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Non-technical Summary

In this paper, we analyze the heterogeneity of the venture capital market. Concretely, we investigate whether the governance structures, objectives, abilities and track records of different types of venture capitalists (bank-dependent, corporate, public and independent) have an influence on their investment and divestment patterns. A natural playing field for this analysis is the German venture capital market with its wide variety of venture capitalists' types. In contrast to the US, where venture capital funds typically are independent entities, bank-dependent and public venture capitalists have a large market share in Germany. The study is based on a unique hand-collected database of all venture-backed initial public offerings (IPOs) on Germany's *Neuer Markt*.

We find that significant differences among the different types of venture capitalists exist. The behavior of independent and corporate venture capitalists is more similar to that of their US counterparts whereas bank-dependent and public venture capital funds typically are bridge investors rather than true venture capitalists. Independent and corporate venture capitalists usually take larger equity positions, syndicate more, use more often stage financing, invest at earlier stages, finance their companies for longer periods of time and are able to better manage the IPO timing. We explain this behavior by different capabilities and experience on the one hand as well as differing aims on the other hand. Thus, it seems that the joint provision of capital and managerial support, which is a characteristic of venture capital financing, is offered by independent and corporate venture capitalists rather than by public and bank-dependent funds.

Who Are the True Venture Capitalists in Germany?

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Abstract: In this paper, we analyze the investment and divestment patterns of different types of venture capitalists. Using a data set embracing all venture-backed IPOs that occurred on Germany's *Neuer Markt* we investigate whether the governance structures, objectives, abilities and track records of different types of venture capitalists have a decisive influence on their behavior. Our main finding is that significant differences among the different types of venture capitalists exist. The behavior of independent and corporate venture capitalists is more similar to that of US funds whereas bank-dependent and public venture capitalists typically are bridge investors rather than true venture capitalists. Our findings may be interesting for policy makers, for companies that seek capital and for venture capitalists who look for syndication partners.

JEL Codes: D82, G24, G32

Keywords: Venture Capital, IPO, Heterogeneity

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1 Introduction

An obvious problem in the process of the transformation of an innovative idea into a salable product is in many cases the lack of capital. A less obvious but essential problem is often the poor managerial background of the owner of this idea. In an ideal case, venture capital financing offers a joint provision of capital and managerial support. Then, venture capitalists (VCs) play an active role in advising their portfolio firms, providing them with necessary contacts and taking principal decisions. Additionally, a company may profit from an increase in its credibility if a renowned VC finances its ideas.

The positive role of venture capital is emphasized by a wide range of literature. On the company level, empirical studies document the contribution of this financing instrument to the creation of start-ups (*Gompers/Lerner/Scharfstein (2003)*), their growth (*Hellmann/Puri (2000)* for the US, *Bottazzi/DaRin (2001)* for Europe and *Engel (2002)* for Germany), professionalization (*Hellmann/Puri (2002)*), better operating performance (*Rindermann (2003)* or *Jain/Kini (1995)*) and the certification of their quality (*Megginson/Weiss (1991)* or *Lin/ Smith (1995)*). Above this, on the aggregated level, venture capital has a positive impact on economic growth (*Keuschnigg (2001)*) and innovative activity (*Kortum/Lerner (2000)*).

These strengths of venture capital result from the combination of financing, control and managerial support. Whereas the vast majority of literature deals with the venture capital industry as being homogenous, in this paper we test whether different types of VCs differ in their strategies and hence in the value they add to their portfolio companies. Our hypothesis is that - due to the differences in the governance structures, objectives, abilities and track records - different types of VCs behave differently and play differing roles in their portfolio firms.

Concretely, our goal is to find out whether there are systematic differences in the investment and divestment patterns of venture capitalists due to their institutional background. A natural playing field for this analysis is the German venture capital market with its wide variety of VCs' types. In contrast to the US, where venture capital funds typically are independent entities, bank-dependent and public VCs have a large market share in Germany.

There are a few studies that deal with heterogeneities among venture capital firms. The role of the VCs' reputation on the underpricing of their portfolio firms is considered e.g. by *Barry et al. (1990)*. Beyond this, *Gompers (1993) and (1996)* analyzes differences between young and old VCs with regard to the holding period and the IPO timing. Several papers deal with a certain type of VC and show its differences to the rest. Examples are *Hellmann/Lindsey/Puri (2003)* for bank-dependent, *Gompers/Lerner (2000)* for corporate and *Bascha/Walz (2002)* for public VCs. In contrast to these studies we distinguish not only between one type of VCs and the rest but we divide the sample into four subgroups (public, bank-dependent, independent and corporate). Our data is described in section 2. A set of testable hypotheses is derived in section 3. The results, which are presented in sections 4 (descriptive statistics) and 5 (multivariate analyses), support our supposition of heterogeneity. We find significant differences between different types of VCs in Germany. Finally, section 6 concludes.

2 Our data set

Our analysis was based on a unique hand-collected database of IPOs on Germany's *Neuer Markt*. The data on companies were obtained from the *Deutsche Börse AG* and from the listing prospectuses. There

were 327 IPOs on the *Neuer Markt*.[2] We considered a company as venture-backed if at least one of its shareholders was affiliated at a national or an international venture capital association. According to our definition, 138 (42.2%) of the IPOs on the *Neuer Markt* were venture-backed. The venture capital firm that held the largest share of the equity prior to the IPO was labeled the lead VC. The information about the VCs' type was collected from the following sources: *VentureXpert* database, the directories of the German, European and US venture capital associations (*BVK*, *EVCA*, *NVCA*) and webpages of venture capital firms. We divided the IPOs into four subgroups depending on the type of the lead VC (public, bank-dependent, independent and corporate VCs). The group of public VCs in our sample consisted of the subsidiaries of German *Sparkassen* and *Landesbanken*. In these banks namely, public authorities have a large impact. Thus, the group of bank-dependent VCs contained only subsidiaries of private commercial banks.

3 Our hypotheses

3.1 Objectives

Our first set of hypotheses is based on the assumption of differing objectives of different types of VCs.

According to *Hellmann/Lindsey/Puri (2003)*, banks want to build early relationships for their lending activities, which are banks' core business. Thus, they want to participate via their venture capital subsidiaries in as many companies as possible in order to expand the group of potential future borrowers. To achieve this with a given

[2]The *Neuer Markt* was launched in March 1997 and closed in June 2003.

amount of capital, bank-dependent and public VCs are expected to take low equity positions for a short period of time.

H1a: Compared to other types of VCs, bank-dependent and public VCs take lower equity positions, syndicate more, take their companies public more rapidly and retain a lower share of their holdings beyond the IPO.

There is an alternative explanation that leads to similar conclusions. Bank-dependent and public VCs in Germany typically enter into silent partnerships or debt contract with companies before they, later on, participate in their equity capital. Since our database only includes equity financing, we should find out that:

H1b: Bank-dependent and public VCs take lower equity positions, invest at later stages and take their portfolio companies public more rapidly.

Bank-dependent and public VCs are usually more risk-averse. Above this, public VCs are often interested primarily in the promotion of local firms rather than the rate of return. The implication is that:

H2: The portfolio companies of independent and corporate VCs achieve higher valuations which lead to their lower book-to-market ratios, higher market values and larger issue sizes.

Through investing in young innovative companies via corporate VCs, large corporations pursue strategic goals. Typically, their aim is to profit from the synergies between their own and the portfolio companies' production, which is usually closely related to their core business. Thus, they do not want to share the innovative ideas of their portfolio companies with other VCs. This leads us to the following hypothesis:

H3: Corporate VCs syndicate less.

3.2 Abilities and strengths

The second set of hypotheses results from different strengths and abilities of different types of VCs. Bank-dependent and public VCs have a comparative advantage in providing money whereas, due to their experience and established networks, the managerial support is the strength of independent and corporate VCs.

According to the value-added-hypothesis (see *Tykvová (2003)*), independent and corporate VCs are able to create a substantial additional value and aim therefore at long-term relationships with their portfolio companies. On the other hand, the skill set of bank-dependent and public VCs is exhausted rather quickly. This implies their shorter holding periods, orientation towards later stages and lower equity positions (as already indicated by *H1b*) as well as less syndication (as stated in *H1a*). Whereas corporate and independent VCs give both, advice and money, bank-dependent and public VCs are typically weak in providing the managerial support. Therefore, their portfolio companies should have lower valuations which is in accordance with *H2*. Above this, due to their poorer sophistication and a less intensive involvement in the company's management:

H4: Bank-dependent and public VCs use less stage financing.

Lerner (1994) shows that VCs try to optimize their exit timing. They go public when equity valuations are high and employ private financings when values are lower. Our supposition is that sophisticated VCs are able to better manage the IPO timing.

H5: Companies of independent and corporate VCs go public during hot issue periods with a higher probability than firms backed by public and bank-dependent VCs.

Bank-dependent and public VCs typically are only bridge investors who provide money shortly before the IPO and who want to exit quickly, at best directly at the IPO.

H6: Bank-dependent and public VCs retain a smaller fraction of their old shares beyond the IPO.

3.3 Certification and signaling

The third set of hypotheses is based on certification and signaling issues. The suggestion is that companies backed by corporate and independent VCs have high whereas companies backed by public VCs have low transparency. A low transparency results in the necessity to signal the firm quality. VCs may do this by showing their willingness to retain shares beyond the IPO and (or) by a larger underpricing (see e.g. *Grinblatt and Hwang (1989)*). This leads us to the following two hypotheses:

$\neg H6$*: Corporate and independent VCs retain a smaller fraction of their old shares beyond the IPO.*

H7: Companies of public VCs have the largest underpricing.

3.4 Grandstanding

The fourth possible explanation for the differences is the grandstanding phenomenon (see *Gompers (1993) and (1996)*). According to it, the reason why some VCs take their portfolio firms public too early (after short financing periods) is that these VCs want to increase their reputation in order to be able to attract capital for new funds. Signaling their quality to investors plays the most decisive role for independent VCs. Hence, contradictory to *H1*:

H8: Independent VCs take their companies public more rapidly.

4 Descriptive statistics

In this section the set of hypotheses *H1-H4* and *H6-H8* is tested using descriptive statistics. The results are provided in Table 1. The hypothesis *H5* is examined in the next section. *H1b*, *H2*, *H3*, *H4* and *H7* are confirmed. The data do not give clear evidence for either *H6* or $\neg H6$. Further, the syndication hypothesis (*H1a*) and the grandstanding hypothesis (*H8*) can be denied.

Independent VCs (INDEP) syndicate more whereas bank-dependent (BANK), public (PUBLIC) and corporate (CORP) VCs syndicate less (contradictory to *H1a*, consistent with *H3*). Bank-dependent and public VCs employ fewer financing rounds before they take their portfolio firms public (consistent with *H4*). Public and bank-dependent VCs enter in later stages, finance their companies for shorter periods of time before they take them public and take lower equity positions (consistent with *H1a* and *H1b*, the shorter span of time is contradictory to *H8*). Compared to other subgroups, independent VCs retain the largest fraction of their old shares beyond the IPO (consistent with *H1a* and *H6*), namely 78% on average. However, the difference to the rest is significant only at a low level. The average valuations are as predicted (*H2*) and result in a large average market value, a low book-to-market ratio and a large issue size for companies backed by independent and corporate VCs. Companies financed by public VCs are underpriced most heavily (consistent with *H7*). The difference is, however, not significant.

5 Multivariate analyses

We next explore the determinants of the duration of the pre-IPO venture capital financing in a multivariate regression approach. 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). All three models deliver very similar results. It is a good indicator of the robustness of these estimations.

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), a domestic dummy (company from Germany or from abroad), a set of dummy variables for industries and for VC-types as well as a start-up dummy (start-up financing or not). The results are not reported here. With the help of the Akaike information criterion we then determine the optimal size of the matrix of explanatory variables. In all three model specifications (Weibull, exponential and Cox) the variables chosen on behalf of this criterion are the same and include INDEP, START-UP and two of the dummy variables for industries.

We report regression outcomes in Table 2. Our results provide further evidence for the differing behavior of different types of VCs. The dummy variable INDEP always belongs to the regressions and its coefficient is always negative at a high significance level. Thus, due to the differences in the venture capitalists' experience and aims (consistent with *H1*), independent VCs finance their portfolio firms for longer periods than other VCs before they take them public. This contradicts to the grandstanding hypothesis (*H8*). Further, companies that belong to the branches internet and media & entertainment are financed for significantly shorter periods. The investment in a start-up company leads to longer financing periods. Simple OLS regressions deliver similar results as the hazard rate models discussed above. The variables selected by the optimization of the Akaike criterion and their

coefficients' signs are exactly the same as in the hazard rate models and are not reported here.

Concerning the optimization of IPO timing, all nine firms backed by a corporate VC in our sample went public during a hot issue period. We conduct a logit regression for the hot issue dummy as dependent variable with dummies for the remaining VC-types, start-up financing and industries as explanatory variables. The results are depicted in Table 3. We find confirmation for the hypothesis *H5* that independent and corporate VCs are able to better manage the timing of their IPOs.

6 Conclusion

In the German market independent and corporate VCs typically have differing investment patterns from bank-dependent and public VCs. Moreover, the behavior of the former two types of VCs is more similar to that of US venture capital funds as described in the literature (e.g. *Barry (1994)* and *Sahlman (1990)* for an overview). Independent and corporate VCs usually take larger equity positions, syndicate more, use more often stage financing, invest at earlier stages, finance their companies for longer periods of time and are able to better manage the IPO timing. Compared with that, bank-dependent and public VCs often act as bridge investors rather than true venture capitalists. We explain this behavior by different capabilities and experience on the one hand as well as differing aims on the other hand. Our findings may be interesting for policy makers, for companies that seek capital and for VCs who look for syndication partners.

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Table 1 - Descriptive statistics

This table provides means of variables associated with the pre-IPO venture capital financing, the venture capitalists' behavior at the IPO, the characteristics of the company and its issue. The firms are divided into four subgroups depending on the type of the lead VC. We conduct a standard two-sided t-test (allowing for unequal variances) to analyze the differences in means between the subgroups of a certain VC-type and the rest. One, two and three asterisks point to significance at the 10%, 5% and 1% level. An asterisk in brackets indicates significance at the 15% level.

	PUBLIC	***BANK***	***INDEP***	***CORP***
	Pre-IPO venture capital financing			
No. of VCs	1.3 ***	1.3 ***	2.3 ***	1.4 (*)
No. of ROUNDS	1.3	1.1 ***	2.1 ***	1.5
STAGE (0-2)	1.67 (*)	1.52 **	1.11 ***	1.25
Pre-IPO LENGTH (years)	0.93 (*)	1.08 *	1.75 **	2.02
Pre-IPO Share of VCs (%)	18.22 *	23.10	27.97	35.89
	Behavior of the VCs at the IPO			
Post-IPO Share of VCs (%)	9.22 **	12.41	16.3 **	15.47
RETAINED by the VCs (% of their old shareholdings)	72	72	78 (*)	69
	Company and issue characteristics			
AGE at IPO (years)	14.49	13.31	11.24	11.63
MARKET VALUE (Mill. €)	205.70	177.80 ***	288.40 **	345.40
BOOK-TO-MARKET (x 10 $^{-3}$)	35.20	36.80 ***	21.10 **	18.40 *
ISSUE SIZE (Mill. €)	33.40 **	40.00 **	57.30 *	78.50 (*)
UNDERPRICING (%)	80.01	49.30	47.10	33.74

Table 2 - Hazard rate models: Duration of the VC financing

This table depicts the results of hazard rate models for the dependent variable: duration of the pre-IPO venture capital financing. 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 point to significance at the 10%, 5% and 1% level. The number of observations is 119.

Dependent Variable: Duration of the pre-IPO venture capital financing			
	Weibull	**Exponential**	**Cox**
		Coefficients	
START-UP	-0.47*	-0.41*	-0.50**
INTERNET	1.09***	0.89***	1.10***
MEDIA & ENTERTAINMENT	1.84***	1.54***	1.72***
INDEP	-0.36*	-0.32*	-0.49**
Model p-value	**0.0000*** **	**0.0000*** **	**0.0000*** **

Table 3 - Logit models: Hot issue period

This table shows the results of logit models for the dependent variable hot issue. Industry dummies and the start-up dummy are used as control variables, but not reported in the table. Two asterisks point to significance at the 5% level. The number of observations is 120.

Dependent Variable: Hot issue			
PUBLIC	0.17	-0.03	
BANK		0.08	0.48
INDEP	0.82**		0.93**

CORP predicts success perfectly.