No. 2004/17

**Legality and Venture Governance
Around The World**

Douglas Cumming, Daniel Schmidt, Uwe Walz

Center for Financial Studies

The *Center for Financial Studies* is a nonprofit research organization, supported by an association of more than 120 banks, insurance companies, industrial corporations and public institutions. Established in 1968 and closely affiliated with the University of Frankfurt, it provides a strong link between the financial community and academia.

The CFS Working Paper Series presents the result of scientific research on selected topics in the field of money, banking and finance. The authors were either participants in the Center´s Research Fellow Program or members of one of the Center´s Research Projects.

If you would like to know more about the *Center for Financial Studies*, please let us know of your interest.

Prof. Dr. Jan Pieter Krahnen   Prof. Volker Wieland, Ph.D.

CFS Working Paper No. 2004/17

Legality and Venture Governance Around the World

Douglas Cumming*, Daniel Schmidt[+] and Uwe Walz[++]

April 2004

Abstract:
We analyze governance with a dataset on investments of venture capitalists in 3848 portfolio firms in 39 countries from North and South America, Europe and Asia spanning 1971-2003. We find that cross-country differences in Legality have a significant impact on the governance structure of investments in the VC industry: better laws facilitate faster deal screening and deal origination, a higher probability of syndication and a lower probability of potentially harmful co-investment, and facilitate board representation of the investor. We also show better laws reduce the probability that the investor requires periodic cash flows prior to exit, which is in conjunction with an increased probability of investment in high-tech companies.

* Douglas Cumming, University of Alberta School of Business, Edmonton, Alberta, Canada T6G 2R6, Tel: 001-780-492-0678, Fax: 001-780-492-3325, Email: douglas.cumming@ualberta.ca, http://www.bus.ualberta.ca/dcumming/

[+] Daniel Schmidt, J.W. Goethe-Universität Frankfurt/Main and CEPRES, Mertonstr. 7, D-60054 Frankfurt/Main, Germany, Email: daniel.schmidt@cepres.de

[++] Uwe Walz, J.W. Goethe-Universität Frankfurt/Main, Schumannstr. 60, 60054 Frankfurt/Main, Germany, Tel.: ++49-69-798-22775, Fax: ++49-798-22753, Email: uwe.walz@wiwi.uni-frankfurt.de, http://www.wiwi.uni-frankfurt.de/profs/walz and Center for Financial Studies, Taunusanlage 6, 60329 Frankfurt/Main, Germany

1. Introduction

Venture capital is distinct from other forms of financial intermediation primarily through the governance and value added that the investor provides to the investee (Gompers and Lerner, 1999). While the oldest and most successful venture capital market has been in the U.S., venture capital activities have spread across the globe with increasing vigour in the latter part of the 20th century (Lerner, 2000; Lerner and Schoar, 2003). Nevertheless, massive differences remain in the size and success of venture capital markets around the world. Given the defining characteristic of venture capital as a form of financial intermediation is in the governance provided to their entrepreneurial investees, the source of international differences in venture capital markets is most likely attributable to the impact of laws and institutions on venture capital governance structures.

In this paper, we focus on international differences in governance structures in venture capital in three related and equally important categories: (1) time to deal origination (which reflects screening and due diligence), (2) syndication and co-investment, and (3) board seats and security choice. To fully understand the structure and governance of venture capitalists vis-à-vis their entrepreneurial investees, it is useful to examine each of these complementary and interrelated aspects in unison. Further, a joint analysis of each of these governance mechanisms facilitates a fairly comprehensive picture of the source of international differences in venture capital markets.

The first main pillar of our analysis focuses on the screening process, which is of vital importance to venture capitalists. For instance, venture capitalists in the U.S. receive more than 1000 requests for financing each year, but complete at most only a couple of deals in a typical year (Sahlman, 1990). In terms of cross-country differences in venture capital finance, where laws impede the due diligence process they slow down the rate of investment and ability of a fund to properly manage deal flow and the financing of meritorious entrepreneurial firms. To the best of our knowledge, prior research has not investigated this particular issue in entrepreneurial finance in any domestic and/or international context.

The screening and due diligence process is in turn closely connected to syndication and co-investment, or the interaction among different investors within any investment. This is the second main pillar of our analysis. Prior research has established the notion that syndication enhances venture capitalist screening, monitoring and value-added (Lerner, 1994; Gompers and Lerner, 1999). By contrast, co-investment does not facilitate these governance mechanisms and may reflect an agency problem vis-à-vis the institutional investors if one VC fund is using capital to bail out the bad investments of another VC fund within the same VC organizational structure (Gompers and Lerner, 1996, 1999). We extend the literature in this paper by exploring the issue of whether successful legal

and institutional structures facilitate syndication relations and inhibit co-investment by VCs in a very broad international context.

Our third and final pillar invokes an analysis of the interaction between venture capitalists and their investees. We study cash flow and control rights that focus on the substantive aspect of governance as opposed to the form of governance. In regards to the control rights, we investigate the question of whether the venture capitalist has a seat on the board directors of the entrepreneurial firm. To this end of studying control, we are able to add to prior research by studying a broader array of data and countries than that which has previously been possible with prior datasets. In regards to cash flow rights, we believe significantly extend prior work by examining whether the financial contract between the VC and entrepreneur involves just upside potential for the investor, or whether or not there is both period cash flows provided to the investor prior to exit, as well as upside potential. That is, we have specific details on the contract that get beyond the form of the contract and get more closely at the substantive structure of the contract. In view of the fact that contracts of different forms may be functionally equivalent (Merton, 1995), and specific contractual forms that are immaterial to their substantive content may be attributable to hidden practice level concerns that are of first order importance (even in the U.S.; see Gilson and Schizer, 2003), this is an important new dimension of analysis that we introduce to the entrepreneurial finance literature. Prior work (either within any country such as the U.S., and/or across countries) has not considered this issue in the entrepreneurial finance and/or venture capital literature.

In each of the three main areas of our analysis we focus on the *Legality* index. The Legality index is a weighted average of the legal index variables introduced by La Porta *et al*. (1997, 1998), as defined by Berkowitz *et al*. (2003). Each of the components of the Legality index is highly pertinent to venture finance, as discussed in detail in section 2 of this paper. The Legality index is an appropriate focus of our analysis, in view of the fact that the components of the legality index are very highly correlated, and to focus on a subset of indices within the component of legality to avoid the collinearity problem might tend to have the appearance of data mining.

A key component of our analysis rests with the introduction of a very large international dataset of 3828 venture capitalist investments from 39 countries (from North and South America, Europe and Asia) and 32 years (1971-2003). Comparable papers in the literature (discussed further herein) have considered fewer countries and fewer transactions, and comprise different details in their datasets that give rise to different research questions. We show that the legal framework has a strong impact on each of these closely related areas of governance, and significantly build on and extend the literature on international differences of venture capital. But we also recognize limitations with the data and point out a number of fruitful avenues for future research toward the latter part of this paper.

The new data introduced herein reveal a number of key results with respect to international differences in time to investment and deal origination, syndication, co-investment, board seats, and the functional form of the financing instrument chosen. Our first central result indicates that better laws facilitate faster deal screening and origination. Using a convex (logarithmic) estimate to account for diminishing effects of an improvement in the quality of laws, we find that an increase in the Legality index from 20 to 21 (a typical improvement among developed nations) lowers the time until lead first investment by approximately 16%, whereas an increase from 10 to 11 (a typical improvement among emerging markets) lowers the time until lead first investment by approximately 33%.

Second, we show that better laws lead to a higher probability of syndication and a lower probability of potentially harmful co-investment. In particular, an increase in Legality from 20 to 21 increases the probability of syndication by approximately 3.0%, whereas an increase from 10 to 11 increases the probability of syndication by approximately 5.8%. Similarly, an increase in Legality from 20 to 21 reduces the probability of co-investment by approximately 1.9%, whereas an increase from 10 to 11 reduces the probability of co-investment by approximately 3.7%.

Third, we show that better laws also facilitate board representation of the investor and reduce the probability that the investor requires periodic cash flows. In particular, an increase in Legality from 20 to 21 increases the probability of board seats by approximately 4.3%, whereas an increase from 10 to 11 increases the probability of board seats by approximately 8.4%. Similarly, an increase in Legality from 20 to 21 reduces the probability of periodic cash flows by approximately 1.9%, whereas an increase from 10 to 11 reduces the probability of periodic cash flows by approximately 3.8%. In regards to periodic cash flows, our data indicate a positive correspondence between Legality and the probability of a high-tech company (i.e., in an industry with a high market/book ratio) being financed (as might be expected), which at least in part accounts for the reduced probability of the use of securities that provide periodic cash flows. Overall, the data indicate that Legality plays a crucial role in venture capitalist governance structures that facilitate the financing of high-tech entrepreneurial ventures, and the success of a country's venture capital market.

This paper is organized as follows. Section 2 provides a brief overview of the literature on law and entrepreneurial finance. Section 3 introduces the data and provides summary statistics. Econometric analyses are provided in section 4: the empirical methods used are outlined in subsection 4.1; time to investment and deal origination is considered in subsection 4.2., syndication and co-investment in subsection 4.3., and cash flow and control rights in subsection 4.4. Limitations and future research are discussed in section 5. The last section concludes.

2. Legality and Venture Governance

The *Legality* index is a broad measure based on La Porta *et al.* (1997, 1998) which comprises civil versus common law systems, the efficiency of the judicial system, the rule of law, corruption, risk of expropriation, risk of contract repudiation, and shareholder rights (the Legality index is a weighted sum of the factors based on Berkowitz *et al.*, 2003). A higher Legality index indicates better substantive legal content pertaining to investing, the quality and likelihood of enforcement. Higher numbers indicate 'better' legal systems across each of the factors. Note that Legality appropriately refers to the laws of the country of residence of the entrepreneurial firm.[1]

Our focus in this paper is on the relation between Legality and venture capital governance in terms of (1) time to deal origination (which reflects screening and due diligence), (2) syndication and co-investment, and (3) board seats and security choice. Some of these complementary areas that we investigate are in part related to prior work in venture finance, but with some significant differences relative to that which are explicitly explored herein. In regards to deal origination, while no direct work on point can be referenced, at a general level the multitude of seminal analyses in Gompers and Lerner (1999) on the U.S. market is consistent with the view that better laws reduce the costs of information flow and therefore reduce the time required to screen and originate a deal.

In regards to syndication, Lerner (1994) and Admati and Pfleiderer (1994) have pointed out significant potential problems associated with deal syndication. In particular, where there exits a lead inside investor and follow-on outside investors with less information about the quality of the entrepreneurial firm, the lead investor may induce the follow-on investor to invest at excessively high deal prices, and/or finance negative NPV projects, and/or ask for a larger capital contribution than that which is necessary. While Admati and Pfleiderer (1994) proposed a contractual solution to mitigate this problem, their model is not robust to problems of entrepreneurial moral hazard, among other things (as identified by Admati and Pfleiderer, 1994, as well as Bergmann and Hege, 1998; for further details, see Cumming, 2004). In effect, because contracts by themselves can at best mitigate and not completely eliminate agency problems among syndicated investors, there is a complementary role for the country's legal system in facilitating the syndication process. Where successfully carried out, there is a significant role for syndication to enhance the value-added provided by the investors to the investees (Lerner, 1994).

---

[1] In the vast majority of cases in our dataset the VC and entrepreneur were resident in the same country. Of the total population in our data (3848 entrepreneurial firms), 266 involved a VC that was not resident in the same country. This aspect of the data is not part of our group of explanatory variables, as there is no clear causal connection from choice of foreign/domestic investing and our dependent variables of interest in this paper.

In contrast to syndication, co-investment is generally viewed as undesirable. The seminal work on point is provided by Gompers and Lerner (1996, 1999). Gompers and Lerner explain that venture fund managers have incentives to co-investment where the funds from one VC fund within a VC organization are used to bail out the bad investments of another fund within the same organization. As such, many VC funds have covenants that prohibit such co-investment. In terms of cross-country differences, we would expect the ability of institutional investors and venture fund managers to have an enhanced ability to write enforceable limited partnership agreements that bar co-investment in those countries with better legal structures. If so, co-investment itself should be observed less frequently in countries with better laws.

In a similar way, control rights should also naturally be related to legality. In respect of control rights, we examine the representation by the VC on the entrepreneurial firm's board of directors. While this is certainly not the only dimension of control at the hands of the VC, this element of control tends to be highly correlated with other means by which a VC can exercise control (Gompers, 1997; Kaplan and Stromberg, 2003), and therefore provides a useful indication as to the effect of Legality on control. With our data (section 3) we are able to assess a much broader array of countries and time periods with a much greater volume of data than that which is considered in comparable studies (Kaplan et al., 2003; Lerner and Schoar, 2003), and therefore we complement the prior work on this specific topic (without going into the same detail in terms of different specific control rights). We also consider our work to be complementary to Lerner's (1995) detailed analysis of board seat structure (and impact) of venture-financed firms. We expect board seats to be more effective in countries with higher Legality indices, because better legal systems enhance the marginal benefit and lower the costs to sitting on the board of directors with more transparent and complete access to information pertaining to the entrepreneur's activities.

Last, but certainly not least, we examine cash flow rights in terms of the security choice. Research in venture capital finance has predominantly focused on the form of the security, with a view towards concluding that convertible preferred equity is optimal.[2] In short, this literature indicates convertible preferred equity securities are predominant in the United States, whereas a variety of instruments are used more often in other countries.[3] Again, the focus in this literature has been on the form of the contract, as opposed to its function in practice. Merton (1995) (among others) has shown

[2]   Bascha and Walz (2001a), Berglöf (1994), Bergmann and Hege (1998), Casamatta (2003), Cornelli and Yosha, (2003).

[3]   Bascha and Walz (2001b), Bergman and Hege (1998), Cumming (2004a,b), Gilson (2003), Gompers (1998), Gompers and Lerner (2001a,b), Hege *et al.* (2003), Kaplan and Strömberg (2003), Kaplan *et al.* (2003), Lerner and Schoar (2003), and Sahlman (1990).

that neutral mutation exists among different securities such that they may replicate one another in practice. In our analysis, we focus on whether or not the security provided for period cash flows from the investee back to the investor (alongside the upside potential), and significantly expand the scope of data in the cross-country analysis (more than 3000 firms, detailed in section 3). All else being equal, in countries with poor laws (in terms of investor protection, etc.), we would expect the investor to require periodic cash payments in addition to the possibility of an upside potential upon exit in order to mitigate the pronounced risks associated with investing in a countries with poor laws.

In sum, at the broadest level of generality, we conjecture that Legality (in the spirit of La Porta *et al.*, 1997, 1998) matters to venture governance in the following way: better legal systems mitigate the risk to investment and facilitate value-added (but not 'heavy-handed') governance mechanisms. Based on this simple broad principle, all else being equal, we therefore specifically predict that *higher* Legality indices:

➢ (H1) *reduce* the costs of and time required to screen and originate a deal;

➢ (H2) *reduce* the potential agency costs associated with syndication (such as lying in regards to deal prices among inside and outside investors, and inducing financing of negative NPV projects among outside investors; Lerner, 1994) and therefore facilitate the value-adding properties of syndication (Lerner, 1994);

➢ (H3) *increase* the benefits to writing contracts vis-à-vis the institutional investors and venture capital fund managers which forbid co-investment, due to enhanced enforcibility, and stability of the legal system to sustain a long-term contract (limited partnership contracts typically span 10-13 years; Gompers and Lerner, 1996, 1999), thereby mitigating the probability of co-investment;

➢ (H4) *increase* the benefit to VC board representation via enhanced information flow from the company as mandated at law in countries with better legal systems;

➢ (H5) *reduce* the need to require the entrepreneur to pay periodic cash flows to the investee prior to the capital gain derived upon exit (in the form of an IPO or acquisition or worse), such that investees that do not have the ability to pay periodic cash flows will be financed (i.e., riskier ventures are more likely to be financed).

Of course, in testing these hypotheses we control for a variety of pertinent factors pertaining to market conditions, characteristics of the venture capitalist and characteristics of the entrepreneurial firm. These factors are explained below in further details in sections 3 and 4.

3. Data and Summary Statistics

3.1. Data Description

Our dataset was collected by the Center of Private Equity Research (CEPRES), Germany. The data comprise 193 venture capital funds, 66 venture capital firms, 3848 observations for entrepreneurial firms, 32 years (1971 – 2003), and 39 Countries from North and South America, Europe and Asia.[4] The data are completely anonymous. For reasons of confidentiality, names of funds, firms etc. are not disclosed.

The CEPRES dataset is somewhat related to other VC and entrepreneurial finance papers with cross-country datasets. Gompers, Lerner and Desai (2003b) present a large dataset on entrepreneurial firms across different European countries, but do not consider information pertaining to venture capital finance. Lerner and Schoar (2003) provide a seminal look at venture capital in emerging markets and present cross-country data on specific transaction structures with 167 observations, and focus on the form of the contract used in the developing world;[5] similarly Kaplan *et al.* (2003) present data across 107 investments in 23 countries from Europe and the North America, and focus on the contract used among venture capitalists in more developed countries. Cumming and Fleming (2003) have data on 326 investments from 13 Asia-Pacific countries, but lack details comprised herein pertaining to governance, and only focus on exits. Our dataset differs from all of these papers in that we consider a much larger sample of 3848 investments and focus on governance variables that are uniquely different relative to those considered in other studies.

Our dataset comprises a mixing of both realized (2463 firms) and unrealized (1385 firms) investments. The returns to these investments (which are summarized in Cumming and Walz, 2004, in a study of the impact of Legality on IRRs[6] and discussed in Schmidt (2003) in a portfolio-based approach[7]) are consistent with that reported elsewhere for U.S.-only datasets on returns (e.g., Cochrane, 2002). The data are not skewed by sampling only good or bad performing investments.

---

[4]   Specifically, the countries include Argentina, Austria, Belgium, Brazil, Canada, China, Czech, Denmark, Finland, France, Germany, Greece, Guatemala, Hong Kong, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malaysia, Netherlands, Norway, Philippines, Poland, Portugal, Puerto Rico, Romania, Russia, Singapore, Spain, Sweden, Switzerland, Taiwan, the UK, and the USA.

[5]   The number of countries and specific countries were not identified in a preliminary draft distributed at the 2003 WFA conference, but our understanding is Lerner and Schoar (2003) were in the process of expanding their dataset.

[6]   Cumming and Walz (2004) also study IRRs in private equity (buyouts, etc), which are not considered herein. Our focus is more homogeneous on venture capital as broadly defined to encompass seed to expansion stage investments, which is consistent with the definition of venture capital in an international context (see, e.g., www.evca.com).

[7]   In a related paper. Schmidt et al (2003) investigate the market timing ability of private equity fund managers and its implication on the performance of private equity funds.

The data span 32 years (1971 – 2003, as depicted in Figure 1). The volume of data is consistent with that reported elsewhere (see, e.g., Gompers and Lerner, 1999, and Lerner, 2002a, for the volume of transactions in the U.S.). The distribution of our investments over time is in line with the overall distribution of VC investments in entrepreneurial firms over time and can therefore be considered as a good intertemporal sample for the VC market. Our data comprise the most transactions from the U.S. (1874 entrepreneurial firms), followed by France (395 firms), the U.K. (316 firms) and Germany (194 firms). The remaining 1069 entrepreneurial firms are derived from the remaining 35 countries identified in note 5. The volume of data in each country roughly corresponds to the size of the venture capital markets in each country (comparison tests are available upon request for Europe and North America; however, for other less well developed regions the size of the venture capital markets is largely unknown or estimated with uncertain precision). As mentioned, to provide a perspective on the scale and scope of data provided herein, recall that prior datasets on topic with international comparisons are on the order of magnitude of approximately 20 countries and a little more than 100 entrepreneurial firms.

[Figure 1 About Here]

The data comprise very detailed information on a number of different transaction-specific variables, as summarized and defined in Table 1.[8] The types of variables are broken down into 4 primary categories: market and legal factors (MSCI returns, committed capital on the market, and legality), VC fund characteristics (fund number in the VC firm, age of fund at first investment, fund date, and fund capital per general partner), entrepreneurial firm characteristics (stage of development, industry, location), and investment characteristics (lead investor, syndication, co-investment, board seats, functional cash flow securities, and amounts invested). These variables are used in the ensuing empirical analyses. Numerous other variables are available in the dataset (additional details are available upon request); however, we focus on the ones that seemed most sensible to the research questions considered.

[Table 1 About Here]

One of the dimensions in which we focus is the time to investment (relative to the date at which the fundraising was completed and the fund commenced). Although this is not a direct

---

[8]   There are a few additional details in the dataset that are not reported in this paper. The main reasons are that, as per our theoretical model, we believe we have captured the important aspects that pertain to the research questions at hand. Excessive reporting of other variables would detract from the central focus.

measure of the exact amount of time that the investors spent screening a particular deal,[9] it is nevertheless a useful proxy for the screening time. While imprecise, we believe this offers an interesting new dimension in which we may infer the role of Legality in venture capitalist due diligence, among other things, and hope this inspires further data collection for future research.

In our dataset we are missing some observations for syndication, co-investment and board seats. That is, for certain firms this was unknown information (but not skewed with the other aspects of the firms and entrepreneurs that we did know about). The details in terms of numbers of observations for which we do not have specific information are directly ascertainable in Table 2. In our empirics we make use of controls to account for these missing data points (as discussed below), and show robustness to alternative specifications (and alternative specifications not presented are available upon request).

One of the more significant advantages of the dataset used in this paper is that we observe the possibility of periodic cash flows between an entrepreneurial firm and the venture capitalist. As such, we have information on the substance of the financial instruments used and the contract written between the VC fund and the entrepreneurial firm (i.e., the functional perspective on corporate finance, as described in Merton, 1995). We use this information to construct a variable which reveals whether the corporate governance structure of the firm contains the possibility of some periodic cash flows during the life-time of the firm, which measures the functional characteristic of the financial instrument used. Other papers in the venture finance literature focus on the form of the financing instrument as opposed to its substantive content in terms of the possible provision of periodic cash flows. We believe this is an important aspect of the data in terms of understanding cross-country differences in venture capital contracts, because the form of the contract can be largely influenced by low-visibility practice level concerns in different countries (even when the substance of the contract can nevertheless be quite similar).[10]

---

[9]   The exact time spent screening would require knowledge of the date at which the particular deal first came to the attention of the venture capitalist (and most venture capitalists we spoke with could not even provide approximations of such dates). To the best of our knowledge, such private confidential data has never been obtainable for any academic VC study. With the vast array of data in our sample across 39 countries and 32 years, this was likewise not possible in our paper to obtain such specifics. Nevertheless, we believe our details and analyses are significant new extensions to the literature.

[10]   See, in particular, Gilson and Schizer (2003) on this point for the U.S. venture capital industry. In the U.S. most contracts are structured as convertible preferred in form, but functionally only 1/3 of the contracts make use of the possibility of periodic cash flows back to the venture capitalist prior to exit in the U.S. (which is slightly lower than the average across all the 39 countries considered in our dataset). See Table 2 for details.

3.2. Summary Statistics

Summary statistics are presented in Table 2. The summary statistics are separated into 5 primary columns: (1) time until first investment (for either lead or follow-on investment), (2) proportion of syndicated investments, (3) proportion of co-investments, (4) proportion of investments with board seats, and (5) proportion of investments with periodic cash flows. In the first row we report the number of companies financed within each of these categories. Rows 2 – 19 report differences in the companies financed depending on various elements in the data. For instance, row 2 reports the data for a large amount of capital committed on the market on the first line and a small amount of capital on the second line. We report difference tests across each of the five columns for each of rows 2 – 19. These tests shed light on the factors that are related to the variables in columns (1) – (5), as discussed further below.

[Table 2 About Here]

The summary statistics in Table 2 clearly indicate conditions of Legality affect the dimensions of governance examined. Regarding the Legality index (row 2 in Table 2), in countries with better laws the mean and median screening periods are significantly shorter (consistent with H1),[11] co-investment is less common (consistent with H3), and the use of periodic cash flow securities is less common (consistent with H5). Although the differences in proportions for syndication and board seats are statistically insignificant, differences are nevertheless revealed in multivariate contexts in section 4.

The data and summary comparison tests further indicate market conditions give rise to significant differences in regards to the governance variables. In periods of strong market conditions (high MSCI returns; row 3 in Table 2), which reflects a competitive situation for venture capital investments (Gompers and Lerner, 2000), our data indicate average screening duration is shorter, syndication and co-investment are less common, board seats are less common, and the use of securities that provide periodic cash flows is more common. Similarly, with a high volume of committed capital in the VC industry (row 4 in Table 2) we find significantly lower median screening periods, more frequent syndication and co-investment, as well as more frequent use of board seats and

---

[11]   Our summary statistics are presented for the time to first investment for all lead and follow-on investors. Our multivariate analyses (section 4) focus on the time until lead investment (deal origination). Summary statistics for time until deal origination yielded similar qualitative conclusions and are available upon request from the authors. As well, note that row 14 in Table 2 provides a comparison of time to lead investment versus time to non-lead investment (and as would be expected, time to lead investment is longer because deal origination requires more intensive due diligence; this is consistent with Lerner's 1994 analysis of syndication among U.S. funds).

less frequent investment with periodic cash flows. This is quite intuitive: if the competitive situation stemming from returns in other asset classes is less pronounced and a large volume of capital inflows into the VC industry can be observed, then 'money chasing deals' in the VC industry (Gompers and Lerner, 2000) lead to less intensive screening, less syndication as well as to less direct financial controls via investments with periodic cash flows. As well, co-investment is less common in strong market conditions as the incentive to co-invest is strongest when one venture fund is needed to bail out the bad investments of a companion fund within the same VC organization (Gompers and Lerner, 1996, 1999). Overall, our data are strongly supportive of Gompers and Lerner's seminal work.

The data indicate a relation between fund specific characteristics and governance (see rows 5, 6, 7, and 8 in Table 2). Rows 5 and 6 indicate that older venture capitalists spend less time screening their deals. Obviously experience facilitates due diligence and screening. Moreover, venture firms with long lasting working experience in that industry mostly developed a broad experts network which facilitates the due diligence process. Likewise, the length of the time period until investment hinges on the availability of resources of the fund per general partner. The more capital per fund manager (row 8) the shorter the due diligence and screening process becomes on average, which is quite intuitive as more resources per manager constrain the time available in the screening process thereby shortening the typical period towards deal origination.

There is a pronounced difference of the impact of the VC's age (row 5 in Table 2) on syndication and co-investment: whereas older VC organizations seem to syndicate less, they co-invest more. This is somewhat indirectly at odds with the reputational character of (older) VCs (as reported in the seminal work of Lerner, 1994), but the comparison statistics in terms of the age of the VC organization in our data most likely pick up the positive correlation between the age of the VC organization and the fund number (as confirmed in our multivariate analyses reported in the subsequent sections). Table 2 also indicates that older VC organizations tend to rely more on direct control mechanisms (board seats) rather than indirect control mechanisms (financial instruments with periodic cash flows); we comment further on this aspect of the data in the next section.

Finally, there is a relation between entrepreneur deal specific characteristics and governance (see rows 9-19). Most notably, our findings indicate that the time to duration is significantly shorter the less money is at stake (rows 9-15). In particular, our comparison tests suggest that small, early stage investments taking place in fast-growing industries (high market-to-book ratio) and in which a non-lead investment is undertaken take a shorter due diligence and contracting period. While the comparison tests indicate rather little influence of firm characteristic on the proportion of co-invested deals, we observe that syndication is more likely to occur for seed, start-up and early stage

investments and high market-to-book firms indicating some evidence of risk-sharing as syndication motive.

Overall, the data indicate a strong relation between governance and the legal and economic framework faced by the entrepreneurial firms and venture capital funds. These univariate tests provide a first glance at the data. Since our univariate analysis indicates a multitude of factors that appear to drive the different dimensions of venture governance, it is important to provide more formal multivariate analyses. These multivariate tests are provided in the next section.

4. Multivariate Empirical Analyses

In this section we first describe the empirical methods in subsection 4.1. Thereafter, we present an analysis of time to deal origination (subsection 4.2), staging and syndication (subsection 4.3) and board seats and functional cash flow securities (subsection 4.4). Limitations, alternative explanations and suggestions for future research are discussed in section 5.

4.1. Empirical Methods

In our multivariate analysis we address three different areas with different empirical methods. In the first part (Table 4) we analyse the time from venture capital fund origination to deal origination (the first lead investment in the entrepreneurial firm). The dependent variable is the time between fundraising and the day of lead first investment by the venture capitalist for the particular entrepreneurial firm. Thereby, we make use one of the most widely used duration model, the Cox proportional hazard model (which is also used in, for example, Gompers' 1995 analysis of venture capitalist staging decisions). This particular type of a duration model is particularly helpful when the exact time of each 'exit'[12] is known, a property which is fulfilled in our data set.

The proportional hazard model describes the (instantaneous) hazard function h(t) as a vector of explanatory variables x with unknown variables and h_o as the baseline hazard rate: $h(t)=h_o \exp(x'\text{ß})$. In our context, the hazard rate depicts for every particular entrepreneurial firm the probability of receiving the first lead investment. Because our data are derived from the venture capitalists themselves, we do not observe the time to lead venture capitalist investment for all entrepreneurial firms in our sample; as such, suitable adjustments to the hazard functions were made (using Greene, 1998) to account for the unobserved time until the receipt of lead venture capitalist financing. More precisely, the instantaneous hazard rate h(t) is just the probability of receiving funds

---

[12]   Although 'exit' is the language in the econometric literature on duration, this 'exit' actually means 'first investment' in our analysis of time until investment.

in a (short) time spell (between t and t+dt) given that it has not received money up to t. The Cox proportional hazard model can used to estimate ß without specifying the form of the baseline hazard function h_o (see Kiefer, 1988, p. 667). As such, the hazard rates (exp(x'ß)) are easily computable from the reported coefficients, which measures the economic significance of the coefficient estimates. Table 4 presents, for given values of the independent variables, the probability of receiving the first investment. Hence, the coefficients are readily interpretable. A positive coefficient implies a higher probability of receiving investments implying that the first investment takes place faster; conversely, a longer period towards the first investment is indicated by a negative coefficient.

Parts two and three of our regression analysis (Tables 5 and 6, respectively) are based on logit regressions. We investigate factors which determine whether investment deals are syndicated or in which co-investment took place (Table 5), as well as the determinants of board seats and the use of securities with periodic cash flows (Table 6). Rather than dropping the observations for which we do not have information on syndication, co-investment and board seats (discussed in section 3 and indicated in Table 2), we included these investments by using multinomial logit regressions. More precisely we assigned a zero value if no syndication took place and a two if syndication was reported. If we had no information on syndication a value of one was assigned. The same classification procedure was used for co-investment and board seats. Our results are extremely similar to results that simply exclude observations in which we have incomplete information on these variables and use binomial logits.[13] We present the marginal effects (to explicitly show economic significance in the tables) as opposed to the actual logit coefficients. The marginal effects are explicitly presented for the probability of observing outcome 0 (no syndication or no co-investment as the case may be), and for observing outcome 2 (syndication or co-investment, depending on the model in the table).[14] Since we do not have any observation where the realization of our periodic cash flow variable was unknown, we employ a conventional binomial logit model in that case (Models 6-10 in Table 6). We present different models with different right-hand-side variables to show robustness to potential collinearity.

In each of our multivariate analyses we include explanatory variables to account for market and legal factors (the MSCI return and committed capital in the market at the first investment date, and the Legality index in which the firm, each defined in Table 1) to proxy for the market and legal settings in which the VCs operate. Our central variable of focus – the Legality index – was explained

---

[13]   Such results are not explicitly reported but are nevertheless available upon request. Likewise, numerous other robustness checks (e.g., other variables, other econometric methods with sample selection corrections, etc) were considered but did not materially affect the results. Additional specifications are available upon request.

[14]   In Table 6 we only present the marginal effects for the outcome 2 in the case of board seats, as the marginal effects for the 0 outcome indicate no differences and provide no additional insights.

in detail in section 2. With the market variables we want to approximate the interaction of supply and demand in the VC market and its consequence on governance structures.

Furthermore, our explanatory variables control for VC fund characteristics, as well as entrepreneurial firm and investment characteristics. In terms of VC fund characteristics, in our analysis of time until first investment (Table 4) we include controls for the fund number within the fund organization, the fund capital per general partner, and a time trend which accounts for the date at which the fund was set up (this latter variable is used in Ljungqvist and Richardson, 2003, in their analysis of the returns to U.S. private equity investment; we have included this variable with the same square root transformation that they employ). These variables are proxies for the experience of the fund managers and ability to carry out due diligence prior to lead investment. Our analyses of syndication and co-investment (Table 5) and board seats and functional cash flow securities (Table 6) use the date until first investment (whether lead or otherwise) and the fund number within the VC firm. In Tables 5 and 6, unlike Table 4, we dropped the variables for capital under management per fund manager, primarily due to collinearity with the unknown outcomes for the dependent variables; that is, for 892 of the firms financed we do not know the capital under management per general partner and therefore the loss of these observations creates problems in multivariate estimation of these three dependent variables (syndication, co-investment and board seats) when capital under management is included as an explanatory variable. In terms of entrepreneur and deal specific characteristics, we include dummy variable controls for the stage of entrepreneurial firm development at first investment (a dummy variable for an unknown venture capital stage is suppressed), the industry market/book ratio, industry dummy variables, investment year dummies, country dummies, and a variable for the size of the first investment (again, the precise definitions of all of these variables is provided in Table 1). For the analyses for syndication, co-investment, board seats, and periodic cash flow securities (Table 5 and 6) we include a dummy variable equal to 1 for the lead investor; that variable is not included for the analysis of time until lead investment (i.e., deal origination; Table 4) for obvious reasons. Gompers and Lerner (1999) generally use very similar variables to proxy for investment risk and growth options in their seminal analyses of venture finance in the U.S.

One could potentially argue that one of our variables – the amount invested – is potentially endogenous to the time until first investment (although the entrepreneur's capital requirements could be viewed as exogenous). We did consider this issue, but were limited by the absence of ideal instruments; potential instruments were closely connected to the time until first lead investment as well. Because an elimination of the amount invested does not materially change the overall reported results, and because various instruments considered did not materially affect the results, we consider this endogeneity issue to be of minor importance and report the standard results with this variable.

Finally, note that with the exception of our dummy variable, the other variables measured in levels are expressed in logs to account for declining marginal impacts of higher levels of these variables on the dependent variables of interest (the one exception is the transformation to the time trend date variable with was transformed with a square root, following Ljungqvist and Richardson, 2003, and discussed above). For instance, an increase in the Legality index from 10 to 11 is expected to have a more pronounced effect on governance than an increase from 20 to 21. We did estimate the models without the use of logs, but found the qualitative conclusions pertaining to statistical significance to be quite similar and hence do not report those results. Model diagnostic tests generally supported the models in logs, and therefore we only present those results.

4.2. Analysis of Time to Deal Origination

The estimation results of the Cox proportional hazard model are displayed in Table 4. We distinguish between two types of regressions. In the first part of Table 4 (Models 1-5) the dependent variable measures the time until lead investment for all stages (seed, start-up, early and expansion stage). In the second part of Table 4 (Models 6-10) the dependent variable measures the time until lead investment in seed, start-up and early stage investments (only). In the second part (Models 6-10) we exclude the expansion stage investments[15] and use them as reference group for our estimation. The second part is provided to check the robustness of the estimated economic and statistical significance. In each part we estimate different models to check robustness. The main results from our comparison tests (Table 2) carry over to the multivariate analysis.

[Table 4 about here]

Our results on the effects of the legal system are in line with our theoretical reasoning: better laws facilitate the screening and due-diligence process and hence lead to faster deal origination (see H1). In terms of the economic significance, the estimated effects in Models 1–5 indicate quite large hazard ratios for the log of the Legality index. In particular, an increase in Legality from 20 to 21 (an improvement among developed nations) increases the probability of 'exit' (lead investment) by approximately 16%, whereas an increase from 10 to 11 (an improvement among emerging markets) increases the probability of 'exit' (lead investment) by 33% in any given time interval (i.e., shortens time to lead investment).[16] For Models 6–10 in Table 4, the estimated economic significance on

---

[15]   We also exclude in this second part the entrepreneurial firms for which we do not know the stage of development at the time of first investment.

[16]   Using the estimates in Model 1 in Table 4, the calculation is $e^{2.998*(\ln(21)-\ln(20))}$-100%, and in the second case is $e^{2.998*(\ln(11)-\ln(10))}$-100%. The Legality index values range from 8.51 (for the Philippines) to 21.91 (for Switzerland) in our dataset (the complete list of countries is provided in note 4).

Legality is about half as large, which indicates that the impact of Legality on time to deal origination is less pronounced (but nevertheless still quite large and ranging from 8 – 16% change for a 1-point change in the Legality index) for seed, start-up and early stage firms. This has strong implications for the development of the venture capital market and the access of entrepreneurial firms to risk capital. Overall, this provides very strong evidence in support of our first central hypothesis (H1) that Legality facilitates information flows, shortens screening time and time to contracting. Through this mechanism, Legality therefore has strong implications for the development of venture capital markets and the access of entrepreneurial firms to risk capital.

A number of our other variables are significant in ways that we would expect. For instance, at a general level, the data support the idea that market conditions affect the selection and due diligence process (see Inderst and Müller, 2003, and Gompers and Lerner, 2000). The data fairly consistently indicate across each of the models that an increase in MSCI returns in the year of investment by 10% speeds up the due diligence process by approximately 3.8% (using similar computations as in note 16). This effect can also be interpreted as a sign of overconfident market players in times of positively performing capital markets. There is also some evidence that committed capital on the market is a significant factor, but the effect of this variable is sensitive to the inclusion/exclusion of the other variables. In particular, one of the variables – fund capital/general partner – significantly reduces the number of observations (because we do not have data for this variable for 892 cases), which affects the significance committed capital variable and the fund number variable. The data do suggest (at least for Models 6–9) that an increase in fund capital / general partner speeds up the time to lead investment. This is consistent with the view that screening time is reduced by specific skills of (experienced) venture capitalists with their ability and willingness to screen potential investments by using their network (see, e.g., Gompers, 1995, and Hellman and Puri, 2002). (But another interpretation of this variable might simply be that funds with significant capital might need to invest such capital quicker; consistent with Jensen, 1986; Gompers and Lerner, 2000). Furthermore, our results reveal a time trend. In the absence of the investment-year dummy variables the time-trend variable (fund date) is significant, indicating that for funds established in the recent past the time to deal origination is longer.

Finally, a number of results pertaining to the investment stage and investment characteristics are significant. The data indicate the time to deal origination is quicker for seed and start-up firms, as well as firms with smaller capital requirements. These results are very robust and indicate VCs view the costs of a mistake (financing a firm that should not have been financed) as being comparatively smaller for smaller investments. As well, one might view this evidence as being consistent with the fact that seed and start-up firms simply have little or no track record, and therefore the degree of due diligence that could be carried out prior to investment is less extensive. The data also consistently

indicate that lead investments in firms operating in industries with high market-to-book ratios are undertaken faster. This latter result is perhaps somewhat surprising if we were to view the need due diligence to be greater among high-tech firms in risky industries. A plausible explanation is that venture capitalists have a tendency to invest in potentially more profitable high-tech companies early on in their cycle in order to facilitate future fundraising efforts when (and if) such investments come to fruition (*cf.* Gompers, 1996; Gompers and Lerner, 1999, 2000; Lerner and Schoar, 2002).

4.3. Analysis of Syndication and Co-Investment

Whereas we asked in the previous subsection about how long it takes until a deal it originated by the lead-investor, we now analyze the question of with whom the investor undertakes the investment or whether he stays on his own. We once again display various empirical models which provide insights on the robustness of our results (see Table 5). Recall (as discussed in subsection 3.1.) that we present in Table 5 the probability of no syndication (and no co-investment) and the probability of syndication (and co-investment) separately in Table 5 because we make use of multinomial logit models (where the 3rd possible outcome is an unknown syndication or co-investment). The results from this procedure are very robust to alternative specifications for the unknown data, as discussed.

[Table 5 about here]

The effect of the legal system on the likelihood of syndication and co-investment to occur is quite robust and provides strong support for our theoretical reasoning. Consistent with H2, the data indicate better laws mitigate potential agency problems associated with syndication and enhance the potential for the value-added effect of syndication (consistent with Lerner, 1994), thereby leading to a higher probability of syndication. In particular, an increase in Legality from 20 to 21 (an improvement among developed markets) increases the probability of syndication by approximately 3.0%, whereas an increase from 10 to 11 (an improvement among emerging markets) increases the probability of syndication by approximately 5.8%.[17]

The legal system has the opposite effect on the probability of co-investment relative to syndication. The data indicate that the more developed the rights in regards to investor protection and enforcement (i.e., the higher the Legality index) the less likely is it that co-investment is observed (consistent with H3). This effect is robust and significant in all specifications. In particular, an

---

[17]   Using the estimates in Model 2 in Table 5, the calculation is 0.609*(ln(21)-ln(20)) in the first case, and is 0.609*(ln(11)-ln(10)) in the second case. The inclusion of the time date trend variable in Model 3 significantly lowers the economic significance of these estimates (although they are still statistically significant), partly as a result of collinearity introduced into the system with the inclusion of this extra variable.

increase in Legality from 20 to 21 reduces the probability of co-investment by approximately 1.9%, whereas an increase from 10 to 11 reduces the probability of co-investment by approximately 3.7%. Since syndication is typically regarded as a positive mechanism[18] whereas co-investment is regarded as a problematic device this once again stresses the efficiency-enhancement associated with better legal systems.

A number of our other variables are significant and consistent with single-country studies on syndication (although co-investment has been less frequently studied). The inflow of capital in the VC industry has a positive effect on the likelihood of both syndication and co-investments. In regards to syndication, the data supports Zacharikis (2002) (and see Lerner, 1994, for seminal work) in that syndication can be considered to be a mechanism to create a larger network (of venture capitalist) and hence serve the purpose of ensuring a steady deal flow in the future. The more capital is chasing a given number of entrepreneurial firms, the more it makes sense to syndicate in order to ensure future deals. In regards to co-investment, the data are suggestive that one venture capital fund has resources to spread to another fund in the same organization when there is more capital on the market. The impact of the committed capital variable is, however, much smaller on co-investments than on syndication.

Our findings also support the idea that syndication facilitates information-sharing (see e.g., Sah and Stiglitz, 1986, Lerner, 1994, and Casamatta and Haritchabalet, 2003). Especially younger funds and funds at the beginning of their life-time show a higher likelihood to syndicate. For these venture capital funds the gains of syndication via information sharing is largest. Similarly, the date time trend in Model 3 indicates funds established in the recent past are more likely to syndicate (whereas the time trend variable is insignificant in regards to the probability of co-investment).

We find that seed- and early-stage investments are significantly more likely to be financed via syndicated deals compared to expansion-stage investments. This confirms the view that syndication is especially valuable since it leads to risk-diversification (see Lerner, 1994, and Chowdhry and Nanda, 1996). The fact that our data indicate the likelihood of syndication increases with the industry market-to-book ratio, indicating that syndication takes place especially in industries with few tangible assets, is consistent with this view.

The effects of the entrepreneurial and investment characteristics on co-investment are not clear-cut. There is some evidence (Model 4) that co-investment is more likely for expansion stage firms, which is fairly intuitive as firms in this stage may require excess capital and may have yet to

---

[18]   See, however, Kaplan/Strömberg (2003a) who disagree with this view and argue that entrepreneurial firms which are financed by a single VC receive superior management support.

show profits (i.e., this might reflect agency problems associated with co-investment; see Gompers and Lerner, 1996, 1999). Similarly, Models 5 and 6 suggest that co-investment is more likely among riskier high market/book industries. However, these results are somewhat sensitive to the model specification. Overall, the strongest and most significant results pertaining to syndication and co-investment are in regards to the Legality index (discussed above, and consistent with Gompers and Lerner, 1996, 1999).

4.4. Analysis of Control and Cash Flow Rights

In this final step of our multivariate analyses we address core aspects of the chosen corporate governance structure in the relationship between the venture capitalist and the entrepreneurial firm. Thereby, we consider two aspects, one addressing a formal control mechanism (board seats; Models 1-5 in Table 6) and the second one looking into a functional control and cash flow device (namely the existence of financial instruments which lead to periodic cash flows paid by the firm to the venture capitalists; Models 6-10 in Table 6).

[Table 6 about here]

The data indicate a significant impact of the Legality index on board seat representation, providing strong empirical support for H4 (section 2). In particular, an increase in Legality from 20 to 21 increases the probability of board seats by approximately 4.3%, whereas an increase from 10 to 11 increases the probability of board seats by approximately 8.4%. The data are thus consistent with the view that better laws significantly increase the benefit to VC board representation by ensuring enhanced information flows from management to board seat members.

We also find evidence in support of H5 that better laws are associated with a significant reduction in the probability in the use of securities that provide periodic cash flows (Model 6 in Table 6). In particular, an increase in Legality from 20 to 21 (an improvement among developed markets) reduces the probability of periodic cash flows by approximately 1.9%, whereas an increase from 10 to 11 (an improvement among emerging markets) reduces the probability of periodic cash flows by approximately 3.8%. However, it is important to point out that the statistical significance of this effect is not robust to the inclusion of the industry market/book variable. Referring back to Table 3, we see that firms in high market/book industries are much more likely to be funded in countries that have higher legality indices (which is an expected result for each of the reasons indicated in section 2; higher market/book industries are generally riskier, and legality mitigates this risk). High-tech firms in high market/book industries are less likely to be financed with securities that provide periodic cash flows (Models 7 – 10 in Table 6) (again, this is expected because such firms typically have greater

operating risk and less stable cash flows to facilitate such periodic cash payments). Taken together, the evidence indicates Legality facilitates the financing of risky high-tech companies in high market/book industries without the need for periodic cash flows paid back to the venture investor prior to exit.

Numerous other control variables are significant, and in ways that are quite intuitive. For instance, the data indicate that the supply of risk capital, as approximated by the committed capital to the industry variable, affects governance structures in the VC industry for both board seats and periodic cash flows (consistent with Inderst and Müller, 2003). A greater supply of capital increases the likelihood that the VC is on the board of directors, and reduces the probability that the VC requires periodic cash flows. These results likely reflect a comparative need to offer more advice to the entrepreneur (via board representation) and demand less from the entrepreneur (via periodic cash flows) when there is greater competition among the VCs.

The data consistently indicate that venture capitalists that have spent more time screening their investments are less inclined to sit on the board of directors (i.e., less control is needed when due diligence has been more thorough). Screening time, however, is unrelated to the use of securities with periodic cash flows. Venture capital funds that have previously operated a greater number of funds are less likely to sit on the board of directors and less likely to require periodic cash flows. All of these results are consistent in that funds part of an older VC organization may view their skills at attracting and picking winners to be superior (which is consistent with the analysis of venture capital reputation in the U.S. that is provided by Hsu, 2003). Similarly, the date time trend variable indicates that funds established in the recent past are more likely to take board seats and more likely to require periodic cash flows. Periodic cash flows are more likely to be required among funds with less capital under management (funds raised) per general partner.

The data do indicate support for the view that higher MSCI market returns increase the probability that securities with periodic cash flows will be used. This is expected, as better market conditions increase the likelihood that the entrepreneurial firm can take on such a security and actually meet the payment obligations. Competitive pressures from the capital markets (high MSCI return) may also induce VCs to use periodic cash flow instruments as an indirect functional control device (although the MSCI market returns in the year of investment are unrelated to the likelihood of board seat representation).

The findings with respect entrepreneurial firm characteristics are in line with theory: investments in the early stages (seed, start-up and early stage investments) as well as firms with a high growth potential (high industry market-to-book ratios) are less capable to pay periodically cash to the

investor. Hence, for those firms, periodic cash flow instruments are an expensive control device and hence, can be expected to be less in use. This is confirmed by our empirical results as displayed in Table 6. Similarly, earlier stage firms and firms in high market/book industries tend to be more likely to have VCs on the board of directors (all the results in Table 6 are supportive, with the exception of the start-up stage variable in the board seat regressions). This is generally consistent with the seminal work of Gompers and Lerner (1999) on the U.S. VC market, where earlier stage and high market/book firms exhibit greater potential agency problems and require more monitoring.

In all our models the investment characteristics have significant effects on the likelihood of VC board seat representation and the use periodic cash flow instruments. Larger initial investments are associated with a smaller probability that the VC is on the board of directors (consistent with the stage results discussed immediately above), and a greater probability that periodic cash flow securities are used (consistent with the view that these securities are more likely observed when the larger investee has the ability to make such periodic payments). The data also indicate that lead investors are more likely to sit on the board of directors (consistent with Gompers and Lerner, 1999). Lead investors are also more likely to hold securities that provide periodic cash flows, which likely reflects in part the importance of providing another control mechanism to the lead investor, and in part the importance of compensation for the extra risk undertaken by the lead investors. Conversely, non-lead investors are not in the position to control the entrepreneurial firm thereby lacking the necessity to employ the periodic cash flow instrument.

Overall, we may infer from the data and empirical tests in this section that in addition to VC fund and entrepreneurial firm characteristics, the legal system affects both venture governance structures and venture investment patterns, thereby playing a vital role in the development of venture capital industries around the world.

5. Limitations and Future Research

Our data and empirical analyses afford a significant improvement in the understanding of the impact of the legal and economic framework on the investment patterns and the governance structures in the venture capital industry around the globe. Given the importance of the venture capital industry to long-run innovation and economic growth (Gompers and Lerner, 1999, 2001; Kortum and Lerner, 2000; Lerner, 2002a,b; Kanniainen and Keuschnigg, 2001; Keuschnigg, 2002; Keuschnigg and Nielsen, 2001, 2003a,b,c, 2004), an understanding of the sources of differences in venture capital markets and governance is of vital importance to academics and practitioners alike. Although our data significantly add to the depth and breadth relative to others in existence, there are of course limitations to the data and therefore potentially fruitful routes towards future research.

For reasons of conciseness and empirical focus, and in part data limitations, our analysis concentrated on only 5 related aspects of governance (screening, syndication, co-investment, board seats, and the functional form of the financial instrument). Thereby, the analysis does not analyse the potential interplay with further aspects of the governance structure (most notably investment staging, potential CEO replacement, and other covenants). While we consider this being somewhat of a limitation of our paper we think that nevertheless we were able to shed important light on the particular issues covered, especially by using our very international data set. While a broader treatment of the governance issue would add to completeness in some respects it would have resulted in comparatively less focus and without altering the conclusions drawn from the analyses provided.

In our empirical analysis we used a broad index for the legal system recently developed in the corporate finance literature (Berkowitz *et al*., 2003; as based on La Porta *et al*., 1997, 1998). Each of the components of the Legality index is highly pertinent to venture finance. We do not focus on specific components of this index because they are highly correlated, and to focus on a subset of the components would result in an exercise tantamount to data mining. We considered other indices, but did not find material differences in the results relative to those reported herein.

One limitation of our data is that we do not have information pertaining to other financial intermediaries that may have been involved in the financing of the company (such as banks and angel investors). This is a common limitation of almost all datasets in venture capital and private equity research. We do not have reason to believe that this limitation affects our main results in any systematic way. For instance, the time to deal origination is based on the time to investment in deals prior to the presence of other financial intermediaries. Nevertheless, future research (either with country-specific datasets and/or international datasets) could more fully investigate this issue.

There are other various possibilities of future research emerging directly from our approach. The main focus of our analysis was to investigate the determinants of the governance structure of VC-financed entrepreneurial firm. Clearly it would be very interesting to closer investigate the implications of the corporate governance especially on divestment choices (including the holding period, exit timing and choice of exit channels). Thereby, some recent theoretical approaches (see Aghion *et al*., 2002; Neus and Walz, 2004; Schwienbacher, 2002) in this field could be empirically tested. Furthermore, a second set of implications of the governance structure namely on the success of the venture firm as well as of the venture fund could be investigated.

6. Conclusions

The empirical evidence presented in this paper sheds new light on the structure of the VC market and the governance structure of the VC-financed entrepreneurial firms in a number of aspects. Using a very broad and international data set which also provides information on the cash flows between entrepreneurial firms and the venture capital fund we investigated the factors determining the investment pattern and the governance patterns between the entrepreneurial firm and the venture capitalists. Thereby, we were especially focusing on the influence of the legal framework in the different countries firms and VCs operate. Our data sample of 3848 entrepreneurial firms not only comprises a large number of different countries (39) but also a fairly large time span (1971-2003). Given the distribution of the portfolio firms across countries and time our sample can be considered to be a good representation of the overall development of the international VC market and a significant step for the purpose of studying the interplay between legality and venture governance.

The very broad international dataset introduced herein indicates the legal system has a strong impact on the various aspects of the VCs investment pattern and the venture governance. In particular, the data indicate that better laws facilitate the deal origination process, increase the probability of syndication and mitigate the probability of (potentially damaging) co-investment. Board representation of VCs is also significantly more pronounced in countries with more developed legal systems. Further, we find some evidence that superior legal systems mitigate the need to use securities that provide periodic cash flows. In that latter respect, however, we also showed that this is significantly attributable to the fact that firms in high-tech industries are significantly more likely to be financed in countries with better legal systems, and such high-tech firms tend to not be financed with the use of securities that provide periodic cash flows back to the investor.

These results provide a core understanding of the mechanisms that give rise to international differences in the size of venture capital markets. Governance is a defining attribute of venture capital as a form of financial intermediation (Gompers and Lerner, 1999, 2001). Better legal systems have sound implications on the assertiveness of important mechanisms for solving agency and control problems inherent in the financing of young, innovative firms. Thereby, a sound legal framework can be regarded as an important pre-requisite for the development of sustained venture capital development in a country.

References

Admati, A.R., and P. Pfleiderer. 1994. Robust financial contracting and the role of venture capitalists. Journal of Finance 49, 371-402.

Aghion, P., and P. Bolton, 1992. An incomplete contracts approach to financial contracting. Review of Economic Studies 59, 473-494.

Aghion, P., P. Bolton, and J. Tirole 2002. Exit options in corporate finance: liquidity versus incentives. University of Tolouse, mimeo.

Bascha, A., and U. Walz 2001a. Convertible securities and optimal exit decisions in venture capital finance, Journal of Corporate Finance 7, 285-306.

Berglöf, E. 1994. A control theory of venture capital finance. Journal of Law, Economics and Organization 10, 247-267.

Bergmann, D., and U. Hege, 1998. Venture capital financing, moral hazard, and learning. Journal of Banking and Finance 22, 703-735.

Berkowitz, D., K. Pistor, and J.F. Richard, 2003. Economic development, legality, and the transplant effect, European Economic Review 47, 165-195.

Casamatta, C., 2003. Financing and advising: optimal financial contracts with venture capitalists. Journal of Finance 58, 2059 – 2086.

Casamatta, C. und C. Haritchabalet, 2003. Learning and syndication in venture capital investments. Working paper 3876. CEPR.

Chan, Y-S, D.R. Siegel, and A.V. Thakor, 1990. Learning, corporate control and performance requirements in venture capital contracts. International Economic Review 31, 365-382.

Chowdhry, B. und V. Nanda, 1996. Stabilization, syndication, and pricing of IPOs. Journal of Financial and Quantitative Analysis 31 (1), 25-42.

Cumming, D.J., 2004. Capital structure in venture finance. Journal of Corporate Finance, forthcoming.

Cumming, D.J., 2004. The determinants of venture capital portfolio size: empirical evidence. Journal of Business, forthcoming.

Cumming, D.J., G. Fleming, 2003. The impact of legality on private equity markets: evidence from the Asia-Pacific. Working paper, University of Alberta and Australian National University.

Cumming, D.J., and U. Walz, 2004. Private equity returns and disclosure around the world. Working Paper, Center for Financial Studies, Frankfurt.

Gilson, R., and D. Schizer, 2003. Venture capital structure: a tax explanation for convertible preferred stock. Harvard Law Review 116, 875-916.

Gompers, P.A., 1995. Optimal investment, monitoring, and the staging of venture capital, Journal of Finance 50, 1461-89.

Gompers, P. A., 1996. Grandstanding in the venture capital industry, Journal of Financial Economics 43, 133-156.

Gompers, P.A., 1998. Ownership and control in entrepreneurial firms: an examination of convertible securities in venture capital investments, Harvard Business School Working Paper.

Gompers, P.A. and J. Lerner, 1996. The use of covenants: an empirical analysis of venture capital partnership agreements. Journal of Law and Economics 39, 463-498.

Gompers, P.A., and J. Lerner, 1999. The Venture Capital Cycle. Cambridge: MIT Press.

Gompers, P.A., J. Lerner, 2000. Money chasing deals? The impact of fund inflows on private equity valuations, Journal of Financial Economics 55, 281-325

Gompers, P.A. and J. Lerner, 2001a. The venture capital revolution, Journal of Economic Perspectives 15, 145-168.

Gompers, P.A., and J. Lerner, 2001b. The Money of Invention: How Venture Capital Creates New Wealth. Boston: Harvard Business School Press.

Gompers, P., J. Lerner and M. Desai, 2003. The two faces of entrepreneurship: evidence from Eastern and Western Europe. Working Paper, Harvard Business School.

Greene, W.H., 1998. Limdep. Plainview, New York: Econometric Software Inc.

Hege, U., F. Palomino and A. Schwienbacher, 2003. Determinants of venture capital performance: Europe and the United States. Working Paper, HEC School of Management.

Hellmann, Thomas J., and Manju Puri, 2002. Venture capital and the professionalization of start-up firms: Empirical evidence. Journal of Finance 57, 169-197.

Hsu, D., 2003. What do entrepreneurs pay for venture capital affiliation? Journal of Finance, forthcoming.

Inderst, R., and H. Mueller, 2003. The effect of capital market characteristics on the value of start-up firms. Journal of Financial Economics, forthcoming.

Jensen, M.C., 1986. Agency costs of free cash flow, corporate finance, and takeovers. American Economic Review 76, 323-329.

Kanniainen, V., and C. Keuschnigg, 2003a. The optimal portfolio of start-up firms in venture capital finance. CESifo Working Paper No.381, Journal of Corporate Finance 9, 521-534.

Kanniainen, V., and C. Keuschnigg, 2003b. Start-up investment with scarce venture capital support. Journal of Banking and Finance, forthcoming.

Kaplan, S.N., and P. Strömberg, 2003a. Financial contracting theory meets the real world: an empirical analysis of venture capital contracts. Review of Economic Studies 70, 281-315.

Kaplan, S.N., F. Martel, and P. Strömberg, 2003b. How do legal differences and learning affect financial contracts? Working paper, University of Chicago Graduate School of Business.

Keuschnigg, C., 2002. Taxation of a venture capitalist with a portfolio of firms. Oxford Economic Papers, forthcoming.

Keuschnigg, C., and S.B. Nielsen, 2001. Public policy for venture capital. International Tax and Public Finance 8, 557-572.

Keuschnigg, C., and S.B. Nielsen, 2003a. Tax policy, venture capital and entrepreneurship. Journal of Public Economics 87, 175-203.

Keuschnigg, C., and S.B. Nielsen, 2003b. Progressive taxation, moral hazard, and entrepreneurship. Journal of Public Economic Theory, forthcoming.

Keuschnigg, C., and S.B. Nielsen, 2003c. Taxes and venture capital support. European Finance Review, forthcoming.

Keuschnigg, C., and S.B. Nielsen, 2004. Start-ups, venture capitalists, and the capital gains tax. Journal of Public Economics 88, 1011-1042.

Kiefer, N., 1988, Economic duration data and hazard functions, Journal of Economic Literature 26, 646-679.

Kortum, S., and J. Lerner, 2000. Assessing the contribution of venture capital to innovation. RAND Journal of Economics 31, 647-692.

La Porta, R., F. Lopez-De-Silanes, A. Shleifer and R. Vishny, 1997. Legal determinants of external finance. Journal of Finance 52, 1131-1150.

La Porta, R., F. Lopez-De-Silanes, A. Shleifer and R. Vishny, 1998. Law and finance. Journal of Political Economy 106, 1113-1155.

Lerner, J. 1994. The syndication of venture capital investments. Financial Management 23, 16-27.

Lerner, J., 1995. Venture capitalists and the oversight of private firms. Journal of Finance 50, 301-318.

Lerner, J. 1999. The government as a venture capitalist: the long-run effects of the SBIR program. Journal of Business 72, 285-318.

Lerner, J., 2000. Venture Capital and Private Equity: A Casebook. New York: Wiley.

Lerner, J., 2002a. Boom and bust in the venture capital industry and the impact on innovation. Federal Reserve Bank of Atlanta Economic Review 2002(4), 25-39.

Lerner, J., 2002b. When bureaucrats meet entrepreneurs: the design of effective 'public venture capital' programmes. Economic Journal 112, F73-F84.

Lerner, J. and A. Schoar, 2002. The illiquidity puzzle: theory and evidence from private equity. Journal of Financial Economics, forthcoming.

Lerner, J., and A. Schoar, 2003. Private equity in the developing world: the determinants of transaction structure. Working Paper, Harvard Business School and Massachusetts Institute of Technology.

Ljungqvist, A.P., and M.P. Richardson, 2003. The investment behavior of private equity fund managers. Working Paper, Stern School of Business, New York University.

Merton, R.C., 1995. A functional perspective of financial intermediation. Financial Management 24, 23-41.

Neus, W., and U. Walz, 2004. Exit timing of venture capitalists in the course of an initial public offering. Journal of Financial Intermediation, forthcoming.

Sah, R. K. und J. E. Stiglitz, 1986. The architecture of economic systems: Hierarchies and polyarchies. American Economic Review 76 (4), 716-727.

Sahlman, W.A., 1990. The structure and governance of venture capital organizations. Journal of Financial Economics 27, 473-521.

Schmidt, D., 2003. Private equity-, stock- and mixed asset-portfolios: A bootstrap approach to determining performance characteristics, diversification benefits and optimal portfolio allocations, Working Paper University of Frankfurt.

Schmidt, D., Nowak, E. and Knigge, A. 2003. On the performance of private equity investments: does market timing matter? Working Paper University of Frankfurt and University of Lugano

Schmidt, K.M., 2003. Convertible securities and venture capital finance. Journal of Finance 58, 1139-1166.

Schwienbacher, A., 2002. Innovation and venture capital exits. Working Paper, University of Amsterdam.

Zacharakis, A., 2002. Business risk, investment risk, and syndication of venture capital deals. Arthur M. Blank Center of Entrepreneurship, Babson College.

Figure 1. Number of Investments by Year
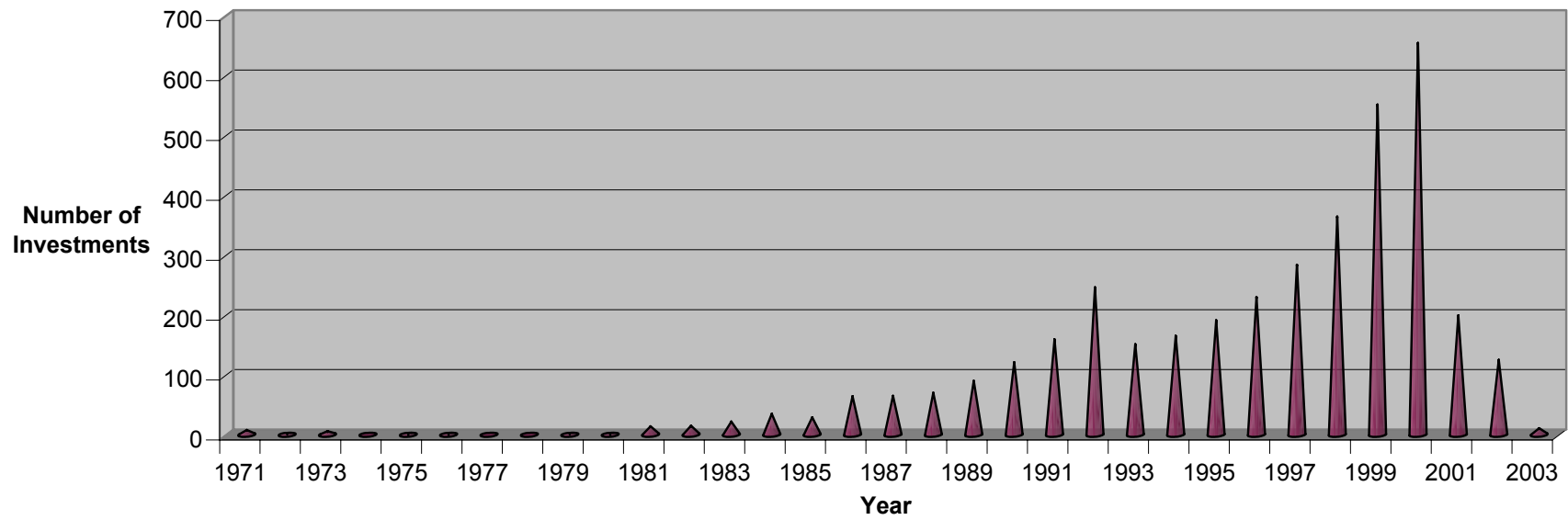
Table 1. Definition of Variables	
This table defines the variables considered in this paper. Summary statistics are presented in Tables 2 and 3.	
Variable	Description
Dependent Variables	
Time to Investment	The time from the start of the fund (end of the fundraising period) to the lead investment in the particular company.
Syndication	A variable equal to one if the investment was syndicated, and 0 if not syndicated. For observations in which syndication was unknown, this variable is assigned the value 2 in the multivariate multinomial logit regressions.
Co-Investment	A variable equal to one if the investment was a co-invested, and 0 if not co-invested. For observations in which co-investment was unknown, this variable is assigned the value 2 in the multivariate multinomial logit regressions.
Board Seats	A variable equal to one if the investment involved board seats, and 0 if not board seats. For observations in which board seats were unknown, this variable is assigned the value 2 in the multivariate multinomial logit regressions.
Periodic Cash Flows	A variable equal to one if the investment functionally allowed for periodic cash flows paid back to the investor prior to exit, in addition to the upside potential of the capital gain for the investor upon exit.
Market and Legal Factors	
MSCI Return	The country-specific MSCI return in the year of investment.
Committed Capital in Market at Investment Date	The industry total committed venture capital in the overall U.S. market (as reported by Venture Economics) in the year of investment. This variable is a proxy for deal flow competition. The measure is from the U.S. and not specific countries in the data to avoid correlation with the Legality index.
Legality Index	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.
VC Fund Characteristics	
Fund Number in the VC Firm	The number of VC funds the VC firm had operated prior to this current fund.
Fund Age at First Investment	The age (in days) of the VC fund from the date of fundraising to the date of the first investment round in the particular entrepreneurial firm financed.
Portfolio Size (# Investees) / # General Partners	The number of investee companies in the VC fund / the number of general partners in the fund.
Fund Date (Time Trend)	The date at which the fund was raised (in days, scaled such that January 1 1971 is equal to 1).
Fund Capital / General Partner	The capital raised by the fund (in real 2003 US dollars) divided by the number of general partners.
Entrepreneurial Firm Characteristics	
Seed Stage	A dummy variable equal to 1 for financing provided to research, assess and develop an initial concept before a business has reached the start-up phase.
Start-up Stage	A dummy variable equal to 1 for financing provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.
Early Stage	A dummy variable equal to 1 for financing provided to companies with product in testing and/or pilot production. The company may or may not be generating revenue, and has usually been in business less than 30 months.
Expansion Stage	A dummy variable equal to 1 for financing provided to companies in need of development capital. The financing is provided for the growth and expansion of a company, which may or may not break even or trade profitably. Capital may be used to: finance increased production capacity; market or product development; provide additional working capital.
Industry Market / Book	The industry market/book ratio for the company's primary industry.
Industry Dummy Variables	Dummy variables equal to 1 for the company's primary industry.
Country Dummy Variables	Dummy variables equal to 1 for the company's country of primary residence.
Investment Year Dummy Variables	Dummy variables equal to 1 for the year of investment.
Investment Characteristics	
Lead Investment	A dummy variable equal to 1 if the investor was the lead investor, 0 if not the lead investor, and 0.5 if unknown.
Initial Amount Invested	The initial investment value (in real 2003 US dollars).

Table 2. Summary Statistics

This table presents difference of means, medians and proportions tests for time until first investment, syndication, co-investment, board seats, and periodic cash flows for different characteristics of the funds, firms and investments. The number of firms is not the same for each column because missing data for syndication, co-investment, board seats, lead investments, and country location are not used in the statistical tests in this table. The number of observations for the holding periods reflects the time until full exit (observations that are not full exits are ignored in those tests). Observations are per entrepreneurial firm, not per investment round. Variables are as defined in Table 1. Cut-off values for the various tests are taken approximately around the mean of the particular variable in each test (and around 0 for the MSCI tests). *, **, *** Significant at the 10%, 5% and 1% levels, respectively.

	Characteristic	# Ent Firms	Average Duration (Holding Period in Days) until First Investment	Difference Test (means)	Median Duration (Holding Period in Days) until First Investment	Difference Test (medians)	# Ent Firms	Proportion of Syndicated Investments	Differ-ence Test	# Ent Firms	Proportion of Co-Investments	Differ-ence Test	# Ent Firms	Proportion of Investments with Board Seats	Differ-ence Test	# Ent Firms	Proportion of Investments with Periodic Cash Flows	Difference Test
1	All Observations	3848	785.461		488		2219	0.434		3383	0.214		1402	0.730		3848	0.353	
2	Legality Index > 20.5	2052	718.762	-8.479***	469	p <= 1.21e-08***	1303	0.413	-0.848	1875	0.167	-4.650***	828	0.722	-0.240	2052	0.335	-5.072***
	Legality Index < 20.5	1140	1042.399		660		848	0.432		930	0.270		378	0.728		1140	0.429	
3	Country MSCI Return at Investment > 0	2218	813.777	-1.718*	523	p <= 0.932	1504	0.394	-3.772***	1986	0.184	-3.112***	829	0.680	-5.716***	2218	0.437	11.759***
	Country MSCI Return at Investment < 0	988	883.300		520		658	0.482		833	0.248		384	0.815		988	0.214	
4	Committed Capital > $117,443,000,000	1759	761.760	-1.411	385	p <= 7.85e-18***	1093	0.495	5.704***	1533	0.275	5.288***	756	0.766	3.628***	1759	0.225	-14.777***
	Committed Capital < $117,443,000,000	2089	805.418		611		1126	0.374		1850	0.163		646	0.689		2089	0.462	
5	Fund Number in VC Firm > 3	1378	470.104	-20.012***	365	p <= 1.9e-19***	995	0.339	-8.062***	1362	0.271	4.468***	475	0.783	3.740***	1378	0.227	-11.752***
	Fund Number in VC Firm <= 3	2470	961.397		608		1224	0.511		2021	0.176		927	0.703		2470	0.424	
6	Fund Date (Time Trend) > 8148 days	2110	438.381	-25.578***	364	p <= 3.59e-60***	1293	0.474	4.516***	1899	0.252	4.052***	893	0.748	2.259**	2110	0.227	-17.535***
	Fund Date (Time Trend) < 8148 days	1738	1206.830		851		926	0.377		1484	0.165		509	0.699		1738	0.507	
7	Fund Age > 814 days	1227	---	---	---	---	680	0.401	-2.008**	995	0.236	1.364	382	0.683	-2.814***	1227	0.460	9.025***
	Fund Age < 814 days	2621	---	---	---	---	1539	0.448		2388	0.205		1020	0.748		2621	0.304	
8	Fund Capital / GP > $70.3 million	861	502.931	-1.826*	348	p <= 0.0244**	613	0.237	-6.856***	833	0.192	-0.676	62	0.726	1.349	861	0.247	-2.903***
	Fund Capital / GP < $70.3 million	1731	545.783		425		1090	0.409		1597	0.209		824	0.692		1731	0.308	
9	Seed Stage	223	412.390	-13.380***	337	p <= 8.97e-08***	143	0.846	10.282***	213	0.136	-1.925*	191	0.743	0.350	223	0.166	-5.828***
	Other Stages	3625	808.411		513		2076	0.405		3170	0.219		1211	0.728		3625	0.365	

		Table 2. Summary Statistics (Continued)															
	Characteristic	# Ent Firms	Average Duration (Holding Period in Days) until First Investment	Difference Test (means)	Median Duration (Holding Period in Days) until First Investment	Difference Test (medians)	# Ent Firms	Proportion of Syndicated Investments	Difference Test	# Ent Firms	Proportion of Co-Investments	Difference Test	# Ent Firms	Proportion of Investments with Board Seats	Difference Test	# Ent Firms	Proportion of Investments with Periodic Cash Flows	Difference Test
10	Start-up Stage	90	565.544	-3.693***	396	p <= 0.55	17	1.000	4.750***	72	0.236	0.185	35	0.743	0.105	90	0.100	-5.134***
	Other Stages	3758	790.728		489		2202	0.429		3311	0.214		1367	0.730		3758	0.359	
11	Early Stage	1093	708.634	-3.365***	428	p <= 0.0014***	876	0.462	2.191**	1071	0.232	1.182	552	0.734	0.251	1093	0.177	-13.945***
	Other Stages	2755	815.941		518		1343	0.415		2312	0.206		850	0.728		2755	0.423	
12	Expansion Stage	467	814.555	0.703	526	p <= 0.592	321	0.243	-7.419***	384	0.227	0.469	173	0.607	-4.667***	467	0.463	5.032***
	Other Stages	3381	781.442		488		1898	0.466		2999	0.212		1229	0.748		3381	0.338	
13	Market/Book > 7.5	1171	660.216	-6.012***	409	p <= 1.51e-07***	861	0.540	7.998***	1102	0.238	1.616	677	0.771	3.610***	1171	0.206	-12.195***
	Market/Book < 7.5	2677	840.247		547		1358	0.366		2281	0.203		725	0.692		2677	0.418	
14	Lead Investor	981	1016.984	5.199***	474	p <= 0.168	657	0.549	-4.928***	892	0.165	0.217	619	0.895	14.861***	981	0.415	6.245***
	Non-Lead Investor	557	734.496		417		395	0.706		513	0.158		397	0.426		557	0.250	
15	Amount Invested > $4,840,594	913	1155.249	10.640***	668	p <= 1.11e-12***	498	0.261	-8.776***	740	0.195	-0.977	95	0.874	6.042***	913	0.559	14.269***
	Amount Invested < $4,840,594	2935	670.430		450		1721	0.483		2643	0.219		1307	0.720		2935	0.290	
16	US Entrepreneur	1874	707.226	-5.081***	468	p <= 0.040**	1197	0.410	-2.379***	1724	0.163	-4.894***	766	0.719	-1.145	1874	0.323	-3.634***
	All Other Countries	1974	859.733		524		1022	0.461		1659	0.267		636	0.744		1974	0.382	
17	UK Entrepreneur	316	1075.326	5.062***	589	p <= 0.070*	194	0.304	-3.776***	220	0.223	0.248	29	0.690	-1.107	316	0.579	8.397***
	All Other Countries	3532	759.527		487		2025	0.446		3163	0.213		1373	0.731		3532	0.333	
18	German Entrepreneur	194	796.201	0.175	494	p <= 0.865	149	0.309	-3.156***	177	0.198	-0.405	57	0.737	0.159	194	0.325	-0.820
	All Other Countries	3654	784.891		488		2070	0.443		3206	0.215		1345	0.730		3654	0.355	
19	French Entrepreneur	395	1314.580	8.992***	823	p <= 7.4e-08***	307	0.752	12.108***	312	0.154	-2.157**	249	0.755	0.974	395	0.494	5.888***
	All Other Countries	3453	724.933		470		1912	0.382		3071	0.220		1153	0.725		3453	0.337	

Table 3. Correlation Matrix

This table presents correlation coefficients across selected variables. Coefficients greater than 0.03 in absolute value are statistically significant at the 5% level. Variables are as defined in Table 1.

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	Fund Age at time of First Investment	1.00																					
2	Syndication	-0.13	1.00																				
3	Co-Investment	-0.02	-0.01	1.00																			
4	Board Seats	-0.09	0.10	0.08	1.00																		
5	Periodic Cash Flows	0.03	-0.05	0.02	-0.03	1.00																	
6	Log (MSCI at investment date)	-0.01	0.03	-0.12	-0.04	0.17	1.00																
7	Log (Committed Capital at Investment Date)	-0.12	0.22	0.16	0.07	-0.25	-0.24	1.00															
8	Log (Legality)	-0.03	0.16	-0.22	0.05	0.05	0.17	-0.15	1.00														
9	Log (Fund Number)	-0.20	-0.20	0.07	0.00	-0.13	-0.12	0.40	-0.24	1.00													
10	(Fund Date Time Trend)$^{-1/2}$	0.03	-0.09	-0.05	-0.02	0.05	0.00	-0.48	0.03	-0.14	1.00												
11	Log (Portfolio Size / Manager)	-0.02	-0.23	0.05	-0.06	-0.07	-0.28	0.34	-0.11	0.37	-0.11	1.00											
12	Seed	-0.08	0.26	-0.07	0.13	-0.08	-0.02	0.13	0.01	-0.02	-0.03	-0.31	1.00										
13	startup	0.02	0.10	0.02	-0.03	-0.07	0.05	0.00	0.05	-0.16	-0.02	-0.15	-0.06	1.00									
14	Early	-0.10	-0.11	0.01	-0.03	-0.20	-0.05	0.10	-0.18	0.40	0.01	0.20	-0.23	-0.14	1.00								
15	Expansion	0.01	-0.19	0.04	-0.04	0.12	0.03	-0.10	0.00	0.05	0.12	0.10	-0.13	-0.08	-0.30	1.00							
16	Log (Industry Market / Book)	-0.12	0.25	-0.03	0.12	-0.23	0.03	0.17	0.13	0.03	-0.03	-0.16	0.10	0.10	0.08	-0.08	1.00						
17	Lead Investor	0.02	-0.02	0.01	0.38	0.04	0.04	0.03	0.02	-0.01	-0.01	0.04	0.03	-0.01	-0.04	-0.04	0.08	1.00					
18	Log (Initial Investment)	0.05	-0.15	0.05	-0.04	0.15	-0.17	0.17	-0.05	0.16	-0.01	0.49	-0.24	-0.14	-0.08	0.16	-0.20	-0.03	1.00				
19	USA Entrepreneur	-0.06	0.13	-0.14	0.04	-0.08	0.12	-0.18	0.43	-0.27	0.07	-0.06	-0.10	0.10	-0.09	0.02	0.17	0.00	-0.05	1.00			
20	UK Entrepreneur	0.02	-0.10	0.01	-0.06	0.09	0.00	0.07	0.02	0.19	-0.03	0.18	-0.05	-0.06	0.05	0.04	-0.10	0.01	0.15	-0.40	1.00		
21	France Entrepreneur	0.00	0.17	-0.04	0.04	0.13	0.02	0.02	-0.11	-0.05	-0.03	-0.21	0.36	-0.06	-0.14	-0.10	-0.11	-0.04	-0.07	-0.39	-0.09	1.00	
22	Germany Entrepreneur	0.02	-0.08	-0.02	0.00	-0.02	0.00	0.01	0.02	0.07	-0.02	-0.02	-0.06	0.00	0.05	-0.02	0.00	0.04	-0.08	-0.35	-0.08	-0.08	1.00

Table 4. Analysis of Time to Early Stage Investment and Deal Origination

This table presents Cox proportional hazard model estimates of the determinants of screening duration: date of investment - date of fundraising. The full sample of all exited and unexited (or partially exited) investments comprises 3213 observations from 39 countries. Observations skipped where incomplete data for the transaction. One observation is per entrepreneurial firm, not per staged investment round. Time to investment in seed, start-up and early stage firms is presented in Models (1) - (5). Time to deal origination is presented in Models (6) - (10). Models (1) - (5) and (6) - (10) differ in the inclusion/exclusion of different right-hand-size variables to illustrate robustness. The marginal effects (only) are presented. *, **, *** Significant at the 10%, 5% and 1% levels, respectively. Variables are as defined in Table 1.

	Dependent Variable: Time to Deal Origination for all Seed, Start-up, Early, and Expansion Firms					Dependent Variable: Time to Deal Origination for Seed, Start-up and Early Firms Only				
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
Market and Legal Factors										
Log (1+ MSCI Return at Inv Date)	0.423***	0.421***	0.439*	0.439*	0.488**	0.430**	0.336	0.394	0.467	0.774***
Log (Commited Capital Overall Market at Inv Date)	0.201***	0.218***	0.011	0.011	-0.227***	0.323***	0.329***	0.061	0.007	-0.276***
Log (Legality Index)	2.998***	2.933***	3.035***	3.007***	2.507***	1.565*	1.449*	1.492*	2.645**	2.624**
VC Fund Characteristics										
Log (Fund Number in the VC Firm)	0.110*	0.060	0.068	0.077	0.254***	-0.268***	-0.265***	-0.277***	-0.365***	0.210***
(Fund Date Time Trend)$^{-1/2}$	1.413***	1.442***	0.526	0.537	-0.759	1.567**	1.555**	0.488	0.394	-0.356
log (Fund Capital / General Partner)	0.003	0.018	0.0133	0.0232	---	0.172***	0.145***	0.144***	0.224***	---
Entrepreneurial Firm Characteristics										
Seed Stage	0.677***	0.662***	0.725***	0.734***	0.934***	0.801***	0.853***	0.912***	0.908***	1.139***
Start-up Stage	0.277	0.289*	0.292*	0.298*	0.464***	0.156	0.272	0.254	0.359*	0.847***
Early Stage	-0.118	-0.143	-0.134	-0.135	-0.091	---	---	---	---	---
Expansion Stage	-0.099	-0.129	-0.126	-0.128	0.036	---	---	---	---	---
Log (Industry Market / Book)	0.340***	0.543***	0.574***	0.569***	0.494***	0.468***	0.423***	0.501***	0.452***	0.151
Industry Dummy Variables?	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Country Dummy Variables?	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Investment Year Dummies?	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Investment Characteristics										
Log (Amount Invested)	-0.101***	-0.100***	-0.090***	-0.089***	-0.101***	-0.094***	-0.095***	-0.083**	-0.072**	-0.089***
Model Diagnostics										
Total Number of Observations	2284	2284	2284	2284	3176	1091	1091	1091	1091	1311
Total Number of 'Exiting' Observations	742	742	742	742	1121	384	384	384	384	500
Loglikelihood Function	-5044.034	-5034.36	-5027.02	-5025.39	-7733.8	-2309.29	-2303.33	-2298.21	-2286.9	-2977.45
Chi-squared statistic	219.583***	238.937***	253.617***	256.880***	403.271***	168.228***	180.151***	190.397***	213.005***	208.963***

Table 5. Analysis of Syndication and Co-Investment

This table presents logit regression model estimates of the determinants of syndication (Models (1) - (3)) and co-investment (Models (4) - (6)). The full sample of all exited and unexited (or partially exited) investments comprises 3213 observations from 39 countries. Observations skipped where incomplete data for the transaction. One observation is per entrepreneurial firm, not per staged investment round. Multinomial logits used to account for cases in which syndication or coinvestment was unknown. The fund capital explanatory variable is excluded due to collinearity with the unknown syndication and coinvestment outcomes as there were similar unknown observations for that explanatory variable. The marginal effects (only) are presented. '---' means variable excluded for reasons of collinearity or a robustness check. *, **, *** Significant at the 10%, 5% and 1% levels, respectively. Variables are as defined in Table 1.

| | Dependent variable: syndication (different VC funds, different VC firms, investing in the same entrepreneurial firm) | | | | | | Dependent variable: co-investment (different VC funds, same VC firm, investing in the same entrepreneurial firm) | | | | | |
| | Model (1) | | Model (2) | | Model (3) | | Model (4) | | Model (5) | | Model (6) | |
	Marginal Effect Probability Syndication=0	Marginal Effect Probability Syndication=1	Marginal Effect Probability Syndication=0	Marginal Effect Probability Syndication=1	Marginal Effect Probability Syndication=0	Marginal Effect Probability Syndication=1	Marginal Effect Probability Co-Investment=0	Marginal Effect Probability Co-Investment=1	Marginal Effect Probability Co investment=0	Marginal Effect Probability Co investment=1	Marginal Effect Probability Co-Investment=0	Marginal Effect Probability Co-Investment=1
Constant	4.565***	-0.553	6.002***	-3.581***	0.098	-0.057	-1.482***	1.281***	-0.581*	0.653**	-0.705**	0.709**
Market and Legal Factors												
Log (1+ MSCI Return at Inv Date)	-0.010	0.049	0.243***	-0.056	0.005	-0.001	0.036	-0.005	0.043	-0.014	0.024	-0.020
Log (Commited Capital Overall Market at Inv Date)	-0.161***	0.095***	-0.278***	0.162***	-0.002	0.002	-0.050***	0.039***	-0.038***	0.030**	-0.026*	0.025*
Log (Legality Index)	-1.093***	-0.103	-1.197***	0.609**	-0.077**	0.033*	0.771***	-0.661***	0.391***	-0.384***	0.386***	-0.386***
VC Fund Characteristics												
Log (Fund Number in the VC Firm)	0.314***	-0.140***	0.324***	-0.114***	0.026**	-0.010**	0.024**	0.025**	0.014	0.013	-0.004	0.009
Log (Fund Age at First Investment since Fundraising)	0.019***	-0.014***	0.029***	-0.020***	-0.0002	-0.0001	0.004	-0.005	0.005	-0.005	0.005	-0.005
(Fund Date Time Trend)$^{-1/2}$	---	---	---	---	11.338***	-4.788**	---	---	---	---	0.870	-0.417
Entrepreneurial Firm Characteristics												
Seed Stage	-0.301***	0.276***	-0.224***	0.189***	-0.013*	0.008*	---	---	---	---	---	---
Start-up Stage	---	---	---	---	---	---	-0.054	0.069	-0.055	0.059	-0.058	0.059
Early Stage	0.017	0.157***	-0.031	0.138***	-0.003	0.004*	0.036*	0.022	0.015	0.013	-0.006	0.010
Expansion Stage	0.114***	-0.056*	0.115***	-0.066**	0.006*	-0.003	-0.044*	0.039*	-0.033	0.024	-0.029	0.027
Log (Industry Market / Book)	-0.112***	0.077***	-0.207***	0.130***	-0.012**	0.006*	-0.007	0.018	-0.034*	0.038**	-0.037**	0.038**
Industry Dummy Variables?	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Country Dummy Variables?	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Investment Year Dummies?	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Investment Characteristics												
Log (Amount Invested)	0.024***	-0.015**	0.026***	-0.006	0.001*	-0.0004	-0.004	0.0019	-0.001	0.0001	-0.001	0.0004
Model Diagnostics												
Total Number of Observations	3176		3176		3176		3176		3176		3176	
Number Syndication (Co-Investment)	900		900		900		565		565		565	
Number No Syndication (No Co-Investment)	1245		1245		1245		2227		2227		2227	
Loglikelihood Function	-2916.469		-2749.458		-2683.604		-2058.143		-1919.353		-1913.789	
Chi-squared statistic	1088.626***		1422.649***		1554.356***		1038.321***		1315.902***		1327.030***	

Table 6. Analysis of Board Seats and Periodic Cash Flows

This table presents logit regression model estimates of the determinants of board seats (Models (1)-(5)) and periodic cash flows (Models (6)-(10)). The full sample of all exited and unexited (or partially exited) investments comprises 3213 observations from 39 countries. Observations skipped where incomplete data for the transaction. '---' means variable excluded for reasons of collinearity or a robustness check. The fund capital explanatory variable is excluded in the board seat regressions due to collinearity with the unknown board seat outcomes as there were similar unknown observations for that explanatory variable. One observation is per entrepreneurial firm, not per staged investment round. Multinomial logits used for models (1) - (5) to account for cases in which the use of board seats was unknown. Binomial logits used for models (6) - (10). The marginal effects (only) are presented. *, **, *** Significant at the 10%, 5% and 1% levels, respectively. Variables are as defined in Table 1.

	Dependent Variable: Board Seats					Dependent Variable: Security with Periodic Cash Flows and Upside				
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)	Model (10)
	Marginal Effect Prob Board Seats=1	Marginal Effect Prob Board Seats=1	Marginal Effect Prob Board Seats=1	Marginal Effect Prob Board Seats=1	Marginal Effect Prob Board Seats=1	Marginal Effect Prob Periodic Cash Flows=1	Marginal Effect Prob Periodic Cash Flows=1	Marginal Effect Prob Periodic Cash Flows=1	Marginal Effect Prob Periodic Cash Flows=1	Marginal Effect Prob Periodic Cash Flows=1
Constant	-2.449***	-2.758***	-3.061***	-3.664***	-0.428	1.202	0.762*	0.467	-0.859	-0.740
Market and Legal Factors										
Log (1+ MSCI Return at Inv Date)	0.006	0.014	-0.054	-0.050	0.006	0.340***	0.344***	0.322***	0.356***	0.258***
Log (Commited Capital Overall Market at Inv Date)	0.075***	0.072***	0.120***	0.115***	0.007	-0.079***	-0.065***	-0.024**	-0.036***	-0.046***
Log (Legality Index)	0.704***	0.736***	0.700***	0.884***	0.179*	-0.394***	-0.161	-0.190	0.281	0.268
VC Fund Characteristics										
Log (Fund Number in the VC Firm)	-0.115***	-0.124***	-0.129***	-0.100***	-0.026**	-0.094***	-0.081***	-0.082***	-0.074***	0.004
Log (Fund Age at First Investment since Fundraising)	-0.015***	-0.014***	-0.018***	-0.017***	-0.002	0.005	0.003	-0.0003	-0.003	-0.016***
(Fund Date Time Trend)^{-1/2}	---	---	---	---	-12.049***	---	---	---	---	-0.208*
log (Fund Capital / General Partner)	---	---	---	---	---	---	---	---	---	-0.041***
Entrepreneurial Firm Characteristics										
Seed Stage	0.384***	0.395***	0.384***	0.313***	0.066**	-0.170***	-0.140***	-0.143***	-0.228***	-0.220***
Start-up Stage	-0.254***	-0.266***	-0.278***	-0.253***	-0.057**	-0.404***	-0.363***	-0.361***	-0.310***	-0.189***
Early Stage	0.179***	0.196***	0.202***	0.186***	0.042**	-0.219***	-0.181***	-0.171***	-0.190***	-0.124***
Expansion Stage	0.091***	0.091***	0.087***	0.090***	0.022**	0.011	0.025	0.028	0.038	0.035
Log (Industry Market / Book)	0.116***	0.236***	0.232***	0.213***	0.043**	---	-0.176***	-0.181***	-0.143***	-0.120***
Industry Dummy Variables?	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Country Dummy Variables?	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Investment Year Dummies?	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
Investment Characteristics										
Lead Investor	0.312***	0.299***	0.300***	0.287***	0.053**	0.125***	0.142***	0.139***	0.149***	0.098
Log (Amount Invested)	-0.064***	-0.058***	-0.060***	-0.056***	-0.012**	0.055***	0.041***	0.041***	0.043***	0.051
Model Diagnostics										
Total Number of Observations	3176	3176	3176	3176	3176	3176	3176	3176	3176	2284
Number Board Seats (Convertibles)	868	868	868	868	868	1176	1176	1176	1176	655
Number No Board Seats (No Convertibles)	331	331	331	331	331	2000	2000	2000	2000	1629
Loglikelihood Function	-2075.505	-1990.817	-1961.195	-1920.427	-1906.782	-1724.103	-1679.359	-1667.957	-1611.709	-1094.692
Chi-squared statistic	1472.221***	1641.597***	1700.840***	1782.377***	1809.667***	738.416***	827.903***	850.707***	963.203***	547.950***

CFS Working Paper Series:

No.	Author(s)	Title
2004/08	**Peter F. Christoffersen** **Francis X. Diebold**	Financial Asset Returns, Direction-of-Change Forecasting, and Volatility Dynamics
2004/09	**Francis X. Diebold** **Canlin Li**	Forecasting the Term Structure of Government Bond Yields
2004/10	**Sean D. Campbell** **Francis X. Diebold**	Weather Forecasting for Weather Derivatives
2004/11	**Francis X. Diebold**	The Nobel Memorial Prize for Robert F. Engle
2004/12	**Daniel Schmidt**	Private equity-, stock- and mixed asset-portfolios: A bootstrap approach to determine performance characteristics, diversification benefits and optimal portfolio allocations
2004/13	**Klaus Adam** **Roberto M. Billi**	Optimal Monetary Policy under Commitment with a Zero Bound on Nominal Interest Rates
2004/14	**Günter Coenen** **Volker Wieland**	Exchange-Rate Policy and the Zero Bound on Nominal Interest
2004/15	**Klaus Adam** **George W. Evans** **Seppo Honkapohja**	Are Stationary Hyperinflation Paths Learnable?
2004/16	**Torben G. Andersen** **Tim Bollerslev** **Francis X. Diebold** **Jin Wu**	Realized Beta: Persistence and Predictability
2004/17	**Uwe Walz** **Douglas Cumming**	Legality and Venture Governance around the World

Copies of working papers can be downloaded at http://www.ifk-cfs.de