent variable, the first row reports the estimated coefficient and the second the T-ratio (in parenthesis), computed using Huber-White robust standard errors. Values significant at the 1%, 5% and 10% level are identified by ***, **, *.

	INTERACTION	BOARD SEAT	BOARD HIRE	RECRUITING	FUNDRAISING
Venture-Exp.	0.008	0.027*	-0.024*	0.01	-0.012
	(0.53)	(1.93)	(-1.76)	(1.03)	(-0.93)
Business-Exp.	0.447***	0.854***	1.031***	1.180***	1.238***
	(3.24)	(7.21)	(8.40)	(9.79)	(9.83)
Science-Educ.	-1.277***	0.474***	0.079	0.539***	-0.083
	(-7.62)	(3.26)	(0.56)	(3.99)	(-0.61)
IndependentVC	0.832***	0.460**	0.774***	0.648***	0.482***
	(4.59)	(2.44)	(4.68)	(3.41)	(2.56)
Market Focus	0.010	-0.191**	0.318***	0.691***	0.180**
	(0.11)	(-2.13)	(3.62)	(7.70)	(2.10)
Deal Focus	0.212***	0.264***	-0.052	0.169**	0.076
	(3.11)	(3.42)	(-1.05)	(3.26)	(1.51)
VC-Size	-0.001	-0.001***	-0.001*	-0.001**	-0.001
	(-1.56)	(-3.67)	(-1.77)	(-2.03)	(-0.54)
VC-Age	-0.006***	-0.003***	0.002***	0.002***	0.004***
	(-11.74)	(-6.58)	(5.06)	(4.90)	(6.59)
Early Stage	-0.100	-0.075	0.117	0.024	0.144*
	(-1.10)	(-0.85)	(-1.35)	(0.28)	(1.70)
Industry Controls	Yes	Yes	Yes	Yes	Yes
SELECTION EQUATIONS					
Vcinde-share	2.955***	3.065***	3.157***	3.106***	3.019***
	(15.75)	(16.13)	(16.07)	(15.95)	(15.43)
Early Stage	0.400***	0.210***	0.166**	0.203**	0.253***
	(4.75)	(2.67)	(2.04)	(2.51)	(3.11)
Industry Controls	Yes	Yes	Yes	Yes	Yes
ρ	-0.259**	0.249**	0.031	0.089	0.039
	(-2.22)	(1.99)	(0.30)	(0.82)	(0.32)
Observations	*1,206*	*1,345*	*1,276*	*1,290*	*1,249*
χ^2	*574.06*	*484.47*	*467.95*	*541.04*	*437.43*
Model p-value	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*