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German Venture Capitalists Different?
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Non-technical Summary

The paper analyzes the behavior of venture capitalists in Germany and their exit via initial public offerings (IPOs). It is based on a unique hand-collected database of all venture-backed IPOs on Germany's *Neuer Markt*. Particularly, the history of the pre-IPO venture capital financing and the venture capitalists' selling activities in the course of IPOs are examined.

We look at the differences between German and non-German VC firms in detail. German venture capitalists strongly prefer German firms to companies from abroad. The sectoral structure of their portfolios differs from that of foreign venture capital firms. They back significantly smaller offerings with a lower capital increase at the IPO. The pre-IPO and post-IPO shareholdings of the group of venture capitalists are lower and their selling intensity at the IPO is higher when a German firm is the lead venture capitalist. Non-German VC firms employ significantly more investment rounds before they take their portfolio firms public, they invest in firms in earlier stages and finance them longer than German venture capitalists. They also syndicate more. German venture capitalists commit themselves to hold their shares after the IPO for longer periods than venture capital firms from abroad.

The differences in the fundraising process, experience and reputation of German venture capital firms deliver hints for the explanation of some of these issues.

Is the Behavior of German Venture Capitalists Different? Evidence from the *Neuer Markt*

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Abstract: Using a unique, hand-collected database of all venture-backed firms listed on Germany's *Neuer Markt*, we analyze the history of venture capital financing of these firms before the IPO and the behavior of venture capitalists at the IPO. We can detect significant differences in the behavior and characteristics of German vs. foreign venture capital firms. The discrepancy in the investment and divestment strategies may be explained by the grandstanding phenomenon, the value-added hypothesis and certification issues.

German venture capitalists are typically younger and smaller than their counterparts from abroad. They syndicate less. The sectoral structure of their portfolios differs from that of foreign venture capital firms. We also find that German venture capitalists typically take companies with lower offering volumes on the market. They usually finance firms in a later stage, carry through fewer investment rounds and take their portfolio firms public earlier. In companies where a German firm is the lead venture capitalist, the fraction of equity held by the group of venture capitalists is lower, their selling intensity at the IPO is higher and the committed lock-up period is longer.

JEL Codes: D82, G24, G32

Keywords: Venture Capital, IPO, Lock-up, *Neuer Markt*

1 Introduction

This paper deals with the behavior of venture capitalists in Germany and their exit via initial public offerings (IPOs), which are generally considered to be the most profitable divestment channel of venture capital firms (see e.g. Bygrave and Timmons, 1992 and Gompers, 1995). Another reason for our focus on this exit channel is the easy access to data on venture-backed IPOs in Germany (compared to venture-backed firms that stay private). The main sources of information are issuing prospectuses of firms going public. They contain information on the firm, the structure of its pre-IPO financing and the preplanned features of the offering. Our analysis is based on a unique hand-collected database of all venture-backed IPOs on Germany's *Neuer Markt* throughout its short, but very turbulent history. The enormous increase in the venture capital (VC) investment activities in Germany came along with the setting up of the *Neuer Markt* in March 1997. However, after a remarkably positive development, particularly in the second half of 1999 and the first half of 2000, the issuing activities on Germany's *Neuer Markt* stopped almost completely in the second half of 2001. Between August 2001 and December 2002 only one firm went public on Germany's *Neuer Markt*. The *Nemax 50* index fell during one and a half years by more than 90 %. Finally, the *Neuer Markt* was closed in June 2003.

We examine the history of the venture capital financing of firms listed on the *Neuer Markt* and analyze the venture capitalists' selling activities in the course of IPOs. Venture capitalists maintain their shareholdings beyond the IPO. Unfortunately, it is not possible to document the development of the capital structure after the IPO with high accuracy. The available databases are very imprecise and contain gaps. To our knowledge it is impossible to find out how the divestment process of venture capitalists in Germany continues after the IPO and the expiration of the lock-up period. Therefore, we concentrate on the in-

vestigation of the pre-IPO venture capital financing and the behavior of venture capitalists at the IPO.

The existing empirical research on the venture capitalists' exit decisions in Germany and Europe is limited. It may be divided into two main areas. On the one hand, there are several papers that compare venture-backed and non venture-backed IPOs: Franzke (2001), Kraus (2002) and Mayer (2001) deal with the underpricing on Germany's *Neuer Markt*; Bottazzi and Da Rin (2001) look at the differences in e.g. corporate growth and funds raised (data for European firms); Audretsch and Lehmann (2002) demonstrate differences in growth and the structure of balance sheets for companies on Germany's *Neuer Markt*. These studies use publicly available data. On the other hand, there is empirical research based on an individual data collection via e.g. questionnaires designed for that purpose. This approach makes it possible to consider other exit channels for which publicly available data do not exist. The determinants of the choice of a particular exit channel by the venture capitalists (trade sale, IPO, liquidation) are analyzed by Schwienbacher (2001) and Cumming (2002). Our paper is based on publicly available data but does not deal with the comparison of venture-backed and non venture-backed IPOs. It considers the differences within the group of venture-backed IPOs.

Our contribution to the empirical research is threefold. Firstly, we collected a unique database of the pre-IPO venture capital financing of all venture-backed IPOs on the *Neuer Markt* in Germany from its foundation in 1997 to its closing in 2003. Our hand-collected database of venture-backed IPOs and their financiers consists of information from several sources. We offer a detailed set of descriptive statistics of venture-backed IPOs on Germany's *Neuer Markt*. Hereby, we distinguish between 3 different definitions of "venture capital" - broad, narrow and pure definitions.

Secondly, we look at the following less explored research topics:

- The venture capitalists' decision on exit timing.
  Venture-backed firms go public after having been financed by venture capital for different time horizons, after a different number of investment rounds and in different stages of their firms' lives. We identify the main determinants of the duration of the pre-IPO venture capital financing in Germany.

- The consideration of the IPO as a "partial" exit.
  Venture capitalists usually exit only partially at the IPO and commit themselves to hold part of their shares for several months beyond the IPO (lock-up). There are large differences in the level of these post-IPO shareholdings and the length of the committed lock-up period among venture capitalists. We investigate how the decision on the lock-up level is related to the timing of the IPO and the features of the VC financing.

Thirdly, we demonstrate significant differences in the investment patterns and the characteristics between German and non-German VC firms. Lower equity holdings, smaller average offering size and shorter financing periods, which characterize German venture capitalists in our sample, might be explained by the grandstanding phenomenon theoretically derived by Gompers (1993) and empirically analyzed by Gompers (1996). According to the grandstanding hypothesis, younger VC firms take their portfolio firms public earlier (after shorter financing periods) than established VC firms, in order to increase their reputation and be able to attract capital for new funds. Since German VC firms are typically younger and smaller than foreign firms investing in Germany, Gompers' hypothesis could offer an explanation for their investment patterns.

Another explanation for some of the differences in the investment and divestment strategies of German and non-German VC firms is based on a value-added hypothesis. Venture capitalists offer a combined provision of capital and managerial experience (see e.g. Casamatta, 2003). They monitor strategic and managerial decisions, tend to take

an active role in advising the firm and providing it with valuable business contacts. Most of German VC firms are very young whereas the majority of VC firms from abroad are established companies with experience. After building-up or restructuring a portfolio company, the capabilities of young VC firms with low experience to add value through further management support are lower than that of experienced venture capital firms. Hence, inexperienced VC firms may want to exit earlier since, after a certain period, their comparative advantage to potential new investors is not very high whereas experienced VC firms may prefer to exit later (see Tykvová, 2003 for a theoretical model). While increasing the value of the portfolio firm over a longer horizon, experienced VC firms can substantially raise its valuation. Young VC firms may prefer to turn their shares into cash earlier and invest it in other firms to which they can add more value. Because of their relatively little experience, they may prefer to invest in companies in a later stage in which the needs for the non-monetary contribution by the venture capitalists are lower than in younger firms. Thus, the value-added hypothesis helps explain the shorter investment durations and the later stage focus by German venture capitalists. It may also serve as an explanation for the different sectoral structure of the portfolios of German and non-German VC firms.

Both the grandstanding and the value-added hypotheses probably play a role in explaining the differences between German and non-German VC firms. To distinguish between them, we would have to take a closer look at the fundraising process of German venture capital firms and the role that reputation plays here. Fundraising in Germany is, for a large part, organized differently and it seems likely that it does not play such an important role as in the US, since in Germany the large fraction of funds are not independent private funds but rather subsidiaries of insurance companies and banks and often organized as public-private partnerships (see Bascha and Walz, 2002). Such institutional arrangements may result in an easier access to new funds.

German venture capitalists use lock-up periods that are longer than prescribed by the *Rules and Regulations Neuer Markt* ("Regelwerk Neuer Markt") more often than foreign VC firms. We argue that the reason for this is that foreign VC firms have a higher reputation at stake. Their presence helps certificate the quality of their portfolio firms. German VC firms are younger and smaller, and thus may want to signal quality by locking themselves in for a longer period of time. In a seminal paper on signaling as a means of information transfer between the insider and the uninformed new investors, Leland and Pyle (1977) show that the insider's willingness to retain shares can serve as a signal of the project quality. Brav and Gompers (2003) demonstrate that in the US insiders of firms that are associated with greater potential for moral hazard lockup their shares for a longer period of time. Hence, signaling and certification issues may offer an additional explanation for the differences between German and non-German VC firms.

We employ descriptive statistics, hazard rate models and Tobit regressions to study the venture capitalists' behavior. The structure of the rest of the paper is as follows: section 2 will offer a short overview of the data, descriptive statistics on a wide set of variables will be presented in section 3 and regression results will be reported in section 4. Section 5 will discuss the relevance of the value-added, the grandstanding and the certification hypotheses for our data. Finally, section 6 will conclude. When appropriate, we compare our results to the outcomes of other empirical studies which are based on US data.

2 Data sources

Our analysis of the venture capitalists' behavior is based on a unique hand-collected database of venture-backed IPOs on Germany's *Neuer Markt*. We obtained the data from several sources. The information on the development of the structure of the firms' equity, the duration

and history of the VC financing before the IPO, the committed lock-up period, the firm characteristics (e.g. age) and the preplanned offering features (offering size with distinction between old and new shares, available greenshoe, etc.) was collected from the listing prospectuses of the companies. Sometimes the listing prospectus did not contain a detailed description of the development of the firm's equity structure. In those cases, the *VentureXpert* database was searched through for missing data on the VC financing. From the *Deutsche Börse AG*, we received data concerning the IPO (e.g. date of the IPO, offer price, first price, exhausting of the greenshoe, the classification of the branch, names of Designated Sponsors[2] and underwriters, etc.). All financial data before 1999 were converted into Euros. We considered only "real" IPOs. Hence, we excluded firms that were listed on another exchange when going public on Germany's *Neuer Markt*.

In its short history, there were 327 IPOs on Germany's *Neuer Markt*. Based on the indication by the *Deutsche Börse AG*, that provided us with a database of venture-backed IPOs, nearly 55 % of them (179 companies) were venture-backed. We refer to the indication by the *Deutsche Börse AG* as the **broad** definition of VC. Using a narrower definition of VC (firms affiliated at a venture capital association), we could indicate 139 (42.5 % of all IPOs) venture-backed IPOs (hereinafter denoted by: **narrow** definition of VC). However, when we excluded the financiers who were engaged only in bridge financing[3] from this group, 86 issuers (26.3 %) remained (**pure** VC). The number of IPOs for the different definitions of VC, sorted by year, is reported in table 1.

The shareholder structure (prior to and immediately after the IPO) and, hence, the venture capitalists' fraction of equity and number of shares held were found in the listing prospectuses (for each venture

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[2]Each share on the *Neuer Markt* should have at least two Designated Sponsors. Their main task is to provide liquidity for the trading of this security.

[3]When the VC financing started less than a year before the IPO and, simultaneously, more than two years after the firm's foundation, we labelled it as bridge financing.

capitalist). For each firm, we collected the data on the venture capitalists' shareholdings for all three definitions of venture capital. The VC firm which held the largest share of the equity prior to the IPO was labelled the lead venture capitalist.

The data on venture capitalists (fund and VC firm size, affiliation(s), age) were brought together from various sources: The *VentureXpert* database, the directories of the German, European and US venture capital associations (*BVK*, *EVCA*, *NVCA*) and Webpages of VC firms on the Internet. The reputation coefficient is based equally on the size and the age of the VC firm.

The reputation of an underwriter depends on his activities as the leading underwriter (the number of new issues on the *Neuer Markt* and their volume in the previous period) and is determined yearly. The reputation of a designated sponsor is based equally on the number of his mandates on the *Neuer Markt* and on his rating by the *Deutsche Börse AG* in the preceding period and is set up quarterly.

In what follows, we will present our results separately for each of the three groups mentioned above. When appropriate, we will compare our findings from the German market to that of the US. The comparison will be based on the results by Megginson and Weiss (1991), resp. Barry et al. (1990). These papers will hereinafter be denoted by MW, resp. BM.

3   Descriptive statistics

We divide the firms into two subgroups depending on whether or not the lead venture capitalist is German. For both of these subgroups and for each of the three definitions of VC, table 3 presents descriptive statistics (mean, number of observations) on a number of variables concerning the characteristics of the firms (Panel A) and the IPO (Panel B), the pre-IPO venture capital financing (Panel C) and the venture capitalists' behavior at the IPO (Panel D). We will discuss

Panels A and B in subsection 3.1 and Panels C and D in subsection 3.2. We conduct a standard t-test to analyze differences in means between the two subgroups. Especially in cases where samples are small and the underlying distributions are not normal, it may not be appropriate to compare means. Therefore we also use the Wilcoxon-Mann-Whitney test to analyze the equality of medians. The list of all dummy variables mentioned in the paper can be found in table 2.

3.1 The characteristics of the firms and the IPO

On average, the firms in our sample are 11.6 years old when they go public (12.1 for the narrow definition, 11.9 for pure VC), compared to 8.6 years in the US (see MW). Companies in which a German firm is the lead venture capitalist are younger when going public than firms backed by lead VC firm from abroad. The difference, however, is not significant. For the broad definition of VC, 41 firms (22.9 %) belong to the internet industry, 34 (19.0%) to technology, 22 (12.3 %) to software and the same number to biotechnology, medical technology & health care, 21 (11.7 %) to IT services, 19 (10.6 %) to media & entertainment, 10 (5.6 %) to telecommunications, 8 (4.5 %) to industrials & industrial services and 2 (1.1 %) to financial services. In that part of their portfolio which they take public on the *Neuer Markt*, lead VC firms from Germany have a lower fraction of internet and software firms, compared to lead venture capitalists from abroad, whereas the share of firms from the branches media & entertainment and IT services is higher. The differences in the representation of the branches internet, software and media & entertainment are significant only for one definition of VC and then only at the 10 % significance level. The difference for IT services is significant twice, at the 5 % and at the 10 % level.

The majority of venture-backed firms that go public on the *Neuer Markt* are located in Germany (84.9 % for the broad definition of VC). Logically, for all three definitions of VC, the portfolio of German

venture capitalists consists of a significantly larger fraction of German firms than the portfolio of foreign VC firms (at the 1 % significance level).

For the broad definition, the average size of a firm (nominal share capital) after the capital increase via IPO is 9.27 Mil. Euros. The average book value before the IPO is 6.12 Mil. Euros and the average market value at the IPO reaches 278.3 Mil. Euros. Firms backed by a lead VC firm from Germany are smaller. Particularly the difference in the market values is highly significant (for the broad and narrow definitions). Book-to-market ratios are not significantly different.

For broad and narrow definitions of VC, the offering size of firms backed by a lead VC firm from Germany is significantly smaller, both in shares and in Euros. The average number of shares offered at the IPO is 2.59 Mil.; the average market value of the offering reaches 53.4 Mil. Euros (for the broad definition of VC; without greenshoe). In firms backed by lead venture capitalists from Germany, the fraction of old shares on the total offering is higher, although not significantly. For all venture-backed firms it reaches 21.0 %.

The available greenshoe in shares and in Euros, the relative available greenshoe (in % of the total offering) and the used greenshoe in shares and in Euros are significantly higher for firms backed by a non-German VC firm. The offer price and the first price do not differ significantly. For all three definitions of VC, the average underpricing[4] is higher for firms backed by lead venture capitalists from Germany. However, the difference is not significant in either case.

3.2 The pre-IPO venture capital financing and the behavior of VC firms during the IPO

The descriptive statistics on the variables discussed in this subsection can be found in Panels C and D of table 3. The pre-IPO venture

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[4]Underpricing is defined as: (first price - offer price)/offer price $* 100$ %.

capital financing lasts 19.7 months on average (18.2 for the narrow definition, 28.9 for pure VC). For the broad and the narrow definitions of VC, the German venture capitalists take their portfolio firms public significantly earlier than their non-German counterparts.

One important feature of venture capital financing is staging. The firms do not receive the entire investment sum at the beginning, but rather in stages corresponding to significant developments in the life of the company (e.g. the development of a prototype, the first production, etc.). The capital invested at each point should be sufficient to bring the company to the next stage of its development. The venture capitalist's option to stop the financing helps mitigate agency costs. In our sample, lead venture capitalists from abroad carry through significantly more investment rounds on average than venture capitalists from Germany (for the broad and the narrow definition of VC), providing their portfolio firms more often with fresh capital, before they take their portfolio firms public.

Syndication with other venture capitalists improves the portfolio diversification of a VC firm which can, with a limited amount of resources, participate in more projects. Additionally, Brander, Amit, and Antweiler (2002) confirm that syndicated projects offer higher returns than projects that are financed by only a single venture capitalist. Between 51.1 - 56.2 % (depending on the VC definition) of the firms in our sample are financed via a syndicate of several VC funds. Table 4 shows the distribution of the number of VC funds per firm. The average number of VC funds in a venture-backed firm at the IPO is 2.7 for the broad definition (2.3 for the narrow definition, 2.4 for pure VC) compared to 3.0 in the BM sample. When we consider only funds of different VC companies as a syndicated investment, only between 40.5 - 51.7 % (depending on the VC definition) of investments are syndicated. The results differ significantly between German and non-German VC firms. Lead venture capitalists from Germany syndicate less. For foreign VC firms, the syndication at the funds' level

reaches 72.0 % and the average number of VC funds in a company is 3.8 whereas in firms where a German venture capitalist is the lead investor, only 44.7 % of investments are syndicated and the average number of venture capital funds is 1.9 (broad definition). The difference between foreign and domestic lead investors for both variables, the number of VC funds and the number of VC firms per portfolio company, is significant for all definitions of VC. For broad and narrow definitions, the non-German VC firms start their investments in significantly earlier firm stages than German venture capitalists.

Typically, the venture capitalists take concentrated equity positions. In our sample, the broad group of VC firms owns 32.0 % (the narrow definition: 26.0 %, pure VC: 29.6 %) of the pre-IPO equity of the issuer on average. This is slightly less than in the US where venture capitalists hold 36.6 % (MW), resp. 34.3 % (BM). In our sample, large differences between non-German and German venture capitalists exist (for the broad and the narrow definition of VC). The average pre-IPO share of a group of venture capitalists under a lead VC firm from abroad amounts to 38.3 %, 32.6 %, resp. 32.8 % for broad, narrow, resp. pure VC and, hence, is similar to the results presented by BM and MW; whereas if a lead venture capitalist is a German firm, the venture capitalists' share on the equity is significantly lower. The fraction of firms in which the group of venture capitalists' holds large equity positions (50% of equity and more) prior to the IPO is significantly larger in the subsample of lead VC firms from abroad. For the broad definition of VC, this fraction amounts to 29.3 % for foreign and 10.7 % for German venture capitalists. MW report 28 % and BM 24.4 % for the US (see table 5). If we consider the narrow, resp. pure definition, this share further reduces to 17.5 %, resp. 12.8 % for foreign VC firms and to 6.6 %, resp. 10.8 % for lead venture capitalists from Germany.

We can document significant differences in the total pre-IPO venture capitalists' holdings between the two subgroups. However, the respec-

tive shares of the single lead venture capitalists are not significantly different. The explanation of this phenomenon is that lead venture capitalists from Germany syndicate less and, hence, the holdings of a group of venture capitalists are lower, in spite of the fact that there are no significant differences in the shareholdings between single lead VC firms in both groups.

The venture capitalists maintain their investment beyond the IPO. After the IPO (and the capital increase), they retain 18.6 % (the narrow definition: 14.4 %, the pure VC: 16.2 %) of shares and, on average, they even increase their shareholdings during the IPO. This result, however, is influenced particularly by one firm where the venture capitalists massively raise their shareholdings (more than 150 times!). In 10 out of 179 firms (broad definition), the venture capitalists' shareholdings increase during the IPO (see table 6). The increase in shareholdings is typically due to the conversion of convertible securities at the IPO. If we consider only shares owned by the venture capitalists prior to the IPO, they retain 76.2 % of them beyond the IPO on average. When the lead VC firm is German, the group of venture capitalists sells a larger fraction of the pre-IPO holdings at the IPO on average. The difference is significant only for the broad definition. The behavior of the VC firms in the US, documented in MW, is very different: Here, the venture capitalists sell only about 8 % of their pre-IPO holdings at the IPO. In the majority of firms in the US (56.7 %), the venture capitalists do not sell any shares at all during the IPO whereas in Germany this is true in only less than 30 % of the cases (without significant differences between firms backed by a German vs. non-German lead venture capitalist).

If we consider only firms in which venture capitalists sell some or all of their old shares at the IPO, we can detect significant differences in the fraction sold by the VC firms between companies where a German VC firm is the lead venture capitalist and firms in which a foreign VC firm holds the largest share. When backed by a lead VC firm from

Germany, a significantly higher fraction of old shareholdings is sold by the VC firms at the IPO.

The lock-up period prescribed by the *Rules and Regulations Neuer Markt*, in which old investors are not allowed to sell their old shares, lasts six months. However, in more than 40 % of venture-backed firms, some or all old investors commit themselves not to sell their shares for a period longer than six months. There are significant differences between both subgroups. German VC firms employ a longer lock-up period in every second firm, whereas lead venture capitalists from abroad do this in only every third to fourth firm.

We divide the history of Germany's *Neuer Markt* into three periods. The starting phase with a low issuing activity, from the launching of this market segment in March 1997 to the end of February 1999, is classified as a cold issue period. The time horizon between March 1, 1999 and November 30, 2000, in which the number of firms going public and prices exploded, is the only hot issue period. Afterwards the prices and issuing activities crashed down and have never recovered. Thus, the period since December 1, 2000 is labelled a cold issue period. The IPOs in our sample are heavily concentrated in the hot issue phase. More than 76 % of the firms in our sample went public in this phase. There are no significant differences in the timing of the IPO in hot and cold issue periods between German and non-German venture capitalists.

Large economically and statistically significant differences between the investment patterns of German and foreign VC firms exist. However, among pure venture capitalists, the similarities between both subgroups increase substantially. Here, the only significant differences are in the preference for domestic firms, the greenshoe level, the post-IPO share of venture capitalists as a group, the length of the committed lock-up period, the syndication and the fraction of software firms in the portfolio.

We can detect significant differences not only in the behavior but also in the features of the German and non-German VC firms. The former are typically younger and smaller. We compute a reputation coefficient based on the age and size of the VC companies. The summary results are shown in table 7. The reputation scale ranges from 1 to 5, where 1 is the best and 5 the worst reputation. The age and the size are both given an equal weight of 50 %. German VC firms have a significantly higher reputation coefficient (=lower reputation) than foreign venture capitalists. A large part of investments from foreign VC firms is concentrated in the hands of 3i Group plc and its subsidiaries. They are by far the most frequent financier in our sample. They are the lead VC firm in 11.2 % (18.0 %, 23.8 %) of the venture-backed companies listed on Germany's *Neuer Markt*. Together, as a lead VC investor or as a part of the financing consortium, 3i holds shares of 32 firms in our sample of venture-backed firms (broad definition).

4   Regression Results

4.1   Timing of the IPO

We next explore the determinants of the duration of the pre-IPO venture capital financing in a multivariate regression approach. For each of the three definitions of VC, we conduct a hazard rate analysis to model the duration between the first venture capitalist's equity holdings and the IPO, employing two commonly used parametric models (Weibull and exponential) and one semi-parametric model (Cox proportional hazard model). The advantage of the semiparametric model is that it involves minimal distributional assumptions (Cox, 1972). The description of these models is presented in Appendix. All three models deliver very similar results. It is a good indicator of the robustness of these estimations.

Differences in the consulting intensity of projects as well as in the venture capitalists' experience and their impact on the duration of the pre-IPO venture capital financing have been modelled theoretically by Tykvová (2003). One of the empirical implications of this model is that more experienced venture capitalists finance their portfolio firms longer before they bring them public than less experienced VC firms. In the estimations here, we use the German VC dummy and, alternatively, the reputation coefficient as proxies for experience. Due to differences in the demands for venture capitalists' consulting services, we expect differing lengths of the pre-IPO venture capital financing periods among industries. Therefore, dummy variables for industries are included in the regressions.

Firstly, we estimate the models with a large matrix of dependent variables ("full" models). This matrix consists of a quality variable (market-to-book ratio) and a set of dummy variables for industries, domestic dummy, German VC dummy and start-up dummy (results not reported here). With the help of the Akaike information criterion we then determine the optimal size of the matrix of explanatory variables. For every single definition of venture capital, the appropriate variables resulting from the use of the Akaike information criterion are the same in all three model specifications (Weibull, exponential and Cox). For the broad definition of VC, the following dummy variables are included: German VC, start-up and three of the branches dummy variables. For the narrow definition, the dependent variables are nearly the same as for the broad definition, with the exception of one of the branches dummy variables that is removed. For pure VC, only two variables (branches dummy variables) remain.

We report regression outcomes in table 8. Our results provide further evidence for the different behavior of German venture capitalists. The German VC dummy belongs to the regression (except for pure VC) and its coefficient is always positive at a high significance level. German VC firms finance their portfolio firms for shorter periods before

they take them public. If we, in spite of the Akaike criterion, included this variable to the estimations for pure VC, its coefficient would have the same sign as in the regressions for broad and narrow definitions but would not be significant. Firms from the branches internet and media & entertainment are financed for significantly shorter periods. For broad and narrow definitions of venture capital, the investment in a start-up company leads to longer financing periods. Additionally, the telecommunications firms are taken public earlier (broad definition).

Simple OLS regressions lead to similar results as the hazard rate models discussed above. For all three definitions of venture capital, the variables included (here, as well, Akaike criterion is used) and their coefficients' signs are exactly the same as in the hazard rate models and are not reported here.

If we employ the reputation coefficient instead of the German VC dummy in the hazard rate models, we obtain similar results. We proceed as before, letting all other variables in the "full" models stay the same. For each definition of VC and each approach, we use the Akaike criterion to determine the appropriate size of the matrix of dependent variables. All dependent variables (with the exception of the German VC dummy that we have removed) that are in the reduced models described above, stay here as well. Their coefficients have the same signs and very similar magnitudes (not reported here). Instead of the removed German VC dummy, the domestic dummy is included for the broad definition. Its coefficient is positive, as expected, but not significant. For the narrow definition, the inclusion of two additional variables is suggested: the domestic dummy and the reputation coefficient. Their coefficients are both highly significant with expected signs: German firms are taken public earlier. Firms backed by a lead VC firm with a higher reputation are financed longer. For pure VC, exactly the same variables as above are included in the reduced model when the reputation coefficient, instead of the German VC dummy, is considered in the "full" model.

4.2 Extent of the venture capitalists' exit

The VC firms maintain their investment beyond the IPO. In this section, we model the extent of the venture capitalists' exit at the IPO and their post-IPO shareholdings on the firm level. Firstly, we look at the selling activities of the group of venture capitalists at the IPO. Secondly, we examine the determinants of the extent of the post-IPO venture capitalists' holdings.

In the first part, in which the selling activities of the venture capitalists during the IPO are modelled, the pre-IPO holdings of the group of venture capitalists are taken as benchmark. The dependent variable is the fraction of these holdings retained beyond the IPO. It lies between 0 (when all venture capitalists sell their complete shareholdings at the IPO and, thus, the fraction of old shares retained is 0) and 100 % (when none of the venture capitalists sells any shares). We use Tobit regressions to explore the determinants of the fraction of shares retained. Particularly, we are interested in the impact of the market, firm, IPO and venture capitalists' characteristics and the role of the reputation of Designated Sponsors and leading underwriters. For each definition of VC, we run 10 regressions with different dependent variables.

If we suppose that venture capitalists prefer investing in young companies to which they can add a large value (instead of maintaining their investments in more mature companies that are already listed), we conclude that the venture capitalists' participation beyond the IPO is costly and that they prefer to exit as soon as possible. In this case, the reasons why venture capitalists do not sell all their shares at the IPO are the asymmetric information and uncertainty. The potential new investors expect that venture capitalists as insiders retain a fraction of their shares in order to signal the quality of the firm (see e.g. Allen and Faulhaber, 1989 and Tykvová, 2003). According to this hypothesis, factors that reduce uncertainty and diminish the information asymmetry and / or increase the optimism of the potential new investors

should decrease the fraction retained by the venture capitalists. Thus, the higher the opacity of the firm and the greater the uncertainty, the larger the fraction retained.

For this reason, we assume that a hot issue market may induce larger selling activities due to the optimism of potential investors. The uncertainty, for which the width of the bookbuilding range, the market value and the age of the firm are used as proxies (a wider bookbuilding range, smaller or younger firm imply a larger uncertainty), should have a positive impact on the fraction of shares retained. A high reputation of venture capitalists, Designated Sponsors and underwriters may certify the firm quality and thus diminish the uncertainty (see e.g. Booth and Smith, 1986 or Megginson and Weiss, 1991). The syndication of more venture capitalists and longer pre-IPO financing periods should reduce uncertainty as well. Therefore, the necessity to signal the firm quality should be reduced and, thus, the impact on the fraction of shares retained by the venture capitalists negative.

Up to now, we assumed that post-IPO shareholdings incur cost for the venture capitalists. However, if the venture capitalists expect the revenues on the *Neuer Markt* to be sufficiently high, they may prefer to profit from rising prices and not to sell their shares.

In our data, we can find confirmation for both hypotheses. When the venture capitalists expect rising share prices (in hot issue markets) and a high liquidity (Designated Sponsors with a high reputation), they retain significantly larger fractions of shares. In younger firms and in firms for which the reputation of the lead underwriter(s) is low, the fraction sold by the venture capitalists at the IPO is smaller. Table 9 provides the results of Tobit regressions for the determinants of the fraction of old shares retained by the group of venture capitalists beyond the IPO. Taking into account that the observations are not independent, the robust variance is estimated using the Huber-White-sandwich estimator employing two different approaches: (i) allowing any structure of not independent observations and (ii) allowing not

independent observations only within predetermined clusters, based on market situation (hot vs. cold market) and industry.

In the hot issue phase, the venture capitalists retain a significantly larger fraction of their old shareholdings beyond the IPO (highly significant for broad and pure definitions, for the narrow definition only weak evidence), probably in order to profit from the expected increase in share prices. The width of the bookbuilding range has no effect. A higher firm age at the IPO reduces information asymmetry and uncertainty. Thus, the venture capitalists sell a larger fraction of their shares. The good reputation of Designated Sponsors increases the fraction retained. This finding might be explained by the venture capitalists' expectations that high-quality Designated Sponsors guarantee sufficient liquidity. Hence, they offer an opportunity for the venture capitalists to participate on the expected increase in share prices on the one hand as well as on the other hand make an unproblematic sale of their shares possible whenever the venture capitalists may need cash in the future. We also find evidence that high-quality underwriters certificate the companies and allow the venture capitalists to sell a significantly larger fraction already at the IPO. When the lead VC firm is from Germany, the group of venture capitalists retains a significantly lower fraction of its old shares beyond the IPO compared to firms in which the lead venture capitalist is from abroad (for the broad definition of VC). The longer the duration of the committed lock-up period, the larger the extent of the lock-up. The market value has a significant positive impact on the fraction retained (for narrow and pure definitions).

The results from the second group of regressions (dependent variable: fraction of firm held by the venture capitalists' after the IPO) show in the same direction. Here, as well, we use Tobit model and conduct 10 regressions for each definition of VC. The robust variance is estimated using the same estimators as in the first part. The results are depicted in table 10. The venture capitalists take larger equity posi-

tions during the hot issue phase and in larger firms. For the broad definition, the impact of the length of the committed lock-up period on the post-IPO shareholdings is significantly positive. The firm age has a negative impact. For broad and narrow definitions, a higher reputation of Designated Sponsors increases the post-IPO shareholdings of venture capitalists. When the lead VC firm is from Germany, the group of venture capitalists takes a less concentrated equity position compared to firms in which the lead venture capitalist is from abroad. The pre-IPO shareholdings have a significant impact on the post-IPO shareholdings. Syndication sometimes has a significant positive impact on the fraction held by the venture capitalists after the IPO. The reputation of venture capitalists is significant in two cases at the 10 % level for the broad definition. In agreement with the certification hypothesis, a higher reputation leads to lower shareholdings in these two cases.

5 Grandstanding, value-added and certification hypotheses

Table 11 summarizes the main empirical findings of this paper about the differences in the behavior between German and foreign VC firms and indicates the relevance of the grandstanding, value-added and certification hypotheses for their explanation. Gompers (1996) shows in an empirical investigation of the US market several differences in the behavior of young and old VC firms. He argues that the reason for these differences are the needs of young venture capital firms to establish their reputation in order to be able to attract capital for new funds in the near future. He calls their behavior "grandstanding". We try to transmit his results on the German VC market. Since German VC firms are typically younger and smaller than foreign VC firms investing in Germany, this grandstanding hypothesis could offer an explanation for their investment patterns. In our results, we can find several par-

allels to Gompers' results. He shows that young venture capital firms take their portfolio firms public earlier (after shorter financing periods) than established VC firms. This corresponds to our finding that German venture capitalists' have shorter pre-IPO financing periods than their foreign counterparts. This fact also explains the lower syndication by German VC firms because there is a positive correlation between the syndication level and the duration of the pre-IPO venture capital financing. Syndication typically increases over time as new investors join the financing consortium. We can find further similarities between his and our results: The average offering size is smaller for young (in our case: German) VC firms. The average fraction of equity held by the group of venture capitalists prior to the IPO is lower for young (in our case: German) VC firms.

Contrary to Gompers, who finds that firms backed by a young VC firm are themselves younger at the IPO, the average age of a venture-backed company at the IPO in Germany is not significantly different between the two groups of VC firms (for any of the three definitions of VC). If we employ the reputation coefficient, instead of the German VC dummy, and divide the sample into two subsamples (high vs. low reputation), there is still no significant difference between both the means and medians of the firm age. This finding can be explained by the fact that German VC firms invest in later stages. Hence, in spite of a shorter financing horizon, the age of the firms at the IPO is not lower for firms backed by a German VC firm. Gompers further finds differences in the underpricing. In his sample, the average underpricing is higher for firms backed by a young VC firm whereas in our sample there are no significant differences.

In Germany, the large fraction of domestic funds are not independent private funds as in the US, but subsidiaries of insurance companies and banks. They are often organized as public-private partnerships (see Bascha and Walz, 2002). Therefore, the fundraising process in Germany is, for the most part, structured differently than in the US.

Hence, we offer an additional explanation, which we call value-added hypothesis, for the differing investment patterns of German VC firms.

Venture capitalists participate in strategic decisions, offer advice and provide their portfolio firms with valuable business contacts. This non-monetary contribution increases the firm's value. In early stages, the venture capitalist's managerial involvement often plays a decisive role in the survival of a young firm. As the firm grows older, the non-monetary contribution is less and less important. At a certain point of time, the comparative advantage of VC firms to potential new investors is not very high any more. A venture capitalists' further managerial contribution adds little value to the firm. VC firms prefer to turn their shares into cash at this time and invest it in other firms to which they could add more value. This explains the age similarities of firms in both groups. The relatively little experience of German VC firms in financing and advising firms may be the reason for their preference to invest in more mature companies in which the needs for their non-monetary contribution are lower than in younger firms. Both the grandstanding and the value-added hypotheses probably play a role in explaining the differences in the behavior of German and non-German VC firms. Future research should examine the fundraising process in Germany and its differences to that of the US in detail.

As prescribed by the *Rules and Regulations Neuer Markt*, old investors are not allowed to sell their shares during the period of 6 months beyond the IPO. They often commit themselves to hold their shares for periods longer than this requirement. Old shareholders tend do this more often when the lead VC firm is German. The inside investors in companies backed by German venture capitalists probably try to signal the quality of their firms by locking themselves in for longer periods than are required. In firms backed by a lead VC firm from abroad, the presence of a foreign venture capitalist with a large reputation at stake serves as a certification of the firm's quality. High-quality underwriters play as well a certification role for the companies they

bring public. They allow the venture capitalists to sell a significantly larger fraction already at the IPO.

6   Conclusion

After a certain period of time, venture capitalists have to exit their investments. The purpose of this paper is to examine some important aspects of the investment and particularly divestment process of venture capitalists in Germany. Hereby, we concentrate on the IPO which is considered in the literature to be the most profitable exit channel. At the same time, it is the only divestment channel for which publicly available data in Germany exist. Since different people understand different things under the term venture capital, we distinguish between three different definitions of it and carry out our analysis separately for all of them. We examine all venture-backed IPOs on Germany's *Neuer Markt* from its launching in March 1997 to its closing in 2003.

Our results show that large differences in the behavior of VC investors exist (particularly for the broad and narrow definitions of VC). We look at the differences between German and non-German VC firms in detail. German venture capitalists in our sample tend to invest more in IT services and media & entertainment and less in firms from the branches internet and software. They strongly prefer German firms to companies from abroad. They back significantly smaller offerings with a lower capital increase at the IPO. Both the available and the used greenshoe are smaller. The share of the available greenshoe on the total offering volume is significantly lower as well. The pre-IPO and post-IPO shareholdings of the group of venture capitalists are lower and the selling intensity is higher when a German firm is the lead venture capitalist. Non-German VC firms employ significantly more investment rounds before they take their portfolio firms public, they invest in firms in earlier stages and finance them longer than German venture capitalists. They also syndicate more. German venture

capitalists commit themselves to hold their shares after the IPO for longer periods than venture capital firms from abroad. The grandstanding, the value-added and the certification / signaling hypotheses deliver hints for the explanation of some of these differences in the investment patterns between German and non-German VC firms.

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Appendix: Hazard Models

The duration data are typically analyzed via hazard models. We use three different hazard models to estimate the duration of the pre-IPO venture capital investment: two parametric models (exponential, Weibull) and a semi-parametric model (Cox). The differences between them are in the underlying survival distributions.

The hazard rate $h(t)$ is the conditional probability that a unit "exits" exactly at t, given it lasts until t. Precisely, $h(t) = \lim_{h \to 0} \text{Prob}(t \leq T < t + h | T \geq t)/h$. The survivor function $S(t)$ is the probability that the duration will equal or exceed the value t.

1. **The exponential hazard model**
   The survivor function is $S(t) = exp(-\lambda t), \lambda > 0$. The hazard

rate equals $h(t) = \lambda = exp(\beta'X)$. The hazard rate does not vary over time.

2. **The Weibull hazard model**
   Here, the hazard rate changes over time. It is monotonically increasing or decreasing depending on the parameter p (that is also estimated). The hazard rate is $h(t) = \lambda p(\lambda t)^{p-1}$ where $\lambda = exp(\beta'X)$.

3. **The Cox proportional hazard model** (see Cox, 1972)
   The formal model is $h(t) = h_0(t)exp(\beta'X)$. Every single contribution to likelihood is the hazard rate for the individual k who "exits" at t divided by the sum of the hazard rates for the individuals who exit at t and later: $\frac{exp(\beta'X_k)}{\sum_{l \in R_j} exp(\beta'X_l)}$.

   The baseline hazard function is eliminated. Thus, this model does not impose any structure on the baseline hazard $h_0(t)$. The partial likelihood is then the product of the individual contributions

   $$L(\beta) = \prod_{j=1}^{n} \frac{exp(\beta'X_j)}{\sum_{l \in R_j} exp(\beta'X_l)} \ .$$

   Since there are tied events (spells of the same length) in our data set, we modify the numerator of the partial likelihood using Breslow approximation (see Breslow, 1974) to account for the multiple possible orderings. Let d_j denote the multiplicity of exits at t_j and D_j the set of individuals that exit at t_j. Let s_j be the sum of the vectors X_l over the individuals who fail at t_j. The Breslow approximation is then

   $$L_{Breslow}(\beta) = \prod_{j=1}^{n} \frac{exp(\beta's_j)}{[\sum_{l \in R_j} exp(\beta'X_l)]^{d_j}}$$

   We use other approximations (the Efron and the exact methods) that deliver very similar results (not reported here).

Table 1: Number of IPOs on Germany's *Neuer Markt* and their VC backing

	1997	1998	1999	2000	2001	2002	*Total*
Broad definition of VC	7	23	66	78	4	1	*179*
Narrow definition of VC	7	17	52	59	4	0	*139*
Pure VC	6	8	30	39	3	0	*86*
All IPOs	*11*	*41*	*130*	*133*	*11*	*1*	***327***

BROAD DEFINITION OF VC - indication of the *Deutsche Börse AG*, NARROW DEFINITION OF VC - firms affiliated at a VC association, PURE VC - narrow definition minus bridge financing.

Table 2: Definitions of the dummy variables

INTERNET	One, if the firm belongs to internet industry, zero otherwise
IT SERVICES	One, if the firm belongs to IT services, zero otherwise
MEDIA & ENTERTAINMENT	One, if the firm belongs to media & entertainment industry, zero otherwise
SOFTWARE	One, if the firm belongs to software industry, zero otherwise
TELECOMMUNICATIONS	One, if the firm belongs to telecommunications industry, zero otherwise
DOMESTIC	One, if the firm is located in Germany, zero otherwise
SYNDICATION	One, if more than one VC funds hold firm's shares, zero otherwise
LOCK > 6	One, if the committed lock-up period exceeds 6 months, zero otherwise
HOT ISSUE	One, if the firm went public during the hot issue period[a], zero otherwise
GERMAN VC	One, if the lead venture capital firm is located in Germany, zero otherwise
START-UP	One, if the venture capital firm begins to finance the company in the start-up phase, zero otherwise

[a]The hot issue period was the time horizon between March 1, 1999 and November 30, 2000.

Table 3: Lead VC firms from Germany vs. abroad - descriptive statistics

This table provides descriptive statistics for variables associated with the characteristics of the firm (PANEL A) and the IPO (PANEL B), the pre-IPO venture capital financing (PANEL C) and the venture capitalists' behavior at the IPO (PANEL D). The firms are divided into two subgroups depending on whether or not the lead VC firm is German. Further, we use three different definitions of VC: broad, narrow and pure. For each variable, the table presents six different values (three definitions, for each definition two subsamples) for the number of observations and the mean. Further, we conduct a standard two-sided t-test (allowing for unequal variances) to test for differences in means between the subgroups of lead VC firms from Germany and abroad. Additionally, we use the Wilcoxon-Mann-Whitney test to test for the equality of medians. One, two and three asterisks indicate significance at the 10 %, 5 % and 1 % level or better.

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
PANEL A: Characteristics of the portfolio firms					
AGE, IPO (Years)	Non-German, Broad	75	12.27	0.5105	0.5607
	German, Broad	103	11.12		
	Non-German, Narrow	63	12.43	0.7426	0.4190
	German, Narrow	76	11.75		
	Non-German, Pure	47	12.20	0.7657	0.8113
	German, Pure	37	11.51		
INTERNET	Non-German, Broad	75	0.29	0.0981*	0.0894*
	German, Broad	103	0.18		
	Non-German, Narrow	63	0.27	0.1678	0.1602
	German, Narrow	76	0.17		
	Non-German, Pure	47	0.17	0.4151	0.4221
	German, Pure	37	0.11		
IT SERVICES	Non-German, Broad	75	0.07	0.0562*	0.0710*
	German, Broad	103	0.16		
	Non-German, Narrow	63	0.05	0.0294**	0.0377**
	German, Narrow	76	0.16		
	Non-German, Pure	47	0.06	0.1726	0.1505
	German, Pure	37	0.16		
MEDIA & ENTERTAINMENT	Non-German, Broad	75	0.05	0.0554*	0.0719*
	German, Broad	103	0.14		
	Non-German, Narrow	63	0.06	0.1741	0.1858
	German, Narrow	76	0.13		
	Non-German, Pure	47	0.02	0.4519	0.4244
	German, Pure	37	0.05		
DOMESTIC	Non-German, Broad	75	0.67	0.0000***	0.0000***
	German, Broad	103	0.98		
	Non-German, Narrow	63	0.70	0.0001***	0.0000***
	German, Narrow	76	0.96		
	Non-German, Pure	47	0.66	0.0006***	0.0016***
	German, Pure	37	0.95		

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
BOOK VALUE, IPO (Euro Mil.)	Non-German, Broad	75	7.1	0.2350	0.2909
	German, Broad	103	5.4		
	Non-German, Narrow	63	6.5	0.0991*	0.0866*
	German, Narrow	76	4.5		
	Non-German, Pure	47	5.9	0.9555	0.9533
	German, Pure	37	6.0		
MARKET VALUE, IPO (Euro Mil.)	Non-German, Broad	75	331.4	0.0705*	0.0038***
	German, Broad	103	239.7		
	Non-German, Narrow	63	311.0	0.0072***	0.0011***
	German, Narrow	76	196.3		
	Non-German, Pure	47	249.0	0.7097	0.2697
	German, Pure	37	233.2		
BOOKTOMARKET, IPO ($*10^{-3}$)	Non-German, Broad	75	26.1	0.9194	0.4411
	German, Broad	103	26.5		
	Non-German, Narrow	63	26.7	0.8685	0.6244
	German, Narrow	76	25.9		
	Non-German, Pure	47	27.9	0.6527	0.3995
	German, Pure	37	31.3		
Post-IPO SHARE CAP. (Euro Mil.)	Non-German, Broad	75	10.55	0.2726	0.8205
	German, Broad	103	8.24		
	Non-German, Narrow	63	11.15	0.0737*	0.2533
	German, Narrow	76	6.96		
	Non-German, Pure	47	7.71	0.7594	0.6719
	German, Pure	37	8.21		

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)

<div align="center"><i>PANEL B: IPO characteristics</i></div>

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
OFFERING SIZE (Shares Mil.)	Non-German, Broad	75	3.25	0.0076***	0.0002***
	German, Broad	103	2.09		
	Non-German, Narrow	63	3.21	0.0055***	0.0005***
	German, Narrow	76	1.94		
	Non-German, Pure	47	2.95	0.1757	0.1117
	German, Pure	37	2.35		
OFFERING SIZE (Euro Mil.)	Non-German, Broad	75	65.93	0.0059***	0.0002***
	German, Broad	103	44.11		
	Non-German, Narrow	63	63.61	0.0025***	0.0002***
	German, Narrow	76	40.83		
	Non-German, Pure	47	53.87	0.8446	0.2897
	German, Pure	37	52.25		
OLD SHARES SOLD	Non-German, Broad	75	325743	0.5992	0.0191**
	German, Broad	101	493950		
	Non-German, Narrow	62	279620	0.7319	0.0044***
	German, Narrow	75	408257		
	Non-German, Pure	46	607128	0.4933	0.0865*
	German, Pure	37	475710		
OLD SHARES SOLD (in % of total offering)	Non-German, Broad	75	19.22	0.6190	0.5847
	German, Broad	101	22.54		
	Non-German, Narrow	62	19.47	0.7583	0.3808
	German, Narrow	75	21.95		
	Non-German, Pure	46	21.08	0.6120	0.7728
	German, Pure	37	25.43		
AVAIL. GREENSHOE (Shares)	Non-German, Broad	75	455670	0.0004***	0.0000***
	German, Broad	103	223606		
	Non-German, Narrow	63	447725	0.0004***	0.0000***
	German, Narrow	76	199799		
	Non-German, Pure	47	411047	0.0349**	0.0140**
	German, Pure	37	271475		
AVAIL. GREENSHOE (Euro Mil.)	Non-German, Broad	75	9.07	0.0002***	0.0000***
	German, Broad	103	4.69		
	Non-German, Narrow	63	8.63	0.0001***	0.0000***
	German, Narrow	76	4.23		
	Non-German, Pure	47	7.46	0.2053	0.0869*
	German, Pure	37	6.05		

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
AVAIL. GREENSHOE (in % of total offering)	Non-German, Broad German, Broad	75 103	13.76 9.85	0.0000***	0.0000***
	Non-German, Narrow German, Narrow	63 76	13.76 9.63	0.0000***	0.0001***
	Non-German, Pure German, Pure	47 37	14.17 11.00	0.0051***	0.0558*
USED GREENSHOE (Shares)	Non-German, Broad German, Broad	75 101	380666 191465	0.0032***	0.0001***
	Non-German, Narrow German, Narrow	62 75	400251 151763	0.0006***	0.0000***
	Non-German, Pure German, Pure	46 37	348828 215663	0.0629*	0.0217**
USED GREENSHOE (Euro Mil.)	Non-German, Broad German, Broad	75 101	7.92 4.15	0.0011***	0.0001***
	Non-German, Narrow German, Narrow	62 75	8.00 3.43	0.0002***	0.0000***
	Non-German, Pure German, Pure	46 37	6.66 5.20	0.2407	0.1215
OFFER PRICE (Euro)	Non-German, Broad German, Broad	75 103	24.10 24.35	0.8927	0.8655
	Non-German, Narrow German, Narrow	63 76	24.26 24.06	0.9253	0.8622
	Non-German, Pure German, Pure	47 37	22.51 24.63	0.4739	0.5550
FIRST PRICE (Euro)	Non-German, Broad German, Broad	75 103	37.95 40.10	0.6593	0.6757
	Non-German, Narrow German, Narrow	63 76	38.57 38.17	0.9439	0.9494
	Non-German, Pure German, Pure	47 37	33.88 37.78	0.5815	0.5825
UNDERPRICING (in %)	Non-German, Broad German, Broad	75 103	46.85 58.37	0.2583	0.6183
	Non-German, Narrow German, Narrow	63 76	47.13 49.86	0.8023	0.9157
	Non-German, Pure German, Pure	47 37	37.54 41.25	0.7582	0.8287

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)

PANEL C: Pre-IPO venture capital financing

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
No. of VC FUNDS	Non-German, Broad German, Broad	75 103	3.79 1.92	0.0000***	0.0000***
	Non-German, Narrow German, Narrow	63 76	3.11 1.62	0.0001***	0.0000***
	Non-German, Pure German, Pure	47 37	2.81 1.84	0.0280**	0.0017***
No. of VC FIRMS[a]	Non-German, Broad German, Broad	75 103	3.16 1.78	0.0004***	0.0000***
	Non-German, Narrow German, Narrow	63 76	2.41 1.42	0.0006***	0.0000***
	Non-German, Pure German, Pure	47 37	2.02 1.49	0.0622*	0.0099***
SYNDICATION **(funds' level)**	Non-German, Broad German, Broad	75 103	0.72 0.45	0.0002***	0.0003***
	Non-German, Narrow German, Narrow	63 76	0.75 0.32	0.0000***	0.0000***
	Non-German, Pure German, Pure	47 37	0.72 0.35	0.0006***	0.0007***
No. of pre-IPO **INVESTMENT ROUNDS**	Non-German, Broad German, Broad	53 90	2.19 1.54	0.0066***	0.0016***
	Non-German, Narrow German, Narrow	47 67	2.02 1.45	0.0083***	0.0010***
	Non-German, Pure German, Pure	33 25	2.27 2.28	0.9832	0.6540
STAGE in which **VC ENTERED**[b]	Non-German, Broad German, Broad	59 91	1.05 1.37	0.0138**	0.0102**
	Non-German, Narrow German, Narrow	53 67	1.04 1.46	0.0021***	0.0018***
	Non-German, Pure German, Pure	37 28	0.62 0.71	0.4381	0.4379
Pre-IPO DURATION[c] **(months)**	Non-German, Broad German, Broad	59 91	25.15 16.10	0.0106**	0.0001***
	Non-German, Narrow German, Narrow	53 66	23.28 14.05	0.0049***	0.0001***
	Non-German, Pure German, Pure	37 28	30.63 26.72	0.4257	0.0862*

[a] two funds of one VC firm are considered as a single unit, [b] three different stages are considered: start-up (0), expansion (1), bridge (2), [c] the duration of the pre-IPO venture capital equity financing

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)

PANEL D: Venture capitalists' behavior at the IPO

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
LOCK > 6	Non-German, Broad	73	0.33	0.0652*	0.0675*
	German, Broad	96	0.47		
	Non-German, Narrow	62	0.24	0.0030***	0.0037***
	German, Narrow	72	0.49		
	Non-German, Pure	46	0.28	0.0133**	0.0129**
	German, Pure	36	0.56		

Percent

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
Pre-IPO SHARE, All VCs	Non-German, Broad	75	38.31	0.0042***	0.0019***
	German, Broad	103	27.67		
	Non-German, Narrow	63	32.62	0.0004***	0.0001***
	German, Narrow	76	20.68		
	Non-German, Pure	47	32.76	0.1594	0.1058
	German, Pure	37	26.72		
Pre-IPO ≥ 50 %, All VCs[d]	Non-German, Broad	75	29.33	0.0028***	0.0016***
	German, Broad	103	10.68		
	Non-German, Narrow	63	17.46	0.0550*	0.0462**
	German, Narrow	76	6.58		
	Non-German, Pure	47	12.77	0.7850	0.7848
	German, Pure	37	10.81		
Post-IPO SHARE, All VCs	Non-German, Broad	75	23.42	0.0009***	0.0004***
	German, Broad	103	15.28		
	Non-German, Narrow	63	19.18	0.0000***	0.0000***
	German, Narrow	76	10.48		
	Non-German, Pure	47	18.79	0.0359**	0.0445**
	German, Pure	37	13.43		
Post-IPO ≥ 50 %, All VCs[e]	Non-German, Broad	75	9.33	0.1633	0.1371
	German, Broad	103	3.88		
	Non-German, Narrow	63	3.17	0.1590	0.1190
	German, Narrow	76	0.00		
	Non-German, Pure	47	4.26	0.1595	0.2068
	German, Pure	37	0.00		
Pre-IPO SHARE, Lead VC	Non-German, Broad	75	24.40	0.6863	0.3511
	German, Broad	103	23.17		
	Non-German, Narrow	63	22.58	0.1229	0.0555*
	German, Narrow	76	18.20		
	Non-German, Pure	47	23.64	0.8816	0.8676
	German, Pure	37	23.07		

[d]Fraction of firms in which VC firms as a group hold 50 % or more of the equity prior to the IPO. [e]Fraction of firms in which VC firms as a group hold 50 % or more of the equity after the IPO.

Table 3 - continued

VARIABLE		Obs.	Mean	p-value (t-test)	p-value (Wilcoxon)
Post-IPO SHARE, Lead VC	Non-German, Broad German, Broad	75 103	15.31 12.70	0.2000	0.0421**
	Non-German, Narrow German, Narrow	63 76	14.02 8.93	0.0031***	0.0017***
	Non-German, Pure German, Pure	47 37	14.26 11.23	0.1802	0.1444
RETAINED SHARES, ^{f} **All VCs**	Non-German, Broad German, Broad	75 103	80.91 72.23	0.0393**	0.0837*
	Non-German, Narrow German, Narrow	63 76	78.52 72.44	0.1745	0.5325
	Non-German, Pure German, Pure	47 37	79.05 71.40	0.1908	0.5711
RETAINED SHARES^{fg} **All VCs (when selling)**	Non-German, Broad German, Broad	52 75	72.47 61.87	0.0356**	0.0200**
	Non-German, Narrow German, Narrow	48 52	71.81 59.72	0.0177**	0.0176**
	Non-German, Pure German, Pure	37 27	73.39 60.81	0.0553*	0.1102
RETAINED SHARES,^{f} **Lead VC**	Non-German, Broad German, Broad	75 103	80.50 71.88	0.0530*	0.1106
	Non-German, Narrow German, Narrow	63 76	78.51 72.30	0.1809	0.4696
	Non-German, Pure German, Pure	47 37	79.09 71.26	0.1931	0.5437
FIRMS WITH SELLING^h	Non-German, Broad German, Broad	75 103	69.33 72.82	0.6165	0.6129
	Non-German, Narrow German, Narrow	63 76	76.19 68.42	0.3097	0.3119
	Non-German, Pure German, Pure	47 37	78.72 72.97	0.5489	0.5414

^{f} pre-IPO shareholdings = 100 %, ^{g} for the group of firms where venture capitalists give up shares at the IPO,
^{h} fraction of firms in which venture capitalists give up shares at the IPO

Table 4: Number of VC funds per firm at the IPO

For each of the three definitions of VC (broad, narrow, and pure), this table depicts the number (the percentage) of firms which are financed by 1, 2, 3, 4, 5 and, finally, by more than 5 venture capital funds.

Number of VCs	1	2	3	4	5	5+
Broad definition of VC	78 (43.82%)	37 (20.79%)	18 (10.11%)	20 (11.24%)	12 (6.74%)	13 (7.31%)
Narrow definition of VC	68 (48.92%)	28 (20.14%)	22 (15.83%)	12 (8.63%)	2 (1.44%)	7 (5.04%)
Pure VC	37 (44.05%)	19 (22.62%)	16 (19.05%)	5 (5.95%)	1 (1.19%)	6 (7.14%)

Table 5: Pre- and post-IPO holdings by the group of venture capitalists

This table provides the fraction of venture-backed firms in which the group of venture capitalists holds more than 50 % of the equity before the IPO and after the IPO for all three definitions of VC (broad, narrow, and pure). Further, it shows the average pre-IPO and post-IPO equity holdings of the group of venture capitalists. The results are compared to Megginson and Weiss (1991) and Barry et. al (1990), denoted by MW and BM.

	pre-IPO$\geq$ 50%	post-IPO$\geq$ 50	average pre-IPO	average post-IPO
Broad definition of VC	18.4 %	6.1 %	32.0 %	18.6 %
Narrow definition of VC	11.5 %	1.4 %	26.0 %	14.4 %
Pure VC	11.6 %	2.3 %	29.6 %	16.2 %
MW[a]	28.0 %	8.4 %	36.6 %	26.3 %
BM[b]	24.4 %	n.a.	34.3 %	24.6 %

[a] Megginson and Weiss, 1991, [b] Barry et al., 1990.

Table 6: The venture capitalists' behavior in the course of the IPO

This table presents the fractions of venture-backed firms in which the venture capitalists' shareholdings (i) decrease, (ii) do not change and (iii) increase during the IPO for all three definitions of VC (broad, narrow, and pure). It depicts the average changes for each group as well.

	Percent of firms			Average change		
	Broad definition	Narrow definition	Pure definition	Broad definition	Narrow definition	Pure definition
Change in shareholdings						
Decrease	70.9 %	72.0 %	76.2 %	-33.8 %	-34.5 %	-31.9 %
No change	23.5 %	23.0 %	20.2 %	0%	0%	0%
Increase	5.6 %	5.0 %	3.6 %	+ 1654.3 %	+2343.1%	+5252.4%

Table 7: The venture capitalists' reputation

This table shows the average reputation coefficient of lead VC firms from Germany and abroad for all three definitions of VC (broad, narrow, and pure). The reputation coefficient depends equally on the size and the age of the VC firm. **The reputation scale ranges from 1 to 5, where 1 is the best and 5 the worst reputation.** We conduct a standard two-sided t-test (allowing for unequal variances) to test for differences in means between the subgroups of lead VC firms from Germany and abroad. Additionally, we use the Wilcoxon-Mann-Whitney test to test for the equality of medians. Three asterisks indicate significance at the 1 % level or better.

		Obs	Mean	p-value (t-test)	p-value (Wilcoxon)
REPUTATION COEFFICIENT	Non-German, Broad	75	3.09	0.0000***	0.0006***
	German, Broad	103	4.00		
	Non-German, Narrow	63	2.37	0.0000***	0.0000***
	German, Narrow	76	3.60		
	Non-German, Pure	47	2.40	0.0002***	0.0005***
	German, Pure	37	3.46		

Table 8: Hazard rate models

This table depicts the results of hazard rate models for the dependent variable: duration of the pre-IPO venture capital financing (for three definitions of VC: broad, narrow, and pure). The choice of explanatory variables in each model is based on the optimization of the Akaike information criterion. If the estimated coefficient is higher than 0, then this variable increases the hazard ratio, and vice versa. One, two and three asterisks indicate significance at the 10 %, 5 % and 1 % level or better.

Dependent Variable: Duration of the pre-IPO venture capital financing			
	Weibull	**Exponential**	**Cox**
Explanatory Variables	*Coefficients*		
Broad VC			
GERMAN VC	0.47***	0.46***	0.48***
START-UP	-0.80***	-0.78***	-0.77***
INTERNET	0.79***	0.77***	0.77***
MEDIA & ENTERTAINMENT	0.83***	0.82***	0.87***
TELECOMMUNICATIONS	-0.63*	-0.61*	-0.58
Number of firms	150	150	150
Model p-value	0.0000***	0.0000***	0.0000***
Narrow VC			
GERMAN VC	0.56***	0.51***	0.59***
START-UP	-0.42*	-0.36	-0.48*
INTERNET	1.15***	0.93***	1.18***
MEDIA & ENTERTAINMENT	1.96***	1.62***	1.92***
Number of firms	119	119	119
Model p-value	0.0000***	0.0000***	0.0000***
Pure VC			
INTERNET	1.25***	0.67*	1.30***
MEDIA & ENTERTAINMENT	2.53***	1.43**	2.86***
Number of firms	65	65	65
Model p-value	0.0007***	0.0599*	0.0004***

Table 9: Retained shares by the venture capitalists

This table depicts the results from the Tobit regressions for the dependent variable: fraction of old shares retained by the group of VCs beyond the IPO (for three definitions of VC: broad, narrow, and pure). We use two different versions of the Huber-White-sandwich robust estimator of the variance in place of the conventional MLE variance estimator. In the first approach the general version allowing any not independent observations is used. In the second approach, we allow observations to be not independent within a cluster that is based on the branch and the market situation (we have 18 clusters, based on 9 branches and a dummy variable indicating hot vs. cold issue), but they must be independent between clusters. One, two and three asterisks indicate significance at the 10 %, 5 % and 1 % level or better. The number of asterisks (alternatively: the value of the $Wald\ \chi^2$ and the model p-value) in parentheses indicates the results from the second approach when differences between the two approaches occur.

Broad VC

Dependent Variable: Fraction of old shares retained by the group of VCs beyond the IPO (in %)

	1	2	3	4	5	6	7	8	9	10
CONSTANT	66.8***	60.4***	62.2***	63.2***	63.1***	51.5***	48.6***	49.4***	50.6***	52.3***
Market situation										
HOT ISSUE	12.7*(***)	11.6*(**)	12.5*(**)	12.4*(***)	12.3*(***)	12.8*(***)	10.9*(**)	11.2*(**)	12.7*(***)	12.7*(***)
Firm characteristics / Uncertainty										
BOOKB. RANGE[a]	9.4	7.7	37.4	12.5	13.2	17.6	9.4	43.5	17.2	18.7
AGE[b]	-0.6***	-0.6**	-0.4*()	-0.6**(***)	-0.6*(***)	-0.5**	-0.5**	-0.4	-0.5**	-0.5**
MARKET VALUE[c]	10.8	11.8	10.4	11.1	11.8	15.8	16.4	15.2	15.1	17.1
Signaling / Certification										
DS REP. MIN[d]	-2.6**	-2.6**	-2.6**(***)	-2.6**(***)	-2.6**(***)	-2.7**(***)	-2.8**(***)	-2.7**(***)	-2.7**(***)	-2.6**(***)
UND. REP. MIN[e]	2.2*()	2.2*()	1.9	2.3*()	2.3*()	2.3*()	2.0	1.8	2.4*()	2.3*()
LOCK DURATION[f]	2.8***	2.7***	2.4**(***)	2.8***	2.8***	2.7***	2.7***	2.2**(***)	2.7***	2.7***
VC reputation / Pre-IPO VC financing										
NUMBER VC FIRMS SYNDICATION	-4.2	1.4				0.1	2.2**(*)			
Pre-IPO DURATION[b]			0.5					1.1		
Pre-IPO SHARE, All[g]				-0.01					0.03	
Pre-IPO SHARE, Lead[g]					-0.03					-0.0004
GERMAN VC	-12.2**	-9.3*()	-11.7**(*)	-11.0**(*)	-10.9**()					
REPUT. COEF.[h]						0.8	1.5	1.8	0.8	0.7
$Wald\ \chi^2$	40.57	39.93	29.29	39.47	39.31	36.39	39.95	28.64	36.55	36.31
	(255.51)	(256.42)	(837.60)	(258.33)	(257.83)	(255.40)	(342.06)	(167.99)	(137.42)	(131.79)
Model p-value	0.0000	0.0000	0.0006(0.0000)	0.0000	0.0000	0.0000	0.0000	0.0007(0.0000)	0.0000	0.0000

174 obs. (regr. 3 and 8: 146 obs.)

Table 9 - continued

	1	2	3	4	5	6	7	8	9	10
Dependent Variable: Fraction of old shares retained by the group of VCs beyond the IPO *(in %)*										
Narrow VC										
CONSTANT	67.1***	66.5***	65.9***	73.7***	72.6***	56.2***	58.0***	57.0***	63.5***	65.2***
Market situation										
HOT ISSUE	10.2	10.2	8.4	9.3	9.3	10.4(*)	10.0	8.1	9.9(*)	9.6(*)
Firm characteristics / Uncertainty										
BOOKB. RANGE[a]	-24.5	-25.1	-5.0	-23.8	-21.1	-25.3	-23.2	2.13	-19.1	-16.8
AGE[b]	-0.4*	-0.4*	-0.3	-0.4*()	-0.4	-0.4	-0.4*()	-0.3	-0.4*()	-0.3
MARKET VALUE[c]	37.5**	37.5**	41.7**	37.5**	40.8**	41.7**	41.9**	47.6**	43.0**	45.7**
Signaling / Certification										
DS REP. MIN[d]	-2.6**(***)	-2.6**	-2.0*	-2.6**(***)	-2.7*(***)	-2.6**	-2.6**	-1.9	-2.6**	-2.6**(***)
UND. REP. MIN[e]	2.6*(**)	2.6*(**)	1.9	2.4(*)	2.5(*)	2.8(**)	2.7*	1.9	2.6(*)	2.6(*)
LOCK DURATION[f]	1.7(**)	1.7(**)	1.5(**)	1.7(**)	1.7(***)	1.6(**)	1.6(**)	1.3(*)	1.6(**)	1.6(**)
VC reputation / Pre-IPO VC financing										
NUMBER VC FIRMS							1.3			
SYNDICATION	0.1	0.4				4.3				
Pre-IPO DURATION[b]			-0.1							
Pre-IPO SHARE, All[g]				-0.1				0.6		
Pre-IPO SHARE, Lead[g]					-0.2				-0.1	-0.2
GERMAN VC	-5.6	-5.3	-7.2	-7.3	-6.1					
REPUT. COEF.[h]						1.6	1.3	0.8	0.7	0.7
Wald χ^2	27.70	27.12	20.07	29.18	30.22	28.06	28.62	21.59	28.28	30.23
	(207.37)	(209.87)	(363.94)	(205.67)	(200.22)	(415.49)	(371.99)	(260.05)	(363.39)	(330.96)
Model p-value	0.0011	0.0013	0.0175	0.0006	0.0004	0.0009	0.0008	0.0103	0.0009	0.0004
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

135 obs. (regr. 3 and 8: 115 obs.)

Table 9 - continued

	Dependent Variable: Fraction of old shares retained by the group of VCs beyond the IPO (in %) Pure VC									
	1	2	3	4	5	6	7	8	9	10
CONSTANT	50.3**(***)	52.2***	44.8**	63.9***	61.6***	44.2**(***)	47.4***	40.8**	57.9***	57.1***
Market situation										
HOT ISSUE	17.7**(***)	17.3**(***)	15.9(**)	16.9**(***)	17.0**(***)	19.0**(***)	18.5**(***)	16.2(*)	18.6**(***)	18.5**(***)
Firm characteristics / Uncertainty										
BOOKB. RANGE[a]	2.9	3.2	38.3	-8.9	-3.8	10.6	11.9	50.6	1.9	4.7
AGE[b]	-0.7***	-0.8***	-0.6	-0.8***	-0.7**(***)	-0.7***	-0.7***	-0.7	-0.7***	-0.7**(***)
MARKET VALUE[c]	57.7***	56.4***	64.0***	55.8***	60.2***	61.9***	60.2***	69.0***	60.7***	64.5***
Signaling / Certification										
DS REP. MIN[d]	-1.9	-2.0	-1.1	-2.2*()	-2.2*	-1.6	-1.7	-0.5	-1.8	-1.9
UND. REP. MIN[e]	4.6***	4.5***	3.4**(*)	4.6***	4.6***	4.8***	4.7***	3.6**(*)	4.9***	4.9***
LOCK DURATION[f]	0.4	0.3	0.1	0.3	0.3	0.3	0.2	-0.0	0.2	0.2
VC reputation / Pre-IPO VC financing										
NUMBER VC FIRMS	2.1						1.0			
SYNDICATION		0.7				3.8				
Pre-IPO DURATION[b]			1.2	-0.2(*)				1.2		
Pre-IPO SHARE, All[g]									-0.2	
Pre-IPO SHARE, Lead[g]					-0.3					-0.3
GERMAN VC	-6.7	-7.2	-8.0	-8.8(*)	-7.7					
REPUT. COEF.[h]						-1.3	-1.6	-2.1	-2.1	-1.8
Wald χ^2	51.30	49.35	34.23	50.59	49.88	46.65	45.95	31.83	47.32	46.60
	(99.04)	(103.32)	(132.05)	(121.82)	(94.01)	(98.51)	(97.66)	(213.07)	(108.66)	(92.98)
Model p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002(0.0000)	0.0000	0.0000

81 obs. (regr. 3 and 8: 62 obs.)

[a]Bookbuilding range refers to the width of the bookbuilding range: (range$_{max}$-range$_{min}$)/middle of the range. [b]In years. [c]Market value at the bookbuilding price, in Bil. Euros. [d]The reputation of the designated sponsor with the worst reputation. The reputation scale ranges from 1 to 10, where 1 is the best and 10 the worst reputation. [e]The reputation of the lead underwriter (if several lead underwriters: the reputation of that one with the worst reputation). The reputation scale ranges from 1 to 10, where 1 is the best and 10 the worst reputation. [f]the length of the committed lock-up period in months. [g]In %. [h]Reputation of the lead VC. The reputation scale ranges from 1 to 5, where 1 is the best and 5 the worst reputation.

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Table 10: Post-IPO shareholdings of the venture capitalists

This table depicts the results from the Tobit regressions for the dependent variable: fraction held by the group of VCs after the IPO (for three definitions of VC: broad, narrow, and pure). We use two different versions of the variance. In the first approach the general version allowing any not independent observations is used. We use the *Huber-White-sandwich* robust estimator of the variance in place of the conventional MLE variance estimator. In the second approach, we allow observations to be not independent within a cluster that is based on the branch and the market situation (we have 18 clusters, based on 9 branches and a dummy variable indicating hot vs. cold issue), but they must be independent between clusters. One, two and three asterisks indicate significance at the 10 %, 5 % and 1 % level or better. The number of asterisks (alternatively: the value of the *Wald* χ^2) in parentheses indicates the results from the second approach when differences between the two approaches occur.

Dependent Variable: Fraction held by the group of VCs after the IPO *(in %)*

Broad VC

	1	2	3	4	5	6	7	8	9	10
CONSTANT	-1.8	-2.2	-1.6	-1.9	-2.2	-5.2*(**)	-4.9*(***)	-4.0(*)	-4.6(**)	-5.2*(***)
HOT ISSUE	2.8*(***)	2.5(***)	3.3(***)	2.8*(***)	2.8*(***)	2.6(***)	2.2(**)	3.0(***)	2.7(***)	2.5(**)
Market situation										
BOOKB. RANGE[a]	-3.7	-5.1	-1.0	-3.6	-2.8	-2.6	-5.2	-0.4	-3.1	-1.7
AGE[b]	-0.1***	-0.1***	-0.1*(**)	-0.1***	-0.1***	-0.1*(***)	-0.1**(***)	-0.1*(**)	-0.1***	-0.1**(***)
MARKET VALUE[c]	7.2***	7.9***	7.0***	7.2***	7.8***	8.0***	8.6***	7.8***	8.0***	8.9***
Firm characteristics / Uncertainty										
Signaling / Certification										
DS REP. MIN[d]	-0.4*	-0.4*(**)	-0.5*(**)	-0.4*(**)	-0.4*	-0.5**	-0.5**	-0.5*(**)	-0.4*(**)	-0.5**
UND. REP. MAX[e]	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
LOCK DURATION[f]	0.3**(***)	0.3**(***)	0.2*(**)	0.3**(***)	0.3*(***)	0.2*(***)	0.2**(***)	0.2(**)	0.2*(***)	0.2**(***)
VC reputation / Pre-IPO VC financing										
Pre-IPO SHARE, All[g]	0.6***	0.6***	0.6***	0.6***	0.6***	0.6***	0.6***	0.6***	0.6***	0.6***
NUMBER VC FIRMS		0.5**()					0.6**(*)			
SYNDICATION	-0.1					0.8				
Pre-IPO DURATION[b]			0.2					0.3		
Pre-IPO SHARE, Lead[g]					-0.04					-0.07
GERMAN VC	-1.8*	-1.4	-1.8	-1.8*	-1.5					
REPUT. COEF.[h]						0.5	0.6*	0.4	0.4	0.6(*)
Wald χ^2	960.8	1104.5	535.8	889.7	1111.8	1194.6	1325.6	628.0	1038.2	1462.0
	(1816.0)	(2323.0)	(1377.2)	(1250.5)	(2507.6)	(1501.0)	(2589.7)	(1659.1)	(1408.8)	(4262.6)
Model p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

174 obs. (regr. 3 and 8: 146 obs.)

Table 10 - continued

Dependent Variable: Fraction held by the group of VCs after the IPO (in %)

Narrow VC

	1	2	3	4	5	6	7	8	9	10
CONSTANT	-0.3	0.4	0.6	1.1	-0.0	-3.2	-2.2	-2.1	-1.7	-2.6
Market situation										
HOT ISSUE	3.1**(***)	2.7*(**)	3.5*(**)	3.0*(***)	3.1*(***)	3.3**(***)	2.9*(**)	3.5*(**)	3.2*(***)	3.2**
Firm characteristics / Uncertainty										
BOOKB. RANGE[a]	-7.7	-7.4	-3.9	-6.1	-4.2	-7.5	-6.3	-1.3	-4.1	-2.8
AGE[b]	-0.04	-0.04	-0.04	-0.07*()	-0.04	-0.03	-0.04	-0.04	-0.06	-0.03
MARKET VALUE[c]	7.6***	7.9***	7.8***	7.5***	9.4***	8.7***	9.3***	9.6***	9.2***	10.9***
Signaling / Certification										
DS REP. MIN[d]	-0.4*(**)	-0.5**	-0.4*)	-0.4*(**)	-0.4**	-0.4*(**)	-0.4*(**)	-0.3	-0.4*(**)	-0.4*(**)
UND. REP. MIN[e]	0.4	0.3	0.2	0.3	0.3	0.4	0.3	0.3	0.4	0.4
LOCK DURATION[f]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
VC reputation / Pre-IPO VC financing										
Pre-IPO SHARE, All[g]	0.5***	0.5***	0.5***	0.5***	0.6***	0.5***	0.5***	0.5***	0.5***	0.6***
NUMBER VC FIRMS	1.9	1.0					1.2*()			
SYNDICATION						2.8**(*)				
Pre-IPO DURATION[b]			0.6					0.7		
Pre-IPO SHARE, Lead[g]					-0.1					-0.2
GERMAN VC	-1.9*(**)	-2.1*(**)	-2.9**	-2.6**	-1.9*(**)					
REPUT. COEF.[h]						0.2	0.1	-0.2	-0.1	0.1
Wald χ^2	265.57	326.57	188.80	216.17	323.13	264.07	341.47	175.84	194.17	347.67
	(807.13)	(2716.68)	(234.31)	(301.63)	(1061.19)	(472.72)	(2101.69)	(218.66)	(364.64)	(925.91)
Model p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

135 obs. (regr. 3 and 8: 115 obs.)

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Table 10 - continued

	Dependent Variable: Fraction held by the group of VCs after the IPO (in %) Pure VC									
	1	2	3	4	5	6	7	8	9	10
CONSTANT	-4.0	-2.6	-2.1	-1.7	-2.6	-6.8	-4.7	-4.5	-4.0	-4.7
Market situation										
HOT ISSUE	5.9***	5.4**(***)	7.7***	5.8**(***)	5.8***	6.1***	5.6*(***)	7.6**(***)	6.1**(***)	6.0***
Firm characteristics / Uncertainty										
BOOKB. RANGE[a]	-7.2	-6.6	-11.5	-7.8	-5.5	-4.4	-3.1	-4.9	-3.6	-1.8
AGE[b]	-0.1**	-0.1**	-0.2**(*)	-0.1**	-0.1**(**)	-0.1**	-0.1**(**)	-0.2**	-0.1**	-0.1**(**)
MARKET VALUE[c]	13.9***	12.9***	13.3***	12.7***	14.4***	15.1***	13.8***	15.0***	13.9***	15.6***
Signaling / Certification										
DS REP. MIN[d]	-0.3	-0.4	-0.4	-0.3	-0.3	-0.2	-0.3	-0.2	-0.3	-0.3
UND. REP. MIN[e]	0.5	0.4	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5
LOCK DURATION[f]	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1
VC reputation / Pre-IPO VC financing										
Pre-IPO SHARE, All[g]	0.5***	0.5***	0.4***	0.5***	0.6***	0.5***	0.5***	0.4***	0.5***	0.6***
NUMBER VC FIRMS	1.8	0.9					1.1			
SYNDICATION						2.6*				
Pre-IPO DURATION[b]			1.2					1.2		
Pre-IPO SHARE, Lead[g]					-0.1					-0.1
GERMAN VC	-2.5*(**)	-2.7*(***)	-4.1**	-3.1**(***)	-2.7*(***)					
REPUT. COEF.[h]						-0.1	-0.3	-0.7	-0.4	-0.3
Wald χ²	127.12	195.92	170.14	104.39	185.32	121.52	183.78	169.66	97.29(258.96)	173.43
	(197.40)	(525.92)	(569.84)	(150.08)	(266.72)	(312.87)	(661.00)	(387.91)	(258.96)	(318.06)
Model p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

81 obs. (regr. 3 and 8: 62 obs.)

[a]Bookbuilding range refers to the width of the bookbuilding range: $(range_{max}-range_{min})$/middle of the range. [b]In years. [c]Market value at the bookbuilding price, in Bil. Euros. [d]The reputation of the designated sponsor with the worst reputation. The reputation scale ranges from 1 to 10, where 1 is the best and 10 the worst reputation. [e]The reputation of the lead underwriter (if several lead underwriters: the reputation of that one with the worst reputation). The reputation scale ranges from 1 to 10, where 1 is the best and 10 the worst reputation. [f]the duration of the committed lock-up period in months. [g]In %. [h]Reputation of the lead VC. The reputation scale ranges from 1 to 5, where 1 is the best and 5 the worst reputation.

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Table 11: Behavior of German venture capitalists

EMPIRICAL FINDINGS	Method	Explained by
Shorter pre-IPO VC financing	descriptive statistics, hazard rate models	grandstanding, value-added
Smaller offering size	descriptive statistics	grandstanding
Lower VC holdings	descriptive statistics, Tobit regressions	grandstanding
Lower syndication	descriptive statistics	grandstanding, value-added
Different sectoral structure of portfolios	descriptive statistics	value-added
More later stage financing	descriptive statistics	value-added
Larger selling intensity at the IPO	descriptive statistics, Tobit regressions	value-added, certification / signaling
Longer committed lock-up period	descriptive statistics	certification / signaling
Higher underpricing (not signif.)	descriptive statistics	grandstanding, certification / signaling

Descriptive statistics - section 3, hazard rate models - section 4.1, Tobit regressions - section 4.2.

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