

Advice and monitoring in venture finance

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Published online: 23 January 2007
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Abstract This paper provides empirical insight into the role of contracts and legal systems for managing investor–investee relationships along two dimensions: providing advice and addressing conflict. We examine a new detailed dataset from European venture capital (VC) funds. We match very specific contractual terms in VC contracts with the effort (total time spent) and advice that VCs provide to their entrepreneurial investee firms. We also analyze VC–entrepreneur conflicts. We compare the importance of contractual versus non-contractual governance mechanisms, as well as the role of legal systems in different countries for facilitating VC–entrepreneur relationships. The data indicate VC cash-flow and control rights significantly facilitating effort and advice that VCs provide to entrepreneurs. VC–entrepreneur conflicts are closely tied to the quality of laws in which the entrepreneur resides: higher quality legal systems mitigate VC–entrepreneur conflicts. The data further indicate that non-contractual governance mechanisms significantly facilitate VC advice and mitigate VC–entrepreneur conflicts. The results provide a unique unifying look into the role of actual VC contracts and legal settings versus non-contractual governance

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mechanisms, risk, and success potential on VC–entrepreneur relationships in an international context.

Keywords Venture capital · Monitoring · Advice

JEL Classification G24 · G28 · G31 · G32

1 Introduction

A common theme across the literature in economics, finance, and law is the role of formal mechanisms (e.g., actual contracts that specify ownership and control, and the law that governs the enforcement of such contracts) versus informal mechanisms (e.g., trust, reputation, and management structures) in governing relationships. Contracts are by definition incomplete, as not all eventualities can be anticipated at the time of writing a contract (see, e.g., Hart and Moore 1999). We may therefore expect informal governance mechanisms will play a strong role in relationships that are formed by contract. For example, Kannianen and Keuschnigg (2003, 2004) and Keuschnigg (2004) show an important role for formal and informal governance mechanisms in the context of portfolio size per manager of venture capitalists (“VCs”), which actively seek to add value to entrepreneurial firms not listed on stock exchanges.¹

At issue in this paper is the comparative importance of the more formal contracts and legal settings versus other informal non-contractual governance mechanisms for governing relationships. This paper provides a unique contribution to the literature by (1) matching detailed VC contracts to actions taken by VCs in an international context, and (2) comparing the role of contracts to other governance mechanisms in facilitating VC advice to entrepreneurs versus mitigating VC–entrepreneur conflicts.² The international dimension of our dataset also enables a unique examination of the role of legal systems and legality in different countries (including the rule of law, contract repudiation, among other things; see La Porta et al. 1997, 1998; Berkowitz et al. 2003) for facilitating VC–entrepreneur relationships. It is useful to assess legal systems in conjunction with contracts, as the law provides enforcement mechanisms

¹ See also Keuschnigg (2003) and Keuschnigg and Nielsen (2001, 2003a,b, 2004) for related analyzes of taxation, agency costs and entrepreneurship.

² We use the term “venture capital” in the broad (European) definition of the term. In Europe, the term “venture capital” is defined more broadly than that in the US. All of the funds in our sample do invest in earlier stages of development, but some funds also finance later stage investments (which is referred to as “private equity” not “venture capital” in the US). Hence, we do not exclude investments from the sample data on the basis of the stage of development, because the same VC managers in our sample have contemporaneously invested in both early stage projects and buyouts. That VC managers finance different types of entrepreneurs in different stages is not unheard of in the US. Many VC funds in the US Venture Economics database, for example, indicate a range of investments from seed to buyout, although other US VC funds are prohibited from financing buyouts (see Gompers and Lerner 1999, 2001), as are non-US funds (Cumming and Johan 2006a, b).

for contracts as well as provides a basis for the interpretation of incomplete contracts (i.e., the law provides a set of default rules).

The VC setting is an interesting one in which to analyze the role of law and contracts versus non-contractual mechanisms in business relationships. It is widely recognized that entrepreneurship is characterized by problems of information asymmetry, illiquidity, and non-diversification, and therefore high risk in terms of both idiosyncratic and market risk. An overriding issue is thus the role of the “expert” investor. In fact, one of the primary explanations for the existence of VCs is the presence of pronounced problems of adverse selection and moral hazard in financing entrepreneurial firms (Sapienza 1992; Amit et al. 1998; Zacharakis and Shepherd 2001; Kannianen and Keuschnigg 2003, 2004; Mayer et al. 2005). Inherent in the VCs ability use their expertise to provide valuable advice to the firm is the ability to interfere in business or operational decision-making of start-ups. For example, VCs often substitute the founder entrepreneur with a professional manager when they feel that the firm is best served by a manager with different skill sets to further develop the firm, regardless of the sweat equity put in by the founding entrepreneur. The VC setting is thus an interesting and important context in which to explore the management of investor–investee relations (or in this case, VC–entrepreneur/entrepreneurial firm relations), since the advice may be as important as the contributed capital, and conflict as detrimental as the absence of the contributed capital (Manigart et al. 2000, 2002a, b, c).

In the investigation of the VC–entrepreneur relationship in this paper, we consider “effort” put in by the VC, or the total number of hours per month spent with the entrepreneurial firm by VCs. We then differentiate this VC commitment to the entrepreneurial firm along two effort dimensions, which we will further refer to as the provision of “advice” and addressing “conflict”. We directly measure effort exertion on advice and conflict based on the premise that providing advice is congruent while conflict is dissonant with respect to entrepreneurial interests. In particular, “advice” is the average of the VCs’ rankings, on a scale 1 (lowest)–10 (highest), of the VCs’ contribution to the venture in the following advising fields: strategy, marketing, issues related to financing, R&D, product development, human resources, exit strategy advice, interpersonal support, help in networking, and any other. “Conflict” is the total number of issues for which the VC reported disagreement with the entrepreneur, including strategy, marketing, issues related to financing, R&D, product development, human resources, replacement of founder, and any other. Advice is equivalent to the provision of effort or expertise by the VC that constructively contributes to the value of the venture. On the other hand, conflict refers to a state of affairs that call for the VC’s effort to govern and interfere with the entrepreneur’s activity. Note that advice and number of hours per month are correlated (the correlation coefficient is 0.39), but not perfectly so as hours per month spent with the venture may also involve conflict, and VCs may rank advice higher without spending more time advising the firm.

This paper is distinct from prior papers in that we develop a framework for distinguishing the role of contracts (specific details on VC cash-flow and

control rights) from legal settings (the law of the country in which the entrepreneurial firm resides) for providing formal governance mechanisms for VC–entrepreneur relationships. We further consider and compare the role of formal governance mechanisms (contracts and legal systems) versus other informal non-contractual governance mechanisms (proxied by variables such as syndication and portfolio size per manager) and variables for project risk and success potential, among other things. Prior studies have not provided a unifying look into the role of actual VC contracts and legal settings versus other non-contractual governance mechanisms, risk and success potential on VC–entrepreneur relationships in an international context.

In brief, the data support the view that formal contracts (both cash-flow and control rights) are important for facilitating VC advice, but not mitigating VC–entrepreneur conflicts. The legal system is important for mitigating VC–entrepreneur conflicts, but not facilitating VC advice. The data also indicate non-contractual governance mechanisms and project characteristics are as important as formal governance mechanisms for both facilitating VC advice and mitigating VC conflict.

The paper is organized as follows. Sections 2 and 3 outline our hypotheses and then describes the methodology employed to test the hypotheses. The data are thereafter described in Sect. 4. The core empirical results together with robustness checks are detailed following the presentation of the data in Sect. 5. Section 6 discusses limitations and alternatives for future research. Concluding remarks follow in Sect. 7.

2 Hypotheses

Our hypotheses concerning the determinants of effort exertion by VCs are based on a number of theories modeling the VC's involvement in the entrepreneurial firm through exerting effort. These theories focus on three specific issues: (1) whether the cash-flow allocation has a role in implementing optimal incentive schemes for the entrepreneur and the VC, (2) whether the allocation of control rights provides implicit incentives for the VC to interfere in entrepreneurial decision-making, and (3) the quality of the legal system of the jurisdiction in which the entrepreneurial firm is located. Below, we briefly discuss the most important theories addressing these issues and their empirical implications.

2.1 Allocation of cash-flow rights

The allocation of cash-flow rights affects the effort that the VC and the entrepreneur will contribute to the entrepreneurial venture. Prior research has established that efficient effort is elicited from VCs where VCs are allocated convertible securities (convertible debt or convertible preferred equity)

(Casamatta 2003; Schmidt 2003).³ The intuition is as follows. First, consider non-convertible debt or non-convertible preferred equity relative to convertible securities. If the VC uses non-convertible debt or non-convertible preferred equity, the VC does not obtain any ownership interest in the entrepreneurial firm and therefore does not typically have a financial incentive to provide effort. The only case where the VC has an incentive to provide effort is in cases of expected liquidation (where the entrepreneurial firm is potentially experiencing liquidation, the VC does have an incentive to provide effort as the amount paid to the VC varies directly with the residual value of the entrepreneurial firm; see also Zimmermann 2002). Hence, convertible securities enable stronger incentives for the VC to provide effort than straight debt or straight preferred equity because the VC has the incentive to provide effort in both times of financial distress as well as in good times when the firm is not expecting liquidation.

Second, if the VC uses common equity, the VC does not have the high-powered incentives to help the firm in times of financial distress (typically early in the life of the entrepreneurial firm), unlike the case where the VC holds convertible debt or preferred equity (Berglöf 1994). As just mentioned, when a firm is in financial distress, debt or preferred equity provides stronger incentives to the VC to provide effort because the entire increase in the value of the firm immediately prior to liquidation goes directly to the debt or preferred equity holder. In good times (when not experiencing financial distress), the contingent claim associated with convertible securities provides stronger incentives for the VC to provide effort (Hellmann 1998; Casamatta 2003; Schmidt 2003).

Pursuant to staged financing rounds, there is an agency problem that is sometimes colloquially referred to as “cooking the books” or “window dressing”. That is, entrepreneurs may make the firm look better than it really is in order to secure the next financing round from the VCs. Window dressing problems are typically considered to be more pronounced for informationally opaque firms (early stage and high-tech firms). The entrepreneur’s incentive to window dress is mitigated when the VC holds a convertible debt or convertible preferred security (Cornelli and Yosha 2003), because the VC may convert its preferred security too early (from the perspective of that which would otherwise be optimal for the entrepreneurial firm) if the entrepreneur provides a biased signal of quality. Window dressing may give rise to a conflict between entrepreneurs and VCs; because convertible securities have been theoretically shown to mitigate the incentive to window dress (Cornelli and Yosha 2003), there is reason to believe that convertible securities may also mitigate the extent of VC–entrepreneur conflicts.

Hypothesis 1a *VCs provide more effort and advice to entrepreneurial firms financed with convertible securities (instead of common equity or debt). Moreover, the effort exerted by the VC and advice provided is directly correlated with the VC’s ownership percentage.*

³ See Gorman and Sahlman (1989), Sahlman (1990), Repullo and Suarez (2004) for theoretical work and discussions; see also evidence in Kaplan and Strömberg (2004) and Cumming (2005).

Hypothesis 1b *There are fewer VC–entrepreneur conflicts within entrepreneurial firms financed with convertible securities.*

2.2 Allocation of control rights

Theoretical work in VC finance has indicated that control rights also matter for VC effort incentives. Chan et al. (1990) claim that VCs require substantial control rights because of the internal risk associated with the quality of the founding entrepreneur. For example, control rights provide the VC with incentives to engage in an executive search so that he is able to substitute the original manager or founding entrepreneur once that manager turns out to be insufficiently skilled as the firm progresses or develops. Therefore, the more internal risk involved with the venture, the more control is allocated to the VC, and the more intense the VC's effort exertion. Where VCs exercise control rights to replace the founding entrepreneur or existing manager with a new manager, conflicts are also more likely to arise between the entrepreneur and VC. For instance, Hellmann and Puri (2002) show VCs are more likely to replace the founder with an outside CEO, both in situations that appear adversarial and otherwise [as well as facilitate a number of professionalization measures for the entrepreneurial firm such as adopting stock option plans (see also Ammann and Siez 2005), human resource policies and hiring key personnel]. In addition to internal risk regarding the founding entrepreneur's skill, there is also risk regarding the quality of the project and the likelihood of market adoption. Hellmann (1998) and Kirilenko (2001) argue that a higher degree of external risk associated with project quality and market adoption requires that in equilibrium more control is allocated to the VC. If riskier projects require more effort, the provision of control to the VC should exacerbate the VC's contribution.⁴

Recent work is further consistent with the view that the provision of control rights to the VC may exacerbate the inequality in bargaining power between the entrepreneur and VC, and allow the VC to act opportunistically vis-à-vis the entrepreneur. Fried and Ganor (2006) show that VCs with strong control rights may have an incentive to choose lower-value, lower-risk investment and exit strategies over higher-value, higher risk strategies. For example, VCs may prematurely push for liquidation events, such as dissolutions or mergers that hurt entrepreneurs as ordinary common shareholders but benefit VCs as preferred shareholders. Where entrepreneurs disagree with the control rights exercised by the VC, there is also greater scope for potential conflict between the VC and entrepreneur. These theories imply the following hypotheses.

Hypothesis 2a *VCs provide more effort and advice for entrepreneurial firms for which the VC has been allocated greater control rights.*

⁴ Several theories outside the VC context also suggest that investors' control rights enhance interference. The most well-known examples are Aghion and Bolton (1992) and Burkart et al. (1997).

Hypothesis 2b *VC–entrepreneur conflicts are more likely among investee firms for which the VC has been allocated greater control rights.*

As discussed below, in testing Hypotheses 2a and 2b, we control for the various types of risk associated with the investment (among other things), to ascertain the role of control rights.

2.3 Quality of legal system

Countries differ in terms of the strength of legal protections afforded to investors and entrepreneurs alike, including the efficiency of the judicial system, the rule of law, corruption, risk of expropriation, risk of contract repudiation, and shareholder rights (in other words, the substantive content of laws pertaining to investing, the quality of their enforcement, and the likelihood that they will need to be enforced). La Porta et al. (1997, 1998) have developed indices that account for the strength of each of these legal factors across countries and Berkowitz et al. (2003) have developed a *Legality* index, which is a weighted sum these indices derived from La Porta et al. (1997, 1998).

There are at least three primary reasons to believe that *Legality* matters in the context of managing VC–entrepreneur relationships (see also Armour and Cumming 2006; Leleux and Surlemont 2003). All else being equal, a higher *Legality* index in a country is associated with more certain enforcement of contract terms and a clearer delineation of the rights and responsibilities of the VC and entrepreneur. Better legal systems mitigate information asymmetries associated with decision making pursuant to rights granted via contracts (consistent with La Porta et al. 1997, 1998; however, see also Drobetz 2002, and Bühner et al. 2005). Moreover, better legal systems provide a clearer interpretation of incomplete contracts. Contracts are by their nature incomplete, as not all contingencies and eventualities can be anticipated at the time of investment and incorporated into a written contract. Terms, items, and eventualities not considered and incorporated into contracts are interpreted by the legal system of the country of domicile of the entrepreneurial firm. Matters that govern relationships between firms and their investors depend on the quality of the legal system. Therefore, we expect that *Legality* will mitigate the scope of VC–entrepreneur conflicts and facilitate the provision of VC advice:

Hypothesis 3 *Countries with better legal systems mitigate the scope for VC–entrepreneur conflict as better legal systems facilitate more certainty in the enforcement of contracts, as well as the interpretation of incomplete contracts.*

The primary methods for studying the three central hypotheses are described in the next section. A description of the data and empirical tests follow thereafter in the subsequent sections.

3 Methodology

In this section, we first describe the measurement of the dependent variables for measuring advice and conflict, and compare our measurements to that used

in related work. Thereafter we discuss the variables for testing the central hypotheses and the set of control variables.

3.1 Dependent variables: hours per month, advice and conflict

The unit of analysis in this paper is the entrepreneurial firm. Our empirical proxy the involvement of the VC by the total number of hours per month spent with the entrepreneurial firm. We also asked VCs to rank the importance of their contribution to the venture in a number of different fields of activities on a scale of 1–10 (lowest–highest). Although this measure is subject to the VCs' own performance evaluation, it is indicative that in most advising activities considered, VCs reported a significantly higher number of monthly hours for ventures for which they gave higher advice rankings. It was important to distinguish “advice” from “total hours” because certain hours spent may be attributable to addressing “conflict” and not providing the more constructive “advice”.

Our measure for conflict is based on the number of different types of disagreements with the entrepreneur. We asked VCs to report whether they had disagreements with the entrepreneurial firm concerning different matters including strategy, marketing, financial matters, R&D, human resources, and product development. Our proxy for conflict is the sum of these potential areas of disagreement; that is, it is a measure of the scope of disagreement.⁵ We do not count the frequency of disagreements over the same issue as that was not empirically tractable (VCs could not count how many times they disagreed with, for example, human resource policies; it was either an issue of conflict or it was not).

Note that our measure of conflict (the scope of disagreement) may be correlated with VC monitoring activities carried out during total hours spent on firm business; that is, more intensive monitoring increases the possibility for the VC to discover entrepreneurial shirking and thus gives rise to a higher number of conflicts between the two parties. However, unlike prior work that has directly examined monitoring versus advice (e.g., Kaplan and Stromberg 2004), in our empirical analysis we focus on advice in terms of all types of value-added assistance provided by the VC, and distinguish advice from conflict in terms of the scope of VC–entrepreneur disagreement, which is dissonant with respect to entrepreneurial interests. As indicated, we also provide a measure of total effort in terms of the total number of hours per month the VC spent with the entrepreneurial firm. We provide a new contribution to the literature by examining effort, advice and conflict in relation to very detailed terms used in contracts, among other variables described below.

⁵ It is of course true that not all areas of disagreement may be equal, but when we redefined the dependent variable for disagreement as a subset of different types of disagreement the results did not materially change. (That is, if we changed the variable to a small degree by deleting one or two types of disagreement then the results did not drastically change.) We felt that it was appropriate to consider all types of disagreement mainly because we did not have a theoretical basis for doing otherwise. Additional specifications are available upon request.

Our empirical strategy is related to a few important empirical papers focusing on investors' involvement in the development of entrepreneurial firms. Most notably, Sapienza et al. (1996) measure effort on advice in two dimensions. They consider VCs' rankings of the importance and effectiveness of their contribution. Their measure of advice comes from multiplying the rate of importance with the rate of effectiveness.⁶ Sapienza et al. (1996) further examine VC governance in terms of the frequency of face-to-face interactions the VC has with the venture Chief Executive Officer ("CEO") and the number of working hours devoted to the venture. In related work, Kaplan and Stromberg (2004) provide proxies for advice and monitoring with the use of binary dummy variables. As in Sapienza (1992) and Sapienza et al. (1996), our data comprise significant variation in the dependent variables (among other things described below).⁷

3.2 Explanatory variables to test Hypotheses 1–3

To test Hypotheses 1a and 1b, we use a convertible security dummy variable for investments financed by convertible debt or preferred equity. We exclude dummy variables for other types of securities due to collinearity. To consider the impact of equity holdings, we include the percentage of the VC's ownership share in the firm (in the best case scenario) as an explanatory variable. A more detailed definition of each dependent and independent variable used in the analysis is presented in Table 1.

To test Hypotheses 2a and 2b, we use three different proxies to measure the extent of VC control. First, we use the VC veto rights, which measures the number of veto rights held, such as veto on asset sales or purchases, changes in control, issuance of equity and other decisions. Second, we measure control rights, such as the right to replace the CEO, the right of first refusal in sale, or initial public offering ("IPO") registration rights (among other things defined below in Table 1). The distinction between VC control and VC veto rights is important. VC veto rights are passive rights, where it can be said that although the VC is not "*actively managing*" the firm, it is influencing the outcome of the

⁶ In Sapienza et al. (1996), the rate of importance of the VC's contribution is ranked on a scale of 1–5 (1 = not important at all, 5 = of great importance), while the effectiveness ranking is on a scale of 1–10 (1 = not effective at all, and 10 = extremely effective). The measure for advice comes from multiplying the importance and the effectiveness ranking. In related work, Gorman and Sahlman (1989) point out the role of VCs in strategic analysis, management recruiting, and CEO replacements. Gompers (1995) finds that VCs become more active when the risk and growth options involved in their investments are high. Sapienza (1992) shows that it is the highly innovative entrepreneurs that benefit most from value added by VCs. De Clercq and Sapienza (2005), De Clercq et al. (2005) Shepherd et al. (2005), Zacharakis and Shepherd (2005), and Sapienza et al. (2005) examine related issues of learning among VCs and entrepreneurs.

⁷ This is unlike Kaplan and Strömberg (2004). It is noteworthy that Kaplan and Strömberg (2004) do not consider potential endogeneity of contracts to effort, unlike our analyzes described and presented below.

business decision to be made, especially if the decision requires a unanimous consensus. VC control rights, such as the right to replace the founding entrepreneur are “*active rights*”, as the outcome of the issue is dependant upon the VC’s resolve. Cronbach’s alpha statistic confirmed the appropriateness of the

Table 1 Definition of variables. This table provides an exact definition for each of the most important variables considered in the paper. This table does not list several control variables in the paper that are easy to interpret (these variables are indicated in Table 2)

<i>Dependent variables: VC effort and conflict</i>	
VC hours	Monthly number of hours VC spends with the venture
Advice	Average of the VC’s rankings, on a scale 1 (lowest)–10 (highest), of the VC’s contribution to the venture in the following advising fields: strategy, marketing, issues related to financing, R&D, product development, human resources, exit strategy advice, interpersonal support, help in networking, and any other. If no advice was provided for a field, then the value ‘0’ was entered
Conflict	Total number of fields for which the VC reported disagreement with the entrepreneur. Fields considered: strategy, marketing, issues related to financing, R&D, product development, human resources, replacement of founder, and any other
<i>Variables to test hypotheses: VC contractual terms and legal conditions</i>	
Convertible security (H1)	Dummy variable for investees financed either with convertible debt or convertible preferred equity
VC ownership share (H1)	% Ownership of VC; given contingencies in contracts, the best case scenario for the entrepreneurial firm performance is considered
Veto rights (H2)	The sum of the following veto right dummies: asset sales, asset purchases, changes in control, issuance of equity, any other decisions. “Full veto control” means that all five types of control rights were used in the investment
Special control rights (H2)	The sum of the following control dummies (dummy takes value ‘1’ if VC has the right): right to replace CEO, automatic conversion at exit, right for first refusal at sale, co-sale agreement, anti-dilution protection, protection rights against new issues, redemption rights, information rights, IPO registration rights, piggyback registration
Board rights (H2)	VC board seats as % of total number of board seats at the company
Legality (H3)	Weighted average of following factors (based on Berkowitz et al. 2003): civil versus common law systems, efficiency of judicial system, rule of law, corruption, risk of expropriation, risk of contract repudiation, shareholder rights. Higher numbers indicate ‘better’ legal systems

Table 1 continued

Selected control variables (others are listed in Table 2)

Project risk	Average of the VC's rankings of the following risk factors: uncertain market size, uncertainty about product, risky competitive position, uncertain customer adoption, risks in business strategy, questionable performance to date, contractual structure, high valuation, costly to monitor, exit conditions, negative influence of other investors
Entrepreneur experience	VC's ranking of the entrepreneur's experience on a scale of 1–10
Hours from syndicated partners	The average number of hours per month that the syndicated VC investors spent with the investee firm
Investment rounds	Number of staged financing rounds the VC financed the investment
Book value	Log of the book value of the investment at the time of first investment, measured in €'000
Investment months	Number of investment months from first investment date to exit (for exited investments) or to 12/2002 (for non-exited investments)
MSCI	The Morgan Stanley Capital International Index (http://www.msci.com) for the public stock market return in the investee country from the time of first VC investment until exit, or until 12/2002 if there has not been an exit
VC portfolio size /# VC managers	The number of entrepreneurial firms in the VC fund portfolio per the number of VC managers

grouping of the veto versus control rights for the data.⁸ As well, in the empirical analysis we account for the potential endogeneity of both the control and cash-flow rights variables and the VC effort variables. We further control for the proportion of board seats held by the VC.

To test the quality of laws on VC–entrepreneur relations in Hypothesis 3, we use the *Legality* index. The *Legality* index accounts for the substantive content of laws pertaining to investing, the quality of their enforcement, and

⁸ Since it is not necessarily appropriate to lump together different types of veto and control rights into a single variable, we computed the Cronbach alpha statistic to check the appropriateness of the grouping of the veto versus control rights. Cronbach's alpha is equal to $N^*r/(1 + (N - 1)*r)$ where N is equal to the number of items and r is the average of the inter-item correlation among the items. For the grouping of veto rights (asset sales, asset purchases, changes in control, issuances of equity and other veto rights) the alpha was 0.9581. For the other types of control rights (non-veto rights, including right to replace CEO, automatic conversion at exit, right for first refusal at sale, co-sale agreement, anti-dilution protection, protection rights against new issues, redemption rights, information rights, IPO registration rights, piggyback registration (see Table 1) alpha is 0.7742. For the grouping of the different risk measures enumerated in Tables 1 and 2, alpha is 0.8351. For the different types of disagreement, alpha is 0.7965. For the different types of advice rankings, alpha is 0.8628. For most social science applications, a reliability coefficient of 0.80 is considered acceptable (See, e.g., <http://www.ats.ucla.edu/stat/spss/faq/alpha.html> <accessed 1 January 2006>; and we also checked dimensionality of the data, and did not find reasons to be concerned with the groupings).

the likelihood that they will need to be enforced. Based on Berkowitz et al. (2003) and derived from La Porta et al. (1997, 1998), the *Legality* index is a weighted sum of the following factors: the efficiency of the judicial system, the rule of law, corruption, risk of expropriation, risk of contract repudiation, and shareholder rights.⁹ Higher numbers indicate “better” legal systems. Because the sub-components of the *Legality* index are highly collinear, we focus on the *Legality* index in our regressions to avoid the appearance of data mining. We did consider specific components of the *Legality* index, but found much similarity in the qualitative results, and therefore focus on the overall *Legality* index variable.

3.3 Other governance mechanisms, risk and controls for other factors

Sapienza et al. (1996) consider the determinants of advice and governance by examining agency risk (represented by CEO experience), and other project and environment related uncertainty (business risk ranking, the firm’s stage of development, and the innovativeness of the project). Although they find no evidence of more intense advice or governance at ventures with less CEO experience, they find that project and environment related uncertainty matter: VCs become more involved in early stage ventures and in projects with higher risk assessment. We likewise control for various measures of risk in our empirical. Similar to Sapienza et al. (1996), Kaplan and Strömberg (2004) use VCs’ investment memoranda and identify three different types of risk measures: “internal risk” which is a consequence of asymmetric information between the parties; “external risk”, which refers to environment related uncertainty, and “project complexity” risk, which arises from the difficulty and complexity of project realization. We use several risk variables that capture the different project and environment-related uncertainty inherent in an investment. The most important are the VCs’ ranking of the “entrepreneur’s experience” and “project risk” on a scale of 1–10. To establish an overall project risk measure, we build on Kaplan and Strömberg (2004).¹⁰ We ask VCs to rank their investments on a scale of 1–10 for a number of risk types such as uncertainty about product/technology, risky competitive position, uncertain customer adoption, etc. We employ an average of these risk factors¹¹—excluding

⁹ We do not use separate variables for each of these legal factors because they are very highly correlated.

¹⁰ Based on an analysis of VCs’ investment memoranda, Kaplan and Strömberg (2004) identify the following risk factors of start-up investments: uncertain market size, uncertainty about product/technology, risky competitive position, uncertain customer adoption, risk in business strategy, quality of entrepreneur’s management and business skills, questionable performance to date, contractual structure and downside risk, high valuation, costly to monitor investment, negative influence of other investors, and uncertain financial market and exit conditions.

¹¹ This is in contrast to Kaplan and Strömberg (2004) who categorize the different risk factors as internal, external, and complexity risk. In our sample, these risk distinctions were not statistically or economically significant, and the risk measures were very highly correlated (generally the correlation coefficients are greater than 0.5).

the entrepreneur's experience, which is considered separately—in the empirical analysis. Since early stage investments and firms in high-tech industries usually represent greater uncertainty, a stage dummy variable and industry dummies for the biotech, electronics, and Internet investments are also considered as additional proxies for the risk involved. Moreover, since foreign investments may also be riskier for the VC, we include a “foreign investment” dummy variable.

Most venture investments are syndicated transactions. In an empirical investigation of the US biotechnology industry, Lerner (1994) finds that older, larger, thus more experienced VCs tend to syndicate with other established venture funds, which refers to complementarities concerning skills of syndicate members (see also Hsu, 2004). Brander et al. (2002) argue VC syndication facilitates value-added advice provided to the entrepreneur. Wright and Lockett (2003) emphasize the importance of non-legal sanctions in mitigating opportunistic behavior by dominant equity holders, particularly through informal mechanisms and reputation concerns. The theoretical analysis in Casamatta and Haritchabalet (2003) is consistent in that it argues that effort exertion by syndicate members depend on their experience: less experienced VCs will exert too little, while more experienced VCs will provide too much effort to increase the chance for success. These theories suggest that a complementarity of effort exertion will characterize syndicated transactions: VCs work more when their syndicating counterparts also exert increased effort. We therefore consider the impact of the average number of monthly hours provided by syndicating partners on the three measures of VCs' involvement. The above discussion suggests that effort exertion in investment syndicates will depend on the participating VCs' skills and experience. Since VCs that exert more effort may accumulate more experience and thus participate in more efficient syndicates, syndication may be endogenous to effort exertion by VCs, thus the direction of causality requires further scrutiny. The problem is addressed in the empirical below.

Moreover, considering the size of the VC fund per number of managers, we test whether the extent of the VC involvement depends on portfolio size, as modeled by Kannianen and Keuschnigg (2003, 2004), and Keuschnigg (2004) (see also Cumming 2006; Gygax 2006). As well, note that since VCs exerting more effort are able to manage larger portfolios, the variable we employ in the analysis (the number of entrepreneurial firms in the portfolio per number of VC managers¹²) may be endogenous to our advising and conflict measures. We address this issue in the empirical analysis. We also use variables for the

¹² Controls for the amount of capital in the VC fund per the number of fund managers were too highly correlated with the variable for this measure of portfolio size per manager, and therefore not used. Either way, the other variables are not affected. The number of observations per fund does not enable us to use fund fixed effects. Nevertheless, we have considered a variety of different controls and robustness checks. For instance, we considered excluding one fund at a time to see if the results changed, and they did not. Other variables such as fund size, fund type, fund age, etc., did not affect the tests of the hypotheses and control variables.

characteristics of the VC fund, including variables that distinguish independent VCs (also referred to as limited partnerships) from captive funds (bank-affiliated or funds owned by large corporations).¹³

Another group of control variables include investment performance characteristics such as dummy variables for successful exits. Since VCs generate most of their profits from a small number of very profitable investments (so-called high-flyers or home runs) which often yield more than five times the value of the initial investment, their projects' inherent success potential seems to be important for success. Related evidence is provided by Sahlman (1990): in a sample of 383 investments, about 35% of all projects turned out to be a total failure, 15% was highly profitable, while the remaining 50% was moderately successful. We presume that VCs exert more effort on their inherently successful projects. We test this assumption by involving dummy variables for successful IPO or acquisition exits. Further, we assume that if VCs exert more effort on a few successful investments, they will exert less effort on their "moderately successful" projects which remain in their portfolio for a long time. In that case, the length of the investment period, which we proxy with the number of investment months, must be negatively related to their involvement. To the extent that successful exits occur as a consequence of intense advising by VCs, concerns for endogeneity naturally arise for this group of variables. The issue is addressed in the subsequent empirical analysis.

Finally, we include the book value of the investment and the number of investment rounds as transaction-related control variables. The first is to test whether the involvement of VCs varies according to investment size. The latter accounts for the fact that staging is a monitoring device: investments in several rounds require more intense involvement by VCs, especially in the monitoring task (Witt and Brachtendorf 2006). To the extent that staging happens as a consequence of the VC's ex-ante appraisal of project risk, the number of investment rounds may be endogenous to effort exertion, especially monitoring. Thus, in the empirical analysis, we treat the number of rounds as a potential endogenous variable.

There are a variety of other variables that were collected to control for other potential factors that influence the VC–entrepreneur relationship. These details are described in detail in the next sections that report the tests of the Hypotheses 1–3 outlined above.

¹³ In Europe, many VC funds are affiliated with larger financial institutions such as banks. We do not restrict our attention to limited partnerships (the more common VC structure in the US) but control for the type of fund in the empirical analysis. We also considered the possibility that other VC fund characteristics matter for advice and conflicts, such as fund age and size, but did not find material differences for the regressions reported below. We further considered the possibility of a "halo effect" for different portfolio companies from the same investor by excluding different funds (one at a time) from the dataset and re-running the regressions, and did not find material influences due to one of the funds. Note, however, that the sample size (described below) did not allow the use of fixed-effect dummy variables for the different funds in the data.

4 The Dataset

4.1 Data collection

The data were obtained by a mail survey and follow-up interviews of VC fund members of the European venture capital association (EVCA). In total, there are data on 121 investment rounds in 74 entrepreneurial firms from 14 VC funds in 7 continental European countries (Belgium, Denmark, Germany, Hungary, Italy, Portugal, and The Netherlands). Approximately 250 private (non-governmental) funds were contacted in the initial data collection effort. Those funds were selected based on a random sample of private venture capital funds from the EVCA in continental Europe. Approximately 30% initially expressed interest in participating in the study; however, upon informing the funds of the extent of details requested, only 14 (5%) agreed to provide full access to contracts used by their funds. Hence, from the broad initial effort, the response rate was slightly more than 5%, which is consistent with the only prior study on topic with the detailed information on contracts used in Kaplan and Strömberg (2004) (as described below, their sample is a US-only sample involving 11 VC funds and 67 entrepreneurial firms, whereas our sample comprises 14 European VC funds and 74 entrepreneurial firms). Funds that had an interest in participating in the study were interviewed (directly for some funds and by phone calls for other funds for which a personal visit was not possible) in 2003 and 2004. The details pertaining to the VC contract terms and effort exerted for their investee firms involved compiling a mix of hard contract data alongside qualitative data on effort and actions taken by the VC fund managers.

It is difficult to quantitatively comment on the representativeness of the data. Normally, we would compare the publicly available information of the respondents versus the non-respondents on a fund level. However, in our case we have details from 14 funds, and with 14 funds it is not possible to carry out meaningful comparison of means and medians tests. To ensure the integrity of the data collected, the respondents were provided assurances that the information collected would remain strictly confidential (particularly the actual contract terms), and not be made publicly available. Data were disclosed on a completely voluntary basis. Given the type of confidential information collected (particularly for actual contract terms), naturally we cannot refer to an aggregate industry database for comparison.

We can point out that our sample is similar to prior datasets on private equity exits in terms of the frequency of use of different securities and specific contract terms (e.g., Kaplan et al. 2005; Lerner and Schoar 2005). The scope of prior datasets on VC activities (see, e.g., Sapienza 1992; Sapienza et al. 1996) is also similar to that reported herein. The scope of other VC datasets with detailed VC contract terms (Bascha and Walz 2001b; Schwienbacher 2002; Kaplan et al. 2005; Lerner and Schoar 2005) is also very similar to our own, in terms of details and number of observations, and the frequency of use of particular contracts is similar to that reported in this study. For example, the only other study that

matches VC contract terms (with the level of detail used in this study) to VC effort (Kaplan and Strömberg 2004) comprises 67 entrepreneurial firms from 11 VC funds in the US, and that study only has binary measures of effort. Our study is unique in that we provide international evidence from continental Europe, and have more variation in VC effort in terms of details on hours spent, etc. (not merely binary measures of effort).

It is important to point out that the unit of analysis, as mentioned in Sect. 3.1, is the entrepreneurial firm; hence, our regression analyzes comprise 74 observations. In the dataset no fund provided data on more than seven investments, and one provided data on just two firms. The number of deals provided by the fund depended on the number of deals in which the managing partner of the VC fund that provided the data had direct familiarity with (crucial in terms of his/her effort measurement, and in terms of the hard contract data); not all fund managers within each of the 14 funds were involved in the study, as VC managers are not directly involved in every firm in which their fund invests.¹⁴ Thus, the results that follow are not uniquely attributable to any given fund in the data (see also footnote 9 and accompanying text). While we do not have all investee firms for all VC funds, we do have all investee funds for all VC fund managers that participated in the study.

4.2 Data summary

Table 1 defines many of the variables in the dataset (and excludes a number of variables that are self-explanatory). Table 2 provides summary statistics for most of the variables in the dataset. The typical VC fund manager in the data provides approximately 15 h of work per month to an entrepreneurial firm. This is similar to seminal work of Gorman and Sahlman (1989), who report lead VCs in the US spending 4–5 h in direct contact with entrepreneurs (non-lead VCs report spending 2–3 h in their visits on average) and extra time helping VCs when not in direct contact with entrepreneurs. The average fund in our data finances on average 2.1 entrepreneurial firms per VC manager, which is identical to prior work on VC portfolio size per manager reported in a Canadian dataset by Cumming (2006). In our sample, 37.8% of transactions use convertible preferred stock, which is less than the 53.8% reported by Kaplan et al. (2005) for an international sample of VCs [although Schwienbacher (2002), reports that VCs in Europe use convertibles for approximately 20% of transactions, which is significantly less than that reported by Kaplan et al.'s, (2005), international sample]. In our sample, 66% of the entrepreneurial firms financed (49 of 74) involved syndicated deals, which is about twice as great as that reported for Europe [see the EVCA yearbook (various issues)]. The difference is likely due to the high proportion of early stage investments in our sample (72%). Schwienbacher (2002) reports that European VCs syndicate

¹⁴ The small number of the entrepreneurial firms in our sample is attributable to the fact that we requested a significant amount of confidential data on each financing transaction.

54% of their deals, which is consistent with our dataset. Wright and Lockett (2003) report a greater number of syndicated partners for early stage deals, which is also consistent with our data. The average number of syndicated VCs in our data is 1.284, which is also consistent with Wright and Lockett (2003) and Schwienbacher (2002). A majority of the exited investments were by way of trade sales, consistent with Schwienbacher's European sample of exits; although note that 32.4% of the investments had not yet been exited at the time of collection of our sample. The average fund size and the investment amounts per investee are quite consistent with figures reported by Wright and Lockett

Table 2 Descriptive statistics. This table provides the mean, median, standard deviation and minimum and maximum values for most of the variables in the data

	Average	Median	Standard deviation	Minimum	Maximum
<i>Dependent variables: VC effort and conflict</i>					
Hours per month	15.48	10	15.59	0	60
Advice	2.39	1.83	1.79	0	6.78
Conflict	0.89	0	1.42	0	7
<i>Contractual terms and legal conditions</i>					
Convertible preferred equity dummy variable	0.38	0	0.49	0	1
VC ownership percentage	0.29	0.25	0.16	0	0.87
VC veto rights	3.80	5	1.98	0	1
VC control rights	5.97	6	2.56	0	1
VC board seats	0.25	0.20	0.22	0	1
Legality index of investee country	19.53	20.44	2.72	12.80	21.78
<i>Control variables: entrepreneurial firm characteristics</i>					
Early stage investee company at time of first investment	0.72	1	0.45	0	1
Late stage investee company	0.28	0	0.45	0	1
Medical dummy variable	0.07	0	0.25	0	1
Computer dummy variable	0.27	0	0.45	0	1
Internet dummy variable	0.18	0	0.38	0	1
Foreign investment dummy variable	0.19	0	0.39	0	1
Project risk	3.30	2.77	2.21	1	8.30
Entrepreneur experience	6.57	7	2.25	1	10
<i>VC fund characteristics</i>					
Limited partner vc dummy variable	0.51	1	0.50	0	1
Capital under management ('000 Euro)	389,069	150,000	604,698	70,000	25,000,00
Capital under management ('000 Euro) / VC manager	21605	16,714	11594	7143	38,462
Number of investee firms / VC manager	2.15	1.59	1.68	0.190	6.00

Table 2 continued

<i>Investment characteristics and performance</i>					
Lead investor dummy variable	0.66	1	0.48	0	1
Number of syndicated VCs	1.28	1	1.24	0	5
Hours per month of syndicated VCs	10.41	6	16.83	0	70
Book value of investment at the time of first investment ('000 Euro)	5,570.10	2,257.30	9,253.36	150.00	52,000
Number of financing rounds	1.64	1	0.85	1	5
Investment months	30.73	31	15.99	3	84
MSCI market return over investment period	-0.08	-0.08	0.14	-0.33	0.36
IPO exit dummy variable	0.16	0	0.37	0	1
Trade sale exit dummy variable	0.45	0	0.50	0	1
Write-off exit dummy variable	0.07	0	0.25	0	1

The number of observations for each variable is 74 (74 investee companies). The unit of analysis is the entrepreneurial investee firm

(2003) for the UK, Bascha and Walz (2001b) for Germany and Schwienbacher (2002) for Europe.

Table 3 (Panels A, B) depicts the data by different numbers of hours worked by the VC. The data are presented by entrepreneurial firm, mainly because we do not observe significant variation across different financing rounds. The first column in Table 3 presents the data for all the entrepreneurial firms in the sample. The next columns break the information down by the number of hours of support received by the entrepreneurial firms from their VCs, including the managing partners and their associates.¹⁵

The first group of numbers in Table 3, Panel A, describes the most important contracting features employed in the investments in our sample. Most of the transactions were financed by convertible securities or straight equity, but we observe a small number of debt investments as well.¹⁶ The use of convertible securities does not seem to enhance the number of hours VCs spend with entrepreneurs. Board representation and the allocation of veto rights reflect however that investors are more involved in firms in which they have more extensive control. In particular, VCs with more extensive board representation tend to provide a greater number of hours. Moreover, the average number of hours

¹⁵ We do not report the entrepreneurs' average hours worked, simply because entrepreneurs generally work full time and it was not feasible to track any variation in entrepreneur hours (see further the discussion in the section on Limitations, alternative explanations and future research).

¹⁶ The pattern of financial contracts observed in this dataset is similar to that reported by Bascha and Walz (2001b) and Schwienbacher (2002) for VCs in Europe; similar evidence is also found in Canada (Cumming 2005).

Table 3 Summary of the data by monthly hours spent with the entrepreneurial firm. This table presents a summary of the data in terms of the average number of hours per month spent with the entrepreneurial firm by the respondent VC

	Total	Hours < 10	10 ≤ hours < 20	20 ≤ hours < 30	30 ≥ hours
Panel A					
Respondent VC hours	74	31	17	9	17
<i>Contractual terms and legal conditions</i>					
Number of common equity and/ or warrant investments	38	18	9	3	8
Number of convertible preferred equity and/or conv. debt invest- ments	28	12	6	2	8
Number of debt and/or preferred equity investments	8	1	2	4	1
Average VC ownership	0.29	0.31	0.26	0.22	0.32
Average VC board seats/total board seats	0.25	0.23	0.22	0.30	0.31
Number of investments with par- tial or no veto control	27	13	11	2	1
Number of investments with full veto control	47	18	6	7	16
Average legality index in entre- preneur's country	19.53	20.06	19.29	17.89	17.68
<i>Project and environment related risk</i>					
Average overall risk ranking	4.46	4.42	4.03	3.69	4.37
average ENT experience ranked on scale 1–10	6.57	6.65	6.35	6.58	6.76
Number of early (seed/start-up / expansion) Stage Investment	53	21	11	7	13
Number of late (late / buyout / turnaround) stage Inv.	21	10	6	1	4
Number of investments in high- tech industry	38	14	9	9	6
Number of investments in non- tech industry	36	17	8	0	11
Number of foreign VC invest- ments	14	8	1	0	5
Number of domestic VC invest- ments	60	23	16	9	12
<i>Investment characteristics and performance</i>					
Average number of financing rounds	1.64	1.35	1.76	1.56	2.06
Syndicated VC hours	74	46	12	4	12
Average book value ('000)	5,570	3,255	11,939	2,616	4,987
Average investment duration (months)	30.73	33.93	33.88	25.11	24.70
Number of actual IPOs	5	1	0	2	2
Number of expected IPOs	7	4	2	0	1
Number of actual acquisitions	11	2	6	0	3
Number of expected acquisitions	22	4	7	6	5

Table 3 continued

<i>VC Characteristics</i>					
Number of limited partnership VCs	38	16	10	4	8
Number of bank affiliated VCs	36	15	7	5	9
Average capital under management ('000) per VC manager	17,888	21,922	18,290	24,422	23,217
VC portfolio size per# VC managers	2.15	2.97	1.06	1.72	2.00
<i>Panel B</i>					
<i>Average VC advice ranked on scale 1–10</i>					
Strategic advice	3.99	3.10	3.94	5.22	5.00
Marketing advice	1.91	1.29	1.65	4.00	2.18
Financial advice	4.64	4.65	3.35	6.11	5.12
R&D advice	0.80	0.84	0.18	1.11	1.18
Product development advice	0.88	0.84	0.41	0.56	1.59
Human resource advice	1.91	1.29	1.53	2.78	2.94
Exit strategy advice	3.04	2.74	3.53	1.56	3.88
Interpersonal support	1.66	0.94	1.76	1.67	2.88
Help in networking	2.73	1.94	1.76	3.89	4.53
<i>Average overall advice ranking</i>	2.39	1.96	2.01	2.99	3.25
<i>Number of disagreements with management team</i>					
Strategy	21	4	6	2	9
Marketing	8	1	1	3	3
Financial	11	3	1	0	7
R&D	3	1	0	1	1
Product development	8	1	1	1	5
Human resources	7	1	1	1	4
Other	1	1	0	0	0
VC has replaced founder as CEO	7	1	0	0	6
<i>Total number of disagreements</i>	66	13	10	8	35

Panel A presents the characteristics of the respondent VCs (type of VC, capital under management), entrepreneurial firm characteristics (legality index of the country of location, foreign versus domestic investments, stage of development, industry), transaction specific (number of hours syndicated partners, type of securities used, board composition, allocation of veto and ownership rights, number of rounds, and book value) and performance characteristics (investment duration, and the actual and expected IPOs and acquisitions). Panel B shows the average advice ranking for nine different advising fields, the number of disagreements in eight possible matters including appointing a new CEO, the number of conflicts related to exit with founder and other parties, the average risk ranking of investments for 13 different risk factors, and the average rank of the entrepreneurs' experience. Some important variables are typed bold

spent is proportionately less when the VCs have partial or no veto control as opposed to full veto control. These observations indicate univariate support for the hypothesis that control rights increase the involvement of VCs in their entrepreneurial firms (Hypothesis 2b).

Our data include a number of project risk characteristics. Noteworthy is that contrary to our expectations, VCs spend the highest number of hours with entrepreneurs with the highest experience rankings. Further, there seems to be a strong positive correlation between the number of hours and the stage of

development.¹⁷ We observe more hours of support for early stage investments. About half of the firms in the sample were in high-tech industries (biotech, electronics, or Internet). There do not appear to be any differences in the involvement of VCs by industry type. However, VCs report a greater number of hours for investments in countries with lower *Legality* indices. These observations indicate univariate support for the hypothesis that VCs exert more effort on riskier investments (Hypothesis 2a).

Concerning the performance of investments, the data suggest that there is generally a negative relation between the average hours of support and total investment duration.¹⁸ This refers to a number of investments in the VCs' portfolio which are neither profitable enough to be exited nor represent failures, but at the same time they are not worth the VC's extensive involvement. Moreover, the information on exit outcomes reflects that most of the IPOs (the most successful exits) to date have received an average of more than 20 h per month of support.

The last group of numbers in Table 3, Panel A, reflects the characteristics of the respondent VCs. Thirty eight of the entrepreneurial firms were financed by limited partnership VCs, 36 by bank-affiliated VCs. We do not observe significant differences in the distribution of hours depending on VC type. Portfolio size per manager, however, is notably larger among the entrepreneurs that receive fewer than 10 h per month of support from the VC, consistent with Kannianen and Keuschnigg (2003, 2004) and Keuschnigg (2004).

Table 3, Panel B, provides information pertaining to our advice and conflict measures. A number of rankings of the importance of VC advice are provided in the first group of numbers including strategic, marketing, financial, R&D, product development, human resources, exit strategy, interpersonal support, and help in networking. The table indicates that for most support activities, VCs report higher advice rankings if they spend a higher number of hours with the firm. This observation holds also for the average advice ranking, which we employ in the multivariate empirical analysis.

The second group of numbers in Table 3, Panel B, reports various types of disagreement between the VC and entrepreneur (including situations in which the VC has replaced the founder with another professional manager as CEO).¹⁹

¹⁷ The venture funds classified the investments as being in one of the following categories: seed, early, expansion, buyout, late, and turnaround stage. This classification corresponds to the definition of stages by the European Venture Capital Association. We use a simplified classification: we consider the investments as of early (i.e. seed, early or expansion phase) or late (late, buyout, or turnaround phase) stage. The main reason for this classification is that the definitions of early stage investments is somewhat blurred across funds and across countries, and our data comprise very few (5) buyout and turnaround investments which did not warrant separate variables.

¹⁸ Another factor influencing the relation between number of investment months and average hours per month is the escalation of commitment. Because VCs may want to avoid being associated with failures, they may be spending more time with their firms in an effort to make them more successful. For work on this topic, see, e.g., Birmingham et al. (2003).

¹⁹ Exit related disagreements are excluded from the sum total of different disagreements because not all firms in the sample have gone through the exit process, and because most of the exit conflicts were not with the entrepreneurial team, but rather with other parties.

The most disagreements were with entrepreneurial firms for which VCs spent at least 30 h per month with the entrepreneurial firm. The positive relationship between disagreements and the time spent with the venture is suggestive that conflicts proxy the VC's monitoring effort.

A correlation matrix is provided in an extended version of the paper which is available on request. The correlations provide some support for Hypotheses 1–3, in that veto rights are significantly positively correlated with monthly hours (the correlation statistic is 0.35) and advice (0.53), and *Legality* is significantly negatively correlated with disagreement (−0.23). It is also noteworthy that the hours from syndicated partners are very highly correlated with the respondent VC hours (0.48), consistent with Wright and Lockett (2003). Portfolio size per manager is highly negatively correlated with disagreement (−0.24). Overall, therefore, the univariate correlations provide suggestive evidence that is consistent with the theory discussed above in conjunction with the hypotheses and control variables. Multivariate tests provided below in the next section provide more robust and conclusive evidence.

The correlation matrix also provided guidance in terms of considering issues of collinearity in the regressions in subsequent sections. We test for collinearity by excluding various variables in alternative regression specifications in the next section. The correlation coefficients between pairs of independent variables are generally lower than 0.4, suggesting that significant collinearity problems are unlikely (see, e.g., Judge et al. 1982, p. 620). Nevertheless, since collinearity may be present among a multitude of independent variables, we also computed the variance inflation factors (VIFs). For one variable, a dummy variable for limited partnership VCs, we found the VIFs to be 2.4. In all other cases, the VIFs were significantly below 2, suggesting that multi-collinearity is not a severe problem for the econometric regressions presented in the next section (Kennedy 1998, p. 190). It is perhaps not altogether surprising that the limited partnership dummy variable has a significant VIF as the type of VC significantly affects its investments (see, e.g., Gompers and Lerner 1999). In the case of the dummy variable for limited partnerships, we also considered excluding that variable, and the reported results were not materially different. The next section provides a number of different specifications of the variables. Additional specifications not presented are available on request.

5 Econometric analysis

This section provides OLS and 2SLS estimations of the three different proxies of the involvement of VCs as dependent variables: the total number of hours per month spent with the entrepreneurial firm, the average advice ranking, and the total number of disagreements between the VC and the entrepreneur. Table 4 presents the results for the number of hours, Table 5 for the advice measure, and Table 6 for the disagreement variable. To account for the discrete nature of the disagreement variable, we show both least squares and ordered logit estimates in Table 6. Each table presents five regressions to check for the

Table 4 Multivariate of hours per month. This table presents OLS and 2SLS estimates of the number of hours per month that the venture capitalist spends with the entrepreneurial firm. Independent variables are as defined in Table 1

Independent variables	Model (1) OLS		Model (2) OLS		Model (3) OLS		Model (4) OLS		Model (5) 2SLS	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Constant	10.75	2.00*	1.43	0.17	10.20	1.02	14.87	0.46	-3.55	-0.10
<i>Contractual terms and legal conditions</i>										
Convertible security (H1)	2.25	0.51	1.88	0.50	-3.23	-0.92	-2.22	-0.66	-10.33	-1.87**
Ownership % (H1)	4.55	0.30	20.83	1.50	25.69	2.30**	30.67	2.67***	38.76	1.64*
Veto rights (H2)	13.44	4.98***	7.96	2.10**	11.36	3.26***	12.15	3.22***	-0.87	-0.07
Board rights (H2)	-0.004	-0.48	-0.001	-0.15	0.003	0.65	0.002	0.44	-0.03	-0.91
Special control rights (H2)							-1.49	-0.23		
Country legality (H3)							-0.39	-0.50		
<i>Project and environment related risk</i>										
Project risk ranking	-4.67	-0.56	-9.77	-1.12	-4.07	-0.46	2.51	0.29	-6.01	-0.37
Entrepreneur experience ranking	-8.35	-2.13**	-10.50	-3.22***	-9.15	-2.47**	-7.44	-1.89*	-5.87	-0.66
Late or buyout stage					-4.70	-0.92	-5.33	-0.93	2.77	0.31
Medical/biotechnology					-4.92	-1.54	-3.95	-1.13	-4.31	-0.78
Computer/electronics					-11.58	-2.82***	-11.16	-2.48**	-9.70	-1.58
Communications/Internet										
Foreign investment	0.46	0.10	-2.85	-0.63	-0.79	-0.20	1.87	0.39	2.75	0.44
<i>Investment characteristics and performance</i>										
Hours from syndicated partners			0.49	5.60***	0.40	5.51***	0.38	5.07***	0.67	2.07**
Investment rounds (Log of) book value			0.51	0.72	3.81	2.59**	4.00	2.55**	1.64	0.19
Investment months					-0.21	-0.28	-0.96	-1.13	0.94	-0.06
					-0.30	-3.35***	-0.30	-3.61***	17.09	1.74**

Table 4 continued

Independent variables	Model (1) OLS		Model (2) OLS		Model (3) OLS		Model (4) OLS		Model (5) 2SLS	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
IPO exit					10.76	2.44**	16.26	3.26***	0.25	0.03
Acquisition exit							7.74	2.09**		
VC fund characteristics			1.74	0.42	0.96	0.29	-2.92	0.74	3.00	0.62
Limited partnership VC			-1.19	-1.55	-2.39	-2.67***	-1.69	-1.88*	-3.01	-1.40
VC portfolio size /# of VC managers	-1.98	-2.53**								
Number of observations	74		74		74		74		74	
Adjusted R ²	0.10		0.31		0.47		0.48		0.24	
Loglikelihood	-299.77		-287.98		-273.92		-271.29		-285.52	
Akaike information criterion	8.35		8.10		7.92		7.93		8.28	
F statistic	1.96*		3.99***		4.57***		4.16***		2.18***	

Models (1)–(4) use OLS; Model (5) uses 2SLS where the following variables that are treated as potentially endogenous: the convertible preferred equity dummy, the fraction of veto rights, board rights, and other “special” control rights held by the VC, the percentage of the VC’s ownership share, the number of hours per month from syndicated VCs, the number of investment rounds, the number of investment months, exit outcomes, and the capital under management per VC fund managers. The following variables are used as instruments: the VC’s ranking of project risk and entrepreneur experience, the log of the book value of the investment, the legality index of the country of the investment, a dummy for entrepreneurs in foreign countries, a late stage investment dummy, industry dummy variables, the limited partnership dummy variable for the VC, dummy variables for the investment and exit years, and the log of the MSCI returns over the period of the investment. White’s (1980) HCCME is used

*, **, *** represent estimates significant at the 1, 5, and 10% levels, respectively

Table 5 Multivariate analysis of advice. This table presents OLS estimates of the venture capitalist's average advice ranking for assistance provided to the entrepreneurial firm

Independent variables	Model (1) OLS		Model (2) OLS		Model (3) OLS		Model (4) OLS		Model (5) 2SLS	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Constant	0.44	0.85	2.31	2.96**	1.64	1.64	3.31	1.19	-2.24	-0.72
<i>Contractual terms and legal conditions</i>										
Convertible security (H1)	0.97	2.87***	0.83	2.59**	0.48	1.27	0.62	1.93*	-0.11	-0.19
Ownership % (H1)	-0.52	-0.53	-0.11	-0.12	-0.19	-0.24	-0.07	-0.09	0.09	0.04
Veto rights (H2)	2.63	6.90***	2.57	5.63***	2.63	5.63***	2.45	5.17***	3.80	3.67***
Board rights (H2)	0.001	1.69*	0.001	1.51	0.001	1.20			-0.007	-2.61***
Special control rights (H2)				0.24	0.24	0.31				
Country legality (H3)							-0.07	-0.64		
<i>Project and environment related risk</i>										
Project risk ranking	1.36	1.51	2.15	2.59***	2.46	2.83***	2.30	2.60**	3.10	2.33**
Entrepreneur experience ranking	-1.34	-4.46***	-0.98	-2.92***	-0.86	-1.88**	-0.80	-1.80**	-0.48	-0.59
Late or buyout stage					-0.47	-0.63	-0.46	-0.68	0.32	0.33
Medical/biotechnology					0.30	0.75	0.26	0.64	0.93	1.73*
Computer/electronics					-1.03	-1.50	-1.06	-1.68*	-0.68	-1.10
Communications/Internet										
Foreign investment	-0.29	-0.84	-0.26	-0.74	-0.28	-0.82	-0.19	-0.63	0.45	0.78
<i>Investment characteristics and performance</i>										
Hours from syndicated partners			-0.003	-0.29	-0.008	-0.78	-0.008	-0.77	-0.01	-0.46
Investment rounds (Log of) book value			-0.25	-2.98***	0.25	1.10	0.34	1.36	0.99	1.21
Investment months					-0.008	-0.84	-0.006	-0.71	0.10	0.11

Table 5 continued

Independent variables	Model (1) OLS		Model (2) OLS		Model (3) OLS		Model (4) OLS		Model (5) 2SLS	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
IPO exit					0.12	0.33	-0.05	-0.13	0.002	2.11**
Acquisition exit							-0.24	-0.61		
<i>VC Fund Characteristics</i>										
Limited partnership VC			-0.18	-0.43	-0.01	-0.04	-0.16	-0.45	0.57	1.08
VC portfolio size /# of VC managers	-0.07	-0.78	-0.14	-1.59	-0.22	-2.21**	-0.26	-2.78***	-0.37	-1.76*
Number of observations	74		74		74		74		74	
Adjusted R ²	0.38		0.40		0.44		0.44		0.44	
Loglikelihood	-125.30		-122.34		-114.90		-114.98		-114.98	
Akaike information criterion	3.63		3.63		3.65		3.65		3.65	
F statistic	6.69***		5.50***		4.02***		4.01***		4.01***	

Independent variables are as defined in Table 1. Models (1)–(4) use OLS; Model (5) uses 2SLS where the following variables that are treated as potentially endogenous: the convertible preferred equity dummy, the fraction of veto rights, board rights, and other “special” control rights held by the VC, the percentage of the VC’s ownership share, the number of hours per month from syndicated VCs, the number of investment rounds, the number of investment months, exit outcomes, and the capital under management per VC fund managers. The following variables are used as instruments: the VC’s ranking of project risk and entrepreneur experience, the log of the book value of the investment, the legality index of the country of the investment, a dummy for entrepreneurs in foreign countries, a late stage investment dummy, industry dummy variables, the limited partnership dummy variable for the VC, dummy variables for the investment and exit years, and the log of the MSCI returns over the period of the investment. White’s (1980) HCCME is used

*, **, *** represent estimates significant at the 1, 5, and 10% levels, respectively

Table 6 Multivariate analysis of disagreement. This table presents OLS and Ordered Logit estimates of the number of disagreements between the venture capitalist and the entrepreneurial firm

Independent Vari- ables	Model (1) OLS		Model (2) OLS		Model (3) ordered logit		Model (4) ordered logit		Model (5) IV ordered logit	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Constant	0.53	0.61	7.75	2.72***	3.67	1.50	9.97	2.07**	7.79	2.13**
<i>Contractual terms and legal conditions</i>										
Convertible security (H1)	-0.04	-0.13	0.31	1.01	0.03	0.40	0.36	0.48	0.20	0.15
Ownership % (H1)	1.21	1.22	1.55	1.67*	3.14	1.14	3.03	1.76*	-0.34	-0.06
Veto rights (H2)	0.27	0.86	-0.42	-0.95	-0.12	-0.11	-0.93	-1.17	-2.57	-0.81
Board rights (H2)	0.83	0.15			3.27	1.15			0.002	0.48
Special control rights (H2)					-2.92	-1.75*			1.64	0.26
Country legality (H3)			-0.29	-3.10***			-0.40	-2.17**		
<i>Project and environment related risk</i>										
Project risk ranking (H2)	-0.23	-0.28	0.41	0.49	0.73	0.20	0.34	0.14	-0.89	-0.40
Entrepreneur experience ranking (H2)			-0.16	-1.83*	-0.39	-1.81*	-0.32	-1.84*	-0.39	-2.35**
Late or buyout stage (H2)	-0.88	-2.83***	-0.34	-1.09	-2.76	-2.46**	-1.30	-1.08	-2.15	-2.02**
Medical/biotechnology (H2)			1.15	1.43	1.93	1.45	1.10	0.93	-0.08	-0.05
Computer/electronics (H2)			-0.33	-0.90	0.44	0.53	-0.06	-0.09	-0.47	-0.41

Table 6 continued

Independent Vari- ables	Model (1) OLS		Model (2) OLS		Model (3) ordered logit		Model (4) ordered logit		Model (5) IV ordered logit	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Communications/Internet (H2)			-0.78	-1.80*	-1.05	-0.93	-1.29	-1.38	-1.19	-0.81
Foreign investment	0.21	0.60	0.48	1.19	0.81	0.75	0.78	0.86	-0.58	-0.25
<i>Investment characteristics and performance</i>										
Hours from syndicated partners	0.03	3.72***	0.03	4.00***	0.09	2.24**	0.06	2.40**	0.02	0.44
Investment rounds			0.16	1.14	-0.42	-0.84	0.06	0.13	-2.57	-2.38**
(Log of) book value	0.03	0.34	0.03	0.33	0.19	0.90	0.14	0.61	0.12	0.50
Investment months			-0.01	-1.87*	-0.04	-1.35	-0.02	-1.02	1.96	1.38
IPO exit			-0.14	-0.28	0.16	0.19	0.81	0.90	0.43	0.52
Acquisition exit			-0.02	-0.04			0.53	0.73		
<i>VC fund characteristics</i>										
Limited partnership VC			-0.98	-2.24**	-0.53	-0.62	-1.23	-1.43	-0.61	-0.82
VC portfolio size /# of VC managers	-0.23	-3.22***	-0.18	-2.20**	-0.79	-1.91*	-0.74	-1.55	-0.42	-1.05
Mu (1)					0.95	3.03***	0.84	2.74***	0.66	2.96***
Mu (2)					1.30	2.41**	1.20	3.10***	0.95	3.42***
Mu (3)					2.59	2.52**	2.60	3.09***	2.01	3.37***
Mu (4)					3.69	2.78***	3.77	2.74***	2.98	2.35**

Table 6 continued

Independent Vari- ables	Model (1) OLS		Model (2) OLS		Model (3) ordered logit		Model (4) ordered logit		Model (5) IV ordered logit	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
Number of observa- tions	74		74		74		74		74	
Adjusted R^2	0.16		0.32		0.38		0.34		0.31	
[Pseudo R^2 for Models (3)–(5)]										
Loglikelihood	-118.31		-104.99		-55.11		-58.29		-69.62	
Akaike informa- tion criterion	3.50		3.37							
F statistic [Chi- square for models (3)–(5)]	2.44**		2.81***		Chi-squared: 67.30***		Chi-squared: 60.94***		Chi-squared: 38.28***	

Independent variables are as defined in Table 1. OLS is used in Models (1) and (2); ordered logit are used in Models (3) and (4); ordered logit with instrumental variables is used in Model (5) with the following variables that are treated as potentially endogenous: the convertible preferred equity dummy, the fraction of veto, board, and other “special” control rights held by the VC, the VC’s ownership share (%), the number of hours per month from syndicated VCs, the number of investment rounds and investment months, exit outcomes, and the capital under management per fund managers. The following variables are used as instruments: the VC’s ranking of project risk and entrepreneur experience, the log of the book value of the investment, the legality index of the country of the investment, a dummy for entrepreneurs in foreign countries, a late stage investment dummy, industry dummy variables, the limited partnership dummy, dummy variables for the investment and exit years, and the log of the MSCI returns over the period of the investment. White’s (1980) HCCME is used
 *, **, *** represent estimates significant at the 1, 5, and 10% levels, respectively

effect of specification bias and collinearity among the explanatory variables. Models (1)–(4) in each table present alternative explanatory variables to show the possible influence of collinearity. Each table also provides a 2SLS specification (Model (5)) to check for the effect of potential endogeneity.

Our explanatory variables are broken down into four categories. The relevant variables to test the impact of contractual terms on effort exertion by VCs (namely, Hypotheses 1–3) are shown in the first group in each table. In order to consider how the risk involved in an investment affects the VC's involvement (Hypothesis 2), we employ a number of different proxies for project and environment related uncertainty which are presented in the second group. The last two categories include controls for investment performance and VC fund characteristics in each table. For reasons discussed alongside the development of the hypotheses above, several contract specific and investment performance variables may be endogenous to the involvement of VCs. We control for the potential endogeneity, by using two-stage least squares estimations, of the following explanatory variables: the convertible security dummy, the VC's ownership share, veto rights, board rights, special control rights, the number of hours by syndicating partners, IPO, and acquisition exit dummies, investment months, investment rounds, and VC portfolio size per number of VC managers. In the first step of the regression, we estimate these variables as functions of exogenous instruments such as project and environment related risk characteristics, investment and exit year dummies, and returns to the Morgan Stanley Capital International Inc. ("MSCI") index over the period of the investment.²⁰ The instruments might be correlated with, for example exit potential or the experience of VCs, but they are less likely to be correlated with the advice and conflict measures.²¹ In an extended version of the paper we present correlations across a variety of potentially endogenous variables and various instruments. In brief, the instruments used are useful (although not 100% perfect), as the correlations with the instruments and dependent variables are generally less

²⁰ For identification, there must be at least as many instruments as the number of explanatory variables. We use a number of instruments that are not included among the original set of explanatory variables. We also treat some of the original variables as instruments (for which endogeneity is not potentially problematic), which is appropriate for obtaining asymptotically efficient estimates and necessary to satisfy the identification criterion with our variables.

²¹ Kortum and Lerner (2000) find that VCs contribute approximately 15% less to innovation in boom periods in the United States, which suggests that our instruments are not ideal. In this European dataset, however, the correlations are not as correlated with the dependent variables and the potentially endogenous explanatory variables (this information was presented in an extended version of the paper and is available upon request). The interaction between effort and years is indirect, via exit conditions and contract decisions. That is, our instruments are based on the premise that investment contract decisions and exits are more closely related to market conditions and year effects, consistent with Gompers and Lerner (1999, 2001), Lerner and Schoar (2004, 2005), Bessler and Kurth (2006), Lauterbach et al. (2006), Tykvova (2006), Tykvova and Walz (2006), Witt and Brachtendorf (2006), and others. Our instruments in this context were not selected on the basis of prior work directly on topic of advice, as such papers (e.g., Kaplan and Strömberg 2004) did not control for endogeneity. We considered alternative specifications, which generally yielded similar results. Other specifications are available upon request.

statistically significant than the correlations between the instruments and the potentially endogenous explanatory variables.

5.1 Hypotheses 1–3: The impact of contracts and laws on VC–entrepreneur relationships

In regards to Hypothesis 1a, there is some evidence consistent with the view that the use of convertible securities and the allocation of a substantial ownership percentage to VCs enhance their effort and advice (consistent with the predictions of Casamatta 2003; Repullo and Suarez 2004; Schmidt 2003), but the results are sensitive to the econometric specification. Large ownership percentage induce VCs to spend more hours with entrepreneurial firms: a 10% increase in the VC's ownership share increases the time spent with the entrepreneur by 3 h per month on average (Models 3–5 in Table 4). When convertible securities are used, VCs value their contribution roughly 10% more important (see Models 1, 2, and 4 in Table 5). Contrary to expectations, we find no significant effect of the ownership variable to the intensity of advice (Table 5).

The results do not support Hypothesis 1b; that is, convertible securities do not mitigate VC–entrepreneur conflicts. On the contrary, there is evidence that a large VC ownership percentage is associated with a greater scope of VC–entrepreneur disagreements (Table 6, Models 2 and 4). One explanation is that VCs' have pronounced incentives to monitor the activities of the entrepreneur when VCs have larger ownership stakes, which in turn this leads to conflict.

The data provide much stronger support for Hypothesis 2a than Hypotheses 1a and 1b. In regards to Hypothesis 2a, the data indicate that the more control given to the VC in the form of veto rights, the more intense his effort exertion, especially with respect to the intensity of advising. VCs with full veto control with respect to the five issues considered (asset sales, asset purchases, changes in control, issuance of equity, and other veto rights; see Table 1) provide roughly 30% more advice than VCs who have no veto rights in any of these decisions (Table 5, Models 1–5). This effect survives when we control for the endogeneity of the “veto rights” variable (Table 5, Model 5). We find that control increases the time spent with the firm too, by roughly 10–12 h per month (Table 4, Models 1–4), but this effect is not robust to potential endogeneity of the variable (see Table 4, Model 5). These results indicate that VC veto rights are an extremely important and effective mechanism for VCs to exercise their views on how to bring the project to fruition, and more effective than information rights and other specific contractual terms. As mentioned earlier, veto rights are passive rights, where it can be said that although the VC is not “*actively managing*” the firm, it is influencing the outcome of the business decision to be made, especially if the decision requires a unanimous consensus. When involving itself in a high risk project such as a start up entrepreneurial firm, a VC will risk being blamed for the failure of the firm in the more than likely event of its failure. By

exercising veto rights, it can avoid having to shoulder full blame as it is not the VC alone that decides various issues related to for example asset sales or asset purchases, it is just failure to reach a consensus by the “whole managing team” that determines which course of action is to be taken. This indirect control is also pertinent in the event there is an attempt to argue that the corporate veil was pierced (some VCs exercise their veto rights as shareholders and not board members). The more veto rights the VC wields, the more secure it feels in involving itself with the firm.

In Model (3) in Table 6, contrary to expectations (Hypothesis 2b), we find support that VC control mitigates the number of VC–entrepreneur disagreements. This indicates that VCs have fewer conflicts with entrepreneurs when they have the right to interfere in entrepreneurial decision-making; however, this effect is not robust to the inclusion/exclusion of the other explanatory variables and controls for endogeneity.

In regards to Hypothesis 3, considering the impact of investor protection and legal rules, we find that VCs experience more disagreements with entrepreneurs in countries with lower *Legality* indices (Table 6). The estimates indicate that an approximately five-point increase in *Legality* (which is roughly the difference in the *Legality* index between Portugal and the Netherlands) gives rise to on average one fewer type of dispute. Recall as well that the correlation between *Legality* and conflicts is -0.23 and significant at the 5% level. The estimated coefficient for *Legality* in Table 6, however, is sensitive to all possible specifications (for other specifications not explicitly reported); overall, therefore, we may infer that the evidence relating higher *Legality* to fewer conflicts is highly suggestive, but not absolutely conclusive. One might intuitively expect better laws and legal certainty to mitigate the scope for disagreement since better laws provide greater certainty in enforcing contracts and interpreting incomplete contracts (La Porta et al. 1997, 1998). Note as well that while VC–entrepreneur conflicts are negatively related, VC advice is statistically unrelated to *Legality*.

In sum, there is some support for the hypotheses pertaining to formal control mechanisms and legal systems in facilitating VC advice and mitigating VC–entrepreneur conflicts. First, in regards to VC advice, the most economically significant and statistically robust effect on VC advice was in relation to VC veto rights. The use of convertible securities and VC ownership percentages also matter for VC advice, but those effects are not completely robust to the econometric specification.²² Second, in regards to VC–entrepreneur conflicts,

²² We may expect that cash-flow rights will not be effective in eliciting more VC support if the VC is not at the same time endowed with more control rights. Without sufficient control rights, the VC probably cannot assure that his advice is being adhered to in the firm. Hence, financial incentives would not be effective in eliciting more advice. With powerful control rights, however, the VC will be very effective in pushing through any suggestions for the improvement, and he will thus engage more if he has more financial incentives. In this sense, financial incentives and control rights should be complements. We considered this possibility by including interaction terms in the regressions. However, such terms were generally insignificant. Additional data collection may shed further light on this issue in future research.

conflicts are not related to contracts in a statistically significant way, but are significantly mitigated by the strength of the legal system.

5.2 Other governance mechanisms, risk and control variables

The data indicate non-contractual governance mechanisms (such as syndication arrangements and portfolio size in terms of number of investees per VC manager), entrepreneur and VC characteristics, project and environment risk, and project success potential all matter for enhancing the active involvement of VCs in the entrepreneurial firms that they finance. The results pertaining to these variables in Tables 4, 5, 6 are described below for syndication, VC fund characteristics, entrepreneur characteristics and project risk, and success potential, respectively.

5.2.1 *Syndication*

The data indicate an hour extra support from other syndicating partners increases the time spent by the VC with the entrepreneur by approximately 0.5–1 h per month (see Table 4). This effect is highly statistically significant (Models 1–5 in Table 4) and very robust to consideration of potential endogeneity (Model 5 in Table 4). This result is consistent with empirical regularities of investment syndication in the US (Lerner 1994) and Europe (Wright and Lockett 2003). The data therefore suggest that syndicated transactions can be characterized by complementarities (as opposed to free riding) in effort exertion by syndicate members. Note, however, that the syndication variable is not significant in Table 5 for the VCs' advice ranking. In Table 6, syndication appears to positively related to the scope of conflict, but this effect is not robust to controls for endogeneity (Model 5 in Table 6).

5.2.2 *VC Fund characteristics*

Concerning the impact of VC fund characteristics, we find that VCs with large portfolios (in terms of the number of investee firms) per number of fund managers become less involved in the development of their ventures. In particular, VCs with one extra entrepreneurial firm per manager in their portfolio provided on average 2–3 h less support per month, 20% less advice, and had 0.2 to 0.3 fewer disagreements with entrepreneurs (Tables 4, 5, 6). This result is robust to the endogeneity of the portfolio size per number of managers variable. The evidence is suggestive that there is an upper bound to the number of ventures which fund managers can efficiently advise, which is an intuitive result and supports Kannianen and Keuschnigg (2003, 2004), Keuschnigg (2004), Cumming (2006) and Jääskeläinen et al. (2006). We find no significant impact of fund type on effort exertion by VCs: in our sample bank-affiliated and limited partnership funds are similar in this respect. As indicated (see footnote 12), other controls for VC fund characteristics were not material to the results.

5.2.3 *Entrepreneur characteristics and project risk*

The data indicate VCs spend less time with their late stage investments. VCs also value their advice as less important for late stage investments. Conflicts are also less frequent for late stage firms (Tables 4, 5, 6). These effects are large and statistically significant: late stage ventures in our sample received on average 8–10 h less time per month, 10% less advice, and had fewer disputes concerning one or two more issues with their VCs. Early stage investments require a much greater effort commitment for VCs, which is consistent with earlier findings in Gompers (1995) and Sapienza et al. (1996). Evidence on the size of the investment in Table 5 is also robust and supportive of the view that the smaller the investment (for earlier stages of development), the greater the importance the VC's advice.

The data also indicate a statistically significant and large positive effect of project risk on advice: when VCs value a project as 10% riskier, they give roughly 25–30% more advice (Table 5). The risk variable is built on the assessment of VCs of both project and environment related risk, such as “uncertain market size”, “uncertainty about product/ technology”, “risky competitive position”, etc. (see Table 1). As a result, it accounts for both “internal” and “external” uncertainty, following the classification used by Kaplan and Strömberg (2004). The distinction between the two risk measures was not meaningful in our data, since they turned out to be very highly (positively) correlated in the sample. Therefore, we use an aggregate of all these risk factors. The result that VCs provide more advice to entrepreneurs with riskier projects is nevertheless consistent with both Sapienza et al. (1996) and Kaplan and Strömberg (2004).

The entrepreneur variable is employed to account for the impact of uncertainty related to the entrepreneur's skills and ability. The results show a positive relation between the entrepreneur's experience and VC advice (Table 4), and a negative relation between the entrepreneur's experience and VC–entrepreneur disagreements (Table 6). Although both effects are rather small, they are statistically significant and robust to alternative specifications. The positive relation between entrepreneurial experience and advice supports the notion of complementarity of efforts by the contracting parties, as assumed in several theoretical models on VC finance (e.g., Casamatta 2003; Cestone 2000; Repullo and Suarez 2004).

An interesting result is that VCs tend to get involved in Internet based firms to a significantly lesser extent than in other types of firms. VCs spend approximately 10–12 h less time each month with their ventures in the Internet or communications industries (Table 4). Moreover, they give 10% less advice to and have on average 1 fewer disagreement with the management of these firms (Tables 5, 6). Although not robust to all specifications, it is noteworthy that this negative relation between the Internet dummy and VC effort exists for all the three dependent variables. Related evidence is consistent with the view that VCs financed more and advised less while taking advantage of the Internet bubble (Kortum and Lerner 2000). Evidence from the US that many VCs were

able to successfully exit their Internet investments, even though many such firms subsequently went bankrupt, is consistent with this interpretation (that is, while our data sample does not enable direct tests of the same phenomenon, our evidence shows that European VCs similarly tend to spend less time with Internet investees). Also noteworthy is that there were no other significant differences with respect to the VCs' involvement in the other two high-tech industries in the data (biotechnology and electronics).

5.2.4 Success potential

Our evidence with respect to the relation between the venture's success potential and VCs' involvement is ambiguous. Similarly, the evidence on the length of the investment horizon is not robust. Based on motives discussed alongside the development of the hypotheses above, we associate the venture's success potential with the probability of successful exit and consider whether actual and planned exits can be associated with more intense involvement. In the sample, exits via IPO and acquisition do not have a robust impact on the advising activities and conflicts (Tables 5 and 6). Models (3) and (4) in Table 4 suggest a positive relation between effort and IPOs, but this effect is not robust to controls for endogeneity. In Model (5) in Table 5 the IPO dummy is statistically significant with the control for endogeneity; however, the economic significance of the estimate is close to zero. Thus, our analysis cannot provide clean evidence for the role of inherently successful ventures in spurring VCs' involvement, but there is nevertheless suggestive evidence that VCs spend more time with, and provide more advice to, their better performing investee firms.

6 Limitations, alternative explanations and future research

The analysis in this paper is based on a new and fairly comprehensive dataset. However, there are limitations to the breadth and depth of the data that are important to mention. For example, our data do not include details on the investor fixed and performance fees, covenants surrounding the management of the fund, experience of the fund managers, sources of the funds, (from pension funds, see also Ammann 2003, banks, etc.), changes in effort measures over time, among other things. Albeit, to the extent that we were able to obtain these details from a subset of the funds, we did not find significant differences in some of these variables, and other variables were correlated with the variables already considered in the paper. Hence, despite the large number of details that are available in the data, there are other elements that could add to the richness in an analysis of investor activities. Moreover, the number of observations for which we could obtain sufficient details is limited (although similar to related prior work on the topic; see Kaplan and Strömberg 2004, for a sample of 67 entrepreneurial firms from 11 VC funds which are derived from a US-only sample). This is primarily due to the fact that most VC funds are loath to disclose (some even contractually restricted from disclosing) confidential information

which limits the breadth and depth of the data that can be analyzed. Nevertheless, despite these limitations, we do not believe there are reasons to expect the results presented above to be materially biased by excluded variables or sample selection problems. Future work could seek to expand the scope of data, and the role of contracts and legal systems for managing investor–investee relationships in different countries, such as in emerging markets. Future work could also consider different types of investors, such as hedge funds (see also Eling 2006; Kassberger and Kiesel 2006; Le Moigne and Savaria 2006).

A unique and useful feature of our data is that it enables an analysis of contract and legal variables alongside information regarding the entrepreneur's and VCs' characteristics, including the syndicate VCs' characteristics. Our data, however, are derived primarily from the VCs, not the entrepreneurs and syndicate VCs. We were able to confirm the accuracy of the information provided in cases where the identities of the entrepreneurs and syndicate VCs could be revealed (in a few ongoing investments this information was considered to be classified), and did not find any material discrepancies or reporting bias.

Finally, we note that the distinction between advice and conflict can be difficult to disentangle in practice. Our data were derived by meeting with the VCs themselves and reviewing their tasks. The VCs consistently identified the data presented herein as exemplifying advice versus conflict. In practice, however, a few VCs did point out that the distinction can become blurred depending on the specific context. Our analysis of specific tasks (as detailed in the summary statistics) did not suggest differences depending on broad versus narrow definitions of advice versus conflict. Further, the broad picture of advice versus conflict was quite consistent with the ways in which VCs viewed their role in facilitating the development of entrepreneurial firms.

7 Conclusions

This paper considered three different proxies to effort exerted by VCs: the hours per month spent with entrepreneurs (total effort), the investors' rankings of the importance of their contribution pertaining to different advising fields (advice), as well as the scope of investor–entrepreneur disagreements (conflict). Our results show that the allocation of cash-flow and control rights and the different project and environment related risk factors affect the three effort measures in different ways. Cash-flow and control rights seem to enhance advice but do not affect the likelihood of conflict. In particular, VCs holding a convertible claim provide on average 10% more advice, large VC ownership percentages significantly increase the amount of VC hours spent with entrepreneurs, and VCs with full veto control give roughly 30% more advice than VCs who have no veto rights.

The quality of a country's legal system matters for the propensity of conflicts between entrepreneurs and their investors. In particular, the data indicate that an approximately five-point increase in *Legality* (which is roughly the difference in the *Legality* index between Portugal and the Netherlands) gives rise to one

fewer type of dispute (such as in regards to strategic decisions, human resource policies of the firm, and the like).

It is important to note that many non-legal and non-contractual features are also vitally important to both VC advising activities as well as VC–entrepreneur conflicts. For instance, when VCs consider a project to be 10% riskier, they provide on average 25% more advice. Moreover, VCs spend on average 8–10 h more with their early stage ventures and provide them roughly 10% more advice. They also have on average 1 or 2 more different types of disagreements with entrepreneurs at their early stages of development. We also find that if syndicate members provide one hour more every month, the VC manager will also spend up to an hour more with the entrepreneur. A related result in this paper is that VCs give more advice to, and disagree less with, more experienced entrepreneurs. This implies that VCs and entrepreneurs tend to have complementary skills or expertise, consistent with many theoretical models of VC financing (Casamatta 2003; Cestone 2000; Repullo and Suarez 2004).

Our evidence also indicates that VCs that have more investments per number of managers tend to contribute less, as expected (Kanniainen and Keuschnigg 2003, 2004; Keuschnigg 2004; Cumming 2006). In our sample, VCs with one extra entrepreneurial firm per manager in their portfolio provided on average 2–3 h less support per month, 20% less advice, and had 0.2 to 0.3 fewer disagreements with entrepreneurs. We also find a positive relationship between VCs' involvement and successful exits but the direction of causality in this context is highly ambiguous.

Overall, the data are consistent with the view that both formal contracts and legal systems are important to managing VC–entrepreneur relationships. But contracts and laws operate alongside other informal governance mechanisms such as syndication and portfolio size, as well as risk factors and success potential. Further work could continue to study the comparative importance of formal contracts and laws versus other governance mechanisms in managing investor–investee relationships in different financing contexts and in less developed countries.

Acknowledgments We owe special thanks to the venture capital funds for providing the data. We also owe special thanks to an anonymous referee, Robert De Young, Enrico Perotti and Ibolya Schindelle for helpful comments, and thanks to the seminar participants at the University of Amsterdam, the University of British Columbia Sauder School of Business, the University of Cambridge Judge Institute of Management, and the EPFL/NYU/RPI Conference on Managing and Financing Innovation in Luusanne (March 2005), the Global Finance Association in Dublin (June 2005), the European Financial Management Association in Milan (June 2005), the Singapore Management University EDGE Conference on Entrepreneurship (July 2005), and the Asian FMA Conference in Kuala Lumpur (July 2005). Any errors and/or omissions are our own.

References

- Aghion, P., Bolton, P.: An incomplete contracts approach to financial contracting. *Rev. Econ. Stud.* **77**, 338–401 (1992)
- Amit, R., Brander, J., Zott, C.: Why do venture capital firms exist? Theory and Canadian evidence. *J. Bus. Ventur.* **13**, 441–548 (1998)

- Ammann, M.: Return guarantees and portfolio allocation of pension funds. *Financ. Mark. Portf. Manage.* **17**, 277–283 (2003)
- Ammann, M., Siez, R.: An IFRS and FASB 123 (R) compatible model for valuation of employee stock options. *Financ. Mark. Portf. Manage.* **19**, 391–396 (2005)
- Armour, J., Cumming, S.: The legislative road to silicon Valley. *Oxford Econ Papers* **58**, 596–635
- Bascha, A., Walz, U.: Convertible securities and optimal exit decisions in venture capital finance. *J. Corp. Finance* **7**, 285–306 (2001)
- Bascha, A., Walz, U.: Financing practices in the German venture capital industry: an empirical assessment. Working Paper, University of Tübingen (2001b)
- Berglöf, E.: A control theory of venture capital finance. *J. Law Econ. Organ.* **10**, 247–267 (1994)
- Berkowitz, D., Pistor, K., Richard, J.F.: Economic development, legality, and the transplant effect. *Eur. Econ. Rev.* **47**, 165–195 (2003)
- Bessler, W., Kurth, A.: Agency problems and the performance of Venture backed IPOs in Germany: exit strategies, lock-up periods, and bank ownership. *Eur. J. Finance* **13**(1), 29–63 (2007)
- Birmingham, C., Busenitz, L., Arthurs, J.: The escalation of commitment by venture capitalists in reinvestment decisions. *Venture Cap. Int. J. Entrep. Finance* **5**, 218–230 (2003)
- Brander, J.A., Amit, R., Antweiler, W.: Venture capital syndication: improved venture selection versus the value-added hypothesis. *J. Econ. Manage. Strategy* **11**, 423–452 (2002)
- Bührer, C., Hubli, I., Marti, E.: The regulatory burden of the Swiss wealth management industry. *Financ. Mark. Portf. Manage.* **19**, 99–108 (2005)
- Burkart, M., Gromb, D., Panunzi, F.: Large shareholders, monitoring, and the value of the firm. *Q. J. Econ.* **112**, 693–728 (1997)
- Casamatta, C.: Financing and advising: optimal financial contracts with venture capitalists. *J. Finance* **58**(5), 2059–2086 (2003)
- Casamatta, C., Haritchabalet, C.: Learning and syndication in venture capital investments. Working paper, University of Toulouse (2003)
- Cestone, G.: Venture capital meets contract theory: risky claims or formal control? Working paper, University of Toulouse and Institut d'Anàlisi Econòmica, Barcelona (2000)
- Chan, Y.-S., Siegel, D.R., Thakor, A.V.: Learning, corporate control and performance requirements in venture capital contracts. *Int. Econ. Rev.* **31**, 365–382 (1990)
- Cornelli, F., Yosha, O.: Stage financing and the role of convertible debt. *Rev. Econ. Stud.* **70**(1), 1–32 (2003)
- Cumming, D.: Capital structure in venture finance. *J. Corp. Finance* **11**, 550–585 (2005)
- Cumming, D.: The determinants of venture capital portfolio size: empirical evidence. *J. Bus.* **79**, 1083–1126 (2006)
- Cumming, D., Johan, S.: Is it the law or the lawyers? Investment covenants around the world. *Eur. Financ. Manage.* **12**, 535–574 (2006a)
- Cumming, D., Johan, S.: Provincial preferences in private equity. *Financ. Mark. Portfolio Manage.* **20**(4) (2006b)
- De Clercq, D., Sapienza, H.J.: When do venture capital firms learn from their investments?. *Entrep. Theory Pract.* **29**(4), 517–535 (2005)
- Drobtz, W.: Corporate governance-legal fiction or economic reality. *Financ. Mark. Portf. Manage.* **16**, 431–439 (2002)
- Eling, M.: Performance measurement of hedge funds using data envelopment analysis. *Financ. Mark. Portf. Manage.* **20**(4) (2006)
- Fried, J.M., Ganor, M.: Agency costs of venture capitalist control in startups. *NYULJ* **81**, 967–1025 (2006)
- Gompers, P.A.: Optimal investment, monitoring, and the staging of venture capital. *J. Finance* **50**, 1461–1489 (1995)
- Gompers, P.A., Lerner, J.: *The Venture Capital Cycle*. MIT Press, Cambridge (1999)
- Gompers, P.A., Lerner, J.: Money chasing deals? The impact of fund inflows on the valuation of private equity investments. *J. Financ. Econ.* **55**, 281–325 (2000)
- Gompers, P.A., Lerner, J.: *The Money of Invention: How Venture Capital Creates New Wealth*. Harvard Business School Press, Cambridge (2001)
- Gorman, M., Sahlman, W.: What do venture capitalists do?. *J. Bus. Ventur.* **4**, 231–248 (1989)
- Gygax, A.: Do venture capitalists imitate portfolio size? *Financ. Mark. Portf. Manage.* **21**(1) (2006)
- Hart, O., Moore, J.: Foundations of incomplete contracts. *Rev. Econ. Stud.* **66**, 115–138 (1999)

- Hellmann, T.: The allocation of control rights in venture capital contracts. *Rand J. Econ.* **29**, 57–76 (1998)
- Hellmann, T., Puri, M.: Venture capital and the professionalization of start-up firms: empirical evidence. *J. Finance* **57**, 169–197 (2002)
- Hsu, D.: What do entrepreneurs pay for venture capital affiliation?. *J. Finance* **59**(4), 1805–1844 (2004)
- Jääskeläinen, M., Maula, M., Seppä, T.: Allocation of attention and the performance of venture capitalist. *Entrep. Theory Pract.* (2006, in press)
- Judge, G.G., Hill, R.C., Griffiths, W.E., Lutkepohl, H., Lee, T.: *Introduction to the Theory and Practice of Econometrics*. John Wiley, New York (1982)
- Kanniainen, V., Keuschnigg, C.: The optimal portfolio of start-up firms in venture capital finance. *J. Cor. Finance* **9**, 521–534 (2003)
- Kanniainen, V., Keuschnigg, C.: Start-up investment with scarce venture capital support. *J. Bank. Finance* **28**, 1935–1959 (2004)
- Kaplan, S.N., Strömberg, P.: Characteristics, contracts, and actions: evidence from venture capital analyses. *J. Finance* **59**(5), 2177–2206 (2004)
- Kaplan, S.N., Martel, F., Strömberg, P.: How do legal differences and learning affect financial contracts? Working Paper, University of Chicago Graduate School of Business (2005)
- Kassberger, S., Kiesel, R.: A fully parametric approach to return modeling and risk management of hedge funds. *Financ. Mark. Portf. Manage.* **20**(4) (2006)
- Kennedy, P.: *A Guide to Econometrics*. Blackwell, Oxford (1998)
- Keuschnigg, C.: Optimal public policy for venture capital backed innovation. CEPR Working Paper No. 3850, Centre for Economic Policy Research (2003)
- Keuschnigg, C.: Taxation of a venture capitalist with a portfolio of firms. *Oxford Econ. Pap.* **56**, 285–306 (2004)
- Keuschnigg, C., Nielsen, S.B.: Public policy for venture capital. *Int. Tax Public Finance* **8**, 557–572 (2001)
- Keuschnigg, C., Nielsen, S.B.: Tax policy, venture capital and entrepreneurship. *J. Public Econ.* **87**, 175–203 (2003a)
- Keuschnigg, C., Nielsen, S.B.: Taxes and venture capital support. *Rev. Finance* **7**, 515–538 (2003b)
- Keuschnigg, C., Nielsen, S.B.: Start-ups, venture capitalists and the capital gains tax. *J. Public Econ.* **88**, 1011–1042 (2004)
- Kirilenko, A.I.: Valuation and control in venture finance. *J. Finance* **56**, 565–587 (2001)
- Kortum, S., Lerner, J.: Assessing the contribution of venture capital to innovation. *RAND J. Econ.* **31**, 647–692 (2000)
- La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R.: Legal determinants of external finance. *J. Finance* **52**, 1131–1150 (1997)
- La Porta, R., Lopez-De-Silanes, F., Shleifer, A., Vishny, R.: Law and finance. *J. Polit. Econ.* **106**, 1113–1155 (1998)
- Le Moigne, C., Savaria, P.: Relative importance of hedge fund characteristics. *Financ. Mark. Portf. Manage.* **20**(4) (2006)
- Lauterbach, R., Welpel, I.M., Fertig, J.: Performance differentiation: cutting losses and maximizing profits of private equity and venture capital investments. *Financ. Mark. Portf. Manage.* **21**(1) (2006)
- Leleux, B., Surlemont, B.: Public versus private venture capital: seeding or crowding out? A pan-European analysis. *J. Bus. Ventur.* **18**, 81–104 (2003)
- Lerner, J.: The syndication of venture capital investments. *Financ. Manage.* **23**, 16–27 (1994)
- Lerner, J., Schoar, A.: The illiquidity puzzle: theory and evidence from private equity. *J. Finance.* **72**(2), 3–40 (2004)
- Lerner, J., Schoar, A.: Does legal enforcement affect financial transactions? The contractual channel in private equity. *Q. J. Econ.* **120**, 223–246 (2005)
- Maginart, S., De Waele, K., Wright, M., Robbie, K., Desbrières, P., Sapienza, H., Beekman, A.: Venture capital, investment appraisal, and accounting information: a comparative study of the US, UK, France, Belgium and Holland. *Eur. Financ. Manage.* **6**, 380–404 (2000)
- Manigart, S., Korsgaard, M.A., Folger, R., Sapienza, H., Baeyens, K.: The impact of trust on private equity contracts. Working Paper, Vlerick Leuven Gent Management School (2002a)
- Manigart, S., Lockett, A., Meuleman, M., Wright, M., Landstrom, Bruining, H., Desbrières, P., Hommel, U.: Why do European venture capital companies syndicate? Working Paper, Vlerick

- Leuven Gent Management School (2002b)
- Manigart, S., DeWaele, K., Wright, M., Robbie, K., Desbrieres, P., Sapienza, H.J., Beekman, A.: The determinants of the required returns in venture capital investments: a five-country study. *J. Bus. Ventur.* **17**, 291–312 (2002)
- Mayer, C., Schoors, K., Yafeh, Y.: Sources of funds and investment activities of venture capital funds: evidence from Germany, Israel, Japan and the UK. *J. Corp. Finance* **11**, 586–608 (2005)
- Repullo, R., Suarez, J.: Venture capital finance: a security design approach. *Rev. Finance* **8**, 75–108 (2004)
- Sahlman, W.A.: The structure and governance of venture capital organizations. *J. Financ. Econ.* **27**, 473–521 (1990)
- Sapienza, H.: When do venture capitalists add value?. *J. Bus. Ventur.* **7**, 9–27 (1992)
- Sapienza, H., Manigart, S., Vermeir, W.: Venture capital governance and value-added in four countries. *J. Bus. Ventur.* **11**, 439–469 (1996)
- Sapienza, H.J., De Clercq, D., Sandberg, W.R.: Antecedents of international and domestic learning effort. *J. Bus. Ventur.* **20**(4), 437–457 (2005)
- Schmidt, K.M.: Convertible securities and venture capital finance. *J. Finance* **58**(3), 1139–1166 (2003)
- Schwiebacher, A.: An empirical analysis of venture capital exits in Europe and the United States. Working paper, University of Amsterdam (2002)
- Shepherd, D.A., Armstrong, M.J., Levesque, M.: Allocation of attention within venture capital firms. *Eur. J. Oper. Res.* **116**(2), 545–564 (2005)
- Tykvova, T.: How do investment patterns of independent and captive private equity funds differ? Evidence from Germany. *Financ. Mark. Portf. Manage.* **20**(4) (2006)
- Tykvova, T., Walz, U.: How important is participation of different VCs in German IPOs? *Global Finance J.* (2006, in Press)
- White, H.: A heteroskedastic-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econ.* **48**, 817–838 (1980)
- Witt, P., Brachtendorf, G.: Staged financing of start-ups. *Financ. Mark. Portf. Manage.* **20**, 185–203 (2006)
- Wright, M., Lockett, A.: The structure and management of alliances: syndication in the venture capital industry. *J. Manage. Stud.* **40**, 2073–2104 (2003)
- Zacharakis, A.L., Shepherd, D.A.: The nature of information and venture capitalists' overconfidence. *J. Bus. Ventur.* **16**, 311–332 (2001)
- Zacharakis, A.L., Shepherd, D.A.: A non-additive decision-aid for venture capitalists' investment decisions. *Eur. J. Oper. Res.* **162**(3), 673–689 (2005)
- Zimmermann, H.: On patience, recovery, and market expectations. *Financ. Mark. Portf. Manage.* **16**, 299–302 (2002)



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