Evolution of Decision and Control Rights in Venture Capital Contracts: An Empirical Analysis

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Evolution of Decision and Control Rights in Venture Capital Contracts: An Empirical Analysis

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Abstract

We analyze the structure and evolution of the allocation of decision and control rights in venture capital contracts by using a sample of 464 contracts between venture capitalists (VC) and portfolio firms from Germany. We focus on the evolution of control and decisions rights along three time dimensions: the point in time when the contract was signed, the expected duration of the contract and the actual duration of the relationship. We show that contracts are not static but that control rights are adjusted along all three time dimensions. First, we observe a change in the structure but not in the level of the VC's control rights during the relationship between the VC and the portfolio firm. While venture capitalists return superfluous operational rights to entrepreneurs, they gain (valuable) exit rights during the course of the relationship. Second, we show that the shorter the expected length of the VC's engagement the more control rights are allocated to the hands of the VC. Finally, we observe that learning took place in the German VC market.

Keywords: venture capital, corporate governance, empirical contract theory, control rights, exit rights.
JEL classification: G24, G32, D86, D80, G34.

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1 Introduction

Contracts constitute the backbone of any financial transaction. However, only in recent years has some light been shed onto the structure of these contracts and their implications for theory[1]. This paper aims to join the fray to widen our understanding of the determinants of these contracts and their relation to theory. We do this especially with respect to the analysis of the incomplete contracting literature and the decision and control rights they describe using venture capital contracts.

We study the complete universe of decision and control rights found in a broad and representative sample of 290 VC contracts with 464 investment rounds for the German VC market. In addition to previous studies, we include veto and exit rights in our analysis and we study the evolution of contracts over various dimensions of time.

With respect to these time dimensions our analysis reveals three major points. First, when studying the evolution of control rights over time, we show a non-monotone pattern between the VC's share of these rights and the duration of the VC's relationship with the firm. On the one hand, we detect a re-transfer of operational rights (i.e. rights that allow the VC to interfere with operational decisions) back to the entrepreneur over the lifetime of the relationship between the VC and the firm. On the other hand, however, we see an increase in the level of exit rights (i.e. rights that allow the VC to determine the type of exit channel to be chosen) given to the VC. Hence, the VC's control and decision rights do not decrease over time, but rather the structure changes. Thereby, we stress that control is a multi-dimensional variable which may have different rationales in the various situations.

Second, our analysis reveals that significant learning processes occurred in the German VC market. Starting from scratch, over time VCs adopted more and more elements of US style contracts in the area of decision and control rights. Initially VCs did not use control and decision rights. This pattern clearly changed over time, even if we control for VC type and take changes in the VC's bargaining power into account. Furthermore, we show that the expected time to exit is an important determinant of the allocation of decision and control rights. The closer the expected exit, i.e. the shorter the expected length of the relationship, the more decision and control rights are in the hand of the VC. Finally, we show that the major theories explaining the use of decision and control rights, e.g. the Grossman/Hart/Moore approach, the Aghion/Bolton model, the

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[1] See the contributions of Gompers (1999) [20], Hellmann (1998) [28], and Kaplan and Strömberg (2003) [33] & (2004) [34].

Aghion/Tirole approach and Dessein's[2] explanation are all relevant, albeit for different rights and settings.

Our analysis extends the existing literature in several dimensions. First, by including more rights, particulary operational and exit rights, in the analysis, we can expand the work that Kaplan/Strömberg (2003) [33] & (2004) [34] began[3]. To be more precise, rather than looking at the whole contractual design, we focus on a very detailed analysis of the allocation of control and decision rights (DCR) between the VC and the entrepreneur and their evolution over different time dimensions. We consider rounds[4], time periods and expected time to exit. With the first, we are able to explore the dynamics of the VC-entrepreneur relationship. As mentioned, this extension is fruitful, in that we can show that by including these additional rights, the overall picture in terms of dynamics becomes more complex than previous research suggests.

Second, our analysis of the link between the expected contract length or time-to-exit and the structure of the control and decision rights is novel. We are able to show that the expected duration has an impact on the use of these rights. We are not aware of other studies that attempt to do this.

Third, we show that the contracts initially found in Germany evolve from being "Lerner & Schoar" type contracts to "Kaplan & Strömberg" type contracts. In other words we are able to show that learning takes place in venture capital contracting over time. By looking into the evolution over time periods we are able to reveal a link between the evolution of contracts and the maturity of the VC market. This allows us to reconcile the differing results found in Kaplan et al. (2005) [35] and Lerner/Schoar (2004) [36]. The former show that more experienced VCs write more complex US style contracts, while the latter show that in developing countries VCs tend to write relatively simple contracts. By demonstrating that learning and convergence to US contracts takes place, we show that less sophisticated VCs are actually able to learn. This suggests that the differences observed by Kaplan et al. (2005) [35] are not set in stone, at least not for a VC market with a sound legal system[5].

Our data base stems from a research cooperation with KfW (Kreditanstalt für Wiederaufbau),

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[2] See Grossman/Hart (1986) [22], Hart/Moore (1990) [25], Aghion/Bolton (1992) [1], Aghion/Tirole (1997) [3], and Dessein (2004) [17].

[3] This also includes the work of Hellmann (1998) [28] who looks at the right of the VC to replace the entrepreneur.

[4] We are not the first ones to look at the evolution over rounds, as Kaplan and Strömberg (2003) [33] do this too. However, they restrict their analysis to voting rights, board rights, investment amounts and auto conversion clauses.

[5] In the last 2006 World Competitiveness Ranking Germany scored first place in terms of property rights protections and contract enforcement.

the largest German promotional bank. KfW has supported a large proportion of all VC deals in Germany over the last 20 years and has therefore received all written information concerning the deals. Contrary to the majority of empirical studies, it is not based on survey data but the information was gathered directly from the contracts. Moreover, it is based on all documents concerning a specific deal, i.e. the business plan, the balance sheet, the term sheet, the shareholders' agreement, the bylaws of the corporation or company, additional agreements, procedural rules and key employment contracts. In addition, it covers a large time period that extends from 1990 until 2004. Finally, it constitutes a representative sample of the German venture capital industry as it is a random sample of all projects supported by KfW[6].

Our data set depicts the entire universe of decision and control rights allocated between the VC(s) and the entrepreneur. These rights obviously serve quite different purposes and are also applicable in quite different situations. In order to acquire a more structured view on these instruments of corporate governance and to bring them together with theoretical considerations, we decided to group them into three different parts.

First, we take a closer look into the decision and control rights which permit the VC to interfere into management decision in normal times (operational control rights). We thereby also stress the potential separation between cash flow and control rights.

Second, we bundle all liquidation rights (such as put options, staging, debt) together and ask for factors determining the allocation of these DCRs to the VC. In addition, we are interested whether these instruments are complements or substitutes.

Finally, we look into a quite specific class of control and decision rights, namely exit rights which give either the VC (in most cases) or the entrepreneur specific rights in the case of exit. These exit rights have to be seen against the background of the temporary nature of the engagement of the VC in its portfolio firms. Owing to the limited period of time of the engagement of the VC[7] an efficient exit decision becomes vital. Overcoming hold-up problems and making sure that the most efficient exit channel is chosen plays a crucial role in this part of the venture capital cycle.

In two companion papers we make use of this data base focusing on other aspects of VC contracts. Bienz/Hirsch (2005) [9] empirically investigate staging and the different modes of staging in venture capital contracts against the insights of the venture capital and the renegotiation

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[6] KfW was involved in more than 60% of all VC deals in Germany. Moreover, since KfW's goal was to reject only very few deals offered, there should be no selection bias in the KfW sample itself.

[7] This aims to solve the agency problems between the VC and its investors; see e.g. Gompers/Lerner (1999) [21] and Sahlman (1990) [38] on this.

literature. Hirsch/Walz (2006) [31] look into the behavior of different types of VCs with respect to contractual design. They investigate whether observed differences between different types of VC stems from selection effects (i.e. different VCs select different portfolio firms) or indeed from different behavior with respect to the corporate governance of their portfolio firms.

The paper is organized as follows. In the next section we will describe our data set. We will then present our descriptive results. A section that presents regression results follows. We will discuss alternative interpretations of our results in a fifth section. The sixth section will present our conclusion.

2   The Data Set

Our analysis uses a proprietary, hand-collected data set which was compiled on the basis of comprehensive and detailed documents made available to us by the KfW in Frankfurt, Germany. The KfW has a unique position in Germany's venture capital market. Being Germany's largest promotional bank, it is in charge of large support programmes that channel state funds to the private sector. However, during the time period covered in our sample (the time period between 1990 and 2004) KfW never invested directly in any of the portfolio firms but supported the firms by promoting the investment of the VC. In this position, it became indirectly involved in a significant part of all venture capital deals in Germany during the last decade. Since these programs allowed VCs to partially refinance their financial engagement in the portfolio firms via KfW, VCs had to apply for these refinancing schemes by submitting all details of the relationship between the VC and the portfolio firm, most notably, the term sheets, the business plans and the shareholder's agreement. By giving us access to these documents, KfW gave us the unique chance to collect detailed information on the relationship between the VC and its portfolio firm. Also, KfW supported a large proportion of the population of all investments realized by the German venture capital industry in the time period under consideration[8].

In order to reduce the very time-intensive task of collecting detailed information from the shareholders agreements and the other documents to a manageable size, we selected a random sample. We categorized each portfolio company into one of three classes with respect to their investment date (before 1997, between 1998 and 2000, and 2001-2004) and eight classes with respect to the programme or programme combination through which their VC investor was supported by

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[8] According to the German Venture Capital Association ([13] and [14]), there were 11854 seed, start-up and expansion deals by its members in the relevant time period; KfW supported almost 7100 deals of potential members. This implies a market coverage of approximately 60%.

the KfW. This categorization was undertaken with the objective of achieving a balanced representation of the population. We then drew a proportional random sample of 300 portfolio companies.

For each investment round we evaluated the company's balance sheet data and its business plan in order to get information with respect to the market position of the company and details about the project financed. Moreover, we gathered detailed information about the firm's security design, the timing and conditions of the investment, the syndication of the investment, control and information rights of the venture capitalists and exit covenants from the term sheet and the shareholder's agreement. We translated this information into quantifiable variables. We complemented this data set with information about the venture capitalist who was refinanced by KfW, i.e. its type (as indicated by the German venture capital organization), origin or industry focus.

As usual in this type of studies we were confronted with the problem that not all data were always available. Thus observations may vary depending on the variable studied. Typically, the amount invested and valuations were the most reliable variables, whereas information on staging or investment memoranda were sometimes missing.

2.1 Sample and Sample Selection Issues

Table 1 gives an overview of the sample that constitutes the basis for our analysis. Unfortunately, the data for 10 portfolio companies could not be evaluated, therefore our random sample finally consists of 290 portfolio companies which were financed in 464 investment rounds from 1990 until 2004.

As already indicated, this sample is a random draw from a large proportion of all investments in the German venture capital industry in the time period under consideration. Therefore, we are confident that we do not have any major selection bias in our sample in this direction. In addition, since we have been responsible for the sample selection process ourselves, we have been able to make sure that no selection bias occurred via the provider of all of our documents (the KfW). Finally, due to KfW's objective to support as many applicants as possible (and given the attractiveness of the programs) there also seems to be no selection effect with respect to the entire KfW sample relative to the German market itself.

One obvious selection bias which we were not able to circumvent is the fact that we are concentrating on one particular geographic region (Germany) and the associated venture capital market. To a lesser degree this is true for the time period. We take all this into consideration by

interpreting our data sample as the description of a situation of a young and evolving venture capital market. We especially address potential dynamics of the contractual designs along the time axis and thereby look for learning processes which may have occurred in this maturing venture capital market.

Table 2 provides an overview of the main characteristics of our sample. The average amount invested per financing round is about 5.4 million euros and the portfolio companies are on average 4.77 years old when they receive VC financing for the first time. The medians are considerably smaller (1.3 million euros and 3 years) which indicates that some outliers exist. At this point, one can already infer that the percentage of start-up financing in our sample is quite high. Indeed, 10.3% of the financing rounds correspond to seed financing and 56.2% to start-up financing whereas only 19% of the financing rounds are related to expansion and 6% to a later stage[9].

Most of the portfolio companies of our sample (70%) are so-called "Gesellschaften mit beschränkter Haftung" (Limited Liability Firm) and only 28% are so-called "Aktiengesellschaften" (Public Limited Liability Firm). Almost all portfolio companies have their head office in Germany (92%) but they are active in a broad range of industries: 5% in the field of biology or biotechnology, 12% in the medical area, 27% in the IT and software branch, 6% in the telecommunications and 10% in the internet sector, 15% in automobiles and engineering and finally 4% in chemistry. 14% of all portfolio companies could not be classified in any of these industries. Finally, 39% of all financing rounds were syndicated whereby the syndicate consists on average of 3.69 partners and staging was used in 53% of all firms. We include data from 91 VCs, an average VC financing 5 firms, while the median VC finances 2 firms in our sample.

2.2 Variable Descriptions

Table 3 describes the variables of our data set. Variables that are self-explanatory are not listed. Additionally some variables describing control rights are discussed in detail later on. Further details can be found in the appendix.

3 Descriptive Results

In this section we describe our descriptive findings for the different types of control rights considered in this paper. We will first consider security choice in its relation to control rights. Then

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[9] For 8.5% we do not have any information about the investment phase.

we will discuss the Venture Capitalist's ability to disentangle voting and control rights. Finally, we present results for the decision and control rights found in the contracts analyzed.

As we are interested in the evolution of these rights, we will structure our findings along the different time dimensions inherent in these data: Rounds, calendar time and time remaining until the VC exits his investment. For each of these categories we present summary statistics and run simple univariate tests.

3.1 Securities

In this section we will start by discussing the VC's securities. As a first step, table 4 presents the type of securities used in our sample. The most important securities used are debt-equity mixes, followed by pure debt and equity with a liquidation preference[10]. Our table documents the wide variety of different securities used. Table 5 shows the evolution of the VC's security choice over the three time periods considered in our paper. What is clear is that in the third period (2001-2004) more than 75% of all financing rounds use a form of equity that gives the VC's claim seniority over that of the entrepreneur. Equity with a liquidation preference accounts for 33%, debt-equity mixes for about 24% and convertibles account for 15%. The 75% are in strong contrast to the 40% encountered in the first period (1990-1997). The shift is mainly away from pure debt finance towards more participation of VCs in the upside potential of the portfolio firms. This is consistent with recent papers showing that VC finance requires not only the VC to hold equity but also shows that this is optimal for the financier, given that the financier provides the venture with value adding services (Berglöf (1994) [7], Bascha and Walz (2001) [6], Casamatta (2003) [15], Schmidt (2003) [40], Dessi (2003) [18], Hellmann (2006) [29], and Schindele (2006) [39]). It is also consistent with the fact that these papers predict downside protection for the VC.

Two elements are different to the US: the relative frequency of debt finance and the relative absence of US style convertible securities. The first phenomenon can be easily attributed to the presence of public VCs, who prefer these securities[11]. The second observation is put into perspective when one looks at the high number of debt-equity mixes. The payoff structure of these securities closely resembles those of convertible securities, as they give the VC's claim seniority while still retaining the VC's incentives by letting him participate in the upside. Kaplan

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[10] A liquidation preference gives the shareholder a senior cash-flow right for a previously defined amount in case of a liquidation (including trade-sales and IPOs) .

[11] Public VCs are supposed to promote "entrepreneurship" and investment and therefore refrain from taking equity stakes in the firm. For more on this topic see Hirsch and Walz (2005) [31].

et al. (2004) [35] also find that these types of securities are often used instead of convertible securities. Even more remarkable is the evolution over time, as the shift towards various forms of equity with a liquidation preference is a first hint that there might be a trend towards US-style contracting in the data.

3.2 Allocation of Board & Voting Rights

In panel two of tables 6 to 8 we analyze the evolution of board & voting rights along three aspects of time: the round the investment has reached, the actual period in time the investment took place and the expected contract duration. We then categorize control rights according to their function in the firm.

What we find is that the VC's voting and board rights increased significantly over both rounds and periods in time from an average of 29% in the first round to 51% in the third round and from an average of 18% in the period up to 1998 to 45% in the period after 2001. This shows that VCs increased their voting rights in the firms up to levels comparable to those found by Kaplan and Strömberg in the US. Indeed, in the third round, in 53% of all cases, VCs had the majority of votes in the firm's shareholder meeting and controlled 62.5% of all boards. Similar levels are found when we look at the third period in time, as in 41% of all cases the VC had the majority in the shareholders meeting and controlled 50% of all boards.

This also shows us that VCs are able to separate voting rights from board rights. Three ways are open to VCs in Germany for this: First, the German commercial code allows VCs to allocate one third of all seats on the board without an election by including such a clause in the firm's charter. Second, VCs can ask entrepreneurs to agree to clauses in a shareholder agreement that asks entrepreneurs to approve candidates put forth by the VC[12]. Third, the charter may also include clauses that increase the majority required in corporate decisions above the usual 50% threshold, giving the VC an effective veto right over decisions (but also the entrepreneur in some cases).

3.3 Allocation of Cash-Flow Rights

In tables 6 and 7 we also analyze the evolution of cash-flow rights over rounds and periods. In Germany, cash flow rights tend to be closely linked to voting rights (though not necessarily

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[12] Although lawyers point out that stipulations in the shareholder's agreement (a voluntary agreement between shareholders) are less effective than those in the firm's charter.

to board rights). There are several reasons for this. First, preference shares in Germany are normally voting shares (so there is no separation). Second, vesting in Germany is different from the US, as we will discuss later on. One effect is that no un-vested shares exist (that do not have voting rights). Thus, in the case of pure equity, cash-flow and control rights clearly coincide.

Therefore, we find that the increase in the VC's in cash flow rights mirrors the increase in voting rights closely. They increased their share of cash-flow rights over both rounds and periods in time from an average of 29% in the first round to 51% in the third round and from an average of 18% in the period up to 1998 to 45% in the period after 2001. This shows that VCs indeed increased their cash flow rights in the firms up to levels comparable to those found by Kaplan and Strömberg in the US.

This is consistent with a central result found in the contract theory literature. Hart and Moore (1990) [25] show that ownership over assets should go to the party that has the highest incentives to invest into the asset. Their result is confirmed here, as the entrepreneur retains ownership of the firm in early rounds of investment. This is normally the phase where the entrepreneur should invest into the firm to develop the firm's business. In later rounds the VC's experience in the professionalisation of the firm matters more (Hellmann and Puri (2002) [30]) and therefore ownership should switch to the VC. This is exactly what we can observe in the data.

However, in other cases, this close link is not so strong. One reason is that VCs have downside protection for their cash flows. In the first round, 30% have this right, while in the third round 60% hold it. Indeed, in the third period, 69% hold a downside protection, up from 5% in the first period. Of those that hold a downside protection only 10% have some form of protection that is lower than their investment amount. 45% have the right to their initial amount, while the rest has rights to more than the initial amount. Also VCs might hold debt instruments. Of course, debt also gives the VC seniority. We will consider debt later when we focus on liquidation rights.

In contrast to the US, we find fewer contingent allocations of cash-flow rights to the VC. The reasons for this are not clear. One reason could be that in Germany the allocation of equity to the entrepreneur, based on the entrepreneur's performance, is taxable. It seems to be the case that there are other mechanisms to get around this issue. One mechanism seems to be the use of milestone finance. In milestone finance the firm is guaranteed new money once it has exceeded predefined milestones. For a detailed analysis see Bienz and Hirsch (2006) [9].

Vesting provisions in Germany work differently than in the US too. While VCs place vesting provisions in 12% of all contracts, founder vesting is "negative" vesting in the sense that the entrepreneur loses his equity if he leaves the firm. Therefore, the entrepreneur does not have to

redeem his stake by showing good performance. Again, the reasons are not known, but taxes might possibly explain this result.

3.4 Operational Rights

In a second step, we look at the evolution of operational or veto rights over time: table 6 shows the evolution of our descriptive statistics over the investment rounds. Veto rights are given in the first section of this table. We look at the following rights: veto rights against changes in the shareholder's agreement, against asset sales, against changes in the capital structure, against changes of the firm's business plan, other veto rights, a veto against financial decisions, against changes in the firm's head count, against dissolution of the firm and finally vetos against decisions on the distribution of profits, given either to shareholders or the board .

Also, please note that some veto rights are granted to any shareholder holding more than 25% of the firm's equity by law. These are the vetos against changes in the capital structure, against changes in the shareholder's agreement and a veto against the dissolution of the firm. Second, shareholders or the supervisory board[13] are entitled to decide about the profit and loss statement and the subsequent distribution of dividends. Therefore, any party that holds more than 50% of all votes automatically has a veto right in this matter.

What table 6 clearly reveals is that veto rights do not necessarily increase with the length of the relationship (i.e. the number of rounds). To the contrary, VCs actually return certain veto rights to the entrepreneur in later stages of the relationship. Examples for this are the veto right against changes in the business plan, the veto right against asset sales, and the veto right against changes in the firm's head count, as well as veto rights against specific financial decisions. However, once we consider exit rights it will become clear that this does not necessarily imply that VCs reduce their influence on the firm. Rather they give up superfluous rights and gain others that have become valuable to them at this specific point in time.

Table 7 presents the evolution of these veto rights over time periods. The three different time periods broadly represent the up and down of the market in recent years. We find that by comparison with the first period, in the third period VCs actually increased the amount of rights they have in the firm. Interestingly, this increase is also visible in the second period, where one might have expected to see a decline in the amount of rights held by the VC, due to

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[13] Note that in contrast to the US and UK, Germany has a two-tier board system: the management board that comprises all executive directors, and the supervisory board that controls the board of directors. The supervisory board is elected directly by the shareholders, while the executive directors are elected by the supervisory board.

the lower bargaining power of the VC's at that time[14]. This implies that learning (or imitation of the US model) seems to be prevalent in the market[15]. The increase for certain rights is dramatic, as in vetos against changes in the shareholder's agreement and in vetos in the shareholders and board meetings against profit distributions. Several increases are statistically significant, e.g. the increased veto rights against financial decisions and the the right to veto changes in the firm's head count.

One driving force is the fact that VCs increase their equity stakes in their firms. Table 6 and table 7 document this. For the veto rights against changes in the firm's capital structure, the veto against dissolution of the firm, and the veto rights against changes in the firm's shareholders' agreement, the increase in the equity stake indeed causes the increase in veto rights, as all the aforementioned rights are automatically granted to the VC once his fraction in the firm increases beyond a certain threshold[16].

Table 8 shows the differences in the use of veto rights for different expected contract durations. Overall, we find that for shorter contract durations more veto rights are employed than for longer durations. Two exceptions are the veto against financial decisions and the veto against dissolution of the firm. In these two cases the use of veto rights increases for medium durations, and finally decreases for very long expected durations.

3.5   Liquidation Rights

Before we present our results for liquidation rights, we provide a short discussion of the relevant rights. In our sample we can differentiate three types of liquidation rights:

- *Debt* is characterized by an obligation to pay interest on the sum invested as well as the requirement to pay back the principal after several years. Normally VCs will not require interest to be paid out, but will specify the repayment date for the principal ex-ante. Thus they are effectively granted the right to shut down the firm after a specific period of time. Also, this claim will be senior to equity claims on the firm's assets. However, normally the size of the VC's debt claim will be small relative to his equity claim.

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[14] Inderst and Müller (2002) [32] show that lower bargaining power directly affects the VCs investment behaviour.

[15] In the data appendix we control whether our results are driven by changes in the composition of VC types in the sample. We find that in almost all cases the subsample of independent VCs behaves qualitatively no different from the complete sample. See below for more on this topic.

[16] This threshold is 25% for the veto against changes in the shareholders' agreement, while it is 50% for decisions about the firm's profit distribution.

- *Staging* allows the VC to withhold future funding from the firm in case of bad performance. Thus, the VC will be able to effectively deprive the firm of future funds. However, once the firm has reached its break even, this threat has partially lost its credibility, as the entrepreneur will not need to rely on the VC for future funding.

- *Put Options* allow the VC to demand the repayment of a contractually specified claim after a pre-defined period of time. In contrast to debt, the repayments need not to be related to the size of the VC's investment. However, a put-option does not grant a hard claim as does debt[17].

Table 6 presents some first results with respect to liquidation rights. We find that in 86% VCs actually have at least some liquidation rights[18]. Once we consider independent VCs, this fraction rises to 93%[19]. The use of liquidation rights is constant over investment rounds. This indicates the importance of these rights. We see that the use of liquidation rights actually differs across the three time periods in the market. In the boom period, the second period, the use of these rights decreases slightly: the use of staging and debt both decline when we compare the first period to the second period. However, whereas staging is again used more frequently, the use of debt again declines to only 15% in the third period. Finally, we see that the use of debt increases for longer expected contract durations, while the use of staging decreases.

Under normal conditions one would conjecture that these liquidation rights are (at least partially) substitutes. Especially, one would expect to find that put-options and debt are used as substitutes. The same does not need to hold for staging, but one would expect to have at least a negative correlation between the use of staging and the other two kinds of liquidation rights.

In table 14 we just consider whether these liquidation rights are complements or substitutes for each other or not. What we can clearly see is the fact that debt-equity mixes, put options and staging are used together in 26 out of 147 cases, i.e. in roughly 20% of all cases. When straight debt is used to finance the VC's investment, we find that in 5 out of 90 cases all three elements are used in conjunction. Thus, while we do not see that all these rights are used together in each financing round, we find that for a significant number of observations this is indeed true. Thus we cannot claim that these rights are used as substitutes only.

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[17] Bartlett (1995) [4] notes that a judge might not declare an otherwise solvent firm insolvent when a shareholder exercises a put option that the firm cannot repay.

[18] Our variable is the sum of debt and staging. We look at put options separately as we lose quite a bit of observations when we include put options.

[19] For more on the variation of contract elements among different VC types see Hirsch and Walz (2005) [31].

Table 15 presents the correlations for these three variables. What we find is the following: While the correlation between put-options and debt usage is negative, it is only slightly so and statistically not significant. On the other hand, there is a positive significant relationship between staging and put-options and a negative significant relationship between debt and staging. Again, we do see that the various liquidation rights do not seem to be strict complements.

3.6 Exit Rights

Owing to one of the main characteristics of venture capital finance, namely the temporary engagement of VCs in their portfolio firms, the contractual design of the VC's exit from the engagement becomes crucial. With a perfect alignment of interest between the VC and the other owners of the portfolio firm with respect to exit timing and exit channel any covenants regarding control and decision rights would be superfluous. The same holds true if it were possible to write complete contracts laying down ex ante any decision in any future state of nature. Clearly the latter is not feasible. In addition, there are obvious conflicts of interest between the parties. Most notably these stem from the fact that both parties typically receive non-monetary benefits from their engagement which are heavily influenced by the exit decision. Entrepreneurs very often realize control benefits which are asymmetrically affected by the various exit channels. Whereas in the case of an IPO the entrepreneur typically stays in control, control benefits are lost or at least reduced in the case of a trade sale. Hence, the entrepreneur will, *ceteris paribus*, prefer the IPO to the trade sale. The VC, in contrast, may acquire a reputation gain from a successful IPO. On the other hand, the VC might also lose reputation should he bring a bad firm onto the market. Hence, depending on the allocation of the monetary rewards from the exit, conflicts of interest may arise.

Exit covenants can be interpreted as instruments to resolve these conflicts of interest in such a way as to enable the ex-post efficient allocation of ownership (and hence the distribution of monetary and non-monetary benefits) in the firm as well as induce the parties to make ex-ante efficient investments (see Hart and Moore (1988) [24], Aghion et al. (2004) [2] or Chemla et al. (2007) [16]). Thus these rights create a mechanism to allocate ownership efficiently.

We can distinguish four different types of covenants related to the exit process[20]. First, **pre-**

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[20] Note that control and decision rights in the case of a liquidation (which can also be interpreted as an exit) are completely different with respect to their economic role but also with respect to the situations to which they apply. Therefore we treated them in the previous section. Also put-options in combination with VC seniority could force the entrepreneur to accept the VC's exit choice (Bartlett (1995) [4]). However, in this chapter we focus on the explicit rights, not on the outcome of possible renegotiation.

emption rights (which might be assigned to either party) forces one of the parties, in the case its being willing to sell its stake to an outside investor, to offer the shares to the other shareholders, at "fair value", often interpreted as the price the outside investor is willing to pay. Second, **take (tag)-along clauses**[21] preclude that one of the parties sell its shares to an outside investor without giving the other shareholders the chance to follow suit as well. Rather, the take-along clause gives the other shareholders the right to include their shares in the sale at the same price as the one offered to the initial party. Third, we observe **drag-along clauses** which give the outside investor, who has achieved a deal with one shareholder, the right to buy the other shareholders' stakes at the same price and the same terms[22]. Basically, this avoids an exit being held up by one party as long as one shareholder has the possibility to sell its stake to an outside investor. Fourth, **piggy back rights** allow each party to include its share in an initial public offering in proportion to its stakes in the firm. Thereby, the exclusion from an IPO can be avoided.

Table 5 displays the main elements of the exit rights prevailing in our data set. First, we should note that sale rights, in contrast to IPO rights, show up in a significant number of contracts. The ones which are most interesting from our perspective (preemption rights, drag and take along rights) can be observed in a range of one to two thirds of all cases. The use of IPO rights seems to be, however, quite limited (below three percent of all cases).

Comparing the exit rights across our three time dimensions reveals interesting insights. The most challenging observation stems without doubt from the comparison of the usage of the exit right instruments across the different rounds and the closeness of the exit point. With respect to the different rounds we find statistically significant increases of the usage of most sale rights across the different financing rounds (see Table 6). The same is true with respect to the IPO rights. The only exception to this general picture is the entrepreneur's preemption right which is increasing from round to round but not to a significant extent. Overall, this implies that whereas other control rights may be handed back to the entrepreneur across the different rounds this is definitely not true for the exit rights in our sample. The differences across rounds are not only statistically significant but also show rather pronounced difference in the level of control which shifts to the VC.

Interestingly, the relatively high number of pre-emption rights (42% in third rounds, 46% when

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[21] The name tag-along seems to be more common in the US. In Germany, take-along is used more often.

[22] Drag-along clauses often (but not always) depend upon a qualifying majority of 50% or 75% of all equity holders agreeing on such a decision. For simplicity we will abstract from this in the following analysis.

the VC's exit is expected to be close) given to entrepreneurs shows that the contracting parties seem to be concerned about the VC's potential to abuse his strong position in the exit process. This is also consistent with Chemla et al. (2007) [16], who show that in case of a hold-up these exit-rights should be used.

Very much the same pattern can be observed with respect to the expected time to exit. The closer the expected exit the more prevalent the usage of exit rights. The differences are pronounced and statistically significant between short (one to three year) and medium (four to six year) expected contract durations. This reflects the increasing importance of exit rights with investments which are due closely for exit. Besides the change in the level of these control rights, the absolute levels are worth noting. For short expected-exit periods we find exit rights for the VC in the majority of all contracts. Aghion et al. (2004) [2] note that exit rights should be given to the VC in case he wants to hold a more liquid stake. Clearly, if the VC wants to exit soon, he will require more exit rights.

Surprisingly at first glance, our univariate statistics also display a clear-cut pattern in our third time dimension, namely calendar time. Over time, i.e. over our three periods (first period until 1997, second period: 1998-2000 and third period lasting from 2001-2004) our data displays a significant increase in the usage of the exit rights and hence indicates some signs of a learning process. This means starting in a rather new and developing VC market, VCs initially did not employ exit right instruments. Over time, corresponding to the diffusion of knowledge about US contracting practices, VCs in the German market seem to have learned about the benefits of contractual design and in particular about the importance of exit rights.

One might conjecture that this learning process does not reflect learning at the level of the individual VC, but rather a change of the composition of the VC pool in the different periods shifting from public and bank-oriented German style funds to more independent and more international funds. A first indication that the learning process actually did take place and was not overshadowed by the changing composition of the VC pool stems from the fact that running the same exercise for the independent VCs revealed the same picture as in Table 6[23].

3.7   Other rights

Anti-competition clauses are frequently found even for very early contracts. However, their usage increases from 50% to about 94% in the third time period. The same is true when we consider

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[23] Please note that the corresponding table can be found in the web appendix.

financing rounds: There, usage increases from 70% to about 83%. However, these results are not statistically significant, whereas they are when considering time periods. Also, VCs seem to be more worried about this issue closer to exit, as documented in table 8. The importance of these rights is emphasized by the analysis of Hart and Moore (1994) [26] and Neher (1999) [37]. Both show that if the entrepreneur's human capital is important, the VC faces hold-up from the entrepreneur. Therefore the VC has to take this into account when designing the contract. By taking the entrepreneur the opportunity to work for competitors or setting up his own firm for at least one year, the VC can partially mitigate this threat.

Exactly the same pattern is true with anti-dilution protection for the VC. However, the increases are more pronounced and begin at lower levels. Here, the VCs rights increase from 23% in the first round to 55% in the third round. Also, VCs used these clauses only in about 2% of all financing rounds initially, but increased their stake to 58% in the third period.

3.8 Separation of Cash-Flow and Control Rights

Before we turn to a multivariate analysis of the issues considered above, we analyze the potential separation of cash flow and control rights (other than voting rights). Cash flow and voting rights often move closely together as shown above. Hence, the separation of cash flow and control rights, as documented by Kaplan and Strömberg (2003) [33], can, in our sample, only take place via the above mentioned operational and veto rights. Table 9 documents that this is indeed the case.

In the table we show how veto rights vary with the VC's cash flow rights. The strongest evidence comes from the first column where VCs holding debt-like claims in their firms already possess an impressive amount of veto rights. Almost all can veto changes in the shareholder's agreement (85%), although they do not hold equity at all. 37% hold veto rights against changes in the firm's headcount, and 44% can block changes in the firm's lines of business. However, even for VCs that hold a fraction of the firms equity it is clear that cash flow and control rights are allocated separately. This means these VCs hold more veto rights than mandated by German commercial law. For example, 64% of all VCs that have equity stakes lower than 25% are allowed to veto changes in the capital structure of the firm, albeit this right is mandatory only for owners of more than 25% of the firm's equity. Indeed, 63% of all VCs that hold between 50% to 75% of a firm's equity are allowed to veto against certain financial decisions (i.e. hedging decisions or FX operations). This again indicates the separate allocation of control and voting rights.

Also, the separation of cash flows and control is documented by the fact that in 18% of all cases

VCs even have the right to replace the firm's management. This right increases from 12% in the first financing round to 38% in the third and from 3% in the first period to 32% in the third period[24]. In the US, VCs also have similar types of rights, as shown by Hellmann (1998) [28].

3.9 Robustness

We run several robustness checks for our descriptive results. These tables can be found in the web appendix. These include the repetition of our analysis for round finance for those firms that reach a third round only (table 1 in the web appendix). The idea behind this reasoning is that there might be a survivorship bias introduced by those firms that make it to the third round. However, all of our previous findings are confirmed when looking at the data in this way.

Second, we only consider firms for which additional rounds are expected (table 2 in the web appendix). The idea is that while looking at firms where third rounds are realized might account for survivors, this might also truncate the sample. Again, our findings are confirmed in the data.

Finally, in order to see whether our findings are driven by learning only, we look at all those firms for which a first or third (or higher) financing round was completed in the years after 2001 (table 3 in the web appendix). The reason behind this finding is that if learning had taken place, its main impact should have been after the crash period starting after spring 2000. However, while we indeed observe a level effect for a lot of variables (i.e. drag-along and take-along rights), the basic results stay the same: there is a significant increase of exit rights over rounds. That is, firms whose first round was financed in or after 2001 have fewer exit rights attached than firms that completed a third round during the same period.

Finally in table 4 in the web appendix we control whether the mix of VCs drives our results by only looking at Independent VCs. However, our findings are reconfirmed here as well

In table 5 of the web appendix we look at whether the entry of more sophisticated investors influences our results. While there is base a effect, our findings remain unchanged. Second, we check whether learning is driven by the increase in rights over rounds only. For this we proceed to consider only first rounds by independent VCs for all three periods. Again, we can rule out this hypothesis.

Finally, in table 7 we check whether our definition of the expected contract duration influences our results[25]. However, the definition of our variable does not seem to influence results.

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[24] Note that this is right independent of the fact whether the VC holds more than 50% of the firm's voting rights and could therefore change management even without this right.

The extent to which these first indications from our univariate statistics survive a multivariate analysis has to be seen in the subsequent regression analysis and will form the next section of our paper.

4   Multivariate Analysis

In this section we extend our results from the last section by relating the choice of contractual mechanisms to observable characteristics of the firm and the VC. We thereby have two objectives. The first one is to ensure that our findings from the last section survive a multivariate analysis. Secondly, we attempt to look into further determinants of control rights allocations and relate these findings to existing theory.

In the following we provide a brief discussion of the main theoretical mechanisms in order to address our second objective.

4.1   Main theoretical mechanisms

In this subsection we will outline the main economic mechanisms of existing theoretical approaches which try to explain control right allocations. We will limit the discussion to aspects which are relevant for our empirical analysis. The theoretical literature on corporate finance and governance stresses a number of key mechanisms. These mechanisms provide different potential explanations for the allocation of decision and control rights among the various agents. Decision and control rights may serve

- as a substitute for pledgeable income,

- as insurance for specific investments,

- as a signalling device, or

- as a information acquisition device.

In the following we outline the main hypotheses behind these mechanisms. The task of operationalizing them is then left to our discussion of our multivariate findings.

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[25] We eliminate all observations for firms where we observe debt finance only and have no information about the exit horizon.

The first mechanism focuses on the role of DCRs in the interaction between cash-flow rights and private benefits (see most notably Aghion/Bolton (1992) [1], Bolton/Scharfstein (1990) [11], Hart/Moore (1994) [26], and (1998) [27]). These papers consider control rights as substitutes for limited pledgable cash flows. These rights may resolve the potential conflicts between monetary and non-monetary benefits and interests arising from the involvement with the firm. The basic idea is to replenish the participation constraint of the investor in the case of lacking or unverifiable monetary returns with decision and control rights. This approach neglects issues of asymmetric information and hence yields no prediction about the influence of asymmetric information.

The main question therefore turns out to be: what factors determine a potential lack of pledgeable income? One important aspect of the existence of pledgeable income is a strong balance sheet (e.g. one with a high degree of fixed assets which may serve as collateral). This would allow the entrepreneur to put up collateral rather than use (the inefficient currency) DCRs. The same effect stems from the higher initial wealth of the entrepreneur relative to the VC's investment. In addition, we would expect from this approach that a higher degree of uncertainty is associated with less pledgeable income streams and hence leads to a higher probability that the VC's participation constraint is not binding in the absence of DCRs.

The second mechanism is stressed in models which form the theory-of-the-firm literature (see e.g. Grossman/Hart (1986) [22], Hart/Moore (1990) [25], and Hart (1995) [23]). This literature considers decision and control rights as instruments that ensure efficient ex-ante investments by solving or at least mitigating hold-up problems. In general terms this implies that the higher the degree of uncertainty the more valuable are DCRs. The special aspect of the relationship between the VC and the entrepreneur is, however, that the potential hold-up works in both directions. Both the entrepreneur as well as the VC are potentially engaged in the entrepreneurial firm with relation-specific investments and hence, may both face a hold-up problem. Therefore, if DCRs are used as measures to mitigate hold-up problems, the allocation of these rights between the entrepreneur and the VC is determined by the relative importance and severity of the hold-up problem. Or, to put it differently: the allocation of decision and control rights in the hands of the VC is more pronounced the more important the hold-up problem of the VC is relative to that of the entrepreneur. If DCRs act as an insurance for non-contractible specific investments it is efficient to allocate a larger proportion of DCRs to the party which contributes most to the relationship.

The third mechanism has recently been advanced by Dessein (2004) [17]. Here, the main idea is, that in the presence of pronounced informational asymmetries between the entrepreneur and

the investor, the entrepreneur may signal his quality by offering many DCRs to the investor. Signalling with DCRs is more important the more pronounced the conflict of interests between the VC and the entrepreneur is and the more pronounced the informational gap between the entrepreneur and the VC is. Controlling for the observed quality of the entrepreneur, using DCRs as a signal implies that we should observe more DCRs being offered to the VC when a higher degree of uncertainty exists. The better the observed quality of the entrepreneur the lower is the signalling value of DCRs. Hence, we would expect repeated (successful) entrepreneurs to offer fewer DCRs to the VC: signalling with DCRs is less attractive if the entrepreneur has proven his ability already somewhere else. Another testable hypothesis of the signalling interpretation of DCRs is that the level of DCRs allocated to the VC increases in the degree of asymmetric information. In addition, this approach implies that tangible assets which may serve as collateral, and hence dampen the agency problem, reduce the need of signalling via DCRs.

Aghion/Tirole (1997) [3] consider the distribution of real versus formal authority in firms and decision making. The retention of formal control rights protects the VC when the two parties' interests potentially collide, while the allocation of formal control to the entrepreneur increases the incentives for information acquisition. Thus control rights allow an optimal allocation of authority when information acquisition matters and interests potentially diverge. Hence, this view predicts a negative relationship between the degree of asymmetric information and the level of DCRs allocated towards the VC. This implies that we have two competing hypothesis we regard to the relationship of asymmetric information and the level of control rights.

4.2 Operational Rights

In a first step, we want to consider the determinants for the use of certain operational control rights. We concentrate our analysis on the variable VETO RIGHTS. VETO RIGHTS themselves can be split into two subcategories: OPERATIONAL VETO RIGHTS that give the VC the right to block certain actions proposed by management. These include vetos against changes in the firm's business plan, a veto against changes in the firm's headcount, against financial decisions and several other veto rights that comprise the category termed others. On the other hand, STRUCTURAL VETO RIGHTS are those that protect the VC's investment in the firm and are also those that are regulated by German Commercial Law[26]. Table 12 presents regressions that aim at explaining the use of these rights. All models report results for ordered probit regressions

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[26] There are two different codes for public firms with limited liability and for private firms with limited liability, the AktG and the GmbHG.

for all rounds in the sample with standard errors clustered at firm level.

The regressions confirm the findings of the univariate analysis. In our base model the variables PERIOD1 and PERIOD3 are significant and the signs of the coefficient indicate learning over time. The usage of the veto rights overall as well as of the structural and operational veto rights increase over time. In table 13 we replace FINISHED PRODUCT by AGE. These variables turned out to be the development stage indicators which are least correlated with the other right-hand side variables. The pattern we stressed in our univariate analysis also holds in our base model with respect to the ROUND variable. Operational rights which have become superfluous over the relationship of the VC and the portfolio firms are returned to the entrepreneur. Whereas this effect is significant for operational rights, the negative coefficient of the ROUND variable is insignificant for the structural veto rights.

If we plug in additional explanatory variables (see models 2, 4, and 6) the above effects become weaker for the learning variables. This is due to the fact that some of these variables are correlated with the period dummies. For instance, we observe an increase of the number of repeat entrepreneurs over time (see tables 10 and 11). However, inserting these additional variables allows us to look into the explanatory power of the theoretical mechanisms discussed above. We use the fixed asset ratio (FAR) and AUDITED BALANCE SHEET as proxies for the pledgeable income/asset mechanism according to Aghion and Bolton (1992) [1]. Whereas the former variable is basically irrelevant for our observed allocation of veto rights, the AUDITED BALANCE SHEET variable provides some support for this mechanism. With an audited balance sheet, income and assets become more verifiable (more pledgeable income) and hence require less control rights for the VC. The negative coefficient (which is significant for the overall VETO RIGHT variable) confirms this relationship.

In contrast, the variable which we constructed in order to measure the relative extent of the VC's hold-up problem (VC EXPERT * EARLY STAGE) does not reveal any significant influence of the specific investment mechanism on the allocation of veto rights. In contrast, the variable which we constructed in order to measure the relative extent of the VC's hold-up problem (VC EXPERT * EARLY STAGE) does not reveal any significant explanatory power of the specific investment mechanism for the allocation of veto rights. We observe in two of the three cases the expected positive sign but the coefficient is completely insignificant. The variable AGE, which we use as a proxy for the degree of uncertainty (older firms have survived longer and have thus proved to be more viable, the future of the firm becomes much more predictable), should have negative coefficients. This is the case in all but one specification, but none of the coefficients is

significant. This reemphasizes our findings.

With respect to the signalling mechanism our regressions reveal mixed findings. The REPEAT ENTREPRENEUR variable has a significantly negative impact on the allocation of operational rights. This indicates that for repeat entrepreneurs the adverse selection problem is less pronounced implying less need to signal with operational control rights.

We construct PERIOD2*EARLY STAGE, an interactive dummy. We thereby aim to test the signalling mechanism, as we expect that early stage firms had a need to signal their type especially during the boom period (PERIOD2). In particular, we would expect a positive and significant effect if signalling matters. The regressions show, however, almost the reverse. This could either be interpreted against the signalling approach or might simply be due to the fact that in this period signalling was too expensive given the high proportion of bad firms in the market.

As has been outlined in the previous subsection the different mechanisms lead to different predictions of the effect of asymmetric information on the allocation of control rights. Using FINISHED PRODUCT as an indicator for asymmetric information (younger firms are more opaque than older ones) points towards the signalling hypothesis, as all signs have the right direction. However none of the coefficients is significant.

Summing up we saw our findings from the univariate analysis confirmed in our multivariate regressions. With respect to the economic mechanism potentially being able to explain the allocation of operation rights we find some evidence for the pledgeable income mechanism à la Aghion and Bolton (1992) [1]. With respect to the signalling approach the result is mixed. In addition, we could not find any support for the specific investment mechanism.

One should stress, however, the obvious: all this has to be seen against the background that we obviously do have only imperfect proxies which also do leave some room for discussion. This caveat holds true for the analysis in the following subsections. Despite this we think that given the abstract model and the limitation of data sets our proxies do depict the underlying variables as closely as possible.

4.3 Liquidation Rights

Regression results are given in table 17. We proceed in two steps. First, we run ordered probit regressions with the dependent variable being the number of liquidation rights given to the VC in the particular financing round. This means our endogenous variable is the sum of the dummy

for debt, staging and the put-option dummy. Thereby, we distinguish between our base model and an extended model in which we include the proxies for the economic mechanism we want to look at. In the base cases we use rather similar specifications as in the previous subsection. In a second step, we exclude the debt variable and look only into staging and put options as liquidation rights[27]. Therefore, we want to ask under which circumstances other liquidation rights have been used. In all the regression we find no significant influence of the ROUND variable. In other words the allocation of liquidation rights does not change structurally over the lifetime of the relationship between the VC and the portfolio firm. With respect to time periods we find a significant increase in the usage of staging and put options between periods 2 and 3. From an overall point of view this is, however, superimposed by the fact that debt has decreased over time. This means that for liquidation rights we find some support for our learning hypothesis. We also find evidence that VCs start increasing the separation of cash-flow and control rights by decreasing the use of debt and increasing the use of alternative liquidation rights.

When we look at the variables that can be related to the economic mechanisms behind the allocation of liquidation rights three main findings become obvious. First, the variable which depicts a proxy for the degree of asymmetric information (FINISHED PRODUCT) is highly significant in the base regression. This is in line with the prediction of the signalling mechanism.

In addition, the negative and significant coefficient of BALANCE SHEET SIZE variable in the overall regression together with the insignificant result for the second type of regression (excluding debt) indicates that especially debt is used as a liquidation right for smaller firms. Also, the more pronounced the degree of uncertainty (the younger the firm, i.e. the lower AGE) the more liquidation rights are allocated towards the VC, thereby providing support for the specific investment mechanism. Both variables indicate that liquidation rights might be used in firms that are more financially constrained, thus finding evidence for the Aghion and Bolton (1992) [1] model.

Thirdly, we have employed RESEARCH DEGREE as a proxy for the specific human capital of the entrepreneur. Hart and Moore (1994) [26] argue that inalienable human capital of the entrepreneur that is essential to the firm leads to a potential hold-up problem. The reason for

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[27] The reason for this is twofold. First, we consider debt to be a rather crude liquidation right since it does not address other incentive and control problems if the firm is doing well. Second, debt also has features that go beyond its function as a liquidation right, e.g. being a sharing rule between the entrepreneur and the VC for any surplus created by the firm. Recent research into the capital structure of VC firms has shown that debt in its function as a security seems to be suboptimal (See among others Bascha & Walz (2001) [6], Casamatta (2003) [15], Dessi (2003) [18], Schmidt (2003) [40], and Hellmann (2006) [29].) This approach thus allows us to disentangle two opposing effects when considering liquidation rights, the decrease in the use of debt and any corresponding increase in staging and put options.

this is that the entrepreneur cannot commit himself not to withdraw his human capital from the firm. They show that a debt contract may resolve this problem. This argument has been extended by Neher (1999) [37] to staged financing. The positive and significant coefficient of our RESEARCH DEGREE variable points in this direction.

All other variables turn out to have no significant effect on the allocation of liquidation rights. This implies that we do not find further support for the signalling mechanism, since in particular the REPEAT ENTREPRENEUR variable is insignificant in all specifications.

4.4   Exit Rights

In the regression analysis we focus on trade-sale rights and leave the analysis of IPO rights aside. A glance at table 16 clearly confirms the hypothesis on the relative importance of IPO vs. trade-sale rights. While we observe trade-sale rights in a very substantial number of cases and with respect to some trade-sale rights even in the majority of cases, the usage of IPO rights is much less pronounced. Only in very few transactions have we seen the usage of IPO rights in the actual contracts. This in line with Bascha/Walz (2001) [5] and Hellmann (2006) [29] who focus on the choices of the exit mode and potential conflicts of interest. Their main argument is that due to the more pronounced asymmetries in non-monetary benefits in the case of a trade sale (most notably there, the entrepreneur loses much of his control benefits) the conflict of interest between the VC and the entrepreneur is more pronounced in the case of a trade sale compared to an IPO. This implies that we should observe significantly more trade sale exit rights than IPO exit rights.

For the trade-sale rights we use two types of specifications. In a first step, we analyze the determinants of all trade-sale rights. We add up drag-along, take-along clauses, and other specific trade-sale rights (the information duty dummy, an anti-dilution protection dummy, and the existence of a VC preemption right). In a second step, we concentrate on the two most important rights, take-along and drag-along clauses. In both steps we use the same regression specification. These specifications are rather similar to the ones employed in the two previous sections. We only add some variables to test exit-specific theories. In addition, rather than using all industry dummies we take into account that in some industries these trade-sale rights are always or never used. In order to avoid the resulting econometric problems we use the growth industry variable as an industry control which allows for some variation among the firms. Regression results are displayed in Tables 18-20.

The learning hypothesis, indicating increasing convergence to US style contracts (with respect

to trade-sale rights) is verified by the various specifications and for the various sales rights (see tables 18-20). The PERIOD1 and PERIOD3 dummy variable always have a negative and positive sign respectively, indicating learning over time. This effect is, in particular, significant for the third period and exists even when we control for VC types. Hence, we clearly find that over time VCs have relied more and more on sales rights as a mean to ensure efficient exit decisions and to avoid inefficiencies due to hold-up problems and ex-post renegotiations.

This supports, at least with respect to control and decision rights, the arguments of Kaplan et al. (2006) [35] that in the long-run, despite all differences in the legal and institutional framework, a convergence towards US style contracts can be observed.

Most notable, our data clearly reveal that the usage of sales rights increases with the length of the relationship between the VC and the entrepreneur. The ROUND variable is always positive and statistically significant (often at the 1 percent level). Hence, in later financing rounds, sales rights are increasingly allocated to the VC, thereby refuting the notion that the decision and control rights are shifted away from the VC during the relationship between the VC and the entrepreneur. Our analysis clearly shows that this notion is true for operational control rights but not for exit rights. For the latter exactly the reverse is true. Therefore, our analysis stresses the importance of looking not only at the aggregate allocation of decision and control rights but at the disaggregated structure as well. Our findings are in line with Bolton and Faure-Grimaud (2006) [10] who argue in a bounded-rationality set-up that individuals have an incentive to prioritize their thinking and leave deliberations on less important decisions to the time or event when they arise. This explains why exit rights are included in the contract only in later stages, despite the fact that the VC could foresee that potential exit provisions are needed later on in the relationship.

With our regression analysis we also want to shed some empirical light on recent theoretical work dealing with exit right provisions in detail. Most notably, Aghion et al. (2005) [2] analyze the choice of contract and security design against the background of the trade off between the need for monitoring and the demand for liquidity. In their model exit rights are chosen in order to guarantee that the VC can satisfy his desire for liquidity in the case of an exit and make sure that an exit actually takes place. Having explicit exit rights is more likely if the VC lacks majority voting rights via the security design. Using a different set-up in which exit rights take the role of ensuring efficient ex-ante investment and preventing ex-post renegotiation and hold-up problems Chemla et al (2005) [16] also predict that more exit rights are used if the VC lacks a majority of voting rights. They also explicitly justify take-along, drag-along as well as

IPO rights on these grounds. In their approach, these problems are more pronounced the more uncertain the entire venture is, the more pronounced the specificity of the investment and the weaker the bargaining position of the VC in the case of a exit. Hence, in these cases we should expect to observe more exit rights.

In addition, using the arguments of Chemla et al. we should observe a close link between the expectations on the exit mode and the respective exit right. In other words in cases where the VC expects an IPO, piggy back and demand rights are more likely to be included in the contract, whereas with an expected trade sale the respective trade-sale rights are employed. This link between the expected exit mode and the distribution of exit rights can also be derived from the Aghion/Tirole (1997) argument of control rights serving as an information acquisition mechanism. This model predicts that the VCs should be given exit rights, as the entrepreneur will not have any incentive to search for potential trade buyers of the firm. Typically, a sale of the firm decreases the entrepreneur's private benefits. On the other hand, a trade sale may actually be more profitable than an IPO, as shown in Bienz (2005) [8]. Thus, the VC actually has incentives to search for such a potential buyer and should be given these rights in cases in which the monetary gains exceed the gains from control benefits. In contrast to this, in case of an IPO the potential for conflicts of interests between both parties is low and therefore no such rights should be necessary. Again, this implies that we should observe significantly more trade sale exit rights than exit rights for the IPO case. Second, it implies that when a trade sale is expected, one would expect to see specific trade sale covenants for the VC.

Our regression analysis partially confirms this view. We clearly find that with an expected trade sale more exit rights are allocated towards the VC. The variable TRADE SALE EXPECTED has the expected positive and significant coefficient in all specifications. Interpreting AGE as a proxy for uncertainty we also find some support for the specific investment explanation of Chemla et al. (2005). In contrast, however, the relationship between VC MAJORITY and exit rights is just the reverse to the one predicted by their analysis. The variable always has a positive and significant coefficient. One potential reason for this is a legal one: courts might be quite reluctant to enforce the rights of VCs if they are minority shareholders. Therefore, these rights are only enforceable for VCs holding a majority of votes.

The other variables have basically no effect on the allocation of exit rights. Hence, our results indicate that with respect to exit rights the pledgeable income mechanism as well as the signalling approach do not seem to play a role. This is in a sense not surprising because the lack of pledgablility of income and the adverse selection problem should be significantly less pronounced

with firms for which the exit decision is relevant.

4.5 Brief Summary

In the previous three sections we looked into the impact of the various time dimensions on the allocation of control rights and investigated several mechanisms that aim at explaining the use of control rights in entrepreneurial firms. What we found was that while none of the theories can be rejected on the outright, some theories seem to have more explanatory power for specific types of control rights. Indeed, with respect to operational rights most evidence points towards the Aghion/Bolton theory of control rights. This theory considers control rights as a way of fulfilling the VC's participation constraint in case the entrepreneur lacks pledgable income.

Dessein's signalling approach is also able to explain some broad features of the allocation of control rights, but the evidence for this approach is less compelling than for the Aghion/Bolton type mechanism.

In the case of exit rights, hedging specific investments and avoiding hold-up problems seems to play a crucial role. There, interpreting exit rights as substitutes for monetary income or as a signalling device seems to play less of a role. Interestingly, we find that the exit problem is addressed only when it becomes more pressing, thereby pointing in the direction of the bounded rationality argument put forward by Bolton and Faure-Grimaud (2006) [10].

5 Alternative Explanations for Learning

In this section we consider alternative explanation to the learning hypothesis and we will discuss why we think that learning seems to be the best explanation for our findings.

5.1 Market Power & Market Conditions

In our discussion above, we interpreted the observed changes in contract design over the three time periods as a learning process. One obvious alternative hypothesis is a change in market conditions and a related change in the bargaining position of the VC relative to the entrepreneur. So, why do we think that market conditions do not explain our findings? If the large inflows into venture capital during the years 1999 and 2000 were to be the cause[28], then in our descriptive statistics we would expect that we should observe a temporary decline in the use of control

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[28] See data from the German Venture Capital Association (BVK) (2006) [19].

rights during the boom period (period 2 in our tables). We do not observe this effect for any of our control rights except for the use of staging. The same is true for our regressions: We would expect the signs of both period dummies to be positive if market conditions would be the determining factor. Again, we find this result in none of the regressions we run.

One could also argue that exit market conditions might be driving the results for the sale rights we observe. Again, if this were to be the case, one would expect a decrease in the use of sale rights for the second period. Exit market conditions in the second period were favorable for IPOs[29], so there was less need to include trade-sale rights. Despite this, we observe a continuous increase in the use of trade-sale rights and the differences are statistically significant.

5.2   Changes in the type of securities used

Another candidate to rationalize the changes in contract design over time periods are the related changes in the financial securities chosen. Or to put it differently: are the observed changes the consequence of a change in the use of securities over time? We think that indeed this is the case. However, if this is the case, this would reemphasize our learning hypothesis. All theoretical papers on security design in venture capital[30] suggest that debt finance is an inefficient form of financing compared to convertibles or debt-equity mixes. Therefore, if learning is taking place, one would expect a shift away from debt finance towards equity finance. However, a shift from debt to equity type instruments would also require the use of additional control rights, such as more staging, put options and liquidation preferences. Why would we expect this? Debt is normally a bundle of cash-flow and control rights in the sense that debt allows the VC the right to close the firm and provides him with seniority for his investment. Therefore, the joint increase in the use of liquidation preferences together with the increase in the use of staging and put options (as documented in table 7) is indeed strong evidence for the learning hypothesis.

6   Conclusion

In this paper we analyze the evolution of control rights over time. We draw a random sample from a base population that covers approximately 60% of the German VC market from 1991-2003. This yields a broad and representative sample of 290 VC firms with 464 investment rounds. Within

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[29] See Deutsche Börse (2006) [12].

[30] See among others Bascha & Walz (2001) [6], Casamatta (2003) [15], Dessi (2003) [18], Schmidt (2003) [40], and Hellmann (2006) [29].

this sample we analyze VC behavior. We think that our paper makes four main contributions to the existing literature.

First, we find that investor control rights do not necessarily decrease with the length of the relationship. With respect to certain decisions, the VC's formal control rights actually increase. Indeed, we show that the closer the expected exit decision the more probable clauses related to the expected exit channel become. Thus, we expand the analysis found in Kaplan and Strömberg (2003 [33], 2004 [34]) as we investigate the use of exit clauses.

Second, we show that learning in venture capital contracts takes place on a broad basis. We make use of a long time series of contracts from 1990 to 2004. What seems to be the case is that VC contracts converge towards their US counterparts. We are therefore able to reconcile the differing findings of Kaplan et al. (2005) [35] and Lerner/Schoar (2004) [36].

A third (methodological) innovation with respect to the aforementioned papers is our use of the expected contract duration and the expected exit choice. Kaplan et al. 2004 [34] show the usefulness of expected risk measures for the allocation of control rights. We expand their framework to include expected exit choice and expected contract duration and find both of them to be an important factor influencing contract design.

Fourth, we show that our data is in line with prior research papers that predict the use of control rights in financial contracts. The most relevant theories seem to be the Aghion/Bolton theory of control rights, Dessein's signalling approach to control rights and the hold-up explanation put forward by Hart and Moore among others.

References

[1] Philippe Aghion and Patrick Bolton. An incomplete contracts approach to financial contracting. *Review of Economic Studies*, 59:473–494, 1992.

[2] Philippe Aghion, Patrick Bolton, and Jean Tirole. Exit options in corporate finance: Liquidity versus incentives. *Review of Finance*, 8:327–353, 2004.

[3] Philippe Aghion and Jean Tirole. Formal and real authority in organizations. *Journal of Political Economy*, 105:1–29, 1997.

[4] Joseph Bartlett. *Equity finance: venture capital, buyouts, restructurings, and reorganizations.* Panel Publishers, New York, 1995.

[5] Andreas Bascha and Uwe Walz. Convertible securities and optimal exit decisions in venture capital finance. *Journal of Corporate Finance*, 7:285–306, 2001.

[6] Andreas Bascha and Uwe Walz. Financing practices in the German venture capital industry: An empirical assessment. CFS Working Paper No. 2002/08, 2002.

[7] Eric Berglöf. A control theory of venture capital. *Journal of Law, Economics and Organization*, 10:247–267, 1994.

[8] Carsten Bienz. The pecking order of venture capital exits. Unpublished Working Paper, 2005.

[9] Carsten Bienz and Julia Hirsch. The dynamics of venture capital contrcts. Unpublished Working Paper, 2006.

[10] Patrick Bolton and Antoine Faure-Grimaud. Thinking ahead: the decision problem. Unpublished Working Paper, 2006.

[11] Patrick Bolton and David Scharfstein. A theory of predation based on agency problems in financial contracting. *American Economic Review*, 80:93–106, 1990.

[12] Deutsche Börse. Going public. Website, http://deutsche-boerse.com, 2006.

[13] German Venture Capital Association (BVK). *BVK Statistik 2003.* BVK, Berlin, 2003.

[14] German Venture Capital Association (BVK). *Jahresbericht 2003.* BVK, Berlin, 2003.

[15] Catherine Casamatta. Financing and advising: Optimal financial contracts with venture capitalists. *Journal of Finance*, 58:2059–2086, 2003.

[16] Gilles Chemla, Michel Habib, and Alexander P. Ljungqvist. An analysis of shareholder agreements. *Journal of the European Economic Association*.

[17] Wouter Dessein. Information and control in alliances & ventures. Forthcoming, Journal of Finance, 2004.

[18] Roberta Dessi. Start-up finance, monitoring and collusion. *The RAND Journal of Economics*, 36:255–274, 2005.

[19] Holger Frommann. Fundraising 2005: Einschätzung der aktuellen Fundraising Situation deutscher Private Equity Gesellschaften. German Private Equity and Venture Capital Association e.V. (BVK), 2006.

[20] Paul Gompers. Ownership and control in entrepreneurial firms: An examination of convertible securities in venture capital investment. Unpublished Working Paper, 1999.

[21] Paul Gompers and Josh Lerner. *The Venture Capital Cycle*. MIT Press, Cambridge (Mass.) and London, 1999.

[22] Sandy Grossman and Oliver Hart. The costs and benefits of ownership: A theory of vertical and lateral integration. *Journal of Political Economy*, 94:691–719, 1986.

[23] Oliver Hart. *Firms, Contracts and Financial Structure*. Oxford University Press, Oxford, 1995.

[24] Oliver Hart and John Moore. Incomplete contracts and renegotiation. *Econometrica*, 56:755–785, 1988.

[25] Oliver Hart and John Moore. Property rights and the nature of the firm. *Journal of Political Economy*, 98:1119–1158, 1990.

[26] Oliver Hart and John Moore. A theory of debt based on the inalienability of human capital. *The Quarterly Journal of Economics*, 109:841–879, 1994.

[27] Oliver Hart and John Moore. Default and renegotiation: A dynamic model of debt. *The Quarterly Journal of Economics*, 113:1–41, 1998.

[28] Thomas Hellmann. The allocation of control rights in venture capital contracts. *The Rand Journal of Economics*, 29:57–76, 1998.

[29] Thomas Hellmann. IPOs, aquisitions and the use of convertible securities in venture capital. *Journal of Financial Economics*, 81:649–679, 2006.

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

[31] Julia Hirsch and Uwe Walz. Contract design and venture capitalist type: An empricial analysis. Unpublished Working Paper, 2006.

[32] Roman Inderst and Holger Müller. The effect of capital market characteristics on the value of start-up firms. *Journal of Financial Economics*, 72:319 – 356, 2004.

[33] Steve Kaplan and Per Strömberg. Financial contracting meets the real world: An empirical analysis of venture capital contracts. *The Review of Economic Studies*, 70:281–316, 2003.

[34] Steve Kaplan and Per Strömberg. Characteristics, contracts, and actions: Evidence from venture capital analyses. *The Journal of Finance*, 59:2177–2210, 2004.

[35] Steven Kaplan, Frederic Martel, and Per Strömberg. How do legal differences and experience affect financial contracts? Unpublished Working Paper, 2006.

[36] Josh Lerner and Antoinette Schoar. Does legal enforcement affect financial transactions? The contractual channel in private equity. *Quarterly Journal of Economics*, 2004.

[37] Darwin Neher. Staged financing: An agency perspective. *Review of Financial Studies*, 66:255 – 274, 1999.

[38] William Sahlmann. The structure and governance of venture capital organizations. *The Journal of Financial Economics*, 27:473–521, 1990.

[39] Ibolya Schindele. Advice and monitoring: Venture financing with multiple tasks. Unpublished Working Paper, 2006.

[40] Klaus Schmidt. Convertible securities and venture capital finance. *Journal of Finance*, 58:1139–1166, 2003.

Appendix A: Data Description

In what follows, we will describe the data set in more detail and introduce the variables necessary for our regressions.

Firm Characteristics

First of all, we have information about the project and the respective portfolio company. The variable AGE represents the age of the firm when the corresponding financing round was closed. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a variable that indicates whether the firm's industry is research intensive, that is whether it is a biotech, IT/telecoms or a traditional high-tech firm. Furthermore, we observe the firm's development stage in each financing round. On the one hand, we know whether the firm has finished its product tests, if it already has a finished product, if the firm holds any patents or if it even has reference customers. On the other hand, we have information about the development stages as defined by the German Venture Capital Association. We distinguish seed and start-up firms and expansion and later stage firms: the dummy EARLY STAGE indicates whether the firm belongs to the first group (dummy equals one) or not (dummy equals zero). Furthermore, we often have the firms' balance sheet data at the date of each financing round: we know if the firm has any revenues (if this is the case the dummy REVENUES takes value one) and whether its balance sheet is audited or not (if this is the case the dummy AUDITED BALANCE SHEET takes value one). We also know the size of the firm's balance sheet. Moreover, the FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total whereby we use balance sheet data of the year preceding the year of closing of the corresponding financing round[31]. Finally, we know if the portfolio company has received funding from other investors apart from the VC we are looking at. We define a dummy OUTSIDE FINANCE that takes value one if the portfolio company has received bank, angel or other VC finance before the first round of VC financing we are looking at or if VC financing takes place via a syndicate of various VCs.

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[31] As we have many missing values in our sample, we adopt the following procedure. For all firms in a first financing round with an age of less than one year at the date of contracting and an investment phase of seed or early, we set the fixed asset ratio to zero. If we lack information for higher rounds, we use the same ratio as in the round before. If this ratio is not available, we code both as missing value. Additionally, we do not resort to the preceding round in the case of second rounds where we coded the first round data to be zero.

Last but not least, we have information about the entrepreneurs running the portfolio firm. We know whether we face a repeat entrepreneur, i.e. if any of the founders has already run a firm (this is captured by the dummy variable REPEAT ENTREPRENEUR). We also know whether any of the founders has a background in engineering, which we code as SCIENCE BACKGROUND. If any of the founders has a PhD or a degree above[32], we code the variable RESEARCH DEGREE to take value one.

Investment Conditions

Second, we have information, about the investment conditions. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs[33]. Additionally, we know whether the VC's are specialized in specific industries or development stages. Moreover, we observe the total amount invested, the financing instrument used and the timing of the investment. The STAGING dummy captures whether the project is financed in several steps or not.

Also, we observe the year when the financing round is closed and define three time dummies. PERIOD1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998, PERIOD2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry.

Voting and Control Rights

Most important of all we know the amount of voting rights the VC holds. We code this as VOTING RIGHTS/CASH-FLOW RIGHTS. We repeat the same exercise for the amount of voting rights the VC has on the firm's board: BOARD VOTING RIGHTS. VC VOTING MAJORITY and BOARD MAJORITY are dummy variables that take value one if the VC has a majority in either the firm's shareholder meeting or on the firm's board. Finally, we measure the degree of supermajority provisions by looking at the REQUIRED DECISION MAJORITY and the BOARD REQUIRED MAJORITY. Our previous measures for the VCs majorities take these into account.

Of course, we observe the types of control rights used in the firm: VETO RIGHTS is the sum of the following veto rights: OPERATIONAL VETO RIGHTS, STRUCTURAL VETO RIGHTS,

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[32] In Germany, this means doctoral degrees, a Habilitation, a Privatdozent or a professorship.

[33] We also include the business angels in our sample in this category.

VETO ASSET SALES, and the two veto rights against profit distribution, both for the board and for shareholders. OPERATIONAL VETO RIGHTS is the sum of the veto rights that govern the entrepreneur's actions in the firm: a veto against changes in the firm's line of business, a veto right against certain financial decisions such as capital expenditures or the use of derivative instruments, a veto right against changes in the firm's head count and veto's against other decisions, i.e. against lawsuits on behalf of the firm. STRUCTURAL VETO RIGHTS is the sum of the veto rights that secure the VC's position in the firm: A veto right against changes in the shareholders' agreement, a veto that forbids the firm's dissolution and a veto against changes in the firm's capital structure such as giving out new shares. Often the shareholders have a veto right against the use of the firm's profit.

LIQUIDATION RIGHTS is the sum of a debt dummy and the STAGING dummy. We also create two dummies that take value one when a VC (or an independent VC) has any liquidation right. The PUT OPTION dummy takes value one when then VC has the right to put his shares to the entrepreneur after a specific period of time, that is when he is able to force a buy-back by the entrepreneur. The DRAG ALONG tells us whether the VC has the right to force the entrepreneur to sell his stake to an (outside) bidder while the TAKE ALONG dummy tells us whether the VC has the right to demand from the entrepreneur to include his stake in any sale of the entrepreneur's stake. We code all this variables to take value if these rights are presents. Sometimes qualifying conditions are present. However, for sake of simplicity, we do not consider these elements here.

The EXIT RIGHTS dummy is the sum of the sale rights found in the sample, that is the sum of the dummy for the existence for an anti-dilution protection, the VC's preemption right dummy, the drag and take (tag) along dummies and finally the info duty dummy. The preemption right allows the VC to buy the entrepreneur's stake in the firm if the entrepreneur were to sell his stake for the price paid by the potential buyer, while the info duty dummy forces the entrepreneur to inform the VC about potential buyers of the firm that approach the entrepreneur. We also code the presence of IPO rights: Piggy back rights allow the VC to include his shares in any offering of the founder's shares in a public market, while the priority registration right allows the VC to register his shares with priority to those of the entrepreneur in case not all can be listed at once.

We also know whether the VC has a LIQUIDATION PREFERENCE (that is if his claims are senior to those of the entrepreneur, even if both hold equity). We also have a dummy variable called RIGHT TO REPLACE ENTREPRENEUR that takes value one exactly when the VC has this right. ANTI-COMPETITION CLAUSE takes value one if the VC has the right to ban the

entrepreneur to work in a related industry if he leaves the firm. Finally FOUNDER VESTING takes value one if the entrepreneur is not allowed to keep all his equity in firm if he resigns from his position in the firm. We do not discern whether there is a difference between the VC firing the entrepreneur or the entrepreneur leaving on his own.

Other Variables

Finally, we observe several other variables. TIME TO EXIT denotes the time the VC thinks he needs to exit the venture[34]. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale is expected by the VC. This expectation is often stated by the VC in his investment memorandum. The fact that this is stated in the investment memorandum means that the VC expects this prior to him signing the contract with the entrepreneur, but that the entrepreneur is not necessarily aware of this. Therefore, causality should run from the expectation of the possibility of a TS to the inclusion of the term in the contract.

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[34] We often had no information about this variable, as we took it directly from the VC's investment memorandi. For the programmes covered, KfW's maximum investment horizon was ten years. Thus, we set this variable to 10 when we faced an investment with debt only and no information about the expected contract duration. We ran robustness checks and found no differences in our results.

7 Appendix

Table 1: Sample selection

	-1997	1998 - 2000	2000 - 2004	Total
1	51	102	22	175
10	0	12	4	16
11	0	8	1	9
100	4	16	2	22
1000	1	33	32	66
1001	0	6	3	9
1010	0	1	1	2
1011	0	1	0	1
Total	56	179	65	300

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by venture capital funds. In this table, the structure of the underlying sample with respect to program choice and the respective period of time are presented. 1 = Technology Participation Programme (KfW/BMWA + KfW/BMTF - Technologie-Beteiligungsprogramm); 10 = ERP-Innovation Programme (ERP-Innovationsprogramm (Beteiligungsvariante)); 100 = Guarantee Programme (KfW-Risikokapitalprogramm - Garantien); 1000 = Fund Programme (KFW-Risikokapitalprogramm - Fondsfinanzierung); and mixes.

Table 2: Summary Statistics

Number of portfolio firms		290
# of financing rounds		464
# of VCs		91
# of Firms financed	Ø	5
	Median	2
Total size of investment	Ø	TEUR 5403
	Median	TEUR 1305
Age	Ø	4.77
	Median	3.00
Stages	Seed	10,3%
	Early	56,2%
	Expansion	19,0%
	Late	6,0%
	No info	8,5%
Legal form	GmbH	70%
	AG	28%
	Others	2%
Origin	Germany	92%
	France	1%
	UK	2%
	Others	5%
Industry	Bio/Biotech	5%
	Medicine	12%
	IT/Software	27%
	Telecom	6%
	Internet	10%
	Auto/Eng	0.15
	Chemistry	4%
	Others	14 %
Syndication	Ø	39%
	# of partners	3.69
	Median	3.00

Staging	No Staging	Staging
Complete Sample	135 (0.30)	311 (0.70)
Period 1	18 (0.28)	46 (0.72)
Period 2	86 (0.34)	167 (0.66)
Period 3	33 (0.24)	106 (0.76)
Independent VC	66 (0.31)	215 (0.69)
Public VC	44 (0.45)	54 (0.55)
Other VC Types	27 (0.36)	48 (0.64)

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by venture capital funds. The statistics given are the averages per round, not per firm. For staging and staging modes first column refers to the number of observations and the second to the percentage.

Table 3: Variable and data description

Variable	Variable description
Firm characteristic	
AGE	Age of the firm at the closing of the financing round
FINISHED PRODUCT	Firm has a product which can be sold
INDUSTRY DUMMIES	Indicate the industry in which the portfolio firm operates
GROWTH INDUSTRIES	Either BIOTECH, IT/Telecoms or traditional high-tech
EARLY STAGE	Seed or start-up firm
REVENUES	Firm has positive revenues
BALANCE SHEET	Dummy for audited balance sheet
FAR	Ratio of fixed assets to balance sheet total
ROUND	Indicating the number of financing rounds through which the firm has already gone
REPEAT ENTREPRENEUR	Founder has already run a firm
SCIENCE BACKGROUND	Founder with engineering background
RESEARCH DEGREE	Founder has at least a PhD
Investment Conditions	
INDEPENDENT, PUBLIC VC	VC being an independent or public VC
OTHER VC	Bank-dependent and corporate VC
STAGING	Dummy indicating whether the project is financed in several steps
PERIOD 1, 2, 3	Financing has taken place before 1998, between 1998 and 2000; after 2000
Voting and Control Rights	
VC MAJORITY	Dummy indicating VC majority in the shareholders meeting
BOARD MAJORITY	Dummy indicating VC majority in the firm's board
VETO RIGHTS	Sum of all veto rights dummies
OPERATIONAL VETO RIGHTS	Sum of dummies indicating veto rights against changes in firm's business plan, against certain financial decisions, against changes in the firm's head count and against other decisions
STRUCTURAL VETO RIGHTS	Sum of the veto rights that protect the strategic position of the VC in the firm
LIQUIDATION RIGHTS	Counts the number of liquidation rights available to the VC.
LIQUIDATION PREFERENCE	VC's claim is senior to the entrepreneur's claim
ANTI-DILUTION PROTECTION	Gives the VC the right to block a dilution of his equity stake in the firm
ANTI-COMPETITION CLAUSE	Clause which hinders the entrepreneur to engage in related or competing activities
PRIORITY REGISTRATION	VC has senior rights to list his shares in the case of an IPO
FOUNDER VESTING	Dummy indicating that the entrepreneur is not allowed to keep his (entire) equity position in the case of resignation
Other Variables	
TIME TO EXIT	Measures the expected time to exit as estimated by the VCs in the investment memorandi
TRADE SALE EXPECTED	Indicates whether the VC expects a trade sale to happen

Table 4: Summary statistics II: security choice

Category	Equity		Debt & Equity		Convertibles			Debt	
Description	Pure Equity	Equity + LP	Debt> Equity	Debt< Equity	US Style US Style	Convertible Equity	Mixes	Nonstandard Debt	Pure Debt
Category	1	2	3	5	6	7	8	4	9
Upside cash flow rights	X	X	X	X	X	X	X	X	-
Downside protection	-	X	X	-	X	X	X	X	X
Change of control	-	-	X	X	X	-	X	X	X
Cash flow rights at exit	X	X	X	X	X	X	X	-	-
Voting rights	X	X	X	X	-	X	X	-	-
	51	85	157	20	11	10	16	11	96
Total Percentage	29%		38%		8%			23%	

Notes: In this table, we report the VC's security choice of 91 German funds for 464 investment rounds into 290 entrepreneurial firms. We categorize each security according to five characteristics: upside cash-flow rights, downside protection, changes of control in defaults, sash-flow rights when the firm is sold and voting rights. We have ten missing values.

Table 5: Summary statistics III: dynamic security choice

Category		Equity		Debt & Equity		Convertibles			Debt		
Description		Pure Equity	Equity + LP	Debt> Equity	Debt< Equity	US Style US Style	Convertible Equity	Mixes	Nonstandard Debt	Pure Debt	
Category		1	2	3	5	6	7	8	4	9	Total
Period 1	#	7	1	25	1	0	0	1	5	26	67
	%	10.45	1.49	37.31	1.49	0.00	0.00	1.49	7.46	38.81	100.00
2	#	31	37	102	12	4	2	11	2	52	257
	%	12.06	14.40	39.69	4.67	1.56	0.78	4.28	0.78	20.23	100.00
3	#	13	47	30	7	7	8	4	4	18	140
	%	9.29	33.57	21.43	5.00	5.00	5.71	2.86	2.86	12.86	100.00
Total	#	51	85	157	20	11	10	16	11	96	464
	%	10.99	18.32	33.84	4.31	2.37	2.16	3.45	2.37	20.69	100.00

Notes: In this table, we report the security choice of 91 German venture capital funds for 464 investment rounds into 290 entrepreneurial firms over three different time periods. Period 1 are the years 1990-1997, period 2 are the years 1998-2000 and period 3 are the years 2001-2004. We categorize each security according to five characteristics: upside cash-flow rights, downside protection, changes of control in defaults, sash-flow rights when the firm is sold and voting rights. We have ten missing values.

Table 6: Descriptive Variables: Rounds

Category	Variable	Full Sample			1st Rounds only			2nd Rounds only			3rd Rounds and more		
		Obs	Mean	Std. Dev.	Obs	Mean	Std.Dev.	Obs	Mean	Std. Dev	Obs	Mean	Std. Dev
Veto Rights	Veto Shareholder's Agreement	417	.9784173	.1454912	253	.972332^{+++}	.1643448	111	.981982	.1336197	53	1	0
	Veto Asset Sales	352	.8096591	.3931289	215	.827907^{+}	.3783422	94	.787234	.4114579	43	.7674419	.4274626
	Veto Capital Structure	415	.8578313	.3496446	251	.8326693	.3740166	111	.8918919	.3119251	53	.9056604	.2950978
	Veto Business Plan	339	.519174	.5003708	211	.521327^{+}	.5007329	91	°°°.5824176	.4958928	37	.3513514	.4839775
	Veto Others	334	.6706587	.4706792	201	.6865672	.4650469	89	.6516854	.4791357	44	.6363636	.4866071
	Veto Financial Decisions	346	.690751	.4628531	210	.7^{+}	.4593526	93	°.7311828	.4457477	43	.5581395	.5024855
	Veto Head Count	339	.5988201	.4908618	209	.5837321	.4941226	91	.6483516	.4801302	39	.5641026	.5023561
	Veto Company Dissolution	418	.9282297	.2584165	253	.9288538	.2575785	112	.9285714	.2586969	53	.9245283	.2666788
	Board Veto Profit Distribution	250	.892	.311003	138	.8623188^{+++}	.3458203	77	.9090909	.2893649	35	.9714286	.1690309
	Shareholders Veto Profit Distribution	351	.6752137	.4689635	210	***.6^{+++}	.4910686	95	.7578947	.4306302	46	.8478261	.3631584
Voting Rights	Required Decision Majority	355	52.67138	8.139221	209	52.40512	7.742523	100	52.7867	8.320183	46	53.63043	9.511067
	VC Voting Majority	449	.2004454	.4007802	278	**.1258993^{+++}	.3323341	117	°°°.2222222	.4175278	54	.537037	.5033084
	Voting Rights/Cash-Flow Rights	449	34.13722	22.74323	278	***28.87^{+++}	21.2813	117	°°°38.88368	21.63844	54	50.99037	22.26202
	Board Voting Rights	179	42.16838	21.57254	94	37.48255^{+++}	19.26785	53	°°42.80113	20.83796	32	54.885	24.40976
	Board VC control	177	.3220339	.4685814	92	.2173913^{+++}	.4147311	53	°°.3207547	.4712334	32	.625	.4918694
	Board required majority	211	50.94962	4.124358	113	51.47814	5.140675	60	50.27783	2.152088	38	50.43868	2.704231
	Board exists?	457	.4617068	.4990778	286	**.3951049^{+++}	.4897301	117	°°.5128205	.5019854	54	.7037037	.4609109
Termination Rights	VC has termination rights	454	.8612335	.3460841	283	*.8798587^{+}	.3257027	117	.8205128	.3854103	54	.8518519	.3585825
	Ind VC has termination rights	347	.9308357	.2540997	223	*.9506726	.2170378	84	.8809524	.3257896	40	.925	.2667468
	Staging	456	.7280702	.4454426	283	.7137809^{+}	.4527937	118	.7288136	.4464679	55	.8	.4036867
	Debt	464	.2306034	.4216737	290	***.2068966^{+++}	.4057809	119	.2773109	.4495642	55	.2545455	.4396203
	Put Option	396	.1641414	.3708724	246	.1504065	.3581982	103	.1941748	.3974984	47	.1702128	.3798826
Sale Rights	Anti Dilution Protection	403	.3151365	.4651477	247	***.2348178^{+++}	.4247456	104	°°.3846154	.4888602	52	.5576923	.501506
	VC preemption	405	.6617284	.4737067	251	***.5697211^{+++}	.4961043	104	°°.7692308	.4233654	50	.9	.3030458
	E preemption	405	.3234568	.468374	251	.2868526^{+}	.4531958	104	.3653846	.4838698	50	.42	.4985694
	Drag Along	413	.3874092	.4877493	255	**.3058824^{+++}	.4616863	107	°°°.4392523	.4986315	51	.6862745	.4686233
	Take Along	412	.4975728	.500602	254	***.4015748^{+++}	.4911846	107	°°°.5794393	.4959721	51	.8039216	.4009792
	Info Duty	403	.2009926	.4012406	251	**.1434263^{+++}	.3512074	105	.2571429	.439155	47	.3829787	.4913686
IPO Rights	Piggy back	383	.0287062	.1672387	230	.0173913	.1310094	103	.038835	.1941462	50	.06	.2398979
	Priority Registration	337	.0267062	.1614632	204	.0196078	.1389895	91	.043956	.2061331	42	.0238095	.1543033
Others	Liquidation preference	414	.3888889	.4880879	253	*.3280632^{+++}	.4704386	108	°°.4259259	.4967879	53	.6037736	.4937931
	Right to Replace Entrepreneur	417	.1822542	.3865176	254	**.1220472^{+++}	.3279866	109	°°°.2201835	.4162842	54	.3888889	.4920756
	Founder Vesting	412	.1213592	.3269413	251	.1115538	.3154457	108	.1111111	.3157348	53	.1886792	.3949977
	Anti-competition clauses	419	.7613365	.6673049	258	.7054264^{+++}	.4567369	107	.8598131	1.076758	54	.8333333	.3761774

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by 91 German venture capital funds. The first section states the results for the complete sample, the other three are for all observations in the first, second and third or higher rounds respectively. ***, **, * denotes statistical significance at the 1%, 5%, and 10% level respectively for the difference between the first and second round. $^{+++}$, $^{++}$, $^{+}$ is the equivalent for the difference between the first and third round, while °°°, °°, ° denotes statistical significance between the second and third round.

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Table 7: Descriptive Variables: Periods

Category	Variable	Full Sample			1st Period			2nd Period			3rd Period		
		Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Veto Rights	Veto Shareholder's Agreement	417	.9784173	.1454912	59	.9491525+++	.2215719	225	°° .9733333	.1614665	130	1	0
	Veto Asset Sales	352	.8096591	.3931289	54	.8703704	.3390495	193	.8031088	.3986836	103	.7961165	.4048535
	Veto Capital Structure	415	.8578313	.3496446	58	**.7068966+++	.459161	224	°° .8616071	.3460852	130	.9230769	.2675002
	Veto Business Plan	339	.519174	.5003708	56	.4642857	.5032363	190	.5315789	.5003201	91	.5384615	.5012804
	Veto Others	334	.6706587	.4706792	49	.6122449	.4922875	186	.6505376	.4780871	98	.7346939	.443766
	Veto Financial Decisions	346	.690751	.4628531	56	.625+	.4885042	191	° .6701571	.4713915	99	.7676768	.4244632
	Veto Head Count	339	.5988201	.4908618	54	.5+	.5046949	188	.6010638	.4909871	95	.6631579	.4751377
	Veto Company Dissolution	418	.9282297	.2584165	61	.852459++	.3575875	224	°° .9196429	.2724541	130	.9769231	.1507287
	Board Veto Profit Distribution	250	.892	.311003	31	.8709677	.3407771	126	°°° .8492063	.3592762	92	.9673913	.1785834
	Shareholders Veto Profit Distribution	351	.6752137	.4689635	55	.5090909+++	.504525	186	°°° .6236559	.4857756	108	.8611111	.3474428
Voting Rights	Required Decision Majority	355	52.67138	8.13922	49	*55.15653+	10.40932	202	52.3251	7.649947	104	52.17308	7.717641
	VC Voting Majority	449	.2004454	.4007802	63	***.031746+++	.1767314	250	°°° .124	.3302427	136	.4191176	.4952388
	Voting Rights/Cash-Flow Rights	449	34.13722	22.74323	63	***18.52714+++	18.81325	250	°°° 31.61996	19.43854	136	45.99568	24.28823
	Board Voting Rights	179	42.16838	21.57254	11	32.05909++	6.53304	89	°°° 33.86011	17.39886	78	53.19154	22.48837
	Board VC control	177	.3220339	.4685814	11	*** 0+++	0	87	°°° .1724138	.3799295	78	.5384615	.5017452
	Board required majority	211	50.94962	4.124358	14	*** 50	0	108	° 51.23778	4.81957	88	50.75784	3.492216
	Board exists?	457	.4617068	.4990778	67	***.2089552+++	.4096308	250	°°° .432	.4963481	137	.6423358	.4810715
Termination Rights	VC has termination rights	454	.8612335	.3460841	65	*.8923077+	.3124038	251	.8326693	.3740166	136	.8970588	.3050054
	Ind VC has termination rights	347	.9308357	.2540997	34	*** 1+++	0	198	.9242424	.2652806	114	.9210526	.2708471
	Staging	456	.7280702	.4454426	64	.75	.4364358	251	°° .6812749	.4669132	138	.8043478	.3981471
	Debt	464	.2306034	.4216737	67	***.4626866+++	.5023689	255	°°° .2078431	.4065619	139	.1582734	.3663172
	Put Option	396	.1641414	.3708724	60	***.1666667	.373823	211	.1611374	.368532	123	.1707317	.3778133
Sale Rights	Anti Dilution Protection	403	.3151365	.4651477	57	***.0175439+++	.1324532	215	°°° .227907	.4204612	129	.5891473	.4939067
	VC preemption	405	.6617284	.4737067	60	*** .4+++	.4940322	215	°°° .6325581	.4832333	128	.8359375	.3717874
	E preemption	405	.3234568	.468374	60	.2166667+++	.4154502	215	° .3023256	.4603373	128	.40625	.4930621
	Drag Along	413	.3874092	.4877493	61	***.0819672+++	.2765913	223	°°° .3318386	.4719327	127	.6299213	.4847377
	Take Along	412	.4975728	.500602	61	***.2131148+++	.4129065	221	°°° .4479638	.4984138	128	.7265625	.4474749
	Info Duty	403	.2009926	.4012406	60	.0833333+++	.2787178	218	°°° .146789	.3547099	123	.3577236	.4812906
IPO Rights	Piggy back	383	.0287206	.1672387	51	0+++	0	208	°° .0144231	.1195145	123	.0650407	.2476062
	Priority Registration	337	.0267062	.1614632	52	0+++	0	183	°° .010929	.1042541	101	.0693069	.2552421
Others	Liquidation preference	414	.3888889	.4880879	58	***.0517241+++	.2234038	222	°°° .3153153	.4656914	132	.6590909	.4758206
	Right to Replace Entrepreneur	417	.1822542	.3865176	57	***.0350877+++	.1856372	226	°°° .1327434	.3400503	131	.3282443	.4713768
	Founder Vesting	412	.1213592	.3269413	55	*** 0+++	0	224	°°° .0714286	.2581162	130	.2615385	.4411726
	Anti-competition clauses	419	.7613365	.6673049	58	*** .5+++	.5043669	227	°° .7312775	.4442749	132	.9393939	.9471337

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by 91 German venture capital funds. The first section states the results for the complete sample, the other three are for all observations before 1998 (Period 1), between 1998 and 2000 (Period 2) and after 2000 (Period3) respectively. ***, **, * denotes statistical significance at the 1%, 5%, and 10% level respectively for the difference between the first and second period. +++, ++, + is the equivalent for the difference between the first and third period, while °°°, °°, ° denotes statistical significance between the second and third period.

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Table 8: Descriptive Variables: Expected Contract Duration

Category	Variable	Full Sample Obs	Mean	Std. Dev.	1-3 years Obs	Mean	Std. Dev.	4-6 years Obs	Mean	Std. Dev.	7-10 years Obs	Mean	Std. Dev.
Veto Rights	Veto Shareholder's Agreement	417	.9784173	.1454912	108	1+++	0	59	°°°1	0	98	.9183673	.275212
	Veto Asset Sales	352	.8096591	.3931289	93	.7419355	.4399413	52	.8076923	.3979586	90	.8	.4022409
	Veto Capital Structure	415	.8578313	.3496446	108	.9814815+++	.1354454	59	°°°.9830508	.1301889	97	.5463918	.5004294
	Veto Business Plan	339	.519174	.5003708	81	.5679012	.4984544	51	.5882353	.4970501	93	.4516129	.5003505
	Veto Others	334	.6706587	.4706792	87	.6896552	.4653167	53	.754717	.4343722	85	.7058824	.4583492
	Veto Financial Decisions	346	.690751	.4628531	89	*.6629213	.4753903	52	°°.8076923	.3979586	92	.6195652	.488154
	Veto Head Count	339	.5988201	.4908618	83	.6746988+++	.4713353	54	°°°.6851852	.4688031	91	.3956044	.4916892
	Veto Company Dissolution	418	.9282297	.2584165	108	*.9537037+++	.2111056	61	°°°1	0	98	.8469388	.3618977
	Board Veto Profit Distribution	250	.892	.311003	75	.88	.3271499	43	°°.9302326	.2577696	59	.9322034	.2535545
	Shareholders Veto Profit Distribution	351	.6752137	.4689635	90	.7666667	.4253221	55	.8	.4036867	91	.6043956	.4916892
Voting Rights	Required Decision Majority	355	52.67138	8.13922	92	51.78261+++	6.852971	49	°°51.65306	6.067506	72	54.58333	9.984142
	VC Voting Majority	449	.2004454	.4007802	115	.3391304+++	.475486	60	°°°.3166667	.4691018	108	.0092593	.096225
	Voting Rights/Cash-Flow Rights	449	34.13722	22.74323	115	44.30784+++	19.75769	60	°°°43.413	16.90894	108	11.99481	16.57282
	Board Voting Rights	179	42.16838	21.57254	67	48.19433+++	21.64788	31	°°°43.2	15.29628	14	24.64286	20.93762
	Board VC control	177	.3220339	.4685814	67	.4328358+++	.4992079	31	°.2903226	.4614144	12	.0833333	.2886751
	Board required majority	211	50.94962	4.124358	52	*49.03231	10.64047	24	52.43083	6.721034	9	53.74111	7.423995
	Board exists?	457	.4617068	.4990778	117	*.6923077+++	.4635236	62	°°°.5645161	.4998678	110	.1363636	.3447449
Termination Rights	VC has termination rights	454	.8612335	.3460841	118	***1.101695	.6046802	60	°°1.383333	.5551505	112	1.142857	.868437
	Ind VC has termination rights	347	.9308357	.2540997	108	*.8888889+++	.3157348	56	.9642857	.1872563	19	1	0
	Staging	456	.7280702	.4454426	115	.7913043+++	.4081549	62	°°°.8225806	.3851418	110	.5636364	.4982036
	Debt	464	.2306034	.4216737	119	*.3109244+++	.4648291	62	°°°.5806452	.474818	112	.9732143	.1621823
	Put Option	396	.1641414	.3708724	100	.19	.3942772	55	.2363636	.4287638	102	.1568627	.3654672
Sale Rights	Anti Dilution Protection	403	.3151365	.4651477	103	.5533981+++	.4995715	55	.4363636	.5005048	99	.0707071	.2576394
	VC preemption	405	.6617284	.4737067	105	.8666667+++	.341565	57	°°°.7894737	.4113064	100	.34	.4760952
	E preemption	405	.3234568	.468374	105	**.4666667+++	.5012804	57	.2982456	.4615545	100	.22	.4163332
	Drag Along	413	.3874092	.4877493	103	*.6407767+++	.4821189	58	°°°.4827586	.5040669	104	.0673077	.2517675
	Take Along	412	.4975728	.500602	103	.6893204+++	.4650348	57	°°°.6315789	.4866643	104	.2211538	.4170337
	Info Duty	403	.2009926	.4012406	106	.3113208+++	.4652333	54	°°°.2592593	.442343	102	.0490196	.2169752
IPO Rights	Piggy back	383	.0287062	.1672387	101	*.0792079+++	.27141	54	.0185185	.1360828	85	0	0
	Priority Registration	337	.0267062	.1614632	84	***.0952381+++	.2953066	46	0	0	84	0	0
Others	Liquidation preference	414	.3888889	.4880879	107	.6448598+++	.4808078	58	°°°.5517241	.5016609	102	.0196078	.1393331
	Right to Replace Entrepreneur	417	.1822542	.3865176	108	.4351852+++	.4980926	56	°°°.375	.4885042	101	.029703	.1706133
	Founder Vesting	412	.1213592	.3269413	103	.184466+++	.3897604	55	°.1818182	.3892495	101	.019802	.1400141
	Anti-competition clauses	419	.7613365	.6673049	105	.8666667+++	.341565	55	.9454545	1.445532	104	.5192308	.5020496

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by 91 German venture capital funds. The first section states the results for the complete sample, the other three are for all observations in the sample. The second part summarizes the distribution of veto rights for expected contract durations between 1 to 3 years, the third part for durations between 3 to 6 years and the fourth part for durations between 6 to 10 years. ***, **, * denotes statistical significance at the 1%, 5%, and 10% level respectively for the difference between the the shortest and middle durations. +++ , ++ , + is the equivalent for the difference between the shortest and longest durations, while °°° , °° , ° denotes statistical significance between the middle and the longest durations.

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Table 9: Separation of Cash Flows and Control:

	VC's Equity Stake										
	0%		<25%		<50%		<75%		≥ 75%		No of Obs
Veto Rights	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	
Shareholder's Agreement*	54	.8518519	50	.98	220	1	68	1	22	1	414
Asset Sales	54	.7592593	55	.9272727	167	.7784431	57	.8245614	12	.8333333	345
Capital Structure*	54	.2407407	50	.64	220	1	68	1	22	.8333333	414
Business Changes	54	.4444444	54	.4444444	168	.5833333	48	.4166667	8	.625	332
Other Rights	51	.6274451	48	.625	160	.66875	56	.6607143	13	.9230769	328
Financial Decisions	54	.537037	53	.6851852	163	.7546012	55	.6363636	13	.7692308	332
Head Count	54	.3703704	53	.5849057	163	.6993865	53	.6037736	9	.4444444	332
Firm Dissolution*	54	.7962963	50	.62	220	1	68	1	22	1	414
Shareholders Veto Profit Distribution*,**	54	.462963	53	.4716981	156	.6538462	65	.9846154	16	1	344
Management Replacement	64	0	60	.0333333	200	.08	67	.5671642	21	.9047619	412

	VC's Supervisory Board Stake										
	0%		<25%		<50%		<75%		≥ 75%		No of Obs
Veto Rights	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	
Shareholder's Agreement*	7	.8571429	15	1	108	1	36	1	7	1	173
Asset Sales	8	.75	14	.7142857	81	.8395062	31	.6451613	6	.8333333	140
Capital Structure*	7	.4285714	15	.8	108	.9444444	36	1	7	1	173
Business Changes	8	.25	14	.2142857	75	.56	28	.3928571	5	.8	130
Other Rights	7	.5714286	14	.7857143	80	.7875	32	.59375	6	1	139
Financial Decisions	7	.7142857	14	.5	77	.6883117	32	.71875	6	.333333	134
Head Count	7	.7142857	14	.5714286	77	.5844156	30	.7666667	6	.8333333	134
Firm Dissolution*	7	.7142857	15	.7333333	108	.962963	36	1	7	1	173
Shareholders Veto Profit Distribution*,**	7	0	13	.6923077	80	.775	28	.8928571	7	1	135
Management Replacement	10	0	16	.25	104	.3461538	37	.8918919	7	1	174

Notes: This table breaks down veto rights by the distribution of voting rights in the firm. * denotes veto rights that are granted to any shareholder with a fraction of more than 25% of the firms equity. ** denotes that this topic is to be decided by the supervisory board or the shareholder's meeting. Note that the Supervisory Board is allowed to replace the firm's management, thus a VC majority there effectively grants the VC this right.

Table 10: Independent Variables correlations Part I

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Finished Product	(1)	1.0000											
Age	(2)	0.2018	1.0000										
		0.0000											
Round	(3)	0.0807	0.0059	1.0000									
		0.0891	0.9025										
FAR	(4)	0.1077	0.1488	0.0870	1.0000								
		0.0326	0.0031	0.0784									
Balance Sheet Size	(5)	-0.0436	0.0191	-0.0423	-0.0103	1.0000							
		0.4302	0.7294	0.4325	0.8499								
Normalized Balance Sheet	(6)	0.0460	0.1305	-0.0347	0.0092	0.1038	1.0000						
		0.4080	0.0187	0.5236	0.8678	0.0558							
Research Degree	(7)	-0.2338	0.0962	0.0871	0.0470	0.0668	-0.0528	1.0000					
		0.0000	0.0643	0.0853	0.3844	0.2604	0.3773						
Science Background	(8)	-0.0127	0.0557	-0.0704	0.0802	0.0152	0.0197	0.1348	1.0000				
		0.8020	0.2754	0.1576	0.1311	0.7948	0.7387	0.0078					
Repeat Entrepreneur	(9)	0.0522	0.1563	-0.0172	-0.0113	-0.0285	0.0862	-0.2299	0.0367	1.0000			
		0.3086	0.0024	0.7333	0.8332	0.6297	0.1473	0.0000	0.4904				
Audited Balance Sheet	(10)	0.4916	0.2395	0.0913	0.2732	-0.0830	0.0366	-0.1477	0.0437	0.0550	1.0000		
		0.0000	0.0000	0.0710	0.0000	0.0366	0.5385	0.0070	0.4188	0.3144			
Period02*Early Stage	(12)	-0.2151	0.2031	-0.1593	-0.1658	-0.0596	-0.0499	-0.0019	-0.0484	-0.0438	-0.2696	1.0000	
		0.0000	0.0000	0.0010	0.0012	0.2929	0.3829	0.9711	0.3517	0.4064	0.0000		
VC Expert*Early Stage	(13)	-0.2638	0.2593	-0.0178	-0.1700	-0.0862	-0.0707	0.2111	0.0352	-0.0590	-0.3003	0.3571	1.0000
		0.0000	0.0000	0.7142	0.0009	0.1280	0.2162	0.0001	0.4982	0.2635	0.0000	0.0000	
VC Majority	(14)	-0.0125	0.0020	0.3353	0.0475	-0.0190	-0.0282	0.1912	0.0217	-0.0146	-0.0402	-0.1196	0.0884
		0.7951	0.9669	0.0000	0.3456	0.7305	0.6116	0.0002	0.6667	0.7749	0.4323	0.0149	0.0723
Trade Sale Expected	(15)	0.1257	0.2102	0.0456	0.0217	-0.0320	-0.0373	-0.0582	-0.1360	0.0860	0.0715	-0.1547	0.0122
		0.0132	0.0000	0.3638	0.6849	0.5861	0.5285	0.2807	0.0109	0.1124	0.1847	0.0027	0.8141
Independent VC	(16)	-0.0514	0.1346	0.1078	-0.1149	0.0514	0.0435	0.0812	-0.1132	-0.0120	-0.1140	0.0027	0.1830
		0.2367	0.1384	0.0205	0.0203	0.3414	0.4252	0.1094	0.0231	0.8129	0.0241	0.9146	0.0002
Public VC	(17)	0.0217	0.0492	-0.1795	-0.0334	-0.0336	-0.0318	-0.0999	0.0824	0.0666	0.0044	-0.0486	-0.1400
		0.6481	0.3043	0.0001	0.5007	0.5340	0.5601	0.0487	0.0985	0.1874	0.9316	0.3181	0.0039
Period 1	(18)	-0.0240	0.0342	-0.1713	0.0191	-0.0346	-0.0274	0.0074	0.1229	-0.1023	0.0967	0.0967	-0.0169
		0.6143	0.4748	0.0002	0.6997	0.5212	0.6143	0.8837	0.0135	0.0423	0.0558	0.3181	0.7281
Period 3	(19)	0.0927	0.0151	0.3345	0.0448	-0.0200	-0.0360	0.0927	-0.0093	0.1182	0.0745	-0.3204	0.0528
		0.0506	0.7522	0.0000	0.3660	0.7107	0.5082	0.0672	0.8528	0.0190	0.1411	0.0000	0.2769
Research Industries	(20)	-0.1760	0.2429	0.0983	-0.1471	0.0362	0.0437	0.0947	-0.0309	-0.0505	-0.1811	0.1223	0.3859
		0.0002	0.0000	0.0343	0.0028	0.5021	0.4218	0.0615	0.5361	0.3170	0.0003	0.0115	0.0000
Life Science	(21)	-0.2367	0.0708	0.0836	0.0026	0.0991	-0.0239	0.4396	0.1635	-0.1743	-0.0700	-0.0356	0.1620
		0.0000	0.1384	0.0721	0.9578	0.0655	0.6611	0.0000	0.0010	0.0005	0.1666	0.4641	0.0008
Internet	(22)	0.0650	0.0952	0.0058	-0.1410	-0.0242	-0.0196	-0.1439	-0.4296	-0.0367	-0.1904	0.2253	0.1853
		0.1714	0.0460	0.9016	0.0042	0.6536	0.7190	0.0044	0.0000	0.4674	0.0001	0.0000	0.0001
IT	(23)	0.0212	0.1090	0.0198	-0.0587	-0.0341	0.0763	0.0002	0.1010	0.1077	0.0189	-0.0013	0.0909
		0.6562	0.0222	0.6712	0.2356	0.5271	0.1604	0.9994	0.0426	0.0327	0.7090	0.9792	0.0607
Trad. High-Tech	(24)	0.0746	0.1509	-0.0406	0.1204	-0.0229	-0.0321	-0.0103	0.1231	-0.0488	0.0679	-0.1008	-0.0275
		0.1160	0.0015	0.3827	0.0148	0.6716	0.5549	0.8391	0.0133	0.3343	0.1798	0.0376	0.5720
Time to Exit	(25)	0.0071	0.1319	-0.2520	0.1032	-0.0953	-0.0467	-0.0534	0.1406	-0.0112	-0.0238	-0.0543	-0.1454
		0.9142	0.0496	0.0001	0.1400	0.2112	0.5432	0.4391	0.0395	0.8759	0.7379	0.4173	0.0292

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Notes: Pairwise correlations for the independent variables used in the regressions for 464 investment rounds into 290 entrepreneurial firms by 91 German venture capital funds. The second row for each variable denotes the level of statistical significance. FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round of the investment in. The BALANCE SHEET SIZE variable measures the size of the balance sheet total whereby we use balance sheet data of the year preceding the financing. The dummy AUDITED BALANCE SHEET takes value one if the firm's balance sheet is audited or not. We create two interaction variables: VC EXPERT*EARLY STAGE takes value one when the VC invests in an industry he states to have experience in, whereas the EARLY STAGE dummy takes value one for seed and start-up firms. We also create an interaction term between firms financed in the second period (1998-2000) and the EARLY STAGE dummy. We also know whether any of the founders has a background in engineering, which we code as SCIENCE BACKGROUND. If any of the founders has a PhD or a degree above, we code the variable RESEARCH DEGREE to take value one. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. The DUMMY VC MAJORITY indicates whether the VC has the majority of voting rights in the firm. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale is expected by the VC. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round was closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely from 1990 until 1997, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm. TIME TO EXIT measures the expected time to exit, as estimated by the VCs in their investment memorandi.

Table 11: Independent Variables correlations Part II

		(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
Finished Product	(1)												
Age	(2)												
Round	(3)												
FAR	(4)												
Balance Sheet Size	(5)												
Normalized Balance Sheet	(6)												
Research Degree	(7)												
Science Background	(8)												
Repeat Entrepreneur	(9)												
Audited Balance Sheet	(10)												
FAR	(11)												
Periode02*Early Stage	(12)												
VC Expert*Early Stage	(13)	1.0000											
VC Majority	(14)	0.0900 / 0.0770	1.0000										
Trade Sale Expected	(15)	0.2284 / 0.0000	0.1705 / 0.0006	1.0000									
Independent VC	(16)	-0.2574 / 0.0000	-0.2145 / 0.0000	-0.6584 / 0.0000	1.0000								
Public VC	(17)	-0.1702 / 0.0003	-0.1490 / 0.0028	-0.2065 / 0.0000	0.1472 / 0.0015	1.0000							
Period 1	(18)	0.3601 / 0.0000	0.2752 / 0.0000	0.1030 / 0.0268	-0.0772 / 0.0976	-0.2700 / 0.0000	1.0000						
Period 3	(19)	0.0118 / 0.5258	0.5258 / 0.0000		-0.1617 / 0.0005	-0.1556 / 0.0008	0.0690 / 0.1378	1.0000					
Research Industries	(20)	0.1187 / 0.0000	0.0319 / 0.0000	0.2296 / 0.0000	-0.1222 / 0.0086	0.0475 / 0.0699	0.0008 / 0.0005	0.3239 / 0.0000	1.0000				
Life Science	(21)	0.2855 / 0.0000	-0.0673 / 0.1798	0.1183 / 0.0109	-0.1142 / 0.0140	0.3073 / 0.0000	0.1325 / 0.0037	0.2366 / 0.0000	-0.1674 / 0.0003	1.0000			
Internet	(22)	-0.0745 / 0.1151	0.0900 / 0.0726	0.1647 / 0.0004	-0.0267 / 0.5668	-0.1346 / 0.0037	-0.0250 / 0.5907	0.5225 / 0.0000	-0.3830 / 0.0000	-0.2457 / 0.0000	1.0000		
IT	(23)	-0.0750 / 0.1126	0.0409 / 0.4150	0.0647 / 0.1651	-0.1164 / 0.0121	0.0451 / 0.3322	-0.1164 / 0.0121	0.5225 / 0.0000	-0.3830 / 0.0000	-0.3830 / 0.0000	-0.3830 / 0.0000	1.0000	
Trad. High-Tech	(24)	-0.0741 / 0.1171	-0.0007 / 0.9896	-0.2142 / 0.0000	0.1291 / 0.0055	0.1214 / 0.0089	-0.0527 / 0.2572	-0.6498 / 0.0000	-0.2523 / 0.0000	-0.1619 / 0.0000	-0.3704 / 0.0000	-0.1619 / 0.0005	1.0000
Time to Exit	(25)	-0.2507 / 0.0001	-0.2703 / 0.0000	-0.5909 / 0.0000	0.6457 / 0.0000	0.3706 / 0.0000	-0.1886 / 0.0035	-0.2963 / 0.0000	-0.1119 / 0.0850	-0.1810 / 0.0051	-0.0700 / 0.2823	0.1107 / 0.0884	0.0884

Notes: Pairwise correlations for the independent variables used in the regressions for 464 investment rounds into 290 entrepreneurial firms by 91 German venture capital funds. The second row for each variable denotes the level of statistical significance. FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. entrepreneur. The BALANCE SHEET SIZE variable measures the size of the balance sheet total whereby we use balance sheet data of the year preceding the year of the closing of the corresponding financing. The dummy AUDITED BALANCE SHEET takes value one if the firm's balance sheet is audited or not. We create two interaction variables: VC EXPERT*EARLY STAGE takes value one when the VC invests in an industry he states to have experience in, whereas the EARLY STAGE dummy takes value one for seed and start-up firms. We also create an interaction term between firms financed in the second period (1998-2000) and the EARLY STAGE dummy. We also know whether any of the founders has a background in engineering, which we code as SCIENCE BACKGROUND. If any of the founders has a PhD or a degree above, we code the variable RESEARCH DEGREE to take value one. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. The DUMMY VC MAJORITY indicates whether the VC has the majority of voting rights in the firm. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale is expected by the VC. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely from 1990 until 1997, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm. TIME TO EXIT measures the expected time to exit, as estimated by the VCs in their investment memorandi.

Table 12: The use of veto rights

| | All Veto Rights | | | | Structural Veto Rights | | | | Operational Veto Rights | | | |
| | Base Model | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
	β	z	β	z	β	z	β	z	β	z	β	z
Finished Product	.0775562	0.51	.3345413	1.57	.1507522	0.75	.3971648	1.57	.0525981	0.35	.0401944	0.19
Round	-.1039884	-1.52	-.181757	-2.16	-.0526071	-0.51	-.1055406	-1.04	-.1554284	-1.83	-.1722674	-1.76
FAR			.3454476	1.06			-.1923447	-0.57			.0728813	0.27
Repeat Entrepreneur			-.1008219	-0.46			.4618413	2.09			-.488756	-2.25
Audited Balance Sheet			-.658061	-2.51			-.4209744	-1.45			-.3297214	-1.40
VC Expert*Early Stage			.030526	0.11			.0410457	0.11			-.1656581	-0.63
Periode02*Early Stage			-.613905	-1.98			-.4701807	-1.38			-.4385698	-1.39
Independent VC	.4418892	2.15	.5999797	2.56	.1314195	0.47	-.2910333	-0.94	.7237478	2.87	1.141075	4.26
Public VC	-.3519354	-1.60	-.3210182	-1.15	-.8021558	-3.11	-1.096251	-3.42	.2479139	1.07	.5042928	1.77
Period 1	-.4628344	-2.70	-.8399836	-2.74	-.3250579	-1.47	-.4680691	-1.09	-.2929191	-1.65	-.5960352	-1.94
Period 3	.5277509	3.19	.205849	0.65	.514313	2.73	.3032977	0.88	.2860634	1.69	-.0774252	-0.23
Life Science	.1706588	0.48	.330463	0.74	.5164052	1.61	1.078426	2.56	-.1731282	-0.54	-.3843792	-0.91
Internet	.019738	0.05	.106179	0.16	.9398118	2.31	.6347658	1.14	-.3191376	-0.89	-.228669	-0.40
IT	.2117789	0.65	.3552583	0.85	.5998794	1.98	.8685371	2.49	.1810301	0.65	.153239	0.38
Trad. High-Tech	.1042226	0.30	.2307689	0.52	.1643135	0.53	.4614365	1.08	.1239838	0.42	-.0612172	-0.14
No of Obs.	267		184		401		254		298		197	
Wald /χ^2/F-Test	34.95		38.26		59.78		55.67		19.98		37.57	
Prob.	0.0001		0.0008		0.000		0.0000		0.0295		0.0010	
R^2	0.0482		0.0732		0.1427		0.1521		0.0383		0.0849	

Notes: Ordered probit regression with clustered standard errors clustered at firm-level. Dependent variable in model one and two are all VETO RIGHTS. In model 3 and 4, STRUCTURAL VETO RIGHTS is the dependent variable, while in model 5 and 6 it is the variable OPERATIONAL VETO RIGHTS. VETO RIGHTS is the sum of the following veto rights: OPERATIONAL VETO RIGHTS, STRUCTURAL VETO RIGHTS, VETO ASSET SALES, and the two veto rights against profit distribution, both for the board and for shareholders. OPERATIONAL VETO RIGHTS is the sum of the veto rights that govern the entrepreneur's actions in the firm: A veto right against changes in the firm's line of business, a veto right against certain financial decisions such as capital expenditures or the use of derivative instruments, a veto right against changes in the firm's head count and veto's against other decisions, i.e. against lawsuits on behalf of the firm. STRUCTURAL VETO RIGHTS is the sum of the veto rights that secure the VC's position in the firm: A veto right against changes in the shareholder's agreement, a veto that forbids the firm's dissolution and a veto against changes in the firm's capital structure such as giving out new shares. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. The FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total whereby we use balance sheet data of the year preceding the year of closing of the corresponding financing. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. We create two interaction variables: VC EXPERT*EARLY STAGE takes value one when the VC invests in an industry he states to have experience in, whereas the EARLY STAGE dummy takes value one for seed and start-up firms. We also create an interaction term between firms financed in the second period (1998-2000) and the EARLY STAGE dummy. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 – a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.

Table 13: The use of veto rights

| | All Veto Rights | | | | Structural Veto Rights | | | | Operational Veto Rights | | | |
| | Model 1 | | Model 2 | | Model 3 | | Model 4 | | Model 5 | | Model 6 | |
	β	z	β	z	β	z	β	z	β	z	β	z
Age	-.0001049	-0.01	.0006123	0.07	-.0014562	-0.27	-.0044083	-0.86	-.0022788	-0.38	-.0045343	-0.49
Round	-.0996004	-1.49	-.1999926	-2.40	-.0559065	-0.52	-.1555089	-1.42	-.1574665	-1.90	-.2026344	-2.14
FAR			.3829114	1.12			-.0578902	-0.15			.2033204	0.75
Repeat Entrepreneur			-.2069829	-0.92			.371398	1.45			-.5997309	-2.69
Audited Balance Sheet			-.5057246	-1.93			-.2138377	-0.69			-.2985893	-1.30
VC Expert*Early Stage			-.059061	-0.22			.0631199	0.18			-.2135025	-0.81
Periode02*Early Stage			-.4685228	-1.32			-.6892153	-1.67			-.3654291	-0.97
Independent VC	.4249837	2.07	.5263475	2.22	.1394297	0.48	-.414086	-1.27	.7042692	2.82	1.101394	4.04
Public VC	-.3494675	-1.55	-.3817853	-1.35	-.7792035	-2.91	-1.126014	-3.16	.2806706	1.21	.5108656	1.78
Period 1	-.4397657	-2.61	-.6953352	-1.95	-.4169182	-1.82	-.7637401	-1.56	-.3069154	-1.74	-.5370416	-1.47
Period 3	.5390434	3.14	.4371354	1.20	.5042752	2.60	.2111672	0.52	.2973196	1.73	.092585	0.23
Life Science	.2323438	0.62	.3162713	0.67	.3290272	0.95	.97304	2.08	-.1050635	-0.29	-.3022622	-0.68
Internet	.1221957	0.28	.3989005	0.62	.739286	1.65	.7854209	1.36	-.2656066	-0.68	-.1358946	-0.24
IT	.2473641	0.69	.3857274	0.84	.407612	1.21	.8632674	2.24	.1533247	0.48	.1540002	0.36
Trad. High-Tech	.2067846	0.56	.3896297	0.82	-.0022771	-0.01	.4097757	0.92	.1824972	0.55	.061368	0.13
No of Obs.	262		184		396		253		287		195	
Wald /χ^2/F-Test	36.15		40.39		67.06		60.49		19.28		42.55	
Prob.	0.0001		0.0004		0.0000		0.0000		0.0369		0.0002	
R^2	0.0461		0.0706		0.1381		0.1569		0.0356		0.0864	

Notes: Ordered probit regression with clustered standard errors clustered at firm-level. Dependent variable in model one and two are all VETO RIGHTS. In model 3 and 4, STRUCTURAL VETO RIGHTS is the dependent variable, while in model 5 and 6 it is the variable OPERATIONAL VETO RIGHTS. VETO RIGHTS is the sum of the following veto rights: OPERATIONAL VETO RIGHTS, STRUCTURAL VETO RIGHTS, VETO ASSET SALES, and the two veto rights against profit distribution, both for the board and for shareholders. OPERATIONAL VETO RIGHTS is the sum of the veto rights that govern the entrepreneur's actions in the firm: A veto against changes in the firm's line of business, a veto right against certain financial decisions such as capital expenditures or the use of derivative instruments, a veto right against changes in the firm's head count and veto's against other decisions, i.e. against lawsuits on behalf of the firm. STRUCTURAL VETO RIGHTS is the sum of the veto rights that secure the VC's position in the firm: A veto right against changes in the shareholder's agreement, a veto that forbids the firm's dissolution and a veto against changes in the firm's capital structure such as giving out new shares. The variable AGE represents the age of the firm when the corresponding financing round was closed. The variable ROUND indicates the round the investment is in. The FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total whereby we use balance sheet data of the year preceding the year of closing of the corresponding financing. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. We create two interaction variables: VC EXPERT*EARLY STAGE takes value one when the VC invests in an industry he states to have experience in, whereas the EARLY STAGE dummy takes value one for seed and start-up firms. We also create an interaction term between firms financed in the second period (1998-2000) and the EARLY STAGE dummy. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.

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Table 14: Liquidation Rights: Substitutes or Complements?

Put Option	No Staging	Milestones	Rounds	Mixes	No. of Obs
	Staging Types				
Pure Equity					
no	20	9	18	43	90
yes	6	1	4	9	20
Debt/Equity					
no	36	18	25	35	114
yes	7	7	3	16	33
Convertibles					
no	5	8	6	10	29
yes	0	0	1	2	3
Pure Debt					
no	39	10	8	33	90
yes	0	0	2	3	5

Notes: This table shows the relation of three types of liquidation rights: Staging, Debt and Put Options: The left hand side shows the use of certain types of securities used, including Debt-Equity Mixes and Pure Debt. For each type of security, the use of put options is analyzed, differentiated on the right by the type of staging encountered.

Table 15: Liquidation Rights: Substitutes or Complements II?

	Put Option	Debt	Staging
Put Option	1		
Debt	-0.0358	1	
Staging	0.0854*	-0.1310***	1

Notes: This table presents the pairwise correlations between the three liquidation rights used: Put-Options, Debt and Staging. Asterisks note the usual significance levels: * notes significance at the 10% level, ** at the 5% level and *** a at the 1% level.

Table 16: Relation of Exit Covenants and IPO Rights

Trade-Sale Rights	0	1	2	Total
	IPO Rights			
0	100	0	0	100
1	31	0	0	31
2	46	0	0	46
3	67	2	0	69
4	39	2	4	45
5	1	2	1	4
Total	284	6	5	295

Notes: Summary statistics for 464 investment rounds into 290 entrepreneurial firms by venture capital funds. The table describes the relation of the number of IPO rights to the number of trade-sale rights. There is a maximum of two IPO rights (Piggy Back Rights and Priority Registration rights) while there are five relevant trade-sale rights: Information Duty, Preemption Right, Drag Along, Take Along and Anti-Dilution Protection.

Table 17: The use of liquidation rights

	All Liquidation Rights								Staging and Puts							
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7		Model 8	
Finished Product	-.2818199	-2.22			-.0789464	-0.33			-.322948	-2.52			-.1364364	-0.58		
Age			-.0132683	-2.56			-.0197527	-2.51			-.0145466	-2.66			-.0595553	-2.20
Round	-.0437411	-0.57	-.0506219	-0.68	.0608622	0.54	.0469531	0.43	.0147855	0.19	.0091361	0.12	-.0205993	-0.17	-.0102302	-0.08
Balance Sheet Size					-1.76e-07	-2.18	-1.49e-07	-2.03					-4.68e-09	-0.06	5.31e-08	0.74
Audited Balance Sheet					-.1634991	-0.65	-.1390859	-0.68					-.219225	-0.79	-.1416006	-0.60
Research Degree					.5602041	2.67	.5603084	2.62					.4878743	2.13	.421271	1.81
Science Background					.2789979	0.57	.27977	0.56					-.2851738	-0.76	-.3304727	-0.89
Repeat Entrepreneur					.0694235	0.32	.1678627	0.77					.0816704	0.38	.1684991	0.78
Independent VC	-.1603681	-1.05	-.1531585	-0.98	.0826618	0.45	.1746609	0.95	-.0376153	-0.20	-.0420743	-0.22	.1643639	0.63	.1996473	0.70
Public VC	.2555192	1.41	.2712808	1.38	.6475027	2.51	.6819818	2.52	-.1421654	-0.61	-.1464382	-0.59	.2700757	0.85	.2022025	0.60
Period 1	.3122138	1.89	.2855595	1.66	.6151969	2.68	.5586334	2.43	.2090255	1.06	.1608935	0.80	.5682693	2.11	.4876969	1.83
Period 3	-.0663058	-0.48	-.1662728	-1.20	-.0209104	-0.11	-.1221174	-0.61	.2994518	2.10	.2268933	1.55	.4168039	1.93	.3568042	1.56
Life Science	.0235465	0.09	.04191	0.17	-.2906344	-0.79	-.5082034	-1.33	.3822829	1.50	.4109829	1.60	.1673864	0.39	.0476808	0.10
Internet	.1411267	0.48	-.0421569	-0.14	.6068494	1.20	.3107172	0.58	.4570404	1.57	.2336236	0.77	.3573001	0.59	.0263111	0.04
IT	-.0019738	-0.01	-.0476248	-0.21	.18236	0.53	-.0930828	-0.26	.319694	1.45	.3021786	1.31	.431194	1.14	.2757438	0.66
Trad. High-Tech	.245681	1.02	.2511263	0.99	.4351957	1.24	.2408789	0.68	.2005854	0.79	.2011384	0.74	.417999	1.01	.3079455	0.72
No of Obs.	378		370		183		181		378		370		183		181	
Wald /χ^2	24.66		27.32		47.27		54.19		21.56		19.15		21.35		32.49	
Prob.	0.0060		0.0023		0.0000		0.0000		0.0175		0.0385		0.1259		0.0055	
R^2	0.0404		0.0341		0.0738		0.0939		0.0290		0.0299		0.0600		0.0848	

Notes: Ordered probit regression with clustered standard errors at firm-level. The sum of all three liquidation rights (debt, staging, and put-options) is the dependent variable in models 1-4 and counts the number of liquidation rights available to the VC. The dependent variable in models 5-8 is the sum of staging and the presence of a put option. The variable AGE represents the age of the firm when the corresponding financing round was closed. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. The BALANCE SHEET SIZE variable measures the size of the balance sheet total whereby we use balance sheet data of the year preceding the year of closing of the corresponding financing. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. We also know whether any of the founders has a PhD or a degree above, we code the variable RESEARCH DEGREE to take value one. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998. PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.

Table 18: The determinants of the use of Exit Clauses (1)

	Finished Product						Age					
	Base Model		Model 2		Model 3		Base Model		Model 2		Model 3	
Finished Product	-.1493539	-1.01	-.1777154	-1.23	-.1015913	-0.54						
Age							-.0068243	-0.87	-.0098185	-1.28	-.0123546	-1.57
Round	.2448702	2.56					.2375311	2.64				
Trade Sale Expected			.5075072	3.30	.3897984	2.12			.4512147	2.93	.3815171	2.09
VC Majority			.8409748	4.07	.9818448	3.75			.8664037	4.02	.9619788	3.64
FAR					.0550433	0.12					.1218687	0.27
Repeat Entrepreneur					.0950303	0.48					.0588868	0.30
Audited Balance Sheet					-.08637	-0.37					-.0719711	-0.32
Periode02*Early Stage					-.0763358	-0.30					-.0248796	-0.10
Independent VC	.4722912	2.64	.6184688	3.37	.6229143	2.73	.6164872	3.60	.6060586	3.25	.6077544	2.35
Period 1	.6425947	3.75	.3875005	-1.76	-.3232705	-1.05	-.2892085	-1.45	-.3476953	-1.60	.5982201	2.61
Period 3	-.3408797	-1.71	.3849943	2.23	.2247681	0.81	.5806539	3.82	.3878917	2.13	-.2916226	-0.95
Growth Industries	.553442	3.79	.4082973	2.27	.6501846	2.53	.4770946	2.58	.4262085	2.26	.332903	1.21
No of Obs.	364		321		215		355		311		213	
Wald /χ^2/F-Test	118.23		119.97		96.82		112.07		116.80		100.11	
Prob.	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
R^2	0.0996		0.1312		0.1384		0.0957		0.1282		0.1359	

Notes: Probit regressions with clustered standard errors at firm-level. Dependent variable is the EXIT RIGHTS dummy. The EXIT RIGHTS dummy is the sum of the sale rights found in the sample, that is the sum of the dummy for the existence for an anti-dilution protection, the VC's preemption right dummy, the drag and take (tag) along dummies and finally the info duty dummy. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. The DUMMY VC MAJORITY indicates whether the VC has the majority of voting rights in the firm. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale can be expected. The FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total. We use balance sheet data of the year preceding the closing of the corresponding financing round. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. We create one interaction variable: firms financed in the second period (1998-2000) multiplied with the EARLY STAGE dummy, where the EARLY STAGE dummy takes value one for seed and start-up firms. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.

Table 19: The determinants of the use of Drag Along Clauses (1)

	Finished Product						Age					
	Base Model		Model 2		Model 3		Base Model		Model 2		Model 3	
Finished Product	-.1056257	-1.61	-.1104368	-1.56	-.1016556	-1.05						
Age							-.0034853	-1.01	-.0045966	-0.80	-.0057768	-0.82
Round	.089611	2.36					.0821099	2.29				
Trade Sale Expected			.1875073	2.37	.1384632	1.39			.1509936	1.86	.1251828	1.24
VC Majority			.4000446	4.41	.4404703	4.06			.4194826	4.58	.4438906	4.03
FAR					-.0141528	-0.08					.0252218	0.14
Repeat Entrepreneur					-.0398557	-0.44					-.0370144	-0.40
Audited Balance Sheet					-.0044946	0.04					-.0069318	-0.07
Periode02*Early Stage					.0207687	0.17					-.0130185	-0.12
Independent VC	.3949424	6.01	.3565347	5.18	.3483375	4.46	.3965937	5.79	.3484219	4.95	.359695	4.51
Period 1	-.2309599	-2.54	-.2388515	-2.18	-.1590632	-1.01	-.1941845	-2.19	-.2289167	-2.09	-.1882953	-1.25
Period 3	.2936513	4.28	.214134	2.69	.2466073	1.89	.2957613	4.15	.211407	2.53	.2323237	1.83
Growth Industries	.18853	2.47	.1578447	1.90	.2052938	2.01	.2006124	2.59	.1902331	2.22	.2184721	2.09
No of Obs.	400		350		233		391		338		230	
Wald /χ^2/F-Test	99.69		96.59		79.73		93.40		89.06		79.55	
Prob.	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
R^2	0.2969		0.3436		0.3662		0.2857		0.3430		0.3568	

Notes: Probit regression with clustered standard errors at firm-level. Marginal effects are indicated. Dependent variable is the dummy drag along that takes value one when staging takes place and 0 otherwise. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. entrepreneur. The DUMMY VC MAJORITY indicates whether the VC has the majority of voting rights in the firm. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale can be expected. The FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total. We use balance sheet data of the year preceding the closing of the corresponding financing round. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. We create one interaction variable: firms financed in the second period (1998–2000) multiplied with the EARLY STAGE dummy, where the EARLY STAGE dummy takes value one for seed and start-up firms. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998, PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.

Table 20: The determinants of the use of Take Along Clauses (1)

	Finished Product						Age					
	Base Model		Model 2		Model 3		Base Model		Model 2		Model 3	
Finished Product	-.0371301	-0.54	-.0581767	-0.82	-.01977	-0.20						
Age							-.0070012	-2.11	-.0102881	-1.59	-.0147067	-2.09
Round	.1318532	2.69					.1202826	2.60				
Trade Sale Expected			.1749809	2.26	.2130973	2.17			.3219158	3.64	.2223065	2.21
VC Majority			.3025094	3.44	.3481484	3.24			.1796909	2.23	.364598	3.28
FAR					.0207213	0.12					.0730563	0.42
Repeat Entrepreneur					-.029795	-0.31					-.040952	-0.43
Audited Balance Sheet					-.0636917	-0.60					-.0145504	-0.14
Periode02*Early Stage					-.1059925	-0.90					-.1418539	-1.23
Independent VC	.280087	3.90	.2227274	2.83	.1865285	2.05	.2559343	3.39	.1766432	2.11	.1748677	1.87
Period 1	-.172481	-1.90	-.2130919	-2.29	-.1654196	-1.28	-.1336817	-1.45	-.1872342	-1.96	-.2055021	-1.66
Period 3	.2592174	4.07	.2127675	3.10	.118354	0.95	.2787842	4.23	.2319495	3.25	.1298448	1.03
Growth Industries	.1759377	2.17	.1824792	2.14	.2794073	2.60	.1619359	1.93	.1869031	2.07	.2541989	2.35
No of Obs.	399		350		234		390		338		231	
Wald /χ^2/F-Test	89.48		64.65		48.84		85.95		59.02		48.04	
Prob.	0.0000		0.0000		0.0000		0.0000		0.0000		0.0000	
R^2	0.2029		0.2329		0.2388		0.1919		0.2318		0.2493	

Notes: Probit regression with clustered standard errors at firm-level. Marginal effects are indicated. Dependent variable is the dummy take (tag) along that takes value one when staging takes place and 0 otherwise. The variable FINISHED PRODUCT indicates whether the firm has a product that can be sold. The variable ROUND indicates the round the investment is in. entrepreneur. The DUMMY VC MAJORITY indicates whether the VC has the majority of voting rights in the firm. The DUMMY TRADE SALE EXPECTED indicates whether the VC thinks that a trade sale can be expected. The FIXED ASSET RATIO (FAR) indicates the ratio of fixed assets to balance sheet total. We use balance sheet data of the year preceding the closing of the corresponding financing round. The variable REPEAT ENTREPRENEUR captures whether we face a repeat entrepreneur. The dummy AUDITED BALANCE SHEET takes value one if the firms balance sheet is audited or not. We create one interaction variable: firms financed in the second period (1998–2000) multiplied with the EARLY STAGE dummy, where the EARLY STAGE dummy takes value one for seed and start-up firms. We classify each VC according to his type into three categories named INDEPENDENT VC, PUBLIC VC and OTHER VCs. The latter category includes both bank(-dependent) and corporate VCs. Also, we observe the year when the financing round is closed and define three time dummies. PERIOD 1 takes value one if the financing round was closed during the early period of relatively low venture capital activity, namely before 1998. PERIOD 2 if it was closed during the boom, i.e. between 1998 and 2000 and PERIOD 3 if it was closed after 2000 - a period of relative decline and reorganization of the venture capital industry. Moreover, we observe the firm's industry: LIFE-SCIENCE, INTERNET, IT/TELECOM, TRADITIONAL HIGH-TECH INDUSTRIES and OTHER INDUSTRIES are all dummy variables that indicate the project's industry. The dummy GROWTH INDUSTRIES is a dummy variable that indicates whether the firm's industry is research intensive, that is whether it is a Biotech, IT/Telecoms or a Traditional High-Tech firm.